2017 INTERNATIONAL COMPARISON PROGRAM FOR ASIA AND THE PACIFIC

PURCHASING POWER PARITIES AND REAL EXPENDITURES

Results and Methodology

OCTOBER 2020

ASIAN DEVELOPMENT BANK

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ADB

Notes:
In this publication, "$" refers to United States dollars, unless otherwise stated.
ADB recognizes "China" as the People's Republic of China, "Korea" as the Republic of Korea, and "Vietnam" as Viet Nam.

Cover design by Rhommell Rico.

Cover photos:
Top, from left to right
Construction workers on the process of building pillars for a building in Calamba, Laguna, Philippines; Dil Maya Magar shows bumper crop from her farm in Thade, Nepal, where the Decentralized Rural Infrastructure and Livelihood Project was designed to reduce rural poverty and to increase access to economic opportunities and social services; and goods loaded to trucks for distribution from a factory of the Programme for Rural Advancement Nationally, the largest food and nutrition company in Bangladesh founded in 1980 (photos by Al Benavente, Kiran Panday, and Abir Abdullah for ADB).

Middle, from left to right
Produce and meat stalls do brisk business at the Kalibo Town Market in the Philippines, where traditional open markets remain part of everyday life; and a worker plucks chilies from the fields at Gabbur, district Raichur, Karnataka, India (photos by Lester V. Ledesma and Rakesh Sahai for ADB).

Bottom, from left to right
Yanur Begum works at the Wool Tex Sweaters Limited in Shewrapara, Dhaka, Bangladesh; street vendors sell bags in Kolkata, West Bengal, India; and daily operations at the 15-megawatt Sermsang Khushig Khundii Solar plant in Khushig valley, Tuv *aimag,* located 40 kilometers from Mongolia's capital, Ulaanbaatar (photos by Abir Abdullah, Amit Verma, and Ariel Javellana for ADB).

Contents

Appendixes

Tables, Figures, and Boxes

TABLES

FIGURES

BOXES

Foreword

The 2017 cycle of the International Comparison Program (ICP), the world's largest statistical initiative covering 176 economies around the world, has been completed. The ICP in Asia and the Pacific, which is a regional component of the global ICP and covers 22 Asian Development Bank (ADB) regional economies, has been coordinated by ADB in its role as the regional implementing agency (RIA). The 2017 ICP for Asia and the Pacific also marks the successful completion of the third benchmark, after the 2005 and 2011 benchmarks, under ADB's stewardship.

The 22 economies of Asia and the Pacific that participated in the 2017 ICP under ADB's technical assistance accounted for more than half of the world's population and nearly one third of world's gross domestic product (GDP) in purchasing power parity (PPP) terms in 2017, according to the results of the global ICP recently released by the World Bank (2020). The three biggest economies of the region—the People's Republic of China with a share of 50.8%, India with 20.8%, and Indonesia with 7.5%—together accounted for 79.1% of the regional GDP in PPP terms, and are also among the top 10 economies of the world in size of GDP in PPPs. The People's Republic of China, with 16.4% of the world GDP in PPP terms in 2017, had the highest share, slightly higher than the United States (16.3%); India, with a share of 6.7%, is ranked third; and Indonesia, with a share of 2.4%, ranked tenth.

Following the release of the summary report on the 2017 ICP in Asia and the Pacific (ADB 2020) in May 2020, this report provides a comprehensive account of the 2017 ICP cycle in Asia and the Pacific with details of the conceptual framework and methodological approaches used in implementing the program, along with an in-depth analysis of the results for 22 participating economies, including estimates of PPPs of currencies, total and per capita real (PPP-converted) GDP and its component expenditures, and price level indexes showing relative costs of living across economies. The content of the report is designed to meet the needs of a variety of readers and users ranging from policy makers at the national and international levels, economists, development strategists, researchers, statisticians who are currently involved in ICP at the economy and regional levels, and those who may be involved in future cycles of the ICP in Asia and the Pacific.

The uses and applications of the PPPs compiled as a part of the ICP are ubiquitous. Apart from the traditional use of PPPs to enable comparisons of GDP and its components across economies of the world, PPPs are used in the estimation of global and regional poverty incidence to monitor Sustainable Development Goal (SDG) 1 of eradicating extreme poverty from the world. Other PPP-based indicators in the SDG framework help monitor income inequality, education, health expenditure, energy intensity, labor productivity, and carbon dioxide emissions per unit of GDP. ADB's Corporate Results Framework, 2019–2024 (2019a) is also aligned to track development progress in Asia and the Pacific.

As this regional report goes to print, the world continues to come to grips with the coronavirus disease (COVID-19) pandemic and its devastating effects on the lives and livelihoods of people around the globe. In these challenging times, economic measurement assumes additional significance. The 2017 ICP results for the 22 participating economies in Asia and the Pacific provide a critical baseline for measuring and assessing the economic impact of the COVID-19 pandemic on price levels, real GDP, per capita real expenditures and the effects on the material well-being of the general population.

The ICP team at ADB worked closely with the implementing agencies of the 22 participating economies, assisting them with the design and conduct of price surveys, rigorous assessment and validation of prices and national accounts data, and compilation of PPPs and real expenditures. During the course of the 2017 ICP cycle, contributing to the ICP's global research agenda, ADB developed a new approach for measuring comparison-resistant dwelling services that has been endorsed and recommended by the ICP Technical Advisory Group for implementation in the next ICP cycle. While using standard PPP computation tools devised by the ICP Global Office at the World Bank, ADB also developed its own codes in Stata software to replicate and validate regional results.

The ICP in the region continues to provide a platform for statistical capacity building in price statistics and national accounts, which is evident as economies increasingly apply good practices from the ICP to price statistics and national accounts statistics. The participating economies have shown a strong commitment to the program and increasingly exhibit a sense of ownership of the program and the results from the ICP in the region. The strong partnership between ADB and the participating economies has been critical to the successful completion of the 2017 ICP cycle. With renewed commitment and strong partnership, ADB and the participating economies will together meet the challenges posed by the disruptions caused by the COVID-19 pandemic, which have led to the postponement of the next ICP cycle from 2020 to 2021. ADB will continue to undertake capacity building and promote sharing of knowledge among the participating economies. Further, innovative methods with appropriate use of techniques like web scraping and Application Programming Interface (API) to collect price data from online sources need to be explored to complement traditional methods of data collection.

I wish to express my sincere appreciation to all who have contributed to the successful completion of the 2017 ICP cycle: the ICP Regional Advisory Board for Asia and the Pacific for its overall guidance; the ICP Experts Group for their advice on technical and methodological issues; the World Bank ICP Global Office for its continued technical guidance to the regional program; the dedicated ICP team of the Statistics and Data Innovation Unit, ADB; and most of all, the implementing agencies in the 22 participating economies for demonstrating their commitment through dedication, hard work, and cooperation, without whom the program would not have been successful.

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Acknowledgments

Abbreviations

AfDB	African Development Bank
ADB	Asian Development Bank
AG	Asia and the Pacific and global core items
AICH	actual individual consumption by households
AP	Asia and the Pacific items
BBS	Bangladesh Bureau of Statistics
BCA	Building and Construction Agency
BOCC	basket of construction components
BPS	Badan Pusat Statistik
CAR-volume	country aggregation with volume redistribution
CBS	Central Bureau of Statistics
CCEG	collective consumption expenditure by government
CIS-STAT	Interstate Statistical Committee of the Commonwealth of Independent States
COFOG	Classification of the Functions of Government
COICOP	Classification of Individual Consumption According to Purpose
COVID-19	coronavirus disease
CPD	country-product-dummy
CPI	consumer price index
CSO	Central Statistical Organization
CV	coefficient of variation
DCS	Department of Census and Statistics
DGBAS	Directorate General of Budget, Accounting, and Statistics
DOS	Department of Statistics
DOSM	Department of Statistics Malaysia
DTIEI	Division of Trade Information and Economic Indices
ECOSOC	United Nations Economic and Social Council
ECP	European Comparison Program
EESD	Economic and Environment Statistics Division
EKS	Éltető-Köves-Szulc
EU	European Union
Eurostat	Statistical Office of the European Communities
FCGO	Financial Comptroller General Office
FISIM	financial intermediation service indirectly measured
GCF	gross capital formation
GDP	gross domestic product
GEKS	Gini-Éltető-Köves-Szulc
GFCE	government final consumption expenditure
GFCF	gross fixed capital formation
GL	global core items
GSO	General Statistics Office
HDI	Human Development Index

ICEG	individual consumption expenditure by government
ICEH	individual consumption expenditure by households
ICP	International Comparison Program
ICP APSS	International Comparison Program Asia Pacific Software Suite
IMF	International Monetary Fund
KLEMS	capital, labor, energy, materials, and services
LCU	local currency unit
LSB	Lao Statistics Bureau
MDG	Millennium Development Goal
MMR	minimum–to–maximum ratio
MOF	Ministry of Finance
NBS	National Bureau of Statistics
NIS	National Institute of Statistics
NPISH	nonprofit institutions serving households
NSB	National Statistics Bureau
NSO	National Statistics Office
NSSC	National Statistical Society of China
OECD	Organisation for Economic Co-operation and Development
PBS	Pakistan Bureau of Statistics
PCT	price collection tool
PISA	Programme for International Student Assessment
PLI	price level index
PPP	purchasing power parity
PSA	Philippine Statistics Authority
PSD	Price Statistics Division
QI	quantity indicator
QL	quality indicator
RIA	regional implementing agency
SDG	Sustainable Development Goal
SNA	System of National Accounts
SPD	structured product description
SUT	supply and use tables
TAG	Technical Advisory Group
UN-ECLAC	United Nations Economic Commission for Latin America
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UN-ESCWA	United Nations Economic and Social Commission for Western Asia
UNICEF	United Nations Children's Fund
UNSC	United Nations Statistical Commission
UNSD	United Nations Statistics Division
UQICD	University of Queensland International Comparison Data
US	United States
WASH	water, sanitation, and hygiene
WHO	World Health Organization
XR	exchange rate

1. An Introduction to the International Comparison Program

What Is the International Comparison Program?

The International Comparison Program (ICP) is a global statistical program conducted under the auspices of the United Nations Statistical Commission (UNSC). The main purpose of the ICP is to facilitate the compilation of internationally comparable macroeconomic and national accounts aggregates such as gross domestic product (GDP) and its components, including individual consumption expenditure by households (ICEH); government expenditure; gross fixed capital formation (GFCF), which includes the categories of construction and of machinery and equipment; and balance of exports and imports. In a highly integrated global economy with internationally diversified production processes and value chains, with large volumes of trade in goods and services, and with tourist flows to destinations around the globe, there has been a significant increase in the demand for timely, reliable, standardized, and comparable data for public policy and research. Within this context, the ICP has grown into prominence as it strives to compile statistics on purchasing power parities (PPPs) of currencies, relative price levels, and real per capita incomes that facilitate such comparisons.

Exchange rates have been the main source for converting macroeconomic data from different economies into a common currency unit. While exchange rates are readily available for converting macroeconomic aggregates into a common currency unit, their usefulness has limitations in making comparisons of real incomes, standards of living and productivity across economies. A major concern is that exchange rates are determined by exogenous factors affecting demand and supply for currencies and therefore exhibit significant volatility. Even more importantly, exchange rates do not reflect price level differences across economies and therefore are unsuitable for measuring real incomes and for comparisons of standards of living.

The ICP originated—and developed over time—with the primary goal of providing measures of general price levels in different economies in the form of PPPs, which can effectively be used in place of exchange rates in converting economic aggregates typically expressed in national currency units. Over the last two decades, the increased availability and coverage of the ICP, which included 176 economies in the 2017 cycle of the program, have resulted in a significant increase in the utilization of PPPs and real expenditure data from the ICP. The PPP-converted measures of the size of real GDP are used for ranking economies by their size. The real per capita incomes from the ICP have become the main source for measuring global and regional poverty. The World Bank anchors its estimates of absolute poverty and international poverty lines on PPPs for household income or consumption from the ICP. These poverty lines are currently set at $1.90 and $3.20 per day, based on the PPPs derived from the 2011 ICP. The formulation and implementation of the Millennium Development Goals (MDGs), including the first goal of halving absolute poverty by 2015, and the more recent Sustainable Development Goals (SDGs), with the target to reduce extreme poverty by 2030, are all anchored on PPPs from the ICP. The International Monetary Fund (IMF) publishes global growth and inflation weighted by PPP-converted GDP in its regular World Economic Outlook reports. The Human Development Index (HDI) makes use of PPP-converted per capita gross national income as an indicator of standard of living—

which constitutes one of the three HDI dimensions—health and education being the other two. There are numerous other applications and uses of PPPs; the IMF uses them to determine quota subscriptions and the European Union (EU) uses PPP-based measures of GDP in its allocation of structural funds.

The ICP started as a small research project in 1968 at the University of Pennsylvania, led by professor Irving Kravis with professors Robert Summers and Alan Heston, in collaboration with what was then known as the United Nations Statistical Office. In its first phase, starting with the reference year 1970, the project covered 10 economies, but slowly and steadily coverage grew, with 176 economies participating in the latest 2017 ICP cycle. During this period, the ICP shifted first from University of Pennsylvania to the United Nations Statistics Division (UNSD) in New York and is now located permanently at the World Bank. The ICP's nature has changed significantly. Until 1985, the ICP was a world program that made comparisons using data collected from participating economies around the world and then compiled and disseminated a single set of comparisons. Regionalization of the ICP began in 1979, when Eurostat established a comparison program for the EU economies and also helped with comparisons in the African region. The process of full regionalization of the ICP began in 1993 and was well established by the 2005 round of ICP, with a well-defined governance structure that marked the beginning of a new era for the ICP. The program benefited from various reviews, the most recent being the review of the 2011 ICP cycle by the Friends of the Chair Group of the UNSC. In 2016, the UNSC adopted the group's recommendations, which established guiding principles for conducting regular and more frequent ICP cycles, starting with the 2017 ICP cycle. In 2018, the ICP celebrated its golden jubilee.

On the UNSC's recommendation, the ICP was established in 2016 as a permanent global statistical program with its global office at the World Bank. The World Bank conducts the ICP in partnership with the African Development Bank (AfDB); Asian Development Bank (ADB); Statistical Office of the European Communities (Eurostat); Organisation for Economic Co-operation and Development (OECD); Interstate Statistical Committee of the Commonwealth of Independent States (CIS-STAT); the United Nations Economic and Social Commission for Western Asia (UN-ESCWA); and United Nations Economic Commission for Latin America (UN-ECLAC).

The ICP is a statistical exercise of vast proportions, involving economies from all regions of the world. Implementation of the ICP is extremely complex, requiring high levels of organization and coordination in standardizing and implementing price surveys, validating and editing data, aggregating data in the process of compiling PPPs and real expenditures, analyzing results, and disseminating the data and findings through reports and electronic media. The ICP is an outstanding example of international cooperation among statistical offices of the participating economies, regional organizations overseeing and coordinating activities among the economies within their region, and finally, the ICP Global Office at the World Bank ensuring strict adherence to the procedures and guidelines developed for the ICP. The ICP's success relies on the enthusiastic involvement of participating economies who embraced the ICP into their regular statistical activities and developed and exhibited a great sense of ownership of the program and results. Participation in the ICP has helped economies improve compilation of their national accounts statistics and that of consumer price index (CPI), which are critical inputs into monetary policy and evidence-based policy making. The continued success and growth of the ICP benefits greatly from statistical capacity-building activities in economies where statistical systems are in a state of development.

International Comparison Program in Asia and the Pacific

Economies in Asia and the Pacific have been a part of the ICP since its inception. The first phase of the ICP,

with 1970 as the reference year, included India and Japan. The second phase in 1973 added Malaysia, the Philippines, and the Republic of Korea. Participation in various phases was decided on an economy by economy basis until the 2005 round of the ICP. The early phases of the ICP used a top-down approach: in these early rounds, Kravis and his associates, and later the UNSD, determined which economies would participate. At the conclusion of the 1993 ICP round, Jacob Ryten (ECOSOC 1999) identified several problems, including marked uneven regional performance, chronic financial difficulties, limited credibility on the part of a number of key providers of data, lack of central coordination, and lack of effective relationships with national statistical organizations. Subsequently, the World Bank has spearheaded the process of renewing and revitalizing the ICP since 2000.

The World Bank identified ADB as a regional partner for the ICP in its report to the 33rd Session of the UNSC, held in 2002 (ECOSOC 2002). The World Bank's report to the 34th session of the UNSC in 2003 defined the roles of regional implementing agencies: "Regional implementing agencies will be responsible for setting up the structures required to implement and monitor ICP at the regional level. Each regional agency will establish a regional ICP office headed by a regional coordinator. Regional agencies will also be encouraged to set up regional committees to maintain contact with participating countries" (ECOSOC 2003, para. 10).

A more formal role for ADB was identified in the World Bank's report (ECOSOC 2004) to the 35th Session of the UNSC held in 2004: the report designated ADB as a coordinator of the regional program in Asia and the Pacific, with technical assistance from the Australian Bureau of Statistics. The participation of economies in the Asia and Pacific region was formalized at the ICP's first regional meeting, held on 19–20 June 2003, with the heads of implementing agencies. For the 2005 round, 23 economies of the region joined the ICP.

The 2017 International Comparison Program in Asia and the Pacific: Participating Economies

In the current 2017 ICP cycle, 22 ADB member economies agreed to participate and signed formal documentation to join the program. These economies are Bangladesh; Bhutan; Brunei Darussalam; Cambodia; Fiji; Hong Kong, China; India; Indonesia; the Lao People's Democratic Republic; Malaysia; Maldives; Mongolia; Myanmar; Nepal; Pakistan; the People's Republic of China; the Philippines; Singapore; Sri Lanka; Taipei,China; Thailand; and Viet Nam.

According to the World Bank's report on the 2017 ICP, released in 2020, these 22 economies account for 24% of the world's nominal or exchange rate converted GDP and 32% of the world's GDP in PPP or real terms and are home to more than half of the world's population.

The ICP in Asia and the Pacific classified participating economies into four subregional groups to determine product lists for price surveys, data validation, and comparative analysis of regions. Three of the four groups are geographically determined; the fourth is the *high income group*, determined by level of development.

High income economies. Brunei Darussalam; Hong Kong, China; Singapore; and Taipei,China.

Mekong. Cambodia, the Lao People's Democratic Republic, Myanmar, Thailand, and Viet Nam.

South Asia. Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.

Southeast Asia and others. Fiji, Indonesia, Malaysia, Mongolia, the People's Republic of China, and the Philippines.

Organization of the Report

The main purpose of this report is to provide the readers, users, and those statisticians who will be involved in future cycles of the International Comparison Program (ICP) in Asia and the Pacific and other regions with a detailed description of the methodology and steps involved in the compilation of purchasing power parities (PPPs) and real expenditures. This report supplements the recently released summary report on the 2017 ICP in Asia and the Pacific with additional analyses and details of the conceptual framework for the ICP; survey design and price collection; data validation and editing; and index number methods for aggregating price and national accounts data. The chapters of this report form three distinct clusters, each of which is designed to meet the needs of different types of readership.

The cluster of the first four chapters of the report are meant for analysts, researchers, policy makers, and users who may be solely interested in the empirical results and analysis of the estimates of PPPs and real expenditures from the 2017 ICP cycle in Asia and the Pacific. After a brief introduction in Chapter 1 to the ICP at the global and at the regional levels in Asia and the Pacific, Chapter 2 equips readers with the basic concepts such as PPPs, price level indexes (PLIs), and real expenditures and helps them to gain a better understanding and appreciation of the results presented in Chapters 3 and 4. Chapter 3 presents the main results along with a brief analysis of the size, ranking, and distribution of the 22 participating economies of the region as measured by the real gross domestic product (GDP) as well as its components. Chapter 4 adds a time dimension to the analysis as it presents updated results for the 2011 benchmark year, examines the consistency between results from the 2011 and 2017 ICP, and presents estimates of regional and subregional growth.

The second cluster consisting of Chapters 5, 6, and 7 is devoted to a description of the ICP governance and framework, methodology and operations, and economic

specific results and the implementation experiences of the 22 participating economies. This cluster would be of particular interest to those who are involved in the ICP at the economy and the regional levels or with interest in details of methodology and operational approaches. Chapter 5 details the governance framework at the global, regional, and economy levels and describes the roles of the ICP Global Office, regional implementing agencies, and implementing agencies of the participating economies. Chapter 6 describes in considerable detail the national accounts framework for the ICP; methods for price and GDP data collection, data editing and validation; procedures and the current practices to deal with comparison-resistant components such as health, education, government compensation and productivity adjustment, machinery and equipment, construction, and housing; the index number methods for aggregating price and GDP expenditure data submitted by the participating economies to derive regional PPPs and real incomes, and, finally, the current methodology used to link regional comparisons leading to the global set of price and real income comparisons. Chapter 7 complements Chapter 3 with key economy-specific results and detailed accounts of the experiences of the participating economies in implementing the ICP surveys and procedures described in Chapter 6.

Chapters 8 and 9 form the concluding part of this report. Chapter 8 provides a brief historical sketch of international price comparisons and the origins and the evolution of the ICP at the global and regional levels. While Chapter 8 deals with the historical antecedents, Chapter 9 deals with the present as it offers a short summary of the 2017 ICP cycle in Asia and the Pacific and looks to the future as it examines the developments, opportunities, and challenges for the ICP in the region in the immediate future.

The detailed statistical tables for the 2017 ICP results (Appendix 1) and for the revised 2011 ICP results (Appendix 2) are presented at the end of the report along with other appendixes giving information on other technical and operational aspects of 2017 ICP.

2. Basic Concepts and Measures in the International Comparison Program

The central objective of the International Comparison Program (ICP) is to provide internationally comparable measures of economic activity in the economies around the world as measured by gross domestic product (GDP) and its several components. GDP is compiled in accordance with the international standards set in the system of national accounts, most recently the System of National Accounts 2008 (United Nations 2009). GDP is calculated as the gross value of output, *less* the value of goods and services used as intermediate outputs, *plus* taxes less subsidies on products. This notion of GDP measures economic activity from the production side. An equivalent measure of GDP from the expenditure side is the market values of all the final expenditures on goods and services in an economy in a given year. GDP from the expenditure side broadly equals the sum of individual consumption expenditure by households (ICEH) and nonprofit institutions serving households (NPISH); government final consumption expenditure (GFCE); gross capital formation (GCF); and balance of exports and imports. There is yet another approach to measure GDP as the sum of incomes accruing to the factors of production: compensation of employees, operating surplus, mixed income, and other taxes less subsidies on production. Theoretically, the GDP derived from the three approaches should be the same.

The ICP focuses on the expenditure side of GDP for two reasons. First and foremost, collecting the price and expenditure data necessary for compiling purchasing power parities (PPPs), real GDP, and its components is more feasible on the expenditure side than on the production side, which requires prices and expenditures for both gross output and intermediate consumption, which is more data intensive. Second, expenditure side comparisons provide more direct measures of the standards of living of people residing in the participating economies. The income side approach does not allow values to be split into price and volume measures and is not a feasible approach.

Comparable measures of per capita real GDP and its component expenditures, such as food, health, and education, provide valuable information on the ability of the general population to access goods and services for their consumption. Although per capita GDP is a good indicator of the standard of living, caution must be exercised in interpreting it as an indicator of material well-being. Stiglitz, Sen, and Fitoussi (2009) comprehensively discuss the suitability of GDP and the need to look beyond GDP in *Report by the Commission on the Measurement of Economic Performance and Social Progress,* which makes a compelling case for using a dashboard of indicators that reflect several dimensions of economic performance and quality of life, with a special focus on health, education, risk of unemployment, poverty, and security. Notwithstanding the recommendations in their report, per capita GDP continues to be a summary measure which reflects and is highly correlated with other dimensions of economic progress and quality of life.

The International Comparison Program and Components of Expenditure Side Gross Domestic Product

The World Bank (2013) sets out the national accounts framework for the ICP in *Measuring the Real Size of the World Economy: The Framework, Methodology,*

and Results of the International Comparison Program—ICP. This publication includes a chapter on the ICP framework and national accounts concepts in the ICP (Rao 2013), and a chapter on the national accounts framework for the ICP (McCarthy 2013a). The following main components of GDP from the expenditure side are critical to the ICP:

Individual consumption expenditure by households. This aggregate, ICEH, consists of the expenditure incurred by households for individual consumption of goods and services, including consumption goods and services acquired abroad.

Individual consumption expenditure by nonprofit institutions serving households. NPISH expenditure includes all goods and services provided by nonprofit institutions that are not controlled by the government. Examples of nonprofit institutions are "social and sports clubs, trade unions, charities, religious institutions, and some types of research bodies and environmental groups" (McCarthy 2013a, 68). These institutions provide goods and services to households either free or at prices well below market prices.

Individual consumption expenditure by government. A significant portion of government expenditure on behalf of households is allocated for providing goods and services to individual households for housing, health, education, recreation and cultural services, and social protection, collectively known as individual consumption expenditure by government (ICEG). These expenditures fall into two categories. The first concerns services such as schools, colleges and universities, and hospitals that the government produces and provides to individual households. The second covers goods and services that the government purchases from other producers and provides to households free of cost or at prices that are not economically significant. These include food distributed to people living in poverty or made available through fair price shops, as well as the supply of medicines, vaccines, and medical services outside hospitals.

Collective consumption expenditure by government. This is the government's expenditure on collective consumption services provided simultaneously to the general population or to particular sections of the community. Typical examples of collective consumption expenditure by government (CCEG) include provision of security, defense, law and order, and the protection of the environment. All members of the population or the community can benefit from such services.

Gross capital formation. This aggregate, GCF, includes the total value of the gross fixed capital formation (GFCF), changes in inventories, and acquisitions less disposals of valuables. GFCF includes construction of residential and nonresidential buildings, construction of civil engineering works such as roads, and purchases of machinery and equipment, and other products.

Balance of exports and imports (net exports). Exports are goods and services produced within the domestic economy but used in other economies. Imports are goods and services supplied from outside the domestic economy. For its purposes, the ICP requires net exports (exports less imports). By definition, net exports may be positive or negative.

A detailed breakdown of GDP based on the classification used in 2017 ICP from the expenditure side is in Appendix 4 of this report.

Decomposition of Value Aggregates into Price and Volume Components

The national accounts aggregates, compiled at different points of time, annually or quarterly, are compared over time by converting the current price aggregates into constant price aggregates. The constant price aggregates are obtained after adjusting for changes in prices over the period under consideration. These adjustments are made using the consumer price index and other suitable price deflators. A similar but slightly more complex

problem arises when national accounts aggregates from different economies are to be compared. The complexity arises because the aggregates are expressed in respective local currency units and price levels in different economies are different.

Comparisons over Time

The System of National Accounts 2008 (United Nations 2009, 297), Chapter 15, on price and volume measures, states: "The index numbers of interest within the System of National Accounts are designed to decompose changes in value aggregates into their overall change in price and volume components." National statistical agencies use this framework to decompose changes in GDP over two periods, 0 and t, where $P_{0,t}$ represents price and $Q_{0,t}$ represents quantity or volume change components:

$$\text{Change in GDP from period 0 to } t = \frac{GDP_t}{GDP_0} = P_{0,t} \times Q_{0,t}$$

The System of National Accounts recommends the use of term "volume" when more than one commodity is involved. In national accounts parlance, $P_{0,t}$ represents the GDP deflator with base period 0. The quantity index, $Q_{0,t}$, is also referred to as the volume index. This equation indirectly obtains the volume change measure from observed change in GDP and a suitably measured GDP deflator $P_{0,t}$:

$$\text{Volume change from period 0 to } t = Q_{0,t} = \frac{\frac{GDP_t}{GDP_0}}{P_{0,t}}$$

This volume change measure can be expressed slightly differently as:

$$\text{Volume change from period 0 to } t = Q_{0,t} = \frac{\frac{GDP_t}{P_{0,t}}}{GDP_0}$$

$$= \frac{GDP \text{ in period } t \text{ at constant period 0 prices}}{GDP \text{ in period 0 in period 0 prices}}$$

Traditionally, volume changes for time series comparisons of GDP are measured using GDP at constant (period 0) prices, which is in turn obtained by deflating the observed GDP in a period with the corresponding deflator. For example, to compare GDP in 2000 and 2005, GDPs in both years are first expressed in constant year prices, for example, for the year 2000 and their ratio then provides a measure of volume change from 2000 to 2005.

Spatial Comparisons of National Accounts Aggregates across Economies

The framework for spatial comparisons in the ICP is analogous to the temporal decomposition described above. In particular, the fundamental notion of decomposing value change into price change and quantity change has a critical role in building the conceptual framework for the ICP.

Now, consider GDP in economies j and k denoted by GDP_j and GDP_k observed at a given point of time, for example the year 2017 for the current ICP cycle. These two GDPs are usually expressed in respective local currencies. To distinguish between temporal within an economy and spatial comparisons across economies, let the price index be denoted by $PPP_{j,k}$ which represents the level of prices in economy k relative to prices in economy j and at the same time accounting for the currency units in which GDPs are expressed. Because $PPP_{j,j} = 1$, the fundamental index decomposition gives:

$$\text{Relative levels of GDP} = \frac{GDP_k}{GDP_j} = PPP_{j,k} \times Q_{j,k}$$

Hence, the volume comparison between economies j and k is given by:

$$Q_{j,k} = \frac{\frac{GDP_k}{GDP_j}}{PPP_{j,k}} = \frac{\frac{GDP_k}{PPP_{j,k}}}{GDP_j} = \frac{\frac{GDP_k}{PPP_{j,k}}}{\frac{GDP_j}{PPP_{j,j}}}$$

where $\frac{GDP_k}{PPP_{j,k}}$ is a measure of real GDP or volume of economy k expressed in currency units of economy j after accounting for differences in levels of prices in these two economies. Similarly, noting that $PPP_{j,j} = 1$, GDP_j represents the volume or real GDP of economy j which is already in currency units of economy j.

Thus, volume comparisons of GDP and other aggregates across 22 participating economies of Asia and the Pacific require estimates of PPPs $\{PPP_j: j = 1,2,...,22\}$ expressed relative to a reference or base economy's currency. For the ICP in Asia and the Pacific, the base economy is Hong Kong, China and the reference currency is the Hong Kong dollar. Chapter 6 discusses in detail the steps involved in compiling PPPs for Asia and the Pacific and at the global level.

Basic Measures in the International Comparison Program

Purchasing Power Parities of Currencies

The notion of PPPs of currencies is fundamental to international comparisons of national accounts aggregates. Prior to a formal description of PPPs, it is useful to consider an illustrative example to gain an intuitive understanding of the notion of a PPP.

Consider the following example. Imagine a tourist from the United States (US) lands in Mumbai, India. Upon arrival, the tourist exchanges her US dollars ($) at the rate of 70 Indian rupees (₹) per dollar (₹70 = $1). She takes a taxi to her hotel and finds that a distance that would have cost $50 in a taxi at home only costs ₹900 in Mumbai—a quarter of the price back home. The tourist orders a meal in the restaurant at the hotel and finds the bill was only ₹1,200 for a meal she would have paid $40 back home—less than half the price. The next day, shopping was similarly cheaper. Public transport cost almost nothing in dollar terms. After a few days in India, the tourist concludes that prices in India are certainly cheaper and felt that overall prices in India were roughly a third of

what she experienced in the US. Basically, she felt that what she could buy in US for $100 would cost only around ₹2,300 in India. On the basis of this, the tourist concludes that the PPP between the US dollar and Indian rupee is approximately $1 = ₹23.00.

This example illustrates the basic notion that underpins the concept of the PPP of a currency, formally defined in Box 2.1.

Box 2.1: Purchasing Power Parity Defined

The System of National Accounts 2008 defines purchasing power parity (PPP) of an economy B with reference to an economy A as "the number of units of B's currency that are needed in B to purchase the same quantity of individual good or service as one unit of A's currency will purchase in A".

Source: System of National Accounts, 2008 (United Nations 2009, para. 15.199).

PPPs are determined by three unique elements:

- **The reference or base economy and its currency.** In the example of the US tourist in India, the reference economy is the US and the reference currency is the US dollar.
- **The currency of the economy for which purchasing power is being measured.** In the illustrative example, the Indian rupee is the currency for which purchasing power is being determined.
- **The basket of goods and services for which purchasing power is being determined.** In the case of the US tourist, the goods and services of interest are those which tourists typically buy, which may include hotel accommodation, food and restaurants, transport, shopping, and cultural and sporting activities.

The methodology used in the ICP ensures that the relative price levels and real expenditure ratios between participating economies are independent of the choice of the reference economy or the reference currency.

PPPs may be defined for single commodities such as bread, milk, rice, or eggs, or for commodity groups such as food, clothing, transport, or medical services. Because the ICP focuses on national accounts aggregates, the ICP computes and publishes PPPs at aggregated levels for GDP and its several components. PPPs for GDP cover prices of all the goods and services that make up the GDP. Similarly, PPPs for machinery and equipment reflect prices of various types of machinery and equipment. In the next chapter, PPPs are presented for the macroeconomic aggregates such as, GDP, ICEH, AICH, government final consumption expenditure (GFCE), GFCF, and domestic absorption, while PPPs for more detailed expenditure aggregates are presented in the tables in Appendix 1.

The most celebrated example of a PPP based on a single commodity is the Big Mac Index published by *The Economist* magazine. The left-side panel in Box 2.3 shows the price of a Big Mac in Malaysia (RM9.50) and Hong Kong, China (HK$20.50). This means that the Big Mac PPP for the Malaysian ringgit (RM) is RM0.46 per HK$1. As the Big Mac is a standardized item of consumption with identical specifications and quality in both economies, the PPP is based on a comparable product. However, this PPP is of limited use because the Big Mac does not represent consumption baskets in Malaysia or Hong Kong, China; a PPP more relevant to policy would relate to the household consumption basket. The right-side panel in Box 2.3 shows that the basket of goods and services that represents a household's consumption in a month costs HK$20,130 in Hong Kong, China and RM5,636 in Malaysia, and hence a PPP of RM0.28 per HK$1. The PPPs for the Big Mac and for household consumption indicate that in Malaysia, a Big Mac is relatively more expensive than general household consumption goods and services.

Box 2.3: Purchasing Power Parities for the Big Mac and Household Expenditure
(Malaysian ringgit per Hong Kong dollar)

Big Mac Prices
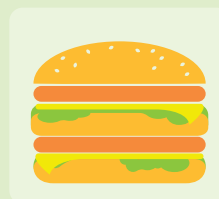
Hong Kong, China: HK$20.50
Malaysia: RM9.50

PPP for Malaysian ringgit = RM9.50/HK$20.50 = RM0.46 per Hong Kong dollar

Monthly Household Expenditure

Hong Kong, China: HK$20,130
Malaysia: RM5,636

PPP for Malaysian ringgit = RM5,636/HK$20,130 = RM0.28 per Hong Kong dollar

HK$ = Hong Kong dollar, PPP = purchasing power parity, RM = Malaysian ringgit.
Sources: *The Economist*. 2020. Burgernomics – The Big Mac Index. https://www.economist.com/news/2020/01/15/the-big-mac-index (accessed 4 March 2020) and Asian Development Bank estimates (Big Mac prices as of 14 January 2020).

PPPs can be used to convert expenditure aggregates expressed in local currencies into real aggregates, which can then be compared across the participating economies. Suppose the PPP for Thailand's baht (B) is B2.14 = HK$1, then B2.14 is deemed to have the same purchasing power as that of one unit of Hong Kong dollar. This PPP can then be used to convert the GDP of Thailand into Hong Kong dollars. However, it is important to note that PPPs are not a direct measure of price level differences between economies. A PPP of B2.14 = HK$1 does not mean that prices in Thailand are 2.14 times that in Hong Kong, China. Price levels can be inferred using the concept of price level index (PLI) explained in a later section.

Exchange Rates

Exchange rates, also known as market exchange rates, are used to convert the currency of one economy into other currencies. An exchange rate for a given currency is the number of local currency units per one unit of the reference currency. Exchange rates depend on a range of factors that affects the demand for and supply of different currencies; therefore, they fluctuate, or could be regulated or managed in some economies. Individuals use exchange rates for transactions across borders; multinational organizations use them for accounting. All official monetary transactions, including foreign aid and transfers, use exchange rates.

Exchange rates are often used for converting national accounts aggregates although, as discussed in Chapter 1, PPPs are better suited to measuring real GDP for comparisons across economies. The principal reason for replacing exchange rates with PPPs is that exchange rates do not indicate differences in price levels across different economies and, therefore, do not reflect the relative purchasing power of different currencies. Further, exchange rates are often volatile in reaction to a host of economic and political factors that influence the demand for and supply of currencies. Thus, using exchange rates to compare real income or real expenditure can be misleading. In contrast, PPPs tend to be less volatile because they are determined by prices of goods and services prevailing in different economies.

Nominal and Real Expenditure Aggregates

The ICP provides measures of nominal and real expenditure aggregates for GDP and its several components. In different economies, statistical offices produce these aggregates and express them in local currency units; therefore, these aggregates cannot be compared across economies. "Nominal GDP"

is the GDP measure of an economy converted into a common currency unit using exchange rates. Let GDP_j represent GDP in economy j in its local currency units, and XR_j represent the exchange rate of currency of economy j representing number of units of currency of economy j per one unit of the reference currency, which is the Hong Kong dollar in the case of Asia and the Pacific.[1] Then the nominal GDP is given by

$$\text{Nominal } GDP \text{ of economy } j =$$
$$\frac{GDP \text{ in local currency units}}{\text{Exchange rate}} = \frac{GDP_j}{XR_j}$$

This aggregate is referred to as "nominal" because the exchange rate simply serves as a currency conversion factor and does not reflect the relative price level in the economy.

"Real GDP" expresses GDP in a common currency unit and at the same time adjusts for price level differences in different economies. The real GDP is obtained by converting GDP in local currency units using the PPP for the economy:

$$\text{Real } GDP \text{ of economy } j =$$
$$\frac{GDP \text{ in local currency units}}{\text{Purchasing Power Parity}} = \frac{GDP_j}{PPP_j}$$

Real GDP is also referred to as a volume measure of GDP. Both the exchange rate and PPP are relative to the reference (or base) currency. If Hong Kong dollar is the base currency for Asia and the Pacific, then the exchange rate and PPP for the Hong Kong dollar relative to itself would be equal to 1; consequently, the nominal GDP, real GDP, and GDP in local currency units are all equal for the base economy. For Hong Kong, China:

$$\text{Real } GDP_{HKG} = \text{Nominal } GDP_{HKG}$$

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[1]   Exchange rates can be expressed, equivalently, as the number of units of reference currency per unit of currency of economy j. It is important to note this while interpreting results from the ICP (next section).

The same definition and meaning of "nominal" and "real" GDP pertain to all the aggregates described earlier. For example, we obtain the nominal ICEH by converting the ICEH aggregate in local currency units using the exchange rate, whereas the real ICEH is obtained by converting the ICEH aggregate in local currency units using the corresponding PPP for ICEH. A word of caution: the PPP for the GDP aggregate cannot be used to convert ICEH and vice versa, whereas when converted using market exchange rates, the same market exchange rates for the period under reference are used as the conversion factor. PPPs must be specific to the aggregate under consideration.

Nominal aggregates, converted using exchange rates, are additive: the sum of the nominal aggregates of ICEH and NPISH, GFCE, GFCF, changes in inventories, acquisitions less disposals of valuables, and net exports will equal nominal GDP. This property holds because all the aggregates are converted using the same exchange rate. This property, additivity of individual aggregates to total GDP, does not hold in the case of real aggregates. Because each real aggregate is converted using a PPP specific to that aggregate, the sum of real values of components of GDP does not equal the real value of GDP. Therefore, real aggregates presented in the tables in Chapter 3 cannot be summed across components.[2]

Price Level Index

The concept of PLI is as important as PPP in international comparisons. The PPP of a currency simply indicates the number of currency units that have the same purchasing power as one unit of reference currency with respect to a given basket of goods and services. For example, Box 2.3 shows that a Big Mac costs RM9.50 in Malaysia compared to HK$20.50 in Hong Kong, China, and the PPP for Big Mac is RM0.46 per HK$1. From this information, it is not possible to infer if price level in Malaysia, based on Big Mac price, is higher, lower, or the same as in

Hong Kong, China. Similarly, given the PPP for household consumption of RM0.28 per HK$1, again it is difficult to have a sense of whether price level in Malaysia is high or low relative to Hong Kong, China. The concept of PLI is developed in order to resolve this problem.

The question as to whether prices in Malaysia are high can be answered by comparing PPP for Malaysian ringgit with the exchange rate, which is HK$1 = RM0.55. This means that HK$100 can be exchanged for RM55. Based on the PPP for household consumption of RM0.28 per HK$1, what can be bought in Hong Kong, China for HK$100 can be purchased in Malaysia with only RM28. This means that price level for household consumption in Malaysia is roughly half (51%) of that in Hong Kong, China. However, if the basket consists of just a Big Mac, the price level in Malaysia is roughly 84% (or the ratio of 0.46 to 0.55).

The PLI for an economy is defined as:

$$PLI_j = \frac{PPP_j}{XR_j} \times 100$$

In the case of Malaysia, for household consumption the PLI is:

$$PLI_{Malaysia} = \frac{0.28}{0.55} \times 100 = 50.91$$

The PPP used in the numerator of PLI varies with the basket of goods and services considered, while the exchange rate in the denominator remains the same. In the case of the Big Mac, the PLI is:

$$PLI_{Malaysia} = \frac{0.46}{0.55} \times 100 = 83.64$$

This means that Big Macs are not as cheap as the general goods and services used in Malaysia for household consumption. Not entirely surprising!

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[2] There are aggregation methods like the Geary-Khamis method which produce international comparisons which are additive but suffer from other deficiencies. See Diewert (2013) for a discussion of the additivity property and related issues.

Two characteristics associated with the reference economy are worth emphasizing.

1. For the reference economy, by definition, PPP and exchange rate are both equal to 1.

   $$PPP_{HKG} = XR_{HKG} = 1 \text{ which means } PLI_{HKG} = 100$$

This means that the PLI measured with Hong Kong, China as the reference economy cannot be used to assess price level in Hong Kong, China. In general, this is true regardless of which economy is chosen as the reference economy. For example, if India is the reference economy, then the PLI for India would equal 100.

2. For the reference economy, as noted earlier, the nominal and real GDP are the same.

   $$\text{Nominal } GDP_{HKG} = \text{Real } GDP_{HKG}$$

This equality also holds for another economy that is chosen as the reference economy. If India is the reference economy, then Nominal GDP_{India} = Real GDP_{India}

The concept of PLI has a long history. The original work of Gilbert and Kravis (1954) found a systematic difference between PPPs and exchange rates for four European economies. Their study for the year 1950 reported PLIs of 64, 73, 68, and 62 relative to the US, which equaled 100. This means that PPPs for these economies in 1950 were systematically lower than corresponding market exchange rates for the US dollar. The term PLI was not used explicitly at that time. It is Kravis et al. (1975, 186–187) who introduced the notion of the *exchange rate deviation index*, defined as $\frac{XR}{PPP}$ (which is the reciprocal of PLI), and reported a downward sloping relationship between the exchange rate deviation index and per capita real GDP. This is the forerunner to what is now routinely reported as an upward sloping relationship between PLI and per capita real GDP, which is often referred to as the Penn effect. Kravis proceeded to explore possible explanations for this empirical phenomenon that led to Kravis and Lipsey (1978), Clague (1986) and

other studies. The main explanation comes from the Balassa-Samuelson effect, which explains the Penn effect through differences in productivity in developed and developing countries. Kravis, Lipsey, Clague, and others found variables such as the degree of openness, per capita GDP, the share of tradables in GDP, and other quantitative measures were useful in explaining the systematic relationship between price levels and per capita real GDP.

Price Level Index and Real Exchange Rate

Economists use the concept of real exchange rate in the context of foreign trade. The real exchange rate is defined for a local currency, the Malaysian ringgit in this example, relative to a reference currency, the Hong Kong dollar. The real exchange rate is derived by adjusting exchange rate, showing the number of reference currency units (HK$) per one unit of local currency (RM), with the ratio of an economy's prices to reference economy's prices. The ratio of prices in Malaysia to prices in Hong Kong, China is exactly the PPP discussed before, and it is equal to 0.28. The exchange rate is HK$1.81 = RM1, which is the reciprocal of the exchange rate of RM0.55 = HK$1. Although exchange rates can be defined symmetrically as number of ringgit per Hong Kong dollar or number of Hong Kong dollars per ringgit, the definition of real exchange rate uses the number of Hong Kong dollars per ringgit. The real exchange rate is then given by the following equation, where "RER" represents the real exchange rate:

$$RER_{RM,HK\$} = XR_{RM,HK\$} \times PPP_{HK\$,RM} = \frac{PPP_{HK\$,RM}}{XR_{HK\$,RM}} = PLI_{Malaysia}$$

since

$$XR_{RM,HK\$} = \frac{1}{XR_{HK\$,RM}}$$

Hence, the real exchange rate showing the number of Hong Kong dollars per ringgit is given by

$$RER_{RM,HK\$} = 1.81 \times 0.28 = \frac{0.28}{0.55} = 0.5091$$

This discussion and the numerical example show that the concept of real exchange rate for the domestic currency, the ringgit, against the foreign currency, the Hong Kong dollar, used by economists is the same as the PLI for Malaysia expressed relative to Hong Kong, China.

Price Level Indexes Expressed Relative to Asia and the Pacific

It is now a standard practice to publish PLIs for different economies expressed relative to the region instead of expressing it relative to the reference economy, which is Hong Kong, China for Asia and the Pacific. In the case of global comparisons published by the World Bank (2020), all PLIs are expressed relative to the world level, which equals 100.

The main rationale for expressing PLIs with respect to regional standard is the following. In the case of Malaysia, the PLI for household consumption is 50.91 relative to Hong Kong, China, which equals 100. This implies that the price level in Malaysia is roughly half of the price level in Hong Kong, China. From this fact, it is difficult to draw any conclusion as to whether prices in Hong Kong, China are generally higher, or prices in Malaysia are lower or both. A related question is higher or lower relative to what? To address this problem, PLIs are expressed relative to the regional average price level set at 100.

There are several ways to compute regional average price level, for example, a simple arithmetic or geometric average, or a weighted arithmetic or geometric average of price levels in different economies. If Hong Kong, China is the reference economy, then Nominal GDP_{HKG} = Real GDP_{HKG}: the nominal and real GDP are the same and the PLI of Hong Kong, China is 100. So, if the PLI for Asia and the Pacific is to be 100, then it is necessary to ensure that nominal GDP for the region equals real GDP for Asia and the Pacific. This is achieved by suitably adjusting PPPs. Appendix 6 describes and illustrates the procedure.

Uses and Applications of Purchasing Power Parities and Real Incomes

With a significant expansion in the scope of the ICP since the 1970s and the increasing availability of estimates of PPPs of currencies and real expenditures, applications of PPPs in international comparative economic analysis are becoming ubiquitous.

The most important use and main purpose of PPPs is to convert national accounts aggregates into a common currency unit after accounting for price level differences, thus allowing for comparisons of real expenditure levels of GDP and its component expenditures across economies. These national accounts aggregates include GDP and its main components—ICEH, actual individual consumption by households (AICH), GFCE, and GFCF. Different PPPs are needed to convert each of these aggregates. Real GDP size and distribution are considered important. The recently released report from World Bank (2020) on the 2017 ICP cycle showed that the world's GDP in PPP terms in 2017 was $119.5 trillion compared to $79.7 trillion in exchange rate terms. The report showed that in PPP-converted terms, the lower-middle income economies had a 15.9% share of global GDP, upper-middle income economies had 34.4%, and high income economies had 48.8%. In exchange-rate converted GDP terms, the lower-middle income group had 7.8% share, the upper-middle income group had 27.7%, and the high income group had 64.0%. These results illustrate that shares can differ significantly depending on whether PPPs or exchange rates are used for converting GDPs of economies. The World Bank also reported that the economies of the People's Republic of China and the US are of almost equal size in 2017, with GDP in PPP terms at $19.6 trillion for the People's Republic of China and $19.5 trillion for the US. Allowing for a margin of error in estimating PPPs, these results indicate that these two economies are roughly the same size,

and together they account for a third of global GDP in PPP terms. India was ranked third in size with 8.1 trillion dollars.

The original purpose of PPPs was to serve as economically meaningful alternatives to exchange rates and to provide internationally comparable national accounts aggregates which fully account for price level differences across economies. But PPPs have also played a critical role in economic measurement in areas of significance to economists, development economists in particular, and policy makers in national and international organizations.

For a comprehensive review of the uses of PPPs at the national and international level, the reader may consult Ward (2009), Eurostat-OECD (2012), Silver (2013), Inklaar and Timmer (2013a), Hamadeh and Abu Shanab (2016), and World Bank (2020).

Global and regional poverty. Since 1990, PPPs from the ICP have become an important input into the process of estimating incidence of absolute poverty at the regional and global level. The World Bank recognized the need to establish an international yardstick to measure absolute poverty in the world. PPPs from the 1985 benchmark were used to construct such a yardstick in the form of $1 per day and $2 per day international poverty lines. Based on an average of poverty lines of a set of low income economies (Ravallion et al. 1991), the international poverty line was found to be close to $1 per day. Since then these international poverty lines became the gold standard. With the availability of new sets of PPPs from different ICP rounds, the so-called dollar-a-day poverty line was revised to $1.08 in 1993, $1.25 in 2005, and $1.90 after the release of the 2011 ICP benchmark results. The PPP-based international poverty line of $1.25 became the basis for tracking global progress on the Millennium Development Goal (MDG) of halving the extreme poverty between 1990 and 2015. The Atkinson Commission on Global Poverty (World Bank 2017) recommended that the poverty line of $1.90 based on 2011 PPPs be maintained in

the future after making appropriate adjustments to price changes in different economies.

The World Bank estimates of absolute poverty, updated in March 2020, showed that 1.9 billion people (or 35.96% of world population) was in extreme poverty in 1990. World Bank estimates showed that in 2015, 10.04% of world's population (or 737 million people), were in extreme poverty, indicating that the first MDG was successfully met by a significant margin (Atamanov et al. 2020).

The relevance and role of PPPs from the ICP continues to be a major research area. In particular, some economists raised questions about whether PPPs from ICP are well-suited for global poverty measurement. A major research project conducted by ADB (2008) concluded that PPPs based on prices of goods and services that are more typical of consumption of people living in poverty and their budget shares are more appropriate than PPPs based on ICP consumption baskets and economy-wide consumption shares.

Global and regional inequality. The use of PPPs has a profound effect on the estimates of income inequality around the world. The PLIs for low income and high income economies show that in low income economies, PPPs of currencies are significantly lower than the exchange rates, and in high income economies, PPPs are closer to exchange rates. The essence of the Penn effect is that global inequality would be significantly higher when based on exchange-rate-converted incomes rather than PPP-converted incomes. Based on World Bank (2020) results, the Gini measure of population-weighted inter-economy inequality using PPP-converted per capita GDPs was 0.487 for the 2011 (revised) ICP cycle and 0.474 for the 2017 ICP cycle. Applying the same Gini measure of population-weighted inter-economy inequality using exchange-rate-converted per capita GDPs from the same data, the estimate was significantly higher at 0.640 for 2011 (revised) and 0.617 for 2017. These measures represent inequality between economies. However, when inequality within economies is accounted for,

so that global inequality is measured as inequality among the world population as a whole, inequality estimates are much higher. Warner et al. (2014) reported inequality estimates for the world population using PPP-converted incomes and found the Gini measure to be 0.708 for 1993, 0.693 for 2000, and 0.667 for 2005. Milanovic (2012) reports similar Gini estimates around 0.7 for 1988–2010.

Productivity comparisons and catch-up and convergence. Economists use measures of labor productivity and total factor productivity to assess and explain economic performance of economies over time. As PPP and real income data became available from ICP and, more importantly, through the Penn World Table, researchers and analysts have used measures of labor productivity based on real GDP per worker and per hour worked. In addition, the Penn World Table provides estimates of capital stock in PPP terms using PPP-converted investment (GFCF) for use by researchers. Recent versions of the Penn World Table, from version 8.0 on, also provide estimates of total factor productivity. These estimates of productivity differentials have found their way back into PPP compilation because they provide a basis for adjusting data on government compensation.

Maddison (1995, 2007) used PPPs for 1990, computed using the Geary-Khamis method, as the basis for his historical series of GDP and per capita GDP expressed in 1990 international dollars. His series in the 1995 publication, *Monitoring the World Economy*, covered the period 1820–1992. He extended these series to the last two millennia in his 2007 book, *Contours of the World Economy 1–2030 AD: Essays in Macro-Economic History*.

Maddison's *International Comparisons of Output and Productivity* started in 1990s as a project for international comparisons from the production side and covered the agriculture and manufacturing sectors and some service sectors such as wholesale and retail trade, transport, and communications. However, comparisons from the production side posed formidable challenges. Consequently, researchers

at the Groningen Growth and Development Centre (Inklaar and Timmer 2013b) developed a procedure whereby they were able to use ICP PPPs at the basic heading level to construct PPPs from the production side. Their work has led to the use of PPPs from the ICP in productivity studies on a larger scale, including their use in various studies on capital, labor, energy, materials, and services (KLEMS) conducted by Jorgensen and his associates. Results from these studies can be found on World KLEMS, EU KLEMS, and Asia KLEMS related websites.

The availability of PPPs, especially from the Penn World Table, also led to a large number of studies in the area of catch-up and convergence. In a highly cited work, Barro (1991) made use of data on PPPs and real incomes from Summers and Heston (1988) to study convergence across 98 economies. Barro concluded that convergence was evident if initial school enrollments and the ratio of government consumption to GDP were held constant. Barro's findings on cross-economy convergence contrasted with convergence across states in the US (Barro and Sala-i-Martin 1991). Sachs and Warner (1995) examined the relationship between convergence and economic policies and concluded that convergent growth can be achieved by all economies that follow a set of political and economic policies, including adherence to political and civil liberties and openness of the economy without trade barriers or restrictions on currencies. While convergence studies were popular in the 1990s and relied heavily on data from the Penn World Table, the trend still continues: for example, Lee (2016) made use of data for 105 economies from the Penn World Table 8.1 in a study on the People's Republic of China's economic growth and convergence in an international context. Studies on convergence and economic performance of nations, too numerous to mention or review, have popularized the use of PPP-converted income series and thus led to a greater awareness of PPPs and the ICP.

Use of purchasing power parities in international indicators of development. Since the 1990s, particularly after the use of PPPs in calibrating

the dollar-a-day international poverty line, PPP-converted real incomes have become an important input into the compilation of a great number of indicators used to assess the performance of economies against various criteria.

First and foremost, the use of incidence of absolute poverty, based on the dollar-a-day international poverty line, to define the first MDG of halving absolute poverty by 2015 led to an increased awareness of the use of PPPs (United Nations 2000). In order to assess the performance of economies against this first MDG, the international poverty line had to be converted into local currency units using PPPs prevailing in that period before estimating incidence of absolute poverty. PPPs played a role in both setting the international poverty line as well as in the actual estimation of poverty incidence.

PPPs play a significant role in the setting and subsequent evaluation of the Sustainable Development Goals (SDGs) set by the UN General Assembly in 2015 (United Nations 2015) under Resolution 70/1. A "blueprint to achieve a better and more sustainable future for all" (United Nations n.d.), the SDGs are a set of 17 goals, each consisting of several indicators. A number of SDGs prominently feature PPPs and internationally comparable real expenditure aggregates from the ICP expressed in a common currency. Results from the ICP are useful at several stages: setting targets for various SDGS; continuous monitoring of progress against goals; and, finally, in the analysis designed to identify factors that contribute to successful implementation of programs to achieve various targets.

The first SDG set the goal of eradicating extreme poverty by 2030. Extreme poverty is determined by the $1.90 international poverty line set in 2011 and implemented using the recommendations of the *Report of the Commission on Global Poverty* (World Bank 2017). Some other SDGs also require the

use of PPP-converted GDP and per capita incomes to monitor progress against the goals set. The SDGs included an initial comprehensive set of 169 targets to be met by the year 2030. With resolution 71/313, the United Nations Statistical Commission (UNSC) reviews and refines the indicators every year, with a total of 231 unique indicators as a result of the latest review in March 2020.[3] This continued reliance on PPPs means that there is need for regular, timely, and reliable estimates of PPPs from the ICP, especially in the following SDGs.

Goal 1: End poverty in all its forms everywhere. Target 1.1 of SDG 1 states: "By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day" (United Nations 2015). PPPs play a dual role in this goal. First, determining the international yardstick of $1.25 per day poverty line relies on PPPs from ICP. This poverty line of $1.25 per day was determined at the conclusion of the 2005 ICP cycle and a revised poverty line of $1.90 was established after the 2011 ICP (World Bank 2017). Second, PPPs play an equally crucial role in monitoring progress against the first SDG. In order to estimate extreme poverty incidence at the regional and global levels, it is necessary to convert the international poverty line into local currency units using PPPs.

Goal 2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture. Target 2.3 of SDG 2 states: "By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment" (United Nations 2015). Because agricultural output covers a large number of agricultural commodities, cross-economy comparisons of agricultural output and productivity

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3   The global indicator framework contains 247 indicators; some indicators are used in several goals.

rely on the PPPs for agricultural output by the Food and Agriculture Organization of the United Nations. In order to assess progress against this goal within a given economy, a reliable food price indicator is necessary, while PPPs for food from ICP provide a good basis for cross-economy comparisons.

Goal 3: Ensure healthy lives and promote well-being for all at all ages. This is an overarching goal that covers various dimensions of health and well-being. The ICP provides a wealth of information that is useful in analyzing the performance of economies and comparing indicator 3.8.2: "proportion of the population with large household expenditure on health as a share of total household expenditure or income." PPP-converted per capita income is used as an explanatory variable that affects variations in maternal mortality ratios (indicator 3.1.1) and often these relationships are used for imputations where data may be missing.

Goal 7: Ensure access to affordable, reliable, sustainable, and modern energy for all. This goal aims to ensure universal access to affordable, reliable, and modern energy services by 2030 and emphasizes the role of renewable energy sources. Indicator 7.3.1—energy intensity measured in terms of primary energy and GDP—relies on PPP-converted GDP. Energy intensity is defined as the energy supplied to the economy per economic value of output measured by GDP in PPP terms. Estimates of per capita real expenditure on electricity in different economies from the ICP can be used as a broad indicator of per capita utilization of electricity.

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment, and decent work for all. For indicator 8.2.1, although the annual growth rate of real GDP per employed person does not require conversion in PPP terms, the International Labour Organization (ILO) also publishes real (PPP-based) GDP per employed person which can be used for cross-economy comparisons.

Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation. Developing quality, reliable, sustainable, and resilient infrastructure, and promoting inclusive and sustainable industrialization are the two important elements of Goal 9. The only indicator that utilizes PPPs from the ICP is Indicator 9.4.1—carbon dioxide (CO_2) emission per unit of value added or GDP, where GDP is measured in PPP dollars. A comparative perspective can be formed using per capita expenditure on nonresidential construction as a proxy for infrastructure development.

Goal 10: Reduce inequality within and among countries. Target 10.1 of SDG 10 states: "By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average" (United Nations 2015). The relevant indicator uses PPPs for comparing the per capita income or consumption for the poorest 40% against the national average.

The list of indicators associated with the 17 SDGs is extensive and fairly detailed. There is a mix of physical and monetary indicators associated with each of the 17 SDGs. Estimates of PPPs and per capita real expenditures on different components of GDP and household expenditure can help directly measure certain indicators and may be indirectly used in measuring and subsequently analyzing the performance of various economies in progress toward meeting these goals by 2030. SDG 8—promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all—is an all-encompassing economic goal. Several indicators such as material footprint per GDP (indicator 8.4.1) and domestic material consumption per GDP (indicator 8.4.2) can be computed relative to PPP-converted GDP.

The recently released *Sustainable Development Report 2020* (Sachs et al. 2020) presents the latest statistics on the consolidated SDG index and a dashboard of SDG indicators. The report also

presents the performance of various economies against different indicators associated with SDGs and additional information on the spillover effects.

The report defines the spillover index as follows: The Spillover Index measures transboundary impacts generated by one country on others, which may in turn undermine the other countries' capacities to achieve the SDGs. The Spillover Index covers financial spillovers (e.g., financial secrecy, and profit shifting), environmental and social impacts embodied into trade and consumption (e.g., imported CO_2 emissions, imported biodiversity threats, and accidents at work embodied into trade), and security/development cooperation (i.e. official development assistance and weapons exports). Official development assistance is an example of a positive spillover. Scores should be interpreted in the same way as the SDG Index score: from 0 (poor performance, i.e., significant negative spillovers) to 100 (good performance, i.e., no significant negative spillovers). To allow for international comparisons, most spillover indicators are expressed in per capita terms (Sachs et al. 2020, 90, Table 13).

The Spillover Index is 98.8 for India and 94.2 for the People's Republic of China. The report examines the nature of the index by plotting the index against per capita real GDP in constant 2010 PPP dollars.

In summary, there is a significant role for vast amount of information available from the ICP in the form of PPPs, PLIs, and per capita real expenditures on different consumption components. Internationally comparable estimates of government expenditure on education and health from the ICP are particularly useful in studying performance of economies against various SDGs. PPPs from the ICP play a direct role in SDGs 1, 2, 7, and 9, and a less direct role in other SDGs. The real application of ICP data is in analyzing the progress of economies toward the targets set for 2030.

Another indicator with a high profile where PPP-converted incomes play a significant role is the Human Development Index, first published in the *Human Development Report, 1990* (UNDP 1990). The index comprises three dimensions: the first is a measure of standard of living and is measured by (PPP-converted) per capita real gross national income, the second is health, and the third is level of education.

Among other notable applications of PPPs is the regular publication of global growth and inflation figures by the International Monetary Fund (IMF) through its flagship publication, *World Economic Outlook*. The 2018 World Economic Outlook (IMF 2018) reports a global growth of 3.8% in 2017, using PPPs, and projected that it would reach 3.9% in 2018. The United Nations *World Economic Situation and Prospects 2018* (United Nations 2018, 1) reports: "In 2017, global growth is estimated to have reached 3.0% when calculated at market exchange rate, or 3.6% when adjusted for purchasing power parities." These estimates are essentially weighted averages of growth rates in different economies, with weights based on shares of these economies computed using (PPP-converted) real GDP estimates. In a recent paper, Balk, Rambaldi, and Rao (2020) provide an analytical framework for using PPP-based data to estimate global growth and inflation. Apart from these uses, the Intergovernmental Panel on Climate Change made use of (PPP-converted) real incomes in assessing CO_2 emissions.

Uses of purchasing power parities by international organizations. By statutory requirement, the European Commission uses PPPs in allocating structural funds to its member countries. These funds are designed to reduce economic disparities between the member states. The European Commission uses (PPP-converted) per capita real GDP data in assessing disparities between member states. The IMF uses (PPP-converted) real GDP in its current quota formula to determine subscriptions from member economies to the IMF, financial assistance from the IMF to member economies, and the share in general allocation of Special Drawing Rights (Silver, 2013). ADB's policy

paper ADB Corporate Results Framework, 2019–2024 (2019a) is aligned with the SDG agenda and includes SDG indicators whose measurement depends on PPPs to track development progress in Asia and the Pacific.

Use of purchasing power parities and ICP data for domestic economic analysis and policy. This is a relatively unexplored area. The current focus, illustrated by discussion in previous paragraphs, is primarily on the use of PPPs and other data for international purposes. There is a need to explore the possible applications of ICP results to gain a better understanding of the performance of any given economy in the region. Dwyer and Rao (2009) explored the possibility of using ICP results to assess the price competitiveness of any given economy as a destination for tourists from different points of origin. Price competitiveness for tourism is largely driven by costs of travel, internal transport, accommodation, food (including restaurants), and shopping. A wealth of data are available in the detailed tables generated as a part of the 2017 ICP cycle (Appendix 1).

Limitations and Caution in the Use of Purchasing Power Parities

As the preceding paragraphs illustrate, PPPs and results from the ICP are immensely useful for economic analysis at the global, regional, and economy levels. The ICP's primary purpose is to provide measures of PPPs for converting GDP and its analytical components. However, caution must be exercised in the use of PPPs in other applications.

The first and foremost consideration in the use of PPPs is to select the correct set of PPPs for the required purpose. Often, users are unaware that each PPP is specific to a basket of final goods and services, and that one must be familiar with the scope and coverage of each PPP available from ICP. It is possible that PPP for a desired aggregate,

for example medical services, may not be available. In such instance the user must carefully choose a PPP that comes closest to the aggregate being considered. In this instance, the PPP for household consumption category "health" may be used as the closest approximation. At times, one may have to construct the needed PPP from the basic heading level PPPs, which are building blocks. A good example is the construction of PPPs for tourist expenditures, illustrated in Dwyer and Rao (2009). Another example is the transformation of ICP PPPs for use in production side comparisons (Inklaar and Timmer, 2013a).

Second, it is important for the user to understand that PPPs from a given benchmark year such as 2017 can be used only for comparisons of GDP, consumption, and other measures across economies only for that period. PPPs from one period cannot be directly compared to PPPs from another year to comment on domestic inflation, even for the same aggregate. Similarly, per capita real income in two benchmark years, say 2011 and 2017, cannot be used to directly measure growth rates, because PPPs are not meant for temporal comparisons. Growth rates at the economy level must be taken from domestic sources as measured from the estimates at constant prices.

Third, PPPs are statistics constructed from prices collected and expenditure weights drawn from national accounts data compiled and supplied to ADB by the participating economies. Data collected and compiled are subject to sampling and non-sampling errors. The price data are collected for the ICP, while the national accounts data are a given. Though considerable effort is devoted to data validation and editing (Chapter 6 describes these methods), the PPPs are subject to errors. Further, while it is expected that all economies compile their national accounts following the prescriptions in the System of National Accounts 2008 (United Nations 2009), the underlying input data may vary in quality and may not adequately capture

the unobserved aspects of the economy such as the informal sector. Further, the expenditure estimates at the lower levels of aggregations such as basic headings may not be reliable in the absence of direct data. In addition, since PPPs are like index numbers comparing prices in different economies, the reliability of the PPPs very much depends on the similarity of price structures of the economies. For example, as Singapore and Hong Kong, China are both high income urbanized economies, it is likely that their price structures are similar and PPPs for Singapore with Hong Kong, China as reference are reliable. But the same may not hold for a comparison between Hong Kong, China and Pakistan because they belong to different income groups and their price and consumption structures are likely to differ significantly. Because of issues about differing reliabilities, caution must be exercised in ranking economies whose real expenditures do not differ by a significant amount.

Fourth, some components of GDP are more challenging to compare than others. These are referred to as "comparison-resistant" aggregates. Comparisons for services are difficult, and comparisons for nonmarket services are even more so. Comparisons of housing expenditure, construction, government compensation, health, education, and machinery and equipment are particularly onerous. Striking a balance between "comparability" across economies to adequately account for differences in quality of individual items priced under ICP and their "representativity" in the corresponding expenditures within basic headings in GDP expenditures can be hard. Hence, results for comparison-resistant sectors have to be approached with a greater degree of caution.

Finally, users frequently ask: Can PPPs be used to make a judgment as to whether a currency is overvalued or undervalued? The answer to this question is an emphatic no! The reason for this is twofold. The purpose for which PPPs are compiled as a part of the ICP is for making comparisons of GDP and per capita real consumption, investment, and other macroeconomic aggregates. Consequently, PPPs make use of prices of all goods and services that enter into GDP calculations. When the theory of PPPs was first developed, it was argued that PPPs would be close to equilibrium exchange rates. This is true only if the PPPs solely refer to domestically-produced tradable goods and services valued at export prices. However, the PPPs from ICP not only cover tradable products but also non-tradables such as construction, housing, health, education, and government services. In any event, exchange rates are determined by the total demand for a particular currency, and financing foreign trade is only one component of this demand. Capital transfers are another major determinant. PPPs, therefore, cannot be used to indicate an economy's "correct" exchange rate and therefore cannot serve as an indication as to whether currency of an economy is overvalued or undervalued.

A word of caution to users: it is important to select the right PPP to study a given problem because PPPs refer to specific baskets of goods and services. Despite the need for PPPs, there is also a role for exchange rates. In the context of the ICP, exchange rate information is needed in gaining an understanding of the price levels. Users must be cautious in using published PPPs at different points of time. In conclusion, PPPs are critical in gaining an appreciation of the economic geography of the world in real terms. The real size, ranking, and distribution of economies according to real GDP and measures of standard of living and levels of material well-being based on consumption measures are useful from national and international perspectives.

3. Main Results and Analysis

Introduction

This chapter presents an analysis of the main results from the 2017 International Comparison Program (ICP) cycle in Asia and the Pacific, including purchasing power parities and measures of gross domestic product (GDP) and its component aggregates and sub-aggregates in real and nominal terms for the 22 participating economies of the region. The volume measures of real expenditures of the economies are derived by converting the national accounts aggregates, in respective currencies, using purchasing power parities (PPPs) with Hong Kong, China as the reference economy and the Hong Kong dollar (HK$) as the reference currency. The approaches and methods used to collect and validate data for various components of GDP, including comparison-resistant components such as construction, machinery and equipment, dwellings, and government compensation, are presented in Chapter 6.

Economic Geography of the Region

Understanding the diversity and complexity of Asia and the Pacific will help readers and users appreciate the 2017 ICP results presented in this chapter. The region is a microcosm of the world, and the ICP in the region faces the same challenges as the ICP faces in its global comparisons. The region has some of the richest economies with very high per capita incomes—like Brunei Darussalam; Hong Kong, China; Singapore; and Taipei,China— and economies with very low per capita incomes,

like Nepal, Bangladesh, and Myanmar. The participating economies exhibit disparities in living standards and diversity in consumption patterns which are also reflected in the differences between the consumption baskets of their consumers.

Equally significant, the geographic diversity of the region also has implications for ICP price levels and price structures. The region is home to fully urbanized economies like Hong Kong, China and Singapore, and to the world's two most populous economies, India and the People's Republic of China, which are also endowed with large land masses. The participating economies also include island economies, like Fiji and Maldives, and landlocked economies like Bhutan, the Lao People's Democratic Republic, Mongolia, and Nepal.

Asia and the Pacific plays a major role in the world economy and holds a majority of the world's population. In 2017, the 22 participating economies, with 3.785 billion inhabitants, accounted for more than half of the world's population.[4] The region is also home to five of the world's 10 most populous economies— India and the People's Republic of China exceed 1.3 billion people each, Indonesia has 261.89 million, Pakistan has 199.11 million, and Bangladesh has 161.80 million. The region also includes economies with small populations, like Brunei Darussalam and Maldives, with fewer than half a million people each. Between 2011 and 2017, 14 out of the 22 participating economies grew at an average annual growth rate of more than 5%. Among the two largest economies, India grew at an average rate of 6.8% per year and the People's Republic of China grew at an average

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[4] The regional population is based on mid-year population estimates supplied to ADB by participating economies for the 2017 ICP; the world population is from the World Development Indicators database. World Bank. World Development Indicators. https://databank.worldbank.org/source/worlddevelopment-indicators (accessed 18 March 2020).

rate of 7.6% per year.[5] Economies like Cambodia, the Lao People's Democratic Republic, and Mongolia also posted impressive growth rates, exceeding 7.0% per year.

For ICP purposes, Asia and the Pacific does not include the Asian Development Bank (ADB) members Australia, Japan, New Zealand, and the Republic of Korea, since they are traditionally included in the Organisation for Economic Co-operation and Development (OECD) comparisons. Additionally, ADB regional members in Central Asia, namely, Armenia, Azerbaijan, Kazakhstan, the Kyrgyz Republic, and Tajikistan are covered under the regional ICP coordinated by the Interstate Statistical Committee of the Commonwealth of Independent States (CIS-STAT) and Georgia is included as a guest participant in the Eurostat-OECD comparison (World Bank 2020).

Road Map for the Main Results

The chapter presents and analyzes estimates of real GDP, individual consumption expenditure by households (ICEH) and nonprofit institutions serving households (NPISH), actual individual consumption by households (AICH), government final consumption expenditure (GFCE), gross fixed capital formation (GFCF), and domestic absorption for 22 participating economies of Asia and the Pacific. Estimates of real size of the economies—measured by GDP in PPP terms, their shares in the region, and estimates of price levels for these aggregates—are analyzed and presented in tables and charts. In addition to these aggregates, the chapter also presents PPPs, PLIs, and real expenditures for different commodity groups such as food, transport, education, health, and others. Results from the 2017 ICP cycle, presented in this chapter, provide valuable information on real comparisons

across 22 economies for policy makers at national and international levels for evidence-based policy making. This chapter builds on the basic concepts and measures discussed in Chapter 2.

The main aggregates discussed in this chapter are defined below.

- **Gross domestic product.** GDP is an expenditure side measure that is the sum of ICEH, GFCE, gross capital formation (GCF),[6] and net exports.
- **Individual consumption expenditure by households.** The ICEH measure used in this report is the sum of consumption expenditure by households and the expenditure by NPISH on behalf of the households.
- **Actual individual consumption by households.** A comprehensive measure of goods and services consumed by the households is AICH, which includes ICEH and NPISH expenditures on behalf of individuals, as well as individual government consumption expenditure on behalf of households, or ICEG. AICH is a better measure of material well-being than the overall GDP because it includes all goods and services consumed by the households to meet their individual consumption needs.
- **Government final consumption expenditure.** GFCE is the sum of individual government consumption expenditure on behalf of households (ICEG) and the government consumption expenditure on collective services (CCEG).
- **Gross fixed capital formation.** GFCF is the total value of acquisitions less disposals of all fixed assets in the economy and is the sum of expenditures on construction, machinery and equipment, and other products.
- **Domestic absorption**: Domestic absorption is the sum of individual consumption by households (ICEH plus NPISH), GFCE, GFCF, and changes in inventories and acquisitions less disposals of valuables.

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[5]   The economy-level growth rates presented here are the simple average of annual GDP growth rates calculated from data in Key Indicators Database. Asian Development Bank. https://kidb.adb.org/kidb/ (accessed 16 March 2020) and World Development Indicators database. World Bank. World Development Indicators. https://databank.worldbank.org/source/world-development-indicators (accessed 27 March 2020).
[6]   Gross capital formation is the sum of gross fixed capital formation, changes in inventories, and acquisitions less disposals of valuables.

Box 3.1: Notes on Data and Definitions in This Report

- In the tables presented in the report, "Asia and the Pacific" refers to the 22 participating economies in the 2017 International Comparison Program (ICP) for the Asia and Pacific region; coverage of the Pacific is limited to Fiji.
- In the analysis presented in the report, "real" refers to purchasing power parity (PPP)-converted values of expenditure aggregates, while "nominal" refers to exchange rate-converted expenditure values when converted to the Hong Kong dollar.
- Price data for ICP products used in calculating PPPs are based on national annual average prices for 2017. Results presented in this report are produced by the ICP Asia and the Pacific regional implementing agency, based on data supplied by all the participating economies, and in accordance with the methodology recommended by the ICP Technical Advisory Group and approved by Asia and the Pacific Regional Advisory Board. As such, these results are not produced by participating economies as part of the economies' official statistics. For the 2017 ICP cycle, the estimation methodologies remain the same as in 2011 ICP cycle, with some refinements.
- The gross domestic expenditures in local currency units were disaggregated into 155 basic headings by the participating economies according to the 2017 ICP classification. In many cases, in the absence of published or readily available estimates at that basic heading level, higher-level aggregates were required to be split using data and indicators available from household expenditure surveys, government accounts, and other most recent available data sources. Further, in accordance with the ICP guidelines, economies were also required to allocate statistical discrepancy (if any) on the expenditure side to one or more basic headings based on their best judgment. As such, the nominal expenditure estimates presented in the tables in this report are the best possible estimates compiled by economies to meet the technical requirements of the ICP , and some of the expenditure aggregates in this report may be different from the published expenditure estimates by the economies.
- Bangladesh, India, Myanmar, Nepal, and Pakistan compile their gross domestic product (GDP) according to the financial year. As the ICP requires calendar year GDP expenditures from the economies in local currency units, their financial year based GDP estimates were converted to calendar year 2017 estimates using different approaches, depending on the availability of detailed expenditure estimates in each of these economies.
- In some economies, data for household expenditures include the expenditures undertaken by the nonprofit institutions serving households (NPISH) because it is difficult to segregate NPISH data, with the exception of the People's Republic of China, where NPISH data is included with government expenditures. In some economies, only total expenditure by NPISH was provided and these were broken down into relevant NPISH components using ratios from household consumption. It may be noted that the NPISH expenditures were not allocated to household expenditures, unlike in the 2011 ICP round, according to the decision taken by the Inter-Agency Coordination Group for uniform treatment of NPISH expenditures by all regional implementing agencies.
- Net purchases abroad, although available as a separate estimate in some economies, were not distributed to household expenditure's international tourism-related basic headings, as was done in the 2011 ICP round. This was also based on the decision taken by the ICP Inter-Agency Coordination Group for uniform treatment of available data on net purchases abroad to be followed by all regions.
- PPPs and results estimated in this report are based on data finalized and submitted by the implementing agencies from each economy as of January 2020.
- The 2011 ICP results were also revised because of (i) revisions in the estimates of GDP and population and (ii) refinements in methods for 2017 ICP, such as the methodology for estimating the adjustment factors for the differences in productivity of government, minor changes in ICP classification between 2017 and 2011, revisions in the reference PPPs, and treatment of expenditures by NPISH and on net purchases abroad. The 2011 revised results are produced by the ICP Asia and the Pacific regional implementing agency, based on data supplied by all the participating economies, and in accordance with the methodology recommended by the ICP Technical Advisory Group and approved by Asia and the Pacific Regional Advisory Board. As such, these results are not produced by participating economies as part of the economies' official statistics.

Source: Asian Development Bank.

This aggregate gives an indication of total expenditure in the economy, regardless of whether the goods and services are domestically produced or imported. This aggregate is a better indicator of the standard of living enjoyed by the resident households than GDP.

Box 3.1 presents special notes that readers should keep in mind when using results of 2017 ICP in Asia and the Pacific. Estimated PPPs, price level indexes (PLIs), real and nominal expenditures, per capita real and nominal expenditures and their indexes, and real and nominal economy shares are presented for the 22 participating economies of the region in the subsequent sections. Detailed expenditure aggregates for 34 expenditure categories for the year 2017 and revised tables for the 2011 benchmark are available in Appendixes 1 and 2. For all tables and results in this chapter, unless otherwise specified, Hong Kong, China is the reference economy and the Hong Kong dollar (HK$) is the reference currency.[7]

The Economy of Asia and the Pacific: Real Size and Distribution

GDP is a widely used measure of economic activity recommended in the United Nations System of National Accounts. GDP is the headline measure for the ICP and most sought-after by users. Comparison of per capita real GDP provides information concerning relative average standards of living of populations in these economies. However, per capita GDP measure may not be the best measure to gauge the relative living standards of the population. Measures like the per capita ICEH and AICH are likely to be better indicators of material well-being.

Size of the Economy of Asia and the Pacific

Table 3.1 presents the key results for nominal and real GDP, per capita measures, and other major indicators from the 2017 ICP in Asia and the Pacific.

The sizes of the economies in Asia and the Pacific in nominal terms are obtained by converting the GDP in local currency units (in LCUs) in column 18 into Hong Kong dollars (HK$) using exchange rates in column 3, resulting in the nominal GDP in HK$ of each economy, presented in column 5. In the absence of the ICP and information on PPPs, nominal GDP would be used in assessing the size of the regional economy. The total size of the economy of Asia and the Pacific in nominal terms, in 2017, is HK$148.9 trillion. The biggest economy is the People's Republic of China with HK$94.6 trillion, followed by India with HK$19.9 trillion. The economies of Hong Kong, China, with a nominal GDP of HK$2.7 trillion, and Singapore, with HK$2.6 trillion, are roughly same size. Bhutan, a small landlocked economy, is the smallest economy, with HK$20 billion, followed by Maldives, a small island economy, with HK$38 billion.

The size of the regional economy in real terms (column 4) is derived by converting GDPs of different economies in LCUs in column 18 using PPPs in column 2. The real size of the Asia and Pacific economy, in 2017, is HK$232.3 trillion, significantly larger than its nominal GDP of HK$148.9 trillion. A quick glance at PPPs and exchange rates for different currencies in columns 2 and 3 provides an explanation. PPPs in column 2 for all economies (excluding Hong Kong, China) are significantly lower than the exchange rates; therefore, the real size of all the economies, with Hong Kong dollar as the reference currency, are larger than their respective nominal sizes.

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[7]   The methodology used in the ICP ensures that results presented are invariant to the choice of the reference currency: the relative levels of real GDP would remain the same even if any other participating economy and its currency is used as the base or reference.

Table 3.1: Summary Results for Gross Domestic Product, 2017
(Hong Kong, China as base)

Economy	PPPs (HK$ = 1.00)	Exchange Rates (HK$ = 1.00)	Expenditure (HK$ billion)		Expenditure per Capita (HK$)		Expenditure per Capita Indexes				Shares (Asia and the Pacific = 100.00)			PLIs		Reference Data	
							Asia and the Pacific = 100		HKG = 100		Expenditure						
			Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Population	Asia and the Pacific = 100	HKG = 100	Population (million)	Expenditure in LCU (billion)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Bangladesh	4.95	10.32	4,272	2,047	26,401	12,654	43	32	7	4	1.84	1.38	4.27	75	48	161.80	21,131
Bhutan	3.20	8.36	52	20	70,855	27,094	115	69	20	8	0.02	0.01	0.02	60	38	0.73	165
Brunei Darussalam	0.11	0.18	156	95	362,379	220,065	590	560	101	61	0.07	0.06	0.01	95	61	0.43	17
Cambodia	237.61	519.75	378	173	23,853	10,904	39	28	7	3	0.16	0.12	0.42	71	46	15.85	89,831
China, People's Republic of	0.70	0.87	117,929	94,638	85,061	68,262	139	174	24	19	50.76	63.57	36.62	125	80	1,386.40	82,075
Fiji	0.16	0.27	71	42	80,772	47,572	132	121	22	13	0.03	0.03	0.02	92	59	0.88	11
Hong Kong, China	1.00	1.00	2,663	2,663	360,247	360,247	587	916	100	100	1.15	1.79	0.20	156	100	7.39	2,663
India	3.43	8.36	48,395	19,893	36,965	15,194	60	39	10	4	20.83	13.36	34.58	64	41	1,309.20	166,226
Indonesia	781.12	1,716.98	17,394	7,913	66,419	30,217	108	77	18	8	7.49	5.32	6.92	71	45	261.89	13,587,213
Lao People's Democratic Republic	463.97	1,071.64	303	131	43,944	19,026	72	48	12	5	0.13	0.09	0.18	68	43	6.90	140,698
Malaysia	0.28	0.55	4,916	2,453	153,532	76,589	250	195	43	21	2.12	1.65	0.85	78	50	32.02	1,353
Maldives	1.36	1.97	55	38	112,187	77,137	183	196	31	21	0.02	0.03	0.01	107	69	0.49	75
Mongolia	131.66	313.06	212	89	67,241	28,278	110	72	19	8	0.09	0.06	0.08	66	42	3.15	27,876
Myanmar	61.00	174.56	1,409	493	26,519	9,268	43	24	7	3	0.61	0.33	1.40	55	35	53.15	85,981
Nepal	5.20	13.41	503	195	17,431	6,754	28	17	5	2	0.22	0.13	0.76	60	39	28.83	2,611
Pakistan	5.59	13.53	5,954	2,459	29,905	12,349	49	31	8	3	2.56	1.65	5.26	64	41	199.11	33,270
Philippines	3.22	6.47	4,902	2,444	46,721	23,295	76	59	13	6	2.11	1.64	2.77	78	50	104.92	15,808
Singapore	0.15	0.18	3,171	2,637	564,960	469,907	921	1,195	157	130	1.36	1.77	0.15	130	83	5.61	467
Sri Lanka	8.22	19.56	1,621	681	75,587	31,748	123	81	21	9	0.70	0.46	0.57	66	42	21.44	13,317
Taipei,China	2.62	3.91	6,688	4,480	283,878	190,165	463	484	79	53	2.88	3.01	0.62	105	67	23.56	17,501
Thailand	2.14	4.36	7,232	3,548	106,892	52,444	174	133	30	15	3.11	2.38	1.79	77	49	67.65	15,452
Viet Nam	1,230.21	2,870.44	4,069	1,744	43,179	18,506	70	47	12	5	1.75	1.17	2.49	67	43	94.24	5,005,975
Asia and the Pacific	n.a.	n.a.	232,344	148,874	61,375	39,326	100	100	17	11	100.00	100.00	100.00	100.00	n.a.	3,785.65	n.a.

HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency unit; n.a. = not applicable; PLI = price level index; PPP = purchasing power parity; XR = exchange rate.
Sources: Asian Development Bank estimates. Expenditures in local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Again, the two largest economies in real terms are the People's Republic of China with HK$117.9 trillion and India with HK$48.4 trillion. In nominal terms, the People's Republic of China is roughly 4.76 times the size of India whereas in real terms, the People's Republic of China is only 2.44 times that of the size of India. This means that disparity between these two largest economies narrows greatly when real sizes are considered. The explanation lies in the fact that the general price level measured as the ratio of PPP to exchange rate is much lower for India than the corresponding ratio for the People's Republic of China. The smallest economies in real terms are again Bhutan with HK$52 billion and Maldives with HK$55 billion. Here the relative size of Bhutan in real terms is much closer to Maldives (almost equal) whereas it is roughly half the size in nominal terms, indicating that PPP to exchange rate ratio is lower for Bhutan compared to Maldives. In nominal terms, Singapore's economy was slightly smaller than that of Hong Kong, China; however, on the basis of real GDP, it is higher than Hong Kong, China by about 19%.

Columns 4 and 5 can be used to rank economies by relative size, both real and nominal. Rankings based on real and nominal GDP are identical for the three largest economies—from largest to smallest, the People's Republic of China, India, and Indonesia— and the three smallest economies, from smallest to largest, Bhutan, Maldives, and Fiji. The relative ranks in size for nominal and real GDP are also unchanged for Cambodia, the Lao People's Democratic Republic; Myanmar; Nepal; and Sri Lanka. Shifts in rankings are usually limited to one or two ranks, as with Brunei Darussalam; Malaysia; Mongolia; Pakistan; the Philippines; Taipei,China; Thailand; and Viet Nam. The biggest differences in rank changes occur for the two high income economies, Singapore and Hong Kong, China. Singapore is ranked 7th in nominal terms but drops to 11th in real terms; Hong Kong, China is ranked 6th in nominal terms but drops to 12th in real terms.

Distribution of Nominal and Real Gross Domestic Product

The real and nominal shares of the 22 participating economies (columns 12 and 13) along with their population shares (column 14) and population size (column 17) are in Table 3.1. The real and nominal shares of the 22 participating economies of the region are also presented in Figure 3.1.

Twelve economies, shown in the left panel of Figure 3.1, together account for nearly 98.0% of the real GDP and 98.7% of the nominal GDP of the 22 participating economies in Asia and the Pacific. The remaining 10 smaller economies, shown in the right panel, account for only about 2.0% of real GDP and 1.3% of nominal GDP. The shares of the top three economies in real terms are 50.76% for the People's Republic of China, 20.83% for India, and 7.49% for Indonesia. The three economies together account for 79.08% of the region's GDP and 78.12% the region's population. The People's Republic of China's real GDP share is more than two times that of India and nearly seven times that of Indonesia, which are second and third largest economies in terms of size of real GDP. Although India is ranked second in terms of total real GDP, the real size of the Indian economy is only 41% of the People's Republic of China's economy.

For most economies in the region, shares in the region's real GDP (column 12) are greater than their nominal shares (column 13) for 17 out of 22 participating economies. The main reason is that their price level, measured as the ratio of their PPP to corresponding exchange rate, is below the price level of the region as reference. The reverse is true for high income economies—Hong Kong, China; Singapore; and Taipei,China—and the economies of Maldives and the People's Republic of China, whose real shares in the regional GDP are smaller than their nominal shares, because their price levels are much higher than the region as reference.

Figure 3.1: Economy Shares of Real and Nominal Gross Domestic Product, 2017

(%)
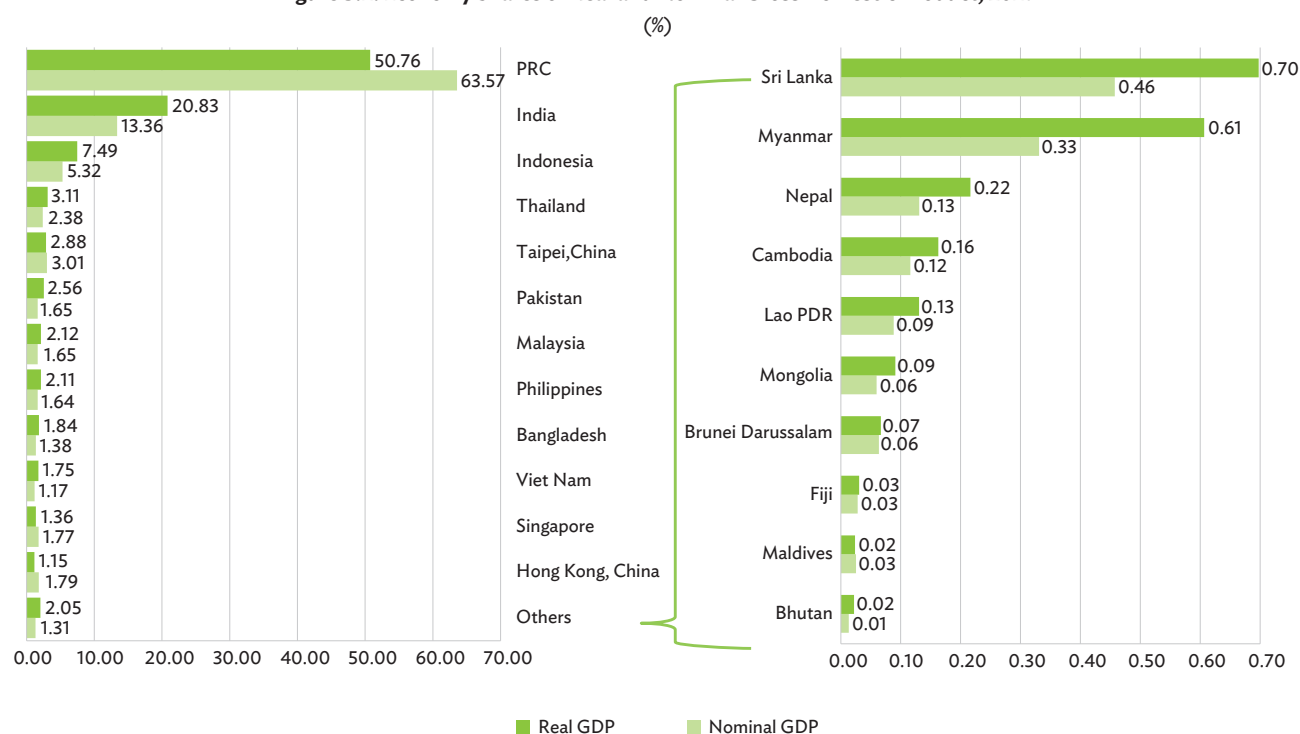
GDP = gross domestic product, Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China.
Source: Table 3.1.

Per Capita Real and Nominal Incomes

The per capita real GDP is an indicator of the population's standard of living or affluence, because it accounts for the size of the population in measuring the size of the economies. From Table 3.1, the three largest economies, the People's Republic of China, India, and Indonesia, in that order, also have the largest populations. Per capita incomes are also referred to as per capita GDP. Columns 6 and 7 of Table 3.1 show the real and nominal per capita GDP in the 22 participating economies. The per capita real GDP for the region as a whole is HK$61,375 compared to HK$39,326 in nominal terms. Figure 3.2 shows a comparative picture of per capita real and nominal GDP for 2017.

The four economies with the highest per capita real GDP or income are, from highest to lowest, Singapore

(HK$564,960); Brunei Darussalam (HK$362,379); Hong Kong, China (HK$360,247); and Taipei,China (HK$283,878). These economies are also the top ranked in terms of per capita nominal GDP. At the other end of the spectrum, Myanmar (HK$26,519), Bangladesh (HK$26,401), Cambodia (HK$23,853), and Nepal (HK$17,431) are the four bottom ranked economies by per capita real GDP. The two largest economies in real GDP are ranked lower in per capita real GDP because of their large populations. With a per capita real GDP of HK$85,061, the People's Republic of China is ranked 8th and India with a per capita real GDP of HK$36,965 is ranked 17th. In both per capita real and nominal GDP, the richest economy is Singapore and the poorest is Nepal; and the highest and lowest per capita GDP differ by a factor of 32.4 in real terms and by a factor of 69.6 in nominal terms.

Figure 3.2: Per Capita Real and Nominal Gross Domestic Product, 2017
(HK$)
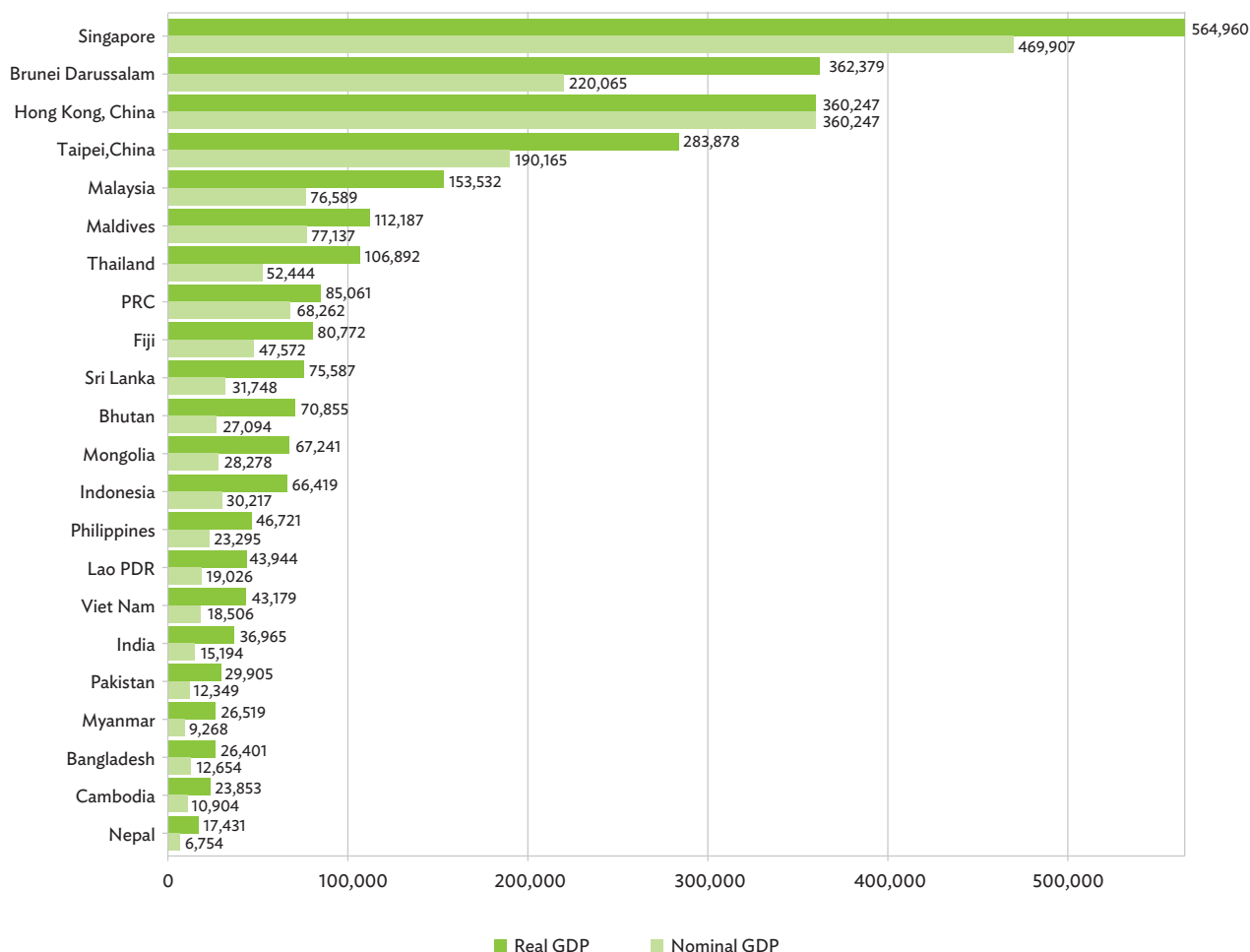
GDP = gross domestic product, HK$ = Hong Kong dollar, Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China.
Source: Table 3.1.

Disparities in Levels of Living

Levels of per capita income, real and nominal, presented in columns 6 and 7 of Table 3.1 offer insights into the distribution of income and disparities across these 22 participating economies in 2017. Wide disparities in per capita incomes exist between the richest and poorest economies (Figure 3.2). The bars shown in Figure 3.2 are heavily skewed to the right for the first four economies, with a sharp decline after Taipei,China. Table 3.2 presents some summary statistics on disparities in per capita real incomes of the Asia and Pacific region for 2011 and 2017.

Regional disparities may be examined using a range of measures: (i) relative sizes of the economies; (ii) differences between the lowest and highest per capita real GDP; (iii) coefficient of variation in real GDP and in per capita real GDP; (iv) standard deviation of logarithms of incomes; and (v) Gini coefficient.

When incomes exhibit a skewed distribution, like in Figure 3.2, then lognormal distribution may provide a good representation of the distribution. In that case, the standard deviation of logarithms of incomes would be a measure of inequality. The Gini coefficient, on the other hand, is used as a measure of inequality of the income distribution.

Table 3.2: Measures of Disparity in Real Gross Domestic Product and Per Capita Real Gross Domestic Product, 2011 (Revised) and 2017

Measures	Population[a] (thousand)		Real GDP[a] (HK$ million)		Per Capita Real GDP[a] (HK$)	
	2011	2017	2011	2017	2011	2017
Asia and the Pacific	3,563,976	3,785,647	144,077,957	232,344,462	40,426	61,375
Ratio of Highest to Lowest	3,416.94	3,227.93	2,693.84	2,288.90	39.00	32.41
Population-weighted						
Coefficient of Variation	n.a.	n.a.	73.07	73.25	71.25	64.13
Standard Deviation	n.a.	n.a.	28,185,638	45,502,946	28,802	39,361
Number of observations	n.a.	n.a.	22	22	22	22
Logarithmic						
Mean	n.a.	n.a.	7.59	7.79	4.61	4.79
Variance	n.a.	n.a.	0.40	0.40	0.05	0.05
Standard Deviation	n.a.	n.a.	0.63	0.63	0.23	0.22
Gini Coefficients	n.a.	n.a.	n.a.	n.a.	0.271	0.266

GDP = gross domestic product, n.a. = not applicable.
[a] For 22 common participating economies in 2011 and 2017.
Sources: Asian Development Bank estimates. Data for population refers to mid-year population estimates supplied by the participating economies for the International Comparison Program.

Given the enormous difference in population sizes of the economies, using population share weighted measures shown in Table 3.2 is appropriate.

Table 3.2 shows distribution data from the 2011 as well as 2017 ICP in the region. The per capita real incomes are not comparable across the two benchmark years 2011 and 2017 because PPPs are meant to adjust price levels across economies in a given year and cannot be used to make temporal comparisons. However, the distribution measures are comparable. By all indicators available for assessing inequality in the distribution of per capita real incomes across economies, inequality in the distribution of real incomes in the region has reduced over the period 2011 to 2017. The ratio of the highest to lowest per capita real income dropped from 39.00 in 2011 to 32.41 in 2017. Over the same period, the coefficient of variation and standard deviation of logarithms declined, though by a smaller magnitude, and similarly, the Gini coefficient declined from 0.271 to 0.266.

Another dimension for discussion on inequality is to see whether per capita real incomes or per capita nominal incomes are more equally distributed. The nature of distribution of incomes can be studied using Lorenz curves for real and nominal incomes.

The Lorenz curves shown in Figure 3.3 are drawn by connecting data points for the 22 participating economies after they are arranged from the lowest per capita income to the highest. The Lorenz curve plots the cumulative percentage shares of expenditures against the cumulative percentage shares of population of the economies in Asia and the Pacific, starting in order from the economy with lowest per capita GDP to the highest. The 45 degree line represents the line of equality; the area between the line of equality and the line representing per capita distribution provides an indication of the extent of inequality. Figure 3.3 shows that the distribution of per capita income is more equal when using real GDP compared to nominal GDP.

Figure 3.3: Lorenz Curves for Per Capita Real and Nominal Gross Domestic Product, 2017
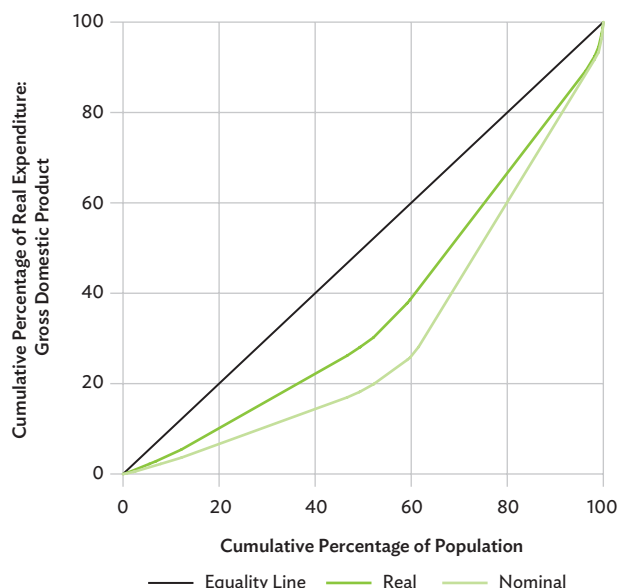
Note: Expenditure is represented by economy-specific per capita gross domestic product.

Source: Asian Development Bank estimates.

This is consistent with the fact that PPPs are significantly lower than the corresponding exchange rates for many low income economies. Column 16 of Table 3.1 shows that PLIs (with Hong Kong, China = 100) for a number of low and lower-middle income economies are about one-third of that in Hong Kong, China. Myanmar has a PLI of 35, Bhutan 38, Nepal 39, and Pakistan and India both 41, so their nominal incomes would be 35% to 41% of their real incomes. The Lorenz curves in Figure 3.3 only measure inequality in the distribution of income between the 22 participating economies and these do not account for inequality within each of the 22 participating economies. These Lorenz curves also show that the populations in economies that are in the poorest 40% of the region account for around 22% of real GDP of the region whereas they account for only about 14% of the nominal GDP of the region.

Table 3.3 provides an indication of inequality within each of the economies in Asia and the Pacific as measured by the Gini coefficient. As Gini measures of inequality within each economy are based generally on household surveys that are not conducted frequently in many economies, the table shows Gini measures for the years closest to the benchmark years 2011 and 2017. Any reduction in inequality in the distribution of income or expenditure enhances welfare within the economy. So, it is reassuring to note a significant reduction in inequality in the People's Republic of China from 0.424 to 0.385 and in Indonesia from 0.411 to 0.394. Increased inequality is observed only in Pakistan and Sri Lanka, with Viet Nam showing an insignificant increase. Despite reductions in inequality, the level of inequality remains high at above 0.350 in most economies with available data. In Taipei,China, which belongs to the high income group of economies, inequality is low, with a Gini of only 0.277 in 2017.

The per capita real incomes in the last two columns cannot be compared as they refer to different years and are based on PPPs for those years. However, as most economies of the region had impressive growth performance over the period 2011 to 2017, results indicate a general increase in the economic welfare of the populations as measured by the twin indicators, per capita real GDP and the Gini measure of inequality. At the regional level, there has been a reduction, albeit small, in inequality between economies of the region, which indicates a degree of economic convergence.

Price Level Indexes for Gross Domestic Product of the Economies of the Region

The PLI is defined as the ratio of PPP to exchange rate for a given economy. In column 16 of Table 3.1, the PLIs for all the economies are less than 100, with the exception of Hong Kong, China, which is the reference economy and hence has a PLI of 100 by definition. From this, it is difficult to draw any meaningful conclusions regarding price levels in different economies. For example, the PLI for India is 41, which means that the price level in India is 41% of that in Hong Kong, China. Is this because prices in India are low or is it because Hong Kong, China prices are high or both are low or high relative to the region?

Table 3.3: Per Capita Real Gross Domestic Product and Gini Coefficients, 2011 (Revised) and 2017

Economy	Gini Coefficient				Per Capita Real GDP[a] (HK$)	
	2011		2017		2011	2017
Bangladesh	0.321	(2010)	0.324	(2016)	14,715	26,401
Bhutan	0.388	(2012)	0.374		39,896	70,855
Brunei Darussalam	...		...		439,565	362,379
Cambodia	...		...		13,888	23,853
China, People's Republic of	0.424		0.385	(2016)	54,043	85,061
Fiji	0.367	(2013)	...		47,339	80,772
Hong Kong, China	...		...		273,549	360,247
India	0.378		...		23,589	36,965
Indonesia	0.411		0.394		48,211	66,419
Lao People's Democratic Republic	0.364	(2012)	...		22,951	43,944
Malaysia	0.439		0.410	(2015)	111,962	153,532
Maldives	0.384	(2009)	0.313	(2016)	66,359	112,187
Mongolia	0.339		0.327	(2016)	46,365	67,241
Myanmar	0.381	(2015)	0.307		17,669	26,519
Nepal	0.328	(2010)	...		11,270	17,431
Pakistan	0.309		0.335	(2015)	22,680	29,905
Philippines	0.465	(2012)	0.444	(2015)	29,803	46,721
Singapore	...		...		418,895	564,960
Sri Lanka	0.392	(2012)	0.398	(2016)	47,607	75,587
Taipei,China	0.296		0.277		213,157	283,878
Thailand	0.375		0.365		72,134	106,892
Viet Nam	0.356	(2012)	0.357	(2018)	23,874	43,179
Asia and the Pacific	...		...		40,426	61,375

... = data not available, GDP = gross domestic product, HK$ = Hong Kong dollar.
Note: For Taipei,China, the estimates for the Gini coefficient are based on per capita disposable income.
[a] For 22 common participating economies in 2011 and 2017.
Sources: Asian Development Bank estimates. Data for the Gini coefficients are obtained from World Bank. World Development Indicators. https://databank. worldbank.org/source/world-development-indicators (accessed 8 June 2020). For Taipei,China: Asian Development Bank. 2019b. *Key Indicators for Asia and the Pacific 2019*. Data for population refers to mid-year population estimates supplied by the participating economies for the International Comparison Program.

In view of this, a better option is to consider on PLIs expressed relative to the regional PLI set to 100. The PLIs, relative to the Asia and Pacific region, are in column 15 Table 3.1, where it shows that the PLI for Hong Kong, China is 156, indicating that the price level in Hong Kong, China is 56% higher than that of the regional average. Maldives (107); the People's Republic of China (125); Singapore (130); and Taipei,China (105) are the only other economies with PLIs higher than the regional average. It is somewhat surprising to see PLI for Maldives above

100, given its per capita real income, but the higher price level may stem from the fact that Maldives is an island economy. Fiji, which is also an island economy, has a PLI 92 close to the regional average. The PLI for India (64) is roughly half that of the People's Republic of China.

Figure 3.4 shows the relationship between PLIs and per capita real incomes based on results from the 2017 ICP cycle. Data points for the chart are drawn from columns 6 and 15 of Table 3.1.

Figure 3.4: Price Level Index versus Per Capita Real Gross Domestic Product, 2017
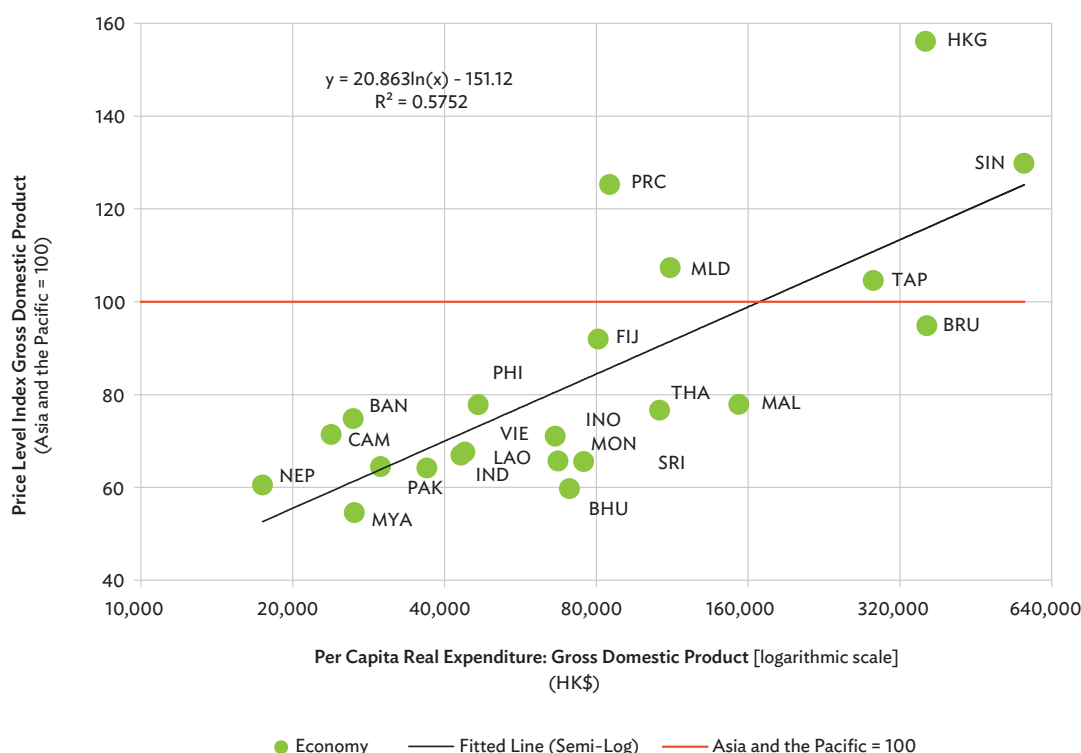
$$y = 20.863\ln(x) - 151.12$$
$$R^2 = 0.5752$$

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Source: Asian Development Bank estimates.

The pattern of the relationship between the PLI and per capita real GDP (in log-scale) shown in Figure 3.4 is consistent with the expectation of an upward sloping relationship that shows increases in PLI with increases in per capita real GDP, known as the Penn effect. A large body of literature (Kravis and Lipsey 1978, Clague 1986) explains price levels and relies heavily on the Balassa-Samuelson effect (Balassa 1964, Samuelson 1964) which explains the differences in prices and incomes across economies as a result of differences in productivity. The main explanation lies in the difference in PLIs for tradable and non-tradable goods and services and productivity level differences between lower-middle and high income economies. Generally, higher productivity in the traded sector tends to drive up wages in the non-traded sector and in the general economy and hence lead to higher relative price (and wages) in non-tradable goods and services. If productivity growth

in non-traded sector is limited, the prices in non-traded sector tend to rise. This in turn leads to the conclusion that generally an economy's PLI is expected to increase with real income, known as the static Penn effect.

The Penn effect for the region (Figure 3.4) is similar to that observed in global and regional comparisons in the past. While the data points for the lower-middle income economies are closely clustered around the fitted line, there is a large degree of variability in PLIs around the fitted line for upper-middle and high income economies. The PLI for the People's Republic of China is higher than what the Penn effect relationship would predict. A number of lower-middle income economies like India, the Lao People's Democratic Republic, Myanmar, and Viet Nam exhibit lower PLIs than what the fitted relationship would imply.

Household Final Consumption: Individual Consumption Expenditure by Households

As GDP includes consumption by households, general government, gross fixed capital formation (GFCF), changes in inventories, acquisitions less disposals of valuables, and net balance of exports, it may be useful to focus on per capita consumption expenditure of households as an indicator of material well-being. Relative levels of per capita real and nominal individual consumption expenditure by households (ICEH) are presented in this section.

A reliable indicator of material well-being is the household consumption expenditure or household final consumption. This aggregate combines ICEH with expenditure by nonprofit institutions serving households (NPISH). The main reason for considering these two together is that, in many economies, national accounts are not detailed enough to provide separate estimates of expenditure by NPISH. Results from the ICP for ICEH are also of critical importance when it comes to poverty assessment in the region as well as in the world. The international poverty line of $1 per day and $2 per day were originally based on PPPs for household consumption expenditure. Following the completion of the 2011 ICP cycle, the international poverty line was set at $1.90 per day.

Size and Distribution

Table 3.4 summarizes the main results for ICEH in the region. Columns 4 and 5 show the real and nominal size of ICEH in the region. The total size of real ICEH is HK$117.1 trillion compared to nominal ICEH of HK$67.6 trillion. The nominal ICEH is significantly smaller compared to real size since PPPs used in converting ICEH in local currency units into Hong Kong dollars are uniformly lower than the exchange rates for all the economies other than Hong Kong, China.

The People's Republic of China at HK$46.6 trillion followed by India with HK$31.4 trillion and Indonesia with HK$9.6 trillion are the top three economies with the highest real ICEH. Economies with the lowest real ICEH, in order from bottom to top, are Maldives, Bhutan, Brunei Darussalam, and Fiji. Rankings of the economies by the size of their real and nominal ICEH are very similar except in the case of Hong Kong, China, which drops from a rank of 7 in nominal terms to 11 in real terms. Bangladesh, Bhutan, Malaysia, Maldives, Pakistan, the Philippines, Thailand, and Viet Nam all have a difference of one rank between real and nominal ICEH, while Taipei,China differed by two ranks.

An interesting picture emerges when the sizes of India and Indonesia relative to the People's Republic of China in terms of real GDP are compared with their relative sizes of ICEH. In the case of real GDP, from Table 3.1, India's is roughly 41% and Indonesia's roughly 15% of that of the People's Republic of China. In contrast, from Table 3.4, for ICEH, India is roughly 67% and Indonesia roughly 20% of the People's Republic of China. This means that the gap between these economies narrows significantly when ICEH is compared and therefore the gap in material well-being is somewhat smaller. This gap can be explained by the large size of GFCF and net exports recorded for the People's Republic of China.

The PPPs (column 2) for ICEH are generally well below the exchange rates (column 3). For example, for India, PPP for ICEH is 3.12 Indian rupees (₹) for one Hong Kong dollar (HK$1 = ₹3.12), compared to the exchange rate of HK$1 = ₹8.36. Several economies from South Asia, Nepal, India, Bhutan, and Pakistan, all have PPPs around 35%–40% of their respective exchange rates. The PLIs, with Hong Kong, China equal to 100, are below 100 for all the economies of the region. PLIs range from a low of 36 for Myanmar and Nepal to a high PLI of 98 for Singapore followed a PLI of 79 for Maldives. Maldives being an island economy with a large tourism sector partly explains such a high PLI.

Table 3.4: Summary Results for Individual Consumption Expenditure by Households, 2017
(Hong Kong, China as base)

Economy	PPPs (HK$ = 1.00)	Exchange Rates (HK$ = 1.00)	Expenditure (HK$ billion)		Expenditure per Capita (HK$)		Expenditure per Capita Indexes				Shares (Asia and the Pacific = 100.00)			PLIs		Reference Data	
			Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Asia and the Pacific = 100		HKG = 100		Expenditure		Population	Asia and the Pacific = 100	HKG = 100	Population (million)	Expenditure in LCU (billion)
							Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Bangladesh	4.73	10.32	3,120	1,429	19,282	8,833	62	49	8	4	2.66	2.12	4.27	79	46	161.80	21,131
Bhutan	3.28	8.36	26	10	36,422	14,296	118	80	15	6	0.02	0.02	0.02	68	39	0.73	165
Brunei Darussalam	0.11	0.18	31	19	71,556	45,068	231	253	30	19	0.03	0.03	0.01	109	63	0.43	17
Cambodia	238.51	519.75	303	139	19,097	8,763	62	49	8	4	0.26	0.21	0.42	80	46	15.85	89,831
China, People's Republic of	0.66	0.87	46,611	35,703	33,620	25,753	109	144	14	11	39.80	52.85	36.62	133	77	1,386.40	82,075
Fiji	0.16	0.27	47	28	53,908	32,106	174	180	22	13	0.04	0.04	0.02	103	60	0.88	11
Hong Kong, China	1.00	1.00	1,785	1,785	241,555	241,555	781	1,354	100	100	1.52	2.64	0.20	173	100	7.39	2,663
India	3.12	8.36	31,360	11,706	23,954	8,941	77	50	10	4	26.78	17.33	34.58	65	37	1,309.20	166,226
Indonesia	815.39	1,716.98	9,551	4,536	36,471	17,320	118	97	15	7	8.16	6.71	6.92	82	47	261.89	13,587,213
Lao People's Democratic Republic	502.05	1,071.64	152	71	22,065	10,337	71	58	9	4	0.13	0.11	0.18	81	47	6.90	140,698
Malaysia	0.28	0.55	2,707	1,357	84,526	42,379	273	237	35	18	2.31	2.01	0.85	87	50	32.02	1,353
Maldives	1.57	1.97	19	15	38,688	30,743	125	172	16	13	0.02	0.02	0.01	138	79	0.49	75
Mongolia	139.95	313.06	107	48	33,862	15,137	109	85	14	6	0.09	0.07	0.08	77	45	3.15	27,876
Myanmar	62.45	174.56	784	281	14,750	5,278	48	30	6	2	0.67	0.42	1.40	62	36	53.15	85,981
Nepal	4.89	13.41	410	149	14,212	5,180	46	29	6	2	0.35	0.22	0.76	63	36	28.83	2,611
Pakistan	5.33	13.53	5,135	2,022	25,791	10,153	83	57	11	4	4.39	2.99	5.26	68	39	199.11	33,270
Philippines	3.11	6.47	3,738	1,796	35,630	17,115	115	96	15	7	3.19	2.66	2.77	83	48	104.92	15,808
Singapore	0.17	0.18	969	947	172,694	168,702	558	945	71	70	0.83	1.40	0.15	169	98	5.61	467
Sri Lanka	8.89	19.56	929	422	43,335	19,698	140	110	18	8	0.79	0.63	0.57	79	45	21.44	13,317
Taipei,China	2.66	3.91	3,484	2,372	147,894	100,673	478	564	61	42	2.98	3.51	0.62	118	68	23.56	17,501
Thailand	2.13	4.36	3,466	1,694	51,232	25,042	166	140	21	10	2.96	2.51	1.79	85	49	67.65	15,452
Viet Nam	1,250.81	2,870.44	2,364	1,030	25,088	10,932	81	61	10	5	2.02	1.52	2.49	76	44	94.24	5,005,975
Asia and the Pacific	n.a.	n.a.	117,100	67,560	30,933	17,846	100	100	13	7	100.00	100.00	100.00	100	n.a.	3,785.65	n.a.

HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency unit; n.a. = not applicable; PLI = price level index; PPP = purchasing power parity; XR = exchange rate.
Note: In this table, individual consumption expenditure by household (ICEH) includes expenditure by nonprofit institutions serving households (NPISH).
Sources: Asian Development Bank estimates. Expenditures in local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

The PLI, expressed relative to the Asia and Pacific region set at 100, for Hong Kong, China is 173. Six more economies have PLIs above 100. The PLI for the People's Republic of China is 33% higher than the regional average. PLIs for the high income economies of Brunei Darussalam; Hong Kong, China; Singapore; and Taipei,China are all above the regional average. Maldives and Fiji are two upper-middle income level economies with PLIs of 138 and 103 respectively.

Per Capita Real Levels and their Distribution

The per capita ICEH is more relevant than the absolute size of ICEH when it comes to material well-being. Further, per capita real ICEH is a more appropriate indicator than per capita nominal ICEH because it more accurately reflects the command or purchasing power over goods and services enjoyed by households. Per capita ICEH for the region is HK$17,846 in nominal

terms and HK$30,933 in real terms. Thus, the per capita real ICEH for the region is 73% higher than its nominal ICEH.

As per capita real ICEH is adjusted for the size of population in these economies, rankings based on per capita real ICEH differ significantly from the rankings based on the total size of real ICEH. Columns 6 and 7 can be used to rank these economies by their per capita real and nominal ICEH. By both of these measures, the highest ranked economies, starting from the top, are Hong Kong, China; Singapore; Taipei,China; Malaysia; and Brunei Darussalam. The People's Republic of China has a somewhat lower rank of 14 in terms of per capita real ICEH compared to its rank of 8 based on per capita real GDP. India, Thailand, and Viet Nam have the same rankings for both per capita real GDP and per capita real ICEH of 17th, 7th and 16th, respectively.

Figure 3.5: Per Capita Real Gross Domestic Product and Individual Consumption Expenditure by Households, 2017
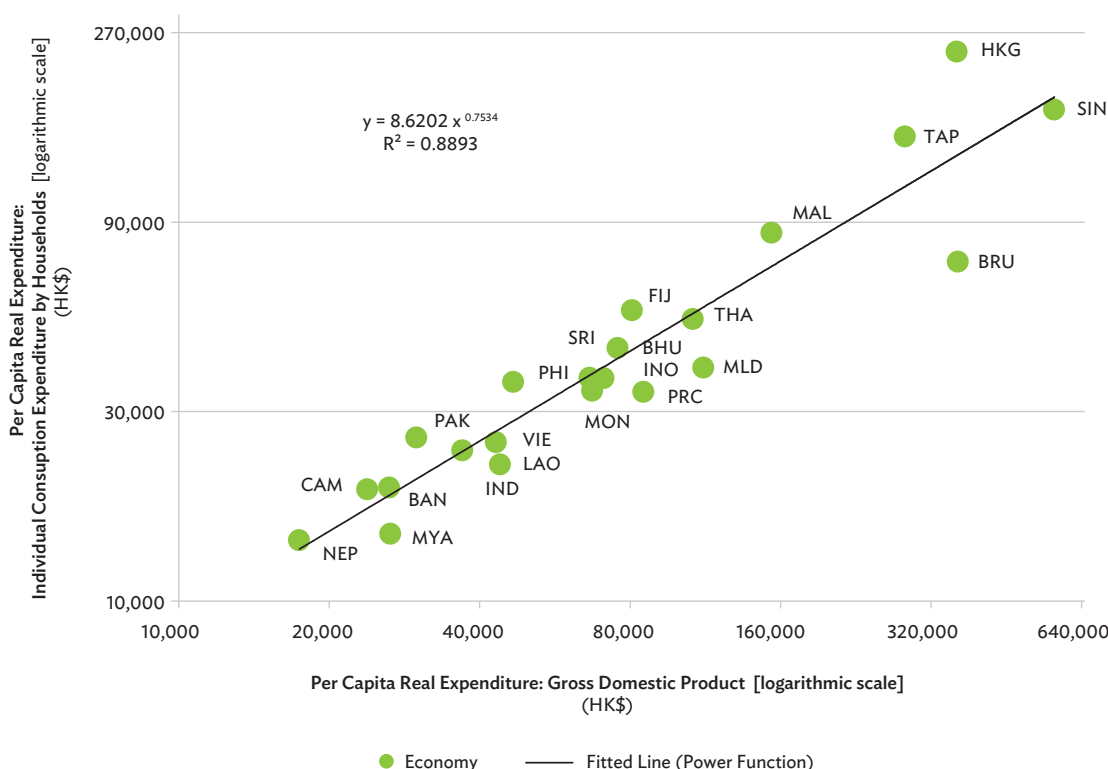
BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Note: In this figure, individual consumption expenditure by households (ICEH) includes expenditure by nonprofit institutions serving households (NPISH).
Source: Asian Development Bank estimates.

The relationship between per capita real ICEH and per capita real GDP as shown in Figure 3.5 is quite interesting. Since per capita real ICEH and per capita real GDP represent consumption and incomes respectively, a strong positive relationship is expected. Figure 3.5 shows a logarithmic-linear relationship between these two variables. The slope of the fitted line shows the elasticity of ICEH with respect to GDP. The estimated elasticity of 0.7534 means that one percentage point increase in per capita real GDP will lead to a 0.7534 percentage change in per capita real ICEH. Figure 3.5 also shows that observations for upper-middle and lower-middle income economies are closely clustered around the fitted line whereas there is increased variability for high income economies.

An equally interesting feature to examine is the ratio of per capita real ICEH to per capita real GDP.[8] The ratio of per capita real ICEH (column 6 in Table 3.4) to per capita real GDP (column 6 in Table 3.1) reveals considerable variability across different economies. Figure 3.6 shows that this ratio ranges from a low of 20% for Brunei Darussalam, a high income economy, to a high of 86% for Pakistan, which is a lower-middle income economy. Nepal at 82%, Cambodia at 80%, and the Philippines at 76% all have high ratios. At the other end of the spectrum, Singapore has a low ratio of 31% compared to Hong Kong, China at 67%. In Brunei Darussalam, the ratio is low because it is a resource-rich economy with sizable GFCF and collective consumption expenditure by government (CCEG).
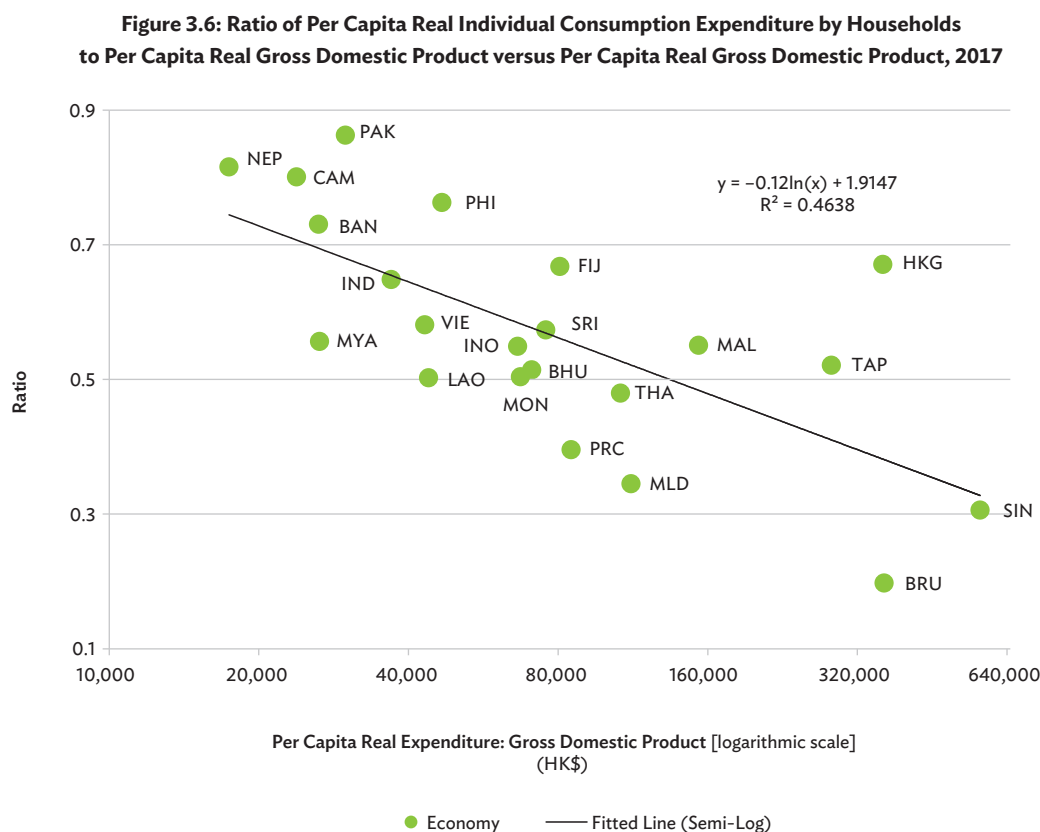
**Figure 3.6: Ratio of Per Capita Real Individual Consumption Expenditure by Households
to Per Capita Real Gross Domestic Product versus Per Capita Real Gross Domestic Product, 2017**

$$y = -0.12\ln(x) + 1.9147$$
$$R^2 = 0.4638$$

Per Capita Real Expenditure: Gross Domestic Product [logarithmic scale]
(HK$)

● Economy   —— Fitted Line (Semi-Log)

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Note: In this figure, individual consumption expenditure by households (ICEH) includes expenditure by nonprofit institutions serving households (NPISH).
Source: Asian Development Bank estimates.

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8   Since the real components of GDP are not additive, hence ratios used in Figure 3.6 need to be cautiously interpreted. However, the trend is clearly evident.

In Singapore, the low ratio stems from a large net exports aggregate that accounts for a large share of GDP. Generally, while the absolute value of per capita real ICEH increases with per capita real GDP, as seen in Figure 3.5, the ratio tends to decline, with the elasticity in Figure 3.5 around 0.75. Figure 3.6 shows a downward sloping relationship between the ratio of per capita real ICEH to per capita real GDP, but the scatter of observations shows sizable deviations from the fitted line at all income levels.

Disparities and Inequality in Individual Consumption Expenditure by Households

As the region is home to economies with very large and very small populations, it is expected that the ratio of the highest to lowest size of ICEH would be big; it is of the order of 2,451 (Table 3.5). The corresponding ratio for population is 3,228 and the ratio for real GDP is 2,289 (Table 3.2). In terms of total size, the dispersion in the size of ICEH and GDP are somewhat similar and in line with dispersion in population sizes.

However, disparities are significantly more pronounced for per capita real GDP compared to the ratio for per capita real ICEH. From Table 3.2, in 2017, the ratio of

the highest to the lowest per capita real GDP is 32.41. In comparison, the highest in terms of per capita real ICEH is only 17 times higher than the lowest per capita real ICEH. This implies that disparities across the economies are significantly reduced when the yardstick for comparisons is per capita real ICEH.

Household Final Consumption: Actual Individual Consumption by Households

A comprehensive measure of goods and services consumed by the households is the actual individual consumption by households (AICH), a concept designed in the System of National Accounts 1993 (United Nations 1993) to capture ICEH and NPISH plus expenditures known as individual consumption expenditure by government (ICEG). The individual consumption expenditures of NPISH and government include expenditures incurred by them on housing, health care, recreation and culture, education, and social protection on behalf of individual households. Government services such as police, firefighting, and defense are classified as collective consumption because they are provided to the population as a whole.

Table 3.5: Measures of Disparity in Real Individual Consumption Expenditure By Households and Per Capita Real Individual Consumption Expenditure By Households, 2017			
Measures	Population (thousand)	Real ICEH and NPISH (HK$ million)	Per Capita Real ICEH and NPISH (HK$)
Asia and the Pacific	3,785,647	117,100,218	30,933
Ratio of Highest to Lowest	3,227.93	2,450.83	17.00
Population-weighted			
Coefficient of Variation	n.a.	57.95	53.24
Standard Deviation	n.a.	16,963,978	16,468
Number of observations	n.a.	22	22
Gini Coefficients	n.a.	n.a.	0.165

HK$ = Hong Kong dollar, ICEH = individual consumption expenditure by households, n.a. = not applicable, NPISH = nonprofit institutions serving households.
Note: In this table, individual consumption expenditure by households (ICEH) includes expenditure by nonprofit institutions serving households (NPISH).
Sources: Asian Development Bank estimates. Data for population refers to mid-year population estimates supplied by the participating economies for the International Comparison Program.

The AICH is a better indicator for measuring material well-being than the overall GDP because this includes goods and services consumed by the households to meet their individual consumption needs from all three sources: consumption expenditure incurred by households; expenditure incurred by NPISH on behalf of households; and government expenditure on behalf of households. However, the relative proportions of ICEH, NPISH, and ICEG tend to vary across economies in the region as governments in some economies tend to be proactive and provide services aimed at low income households.

Size and Distribution

Table 3.6 presents the full set of results for AICH which include estimates of PPPs, price levels, real and nominal size of AICH, per capita real and per capita nominal AICH, and the shares of different economies in the total AICH for the region.

As in the case of GDP and ICEH, PPPs for AICH (column 2) are uniformly lower than exchange rates (column 3). A comparison of PPPs for ICEH (column 2 of Table 3.4) shows that PPPs for AICH are lower than PPPs for ICEH, except for the People's Republic of China and India. Since the main difference between AICH and ICEH is government expenditure on behalf of households, it implies that the prices paid for goods and services provided by the government are lower than the prices paid by the households. The PLIs observed for AICH are, accordingly, lower than their counterparts for ICEH.

The total size of AICH for the region is HK$134.3 trillion in real terms and HK$78.9 trillion in nominal terms. In order of size, the People's Republic of China, India, and Indonesia remain the three largest economies by the size of AICH, both in real and nominal terms. The economies with smallest AICH, real and nominal, are Bhutan, Maldives and Brunei Darussalam. Bhutan is the smallest in nominal terms but Maldives is the smallest in real terms. In terms of real AICH, India is 57% and Indonesia is

18% of that in the People's Republic of China. The largest economy by AICH, the People's Republic of China, is 2,447 times the size of Maldives, which to a large degree reflects their relative population sizes. The population of the People's Republic of China is 2,820 times that of Maldives.

Relative Disparities

When adjusted for population size, relative disparities in per capita real AICH are considerably lower than those by the per capita real GDP. As in the case of per capita real GDP and ICEH, rankings change significantly for per capita AICH. Hong Kong, China has the highest per capita real AICH, which is 7.2 times larger than the regional average, followed by Singapore at 5.4 times and Taipei,China at 4.9 times the regional average. Brunei Darussalam, with a high per capita real GDP at 5.9 times the regional average, has a considerably lower per capita real AICH of only 2.7 times the size of the region. Nepal has the lowest per capita real AICH in the region, followed by Myanmar, Bangladesh, and Cambodia. An important factor contributing to these disparities is the ability of respective governments to provide goods and services to individual households. Governments in high income and upper-middle income economies have a higher capacity to provide goods and services to their population. Consequently, per capita government expenditure on behalf of households is likely to be distributed more unequally than ICEH.

Figure 3.7 represents the distribution of per capita real GDP, real ICEH, and real AICH. The Lorenz curves plot the cumulative percentage shares of expenditures against the cumulative percentage shares of population of the economies in Asia and the Pacific, starting in order from the economy with the lowest per capita income and expenditure to the highest. For example, the Lorenz curve for GDP uses population shares of economies ranked from the bottom to the top on the basis of per capita real GDP.

Table 3.6: Summary Results for Actual Individual Consumption by Households, 2017
(Hong Kong, China as base)

Economy	PPPs (HK$ = 1.00)	Exchange Rates (HK$ = 1.00)	Expenditure (HK$ billion)		Expenditure per Capita (HK$)		Expenditure per Capita Indexes				Shares (Asia and the Pacific = 100.00)			PLIs		Reference Data	
			Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Asia and the Pacific = 100		HKG = 100		Expenditure		Population	Asia and the Pacific = 100	HKG = 100	Population (million)	Expenditure in LCU (billion)
							Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Bangladesh	4.58	10.32	3,285	1,457	20,301	9,004	57	43	8	4	2.45	1.85	4.27	76	44	161.80	15,037
Bhutan	3.05	8.36	31	11	43,196	15,752	122	76	17	6	0.02	0.01	0.02	62	36	0.73	96
Brunei Darussalam	0.11	0.18	42	25	97,121	58,920	274	283	38	23	0.03	0.03	0.01	103	61	0.43	4
Cambodia	227.84	519.75	335	147	21,161	9,276	60	45	8	4	0.25	0.19	0.42	75	44	15.85	76,416
China, People's Republic of	0.67	0.87	57,692	44,670	41,613	32,220	117	155	16	13	42.96	56.64	36.62	132	77	1,386.40	38,741
Fiji	0.15	0.27	53	30	60,057	34,687	169	166	24	14	0.04	0.04	0.02	98	58	0.88	8
Hong Kong, China	1.00	1.00	1,887	1,887	255,310	255,310	720	1,225	100	100	1.41	2.39	0.20	170	100	7.39	1,887
India	3.15	8.36	32,884	12,382	25,118	9,458	71	45	10	4	24.49	15.70	34.58	64	38	1,309.20	103,468
Indonesia	780.92	1,716.98	10,578	4,811	40,391	18,371	114	88	16	7	7.88	6.10	6.92	77	45	261.89	8,260,567
Lao People's Democratic Republic	462.27	1,071.64	173	75	25,055	10,808	71	52	10	4	0.13	0.09	0.18	73	43	6.90	79,927
Malaysia	0.27	0.55	3,070	1,505	95,858	47,013	270	226	38	18	2.29	1.91	0.85	83	49	32.02	831
Maldives	1.48	1.97	24	18	47,964	36,053	135	173	19	14	0.02	0.02	0.01	128	75	0.49	35
Mongolia	125.77	313.06	131	52	41,482	16,664	117	80	16	7	0.10	0.07	0.08	68	40	3.15	16,428
Myanmar	59.20	174.56	865	293	16,267	5,517	46	26	6	2	0.64	0.37	1.40	58	34	53.15	51,181
Nepal	4.74	13.41	434	153	15,041	5,319	42	26	6	2	0.32	0.19	0.76	60	35	28.83	2,057
Pakistan	5.25	13.53	5,495	2,131	27,599	10,704	78	51	11	4	4.09	2.70	5.26	66	39	199.11	28,840
Philippines	3.06	6.47	4,083	1,929	38,916	18,383	110	88	15	7	3.04	2.45	2.77	80	47	104.92	12,475
Singapore	0.17	0.18	1,081	1,043	192,614	185,763	543	892	75	73	0.81	1.32	0.15	164	96	5.61	185
Sri Lanka	7.91	19.56	1,114	451	51,965	21,011	146	101	20	8	0.83	0.57	0.57	69	40	21.44	8,814
Taipei,China	2.58	3.91	4,097	2,707	173,917	114,917	490	552	68	45	3.05	3.43	0.62	112	66	23.56	10,576
Thailand	2.05	4.36	4,202	1,977	62,106	29,226	175	140	24	11	3.13	2.51	1.79	80	47	67.65	8,611
Viet Nam	1,174.31	2,870.44	2,729	1,116	28,955	11,845	82	57	11	5	2.03	1.42	2.49	70	41	94.24	3,204,309
Asia and the Pacific	n.a.	n.a.	134,284	78,873	35,472	20,835	100	100	14	8	100.00	100.00	100.00	100	n.a.	3,785.65	n.a.

HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency unit; n.a. = not applicable; PLI = price level index; PPP = purchasing power parity; XR = exchange rate.
Note: In this table, actual individual consumption by households includes individual consumption expenditure by households, nonprofit institutions serving households, and government.
Sources: Asian Development Bank estimates. Expenditures in local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Figure 3.7: Lorenz Curves for Per Capita Real Gross Domestic Product and Per Capita Real Household Consumption Aggregates, 2017
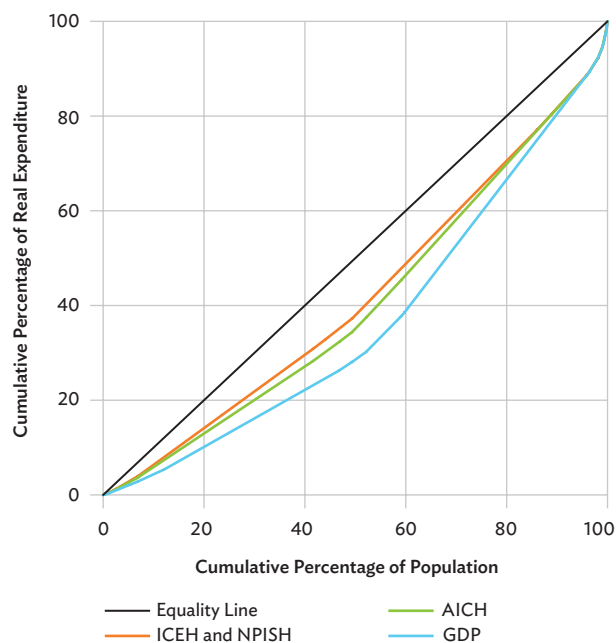
AICH = actual individual consumption by households, GDP = gross domestic product, ICEH = individual consumption expenditure by households, NPISH = nonprofit institutions serving households.
Note: Expenditure is represented by the economy-specific per capita expenditure (GDP, ICEH and NPISH, and AICH).
Source: Asian Development Bank estimates.

The area between the diagonal line, which shows the line of equality, and the Lorenz curve is a measure of inequality. The Gini coefficient, a commonly used measure of inequality, is equal to one minus the area under the Lorenz curve or, equivalently, twice the size of the area between the diagonal and the Lorenz curve.

The highest level of disparity among the three measures is associated with the distribution of per capita real GDP. Inequality in the distribution of ICEH (including NPISH) is the lowest as the Lorenz curve for ICEH is closest to line of equality. The per capita real AICH has slightly higher disparity, largely the result of the ability of governments of high income economies to provide higher levels of government goods and services for individual consumption. The Gini coefficient for per capita real ICEH is 0.165 (Table 3.5), for per capita real AICH 0.192, and for per capita real GDP is 0.266 (Table 3.2), implying that from a material well-being perspective

inequality is less severe. Higher inequality in per capita real GDP could stem partly from differences in the magnitudes of net exports and per capita real GFCF.

Price Levels

The price level index (PLI) for AICH, relative to the Asia and Pacific region (equal to 100), varies from a low of 58 for Myanmar to a high of 170 for Hong Kong, China. As expected, the PLIs for high income economies are above the regional average, with a PLI of 170 for Hong Kong, China; 164 for Singapore; 112 for Taipei,China; and 103 for Brunei Darussalam. The lowest PLIs are for Myanmar at 58, Nepal at 60, Bhutan at 62, and India at 64. The People's Republic of China, with a PLI of 132, is above the expected price level for an upper-middle income economy.

The relationship between PLI for AICH and per capita real GDP shown in Figure 3.8 is consistent with the notion that PLIs for household consumption expenditure increase with per capita real GDP. There are several upper-middle income economies that have PLIs above what the fitted line would predict, like the People's Republic of China at 132 and Maldives at 128. The figure also shows that PLIs for lower-middle and low income economies are close to the regression line, but there is more variability in PLIs around the fitted line for economies in the upper-middle and high income groups.

Household Consumption

As noted earlier, the Asia and Pacific region comprises economies that differ significantly in population size and geographic location. The People's Republic of China and India are large economies both in population size and the sizes of their economies. Both economies comprise provinces which are quite diverse in terms of climate; level of development; and food and clothing habits, tastes, and preferences.

Figure 3.8: Per Capita Real Gross Domestic Product and Price Level Indexes for Actual Individual Consumption by Households, 2017
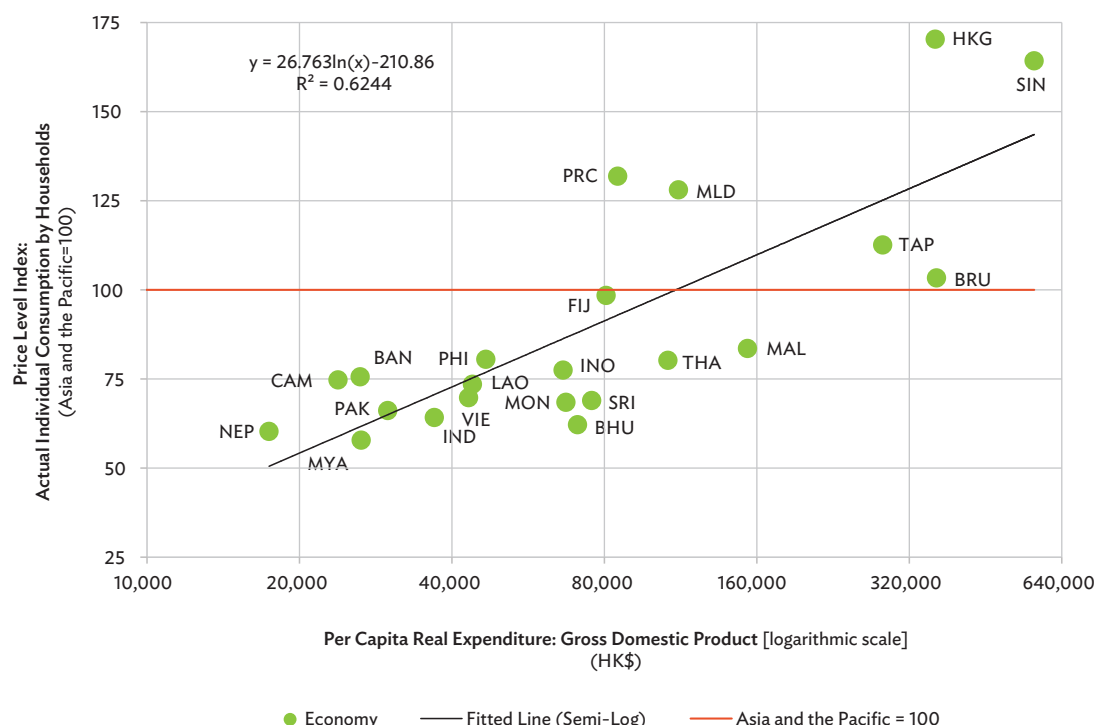
BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Source: Asian Development Bank estimates.

In contrast, Hong Kong, China and Singapore are high income and fully urban economies, while Fiji and Maldives are small island economies with large tourism sectors, which again influences consumption structure and patterns. Consequently, examining consumption profiles for different components can provide further insights into the comparisons on the patterns of consumption in the economies.

Food and Its Components

Table 3.7 presents the composition of food consumption under the categories of bread and cereals, meat and fish, fruits and vegetables, and other food and non-alcoholic beverages. Because per capita real expenditures for each of these components are not additive due to the use of Gini-Éltető-Köves-Szulc (GEKS) aggregation procedure, the table presents the index of per capita real expenditure expressed relative to Asia and the Pacific average, which is set at 100.[9] All the indexes are arranged in descending order based on per capita real AICH. A quick perusal of the columns shows a strong positive association between AICH and the components in columns 3 to 8.

Table 3.7 provides fascinating insights into consumption habits in different economies. Column 3 shows the index of food and non-alcoholic beverages expenditure per capita in real terms, with several interesting features.

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9   Chapter 6 discusses the details of the GEKS procedure and lack of additivity.

Table 3.7: Per Capita Real Expenditure Indexes on Food and Non-alcoholic Beverages, 2017
(Asia and the Pacific = 100)

Economy	AICH[a]	Food and Non-alcoholic Beverages	Food	Bread and Cereals	Meat and Fish	Fruits and Vegetables	Other Food and Non-alcoholic Beverages
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hong Kong, China	720	358	346	172	675	186	351
Singapore	543	188	170	131	216	133	256
Taipei,China	490	244	234	234	291	242	201
Malaysia	270	261	261	166	324	209	315
Brunei Darussalam	274	151	142	151	214	71	172
Thailand	175	179	163	151	167	208	175
Fiji	169	227	224	205	176	268	239
Sri Lanka	146	139	142	219	82	80	179
Maldives	135	119	108	89	192	58	147
Bhutan	122	157	152	173	74	146	215
China, People's Republic of	117	86	86	61	133	91	60
Mongolia	117	136	130	82	232	21	205
Indonesia	114	123	114	122	151	65	149
Philippines	110	192	180	274	281	71	160
Asia and the Pacific	100	100	100	100	100	100	100
Viet Nam	82	96	96	126	157	53	55
Pakistan	78	101	100	112	43	65	167
Lao People's Democratic Republic	71	113	99	122	160	61	107
India	71	88	91	92	29	119	108
Cambodia	60	107	107	161	119	60	93
Bangladesh	57	120	124	232	89	86	88
Myanmar	46	91	92	84	120	92	70
Nepal	42	99	103	164	55	98	94

AICH = Actual individual consumption by households.
[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.
Source: Asian Development Bank estimates.

Though the People's Republic of China is the largest economy and is an upper-middle income economy, it has the lowest index of per capita real expenditure on food and non-alcoholic beverages, at 86. This finding is consistent with the index of 82 reported in the 2011 ICP cycle (ADB 2014). India's consumption of food and non-alcoholic beverages has a similarly low index of 88. Most upper-middle income level economies report indexes well above 100. Singapore has a relatively low index for food categories in comparison to other two richest economies—Hong Kong, China and Taipei,China. Of particular note is Nepal, which has

the lowest per capita real GDP and AICH indexes, but has per capita indexes of 99 for food and non-alcoholic beverages and 103 for food (both near the regional average). The composition of food aggregate is also interesting. There are certain economies which exhibit higher preference for meat and fish compared to bread and cereals. These include economies like Hong Kong, China; Malaysia; Maldives; Mongolia; the People's Republic of China; and Singapore. The opposite is true for Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka, where consumption of rice and wheat is more prevalent. In landlocked Mongolia,

the consumption of meat is well above regional average. At the other end of the spectrum, India's meat consumption index of only 29 may indicate a preference for fruits and vegetables, with an above regional average index of 119.

Nondurables, Semidurables, Durables, and Services

The consumption levels of goods and services in AICH are shown by the classification of expenditures into four broad categories: nondurables, semidurables, durables, and services. This classification is based on the Classification of Individual Consumption according to Purpose (COICOP), adopted by the United Nations Statistical Commission (UNSC) in 1999. COICOP classes and sub-classes are also divided into "services", "nondurables", "semidurables" and "durables". This supplementary classification provides for other analytic applications. For example, it is sometimes useful to estimate the stock of "capital goods" held by households; COICOP classes identified as "durables" provide the basic elements for such estimates. The results in Table 3.8 are based on the 1999 COICOP. The most recent version of COICOP (United Nations Statistical Division 2018) was adopted by UNSC in 2018, a year ahead of the current 2017 ICP cycle.

Table 3.8: Per Capita Real Expenditure Relatives of Components of Actual Individual Consumption by Households, 2017
(Asia and the Pacific = 100)

Economy	AICH[a]	Nondurables	Semidurables	Durables	Services
(1)	(2)	(3)	(4)	(5)	(6)
Hong Kong, China	720	367	1,259	1,298	917
Singapore	543	198	566	758	816
Taipei,China	490	327	760	743	512
Brunei Darussalam	274	204	234	227	184
Malaysia	270	290	222	271	290
Thailand	175	168	123	149	166
Fiji	169	210	122	200	121
Sri Lanka	146	114	279	16	193
Maldives	135	130	122	88	125
Bhutan	122	152	175	107	74
China, People's Republic of	117	97	93	167	109
Mongolia	117	133	111	60	86
Indonesia	114	120	127	111	109
Philippines	110	154	39	46	104
Asia and the Pacific	100	100	100	100	100
Viet Nam	82	103	82	104	69
Pakistan	78	111	93	23	66
Lao People's Democratic Republic	71	105	46	63	53
India	71	80	92	33	85
Cambodia	60	86	26	32	40
Bangladesh	57	96	62	21	33
Myanmar	46	79	28	8	27
Nepal	42	72	28	14	27

AICH = actual individual consumption by households.
[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.
Source: Asian Development Bank estimates.

Most of the items under food, non-alcoholic beverages, and alcoholic beverages are classified as nondurable. Electricity, gas, water, and pharmaceutical and medical products also belong to this group. Clothing, household textiles, glassware and similar items are classified under semidurable goods. Furnishings, floor coverings, major and small household electrical appliances, and transport equipment are all classified as durable. The services category is self-explanatory.

The patterns of indexes for relative per capita real expenditure with Asia and the Pacific as reference or equal to 100 for different COICOP categories exhibit different levels of variability across the 22 economies. The indexes for nondurables aggregate exhibit least spread, with the smallest index value of 72 for Nepal and the highest value of 367 for Hong Kong, China, which are also the lowest and highest per capita income economies in the region. The People's Republic of China and India have low index values of 97 and 80, respectively. When it comes to semidurables and durables, Hong Kong, China has the highest index by big margins with index values of 1,259 (semidurables) and 1,298 (durables) – the next highest values are for Taipei,China with 760 (semidurables) and 743 (durables) and Singapore with 566 (semidurables) and 758 (durables). Myanmar has the lowest index value for durables at 8. The maximum-to-minimum ratios for these two aggregates are 49 (semidurables) and 157 (durables). The index of per capita expenditure on services exhibits highest indexes for Hong Kong, China (917) followed by Singapore (816) and the least value of 27 for both Myanmar and Nepal. The spread between the highest and lowest for the services component also appear to be lower than those observed for durables and semidurables.

Education and Health

Table 3.9 presents indexes (Asia and the Pacific = 100) for per capita real AICH for education and health (columns 3 and 4 respectively), two major expenditure categories where government expenditure on

behalf of individuals can be significant. Generally, government expenditure enables lower income households to attain desirable levels of consumption of goods and services in education and health. The relative disparities in per capita real expenditures on education and health are likely to be lower than those observed for expenditures on semidurables and durables. However, governments of high income economies can devote large outlays to education and health, in which case disparities in education and health may reflect disparities in per capita real GDP and AICH. The top four ranked economies by per capita real AICH (Asia and the Pacific = 100) are also ranked at the top for education. The index value per capita real expenditure on education ranges from 673 for Brunei Darussalam, well above those for other high income economies, to 38 for Bangladesh and 37 for Nepal. The top four ranked economies for health comprise the top three ranked economies by per capita real AICH, joined by Maldives. The per capita index on health ranges from a maximum of 530 for Taipei,China to a minimum of 21 for Nepal and Bangladesh.

Focusing on the index for education, both Singapore and Taipei,China have a higher index than Hong Kong, China. Somewhat high index values for Mongolia at 234 and Sri Lanka at 208 are significantly higher than index values for the People's Republic of China (120) and India (64). The economy with the lowest index value is Nepal (37), followed by Bangladesh (38), Myanmar (40), India (64), and Pakistan (65).

In the per capita real expenditure index for health, the relative positions of the 22 economies differ significantly from the rankings for education. A relatively low value of 125 for the index for health for Brunei Darussalam is striking in contrast with its index for education (673). Taipei,China (530) heads the list followed by Hong Kong, China (335); Singapore (278); Maldives (181) and the People's Republic of China (173). A value of index for per capita real expenditure on health of 50 for India is just above Bangladesh and Nepal (21 each), Myanmar (31), the Philippines

Table 3.9: Per Capita Real Expenditure Indexes on Education and Health, Transportation and Communication, Recreation and Culture, and Restaurants and Hotels, 2017 (Asia and the Pacific = 100)

Economy	AICH[a]	Education[a]	Health[a]	Transportation and Communication	Transportation	Recreation and Culture[a]	Restaurants and Hotels
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hong Kong, China	720	336	335	501	466	2,528	1,581
Singapore	543	433	278	567	549	2,204	1,523
Taipei,China	490	362	530	524	503	1,132	923
Brunei Darussalam	274	673	125	244	274	334	335
Malaysia	270	209	108	352	309	382	711
Thailand	175	239	133	152	169	181	389
Fiji	169	176	60	181	148	73	41
Sri Lanka	146	208	109	175	202	341	98
Maldives	135	161	181	95	67	113	312
Bhutan	122	113	143	106	116	70	62
China, People's Republic of	117	120	173	123	117	151	106
Mongolia	117	234	89	90	90	94	54
Indonesia	114	134	52	126	128	103	257
Philippines	110	120	32	90	98	47	90
Asia and the Pacific	100	100	100	100	100	100	100
Viet Nam	82	144	73	64	72	87	93
Pakistan	78	65	58	37	32	71	43
Lao People's Democratic Republic	71	114	34	28	27	26	120
India	71	64	50	78	84	15	26
Cambodia	60	85	45	26	31	35	66
Bangladesh	57	38	21	18	21	22	31
Myanmar	46	40	31	13	12	12	45
Nepal	42	37	21	10	7	42	20

AICH = actual individual consumption by households.
[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.
Source: Asian Development Bank estimates.

(32), the Lao People's Democratic Republic (34) and Cambodia (45). Twelve out of 22 economies of the region have per capita real expenditure on health index values below the regional average.

Transport, Communication, Recreation and Culture, and Restaurants and Hotels

Indexes of per capita real expenditure (Asia and the Pacific = 100) for these four categories are presented in columns 5 to 8 of Table 3.9. Transport and communication expenditures are usually discretionary, unlike household expenditures on food, clothing, and housing, though communication is increasingly becoming a necessity even in low income economies. Consequently, the expectation is that per capita real expenditure on these categories of goods and services would exhibit larger dispersion and greater inequality in its distribution across the 22 participating economies.

As expected, the high income economies generally have the highest index value. When transport and communication are taken together, the economies with the highest index values are Singapore (567); Taipei,China (524); Hong Kong, China (501); and Malaysia (352). Malaysia's index is higher than Brunei Darussalam's (244). The disparities in this expenditure group are large, with Singapore's index being 59 times that of Nepal. The index of transport and communication in the People's Republic of China is 23% higher than the regional average, whereas in India it is 22% lower.

In transportation, the disparities in the index are similarly high: with the highest value of 549, Singapore's index value is 78 times higher than the index value of 7 for Nepal.

Expenditure on the categories of (i) recreation and culture and (ii) restaurants and hotels is also highly discretionary. The values of per capita real expenditure on these two categories certainly support this notion. Columns 7 and 8 show massive differences in the indexes across all the economies. For recreation and culture, the high income economies have the highest values with Hong Kong, China at 2,528; Singapore at 2,204; and Taipei,China at 1,132, followed by Malaysia at 382. With the highest value of 2,528, the index for Hong Kong, China is 206 times higher than Myanmar's and 173 times higher than India's. Twelve out of the 22 economies have an index value less than that of the regional average. The People's Republic of China has an index of 151, above the regional average.

A similar but somewhat less extreme picture can be seen for restaurants and hotels. Once again, the top three economies by per capita real GDP and AICH are also the top-ranked economies in this expenditure category. Hong Kong, China, with an index value of 1,581, is 80 times that of Nepal and 60 times that of India. The index value of 257 for Indonesia is somewhat high for a lower-middle income economy. The People's Republic of China has an index value of 106, close to the regional average.

Government Final Consumption Expenditure

The government final consumption expenditure (GFCE) is the sum of individual consumption expenditure by government (ICEG) and collective consumption expenditure by government (CCEG). ICEG is predominantly expenditure on health and education, apart from housing, recreation and culture, and social protection incurred by the government on behalf of households, whereas CCEG refers to the expenditures on the services that government provides to the community as a whole, such as general public services, defense, public order and safety, economic affairs, environmental protection, and housing and community amenities. Comparative analysis of per capita real GFCE and its components provides useful insights into how governments in different economies play different roles.

Table 3.10 presents PPPs, PLIs, and real and nominal size of government expenditure along with per capita government expenditures. The PPPs for GFCE (column 2) are quite low compared to exchange rates (column 3) in most of the economies except Hong Kong, China. Because a major component of government expenditure is government compensation in the form of wages and salaries to government employees, PPPs for government expenditure are largely driven by the wages in the government sector. Since the 2005 ICP cycle, ADB as the regional implementing agency in Asia and the Pacific has applied productivity adjustments before making comparisons of wages and salaries of government employees. A more refined set of productivity adjustments proposed in Inklaar (2019) have been employed in the 2017 ICP cycle (details of the productivity adjustment methodology are in Chapter 6).

Despite adjusting for differences in productivity levels of government employees in different economies, PPPs for government in developing economies tend to be low, and PLIs are accordingly low.

Table 3.10: Summary Results for Government Final Consumption Expenditure, 2017
(Hong Kong, China as base)

Economy	PPPs (HK$ = 1.00)	Exchange Rates (HK$ = 1.00)	Expenditure (HK$ billion)		Expenditure per Capita (HK$)		Expenditure per Capita Indexes				Shares (Asia and the Pacific = 100.00)			PLIs		Reference Data	
							Asia and the Pacific = 100		HKG = 100		Expenditure						
			Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Population	Asia and the Pacific = 100	HKG = 100	Population (million)	Expenditure in LCU (billion)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Bangladesh	4.11	10.32	318	127	1,966	783	22	14	6	2	0.94	0.60	4.27	64	40	161.80	1,308
Bhutan	1.62	8.36	17	3	22,991	4,453	258	80	65	13	0.05	0.02	0.02	31	19	0.73	27
Brunei Darussalam	0.07	0.18	64	25	149,626	58,267	1,680	1,046	423	165	0.19	0.12	0.01	62	39	0.43	4
Cambodia	183.79	519.75	41	15	2,592	917	29	16	7	3	0.12	0.07	0.42	57	35	15.85	7,552
China, People's Republic of	0.67	0.87	19,609	15,042	14,144	10,850	159	195	40	31	58.17	71.34	36.62	123	77	1,386.40	13,046
Fiji	0.13	0.27	15	7	17,113	8,176	192	147	48	23	0.04	0.03	0.02	76	48	0.88	2
Hong Kong, China	1.00	1.00	261	261	35,374	35,374	397	635	100	100	0.78	1.24	0.20	160	100	7.39	261
India	4.15	8.36	4,312	2,144	3,294	1,637	37	29	9	5	12.79	10.17	34.58	79	50	1,309.20	17,911
Indonesia	550.85	1,716.98	2,241	719	8,558	2,746	96	49	24	8	6.65	3.41	6.92	51	32	261.89	1,234,554
Lao People's Democratic Republic	236.96	1,071.64	88	20	12,806	2,832	144	51	36	8	0.26	0.09	0.18	35	22	6.90	20,941
Malaysia	0.23	0.55	712	298	22,237	9,319	250	167	63	26	2.11	1.42	0.85	67	42	32.02	165
Maldives	0.96	1.97	12	6	24,196	11,825	272	212	68	33	0.04	0.03	0.01	78	49	0.49	11
Mongolia	61.22	313.06	58	11	18,416	3,601	207	65	52	10	0.17	0.05	0.08	31	20	3.15	3,550
Myanmar	42.51	174.56	374	91	7,046	1,716	79	31	20	5	1.11	0.43	1.40	39	24	53.15	15,918
Nepal	5.05	13.41	59	22	2,035	766	23	14	6	2	0.17	0.10	0.76	60	38	28.83	296
Pakistan	5.27	13.53	727	283	3,649	1,420	41	26	10	4	2.16	1.34	5.26	62	39	199.11	3,827
Philippines	2.88	6.47	617	275	5,882	2,619	66	47	17	7	1.83	1.30	2.77	71	45	104.92	1,777
Singapore	0.13	0.18	372	277	66,233	49,384	744	887	187	140	1.10	1.31	0.15	119	75	5.61	49
Sri Lanka	3.26	19.56	347	58	16,177	2,696	182	48	46	8	1.03	0.27	0.57	27	17	21.44	1,131
Taipei,China	2.07	3.91	1,191	630	50,555	26,747	568	480	143	76	3.53	2.99	0.62	85	53	23.56	2,462
Thailand	1.67	4.36	1,487	569	21,978	8,414	247	151	62	24	4.41	2.70	1.79	61	38	67.65	2,479
Viet Nam	733.48	2,870.44	788	201	8,358	2,136	94	38	24	6	2.34	0.95	2.49	41	26	94.24	577,719
Asia and the Pacific	n.a.	n.a.	33,711	21,085	8,905	5,570	100	100	25	16	100.00	100.00	100.00	100	100	3,785.65	n.a.

HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency unit; n.a. = not applicable; PLI = price level index; PPP = purchasing power parity; XR = exchange rate.
Sources: Asian Development Bank estimates. Expenditures in local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

This means that real government expenditures in these economies would be systematically higher than their nominal expenditures. Column 16 shows PLIs with Hong Kong, China as reference economy of PLI = 100. It may be seen that the PLI for all other economies are below 100, with the People's Republic of China being the next with a PLI of 77 followed by 75 of Singapore. The lowest PLI of 17 for Sri Lanka is followed by a PLI of 19 for Bhutan and 20 for Mongolia.

Figure 3.9 shows an upward sloping relationship between PLI for GFCE (Asia and the Pacific = 100) with the logarithm of per capita real GDP. The scatter plot shows that the regression line is not a good fit, with the observed PLIs scattered far and wide from the fitted line.

The economies with the largest government outlays are the People's Republic of China with HK$19.6 trillion and India with HK$4.3 trillion in real terms. Maldives has the smallest outlay with HK$12 billion.

In terms of per capita real GFCE, Brunei Darussalam, with HK$149,626, is the highest followed by Singapore with HK$66,233. Brunei Darussalam's per capita real GFCE is almost 17 times that of region's average per capita real GFCE. The highest per capita real GFCE of HK$149,626 of Brunei Darussalam is 76 times that of Bangladesh, with the lowest per capita real GFCE at HK$1,966. The per capita real GFCE index of the People's Republic of China is 159 and India's is 37, both relative to Asia and the Pacific average of 100.

Figure 3.9: Per Capita Real Gross Domestic Product and Price Level Indexes for Government Final Consumption Expenditure, 2017
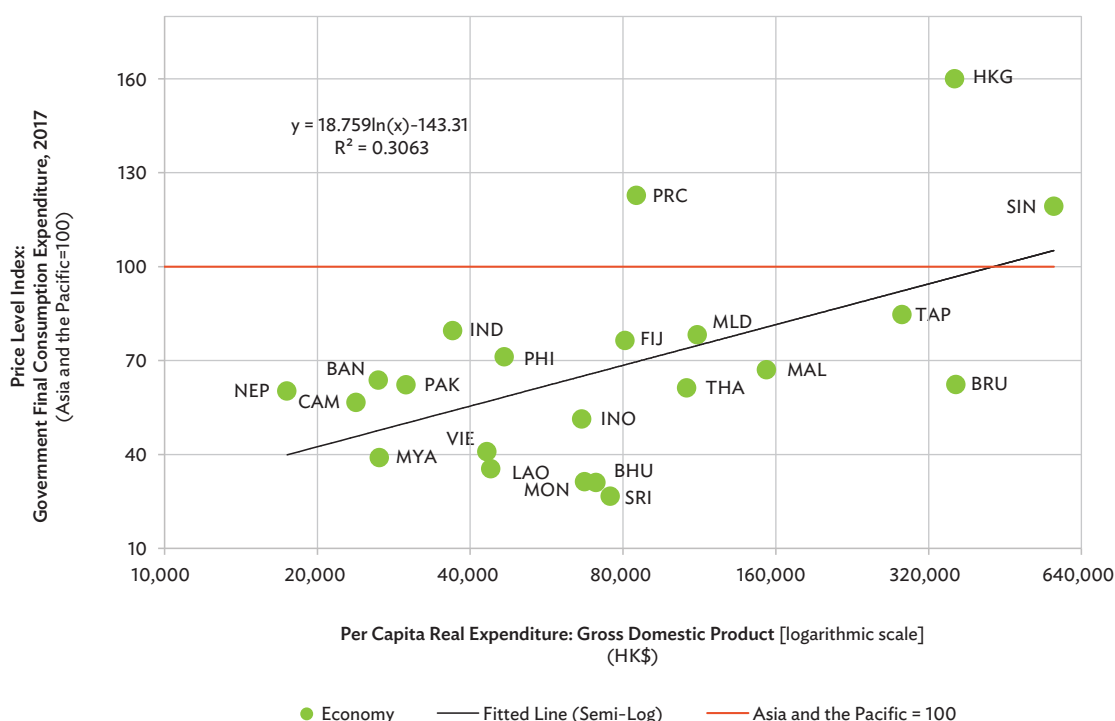
$$y = 18.759\ln(x) - 143.31$$
$$R^2 = 0.3063$$

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Source: Asian Development Bank estimates.

Gross Fixed Capital Formation

The gross fixed capital formation (GFCF) is an important component of GDP from a policy perspective as it comprises investments in physical infrastructure and in machinery and equipment to support production and infrastructure development. GFCF includes construction of residential and nonresidential buildings; construction of civil engineering works such as roads, bridges, railways, ports, electricity networks, and the like; and purchases of machinery and equipment needed for production. GFCF is important in promoting an economy's productive capacity and potential for future growth. High income economies generally invest more on a per capita basis.

The 2017 ICP cycle introduced a few changes in the classification of GFCF and its components: first, GFCF became a category (a main aggregate in 2011 ICP classification) under the new main aggregate of gross capital formation (GCF) in 2017 ICP classification; second, the basic headings of "motor vehicles," "trailers and semi-trailers" and "other road transport" of machinery and equipment in 2011 classification were combined into a single basic heading, "road transport equipment," in 2017; and thirdly, the basic heading "other manufactured goods not elsewhere classified" of machinery and equipment in the 2011 ICP was combined with the "other products" basic heading of the "other products" group in 2017 ICP (Appendix 4, Table A4.2).

PPPs for GFCF in column 2 of Table 3.11, just as in the case of GDP, ICEH, AICH, and GFCE, are uniformly lower than the exchange rates in column 3. This means that PLIs for GFCF of all the economies are less than 100 except for the reference economy, Hong Kong, China, for which the PLI = 100. The PLIs for GFCF, with Hong Kong, China as 100, are all above 50 except for India (46), Indonesia (48), and Myanmar (41). Aside from the reference economy, the People's Republic of China has the highest PLI of 86 among the participating economies, followed by Singapore (82) and Taipei,China (75). The machinery and equipment component of GFCF comprises mostly products that are internationally traded and therefore prices for these products tend to be the same across all the economies, with PLIs closer to 100 (Table 3.14). In fact, for economies where machinery and equipment are largely imported, prices would be higher than international prices because of transport costs and trade margins. The second major component of GFCF, construction, by definition is not tradable and therefore prices in low income economies tend to be lower.

The total size of investment, GFCF, in the region is HK$74.9 trillion in real terms and HK$54.9 trillion in nominal terms. The ratio of real to nominal GFCF is 1.36 compared to 1.56 at the GDP level, indicating that PPPs for GFCF are closer to exchange rates than PPPs for GDP. The People's Republic of China and India have the largest real GFCF, together accounting for nearly 80% of real GFCF for the region. As shown in column 12 of Table 3.11, the top 12 economies of the region account for nearly 99% of real GFCF in the region. The nominal share for the People's Republic of China is greater than its real share (74% versus 63%).

For Asia and the Pacific, the average per capita GFCF is HK$19,795 in real terms and HK$14,512 in nominal terms (columns 6 and 7). Among the four high income economies, Singapore is top-ranked in per capita real GFCF with an index of 765 (with Asia and the Pacific = 100) followed by Brunei Darussalam (667); Hong Kong, China (394); and Taipei,China (263). Maldives's per capita real GFCF index of 255 exhibits a relatively big size of GFCF.

Table 3.12 presents per capita real expenditure indexes (Asia and the Pacific = 100) for GFCF as well as its main components, (i) machinery and equipment and (ii) construction. As GFCF in different economies may have different compositions of machinery and equipment and construction, it is useful to examine indexes for these two components separately.

Table 3.11: Summary Results for Gross Fixed Capital Formation, 2017
(Hong Kong, China as base)

Economy	PPPs (HK$=1.00)	Exchange Rates (HK$=1.00)	Expenditure (HK$ billion)		Expenditure per Capita (HK$)		Expenditure per Capita Indexes				Shares (Asia and the Pacific = 100.00)			PLIs		Reference Data	
							Asia and the Pacific = 100		HKG = 100		Expenditure						
			Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Population	Asia and the Pacific = 100	HKG = 100	Population (million)	Expenditure in LCU (billion)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Bangladesh	6.10	10.32	1,070	633	6,616	3,909	33	27	8	5	1.43	1.15	4.27	81	59	161.80	6,529
Bhutan	4.53	8.36	19	10	25,672	13,903	130	96	33	18	0.02	0.02	0.02	74	54	0.73	84
Brunei Darussalam	0.12	0.18	57	39	132,105	90,377	667	623	170	116	0.08	0.07	0.01	93	68	0.43	7
Cambodia	273.33	519.75	36	19	2,240	1,178	11	8	3	2	0.05	0.03	0.42	72	53	15.85	9,703
China, People's Republic of	0.74	0.87	47,428	40,556	34,209	29,253	173	202	44	38	63.29	73.82	36.62	117	86	1,386.40	35,172
Fiji	0.16	0.27	12	7	13,726	8,460	69	58	18	11	0.02	0.01	0.02	84	62	0.88	2
Hong Kong, China	1.00	1.00	576	576	77,924	77,924	394	537	100	100	0.77	1.05	0.20	136	100	7.39	576
India	3.86	8.36	12,227	5,649	9,339	4,315	47	30	12	6	16.32	10.28	34.58	63	46	1,309.20	47,205
Indonesia	830.33	1,716.98	5,264	2,545	20,099	9,720	102	67	26	12	7.02	4.63	6.92	66	48	261.89	4,370,575
Lao People's Democratic Republic	565.52	1,071.64	83	44	12,042	6,355	61	44	15	8	0.11	0.08	0.18	72	53	6.90	46,996
Malaysia	0.29	0.55	1,186	619	37,035	19,329	187	133	48	25	1.58	1.13	0.85	71	52	32.02	342
Maldives	1.26	1.97	25	16	50,477	32,266	255	222	65	41	0.03	0.03	0.01	87	64	0.49	31
Mongolia	166.96	313.06	41	22	13,066	6,968	66	48	17	9	0.05	0.04	0.08	73	53	3.15	6,869
Myanmar	71.07	174.56	373	152	7,026	2,861	35	20	9	4	0.50	0.28	1.40	56	41	53.15	26,540
Nepal	7.14	13.41	116	62	4,033	2,149	20	15	5	3	0.16	0.11	0.76	73	53	28.83	831
Pakistan	7.08	13.53	698	365	3,505	1,835	18	13	4	2	0.93	0.66	5.26	71	52	199.11	4,943
Philippines	3.85	6.47	1,028	611	9,799	5,826	50	40	13	7	1.37	1.11	2.77	81	59	104.92	3,954
Singapore	0.15	0.18	850	696	151,506	124,067	765	855	194	159	1.13	1.27	0.15	112	82	5.61	123
Sri Lanka	10.70	19.56	327	179	15,270	8,349	77	58	20	11	0.44	0.33	0.57	75	55	21.44	3,502
Taipei,China	2.93	3.91	1,225	918	51,992	38,947	263	268	67	50	1.63	1.67	0.62	102	75	23.56	3,584
Thailand	2.34	4.36	1,500	805	22,173	11,906	112	82	28	15	2.00	1.47	1.79	73	54	67.65	3,508
Viet Nam	1,497.52	2,870.44	795	415	8,435	4,401	43	30	11	6	1.06	0.75	2.49	71	52	94.24	1,190,474
Asia and the Pacific	n.a.	n.a.	74,936	54,938	19,795	14,512	100	100	25	19	100.00	100.00	100.00	100	n.a.	3,785.65	n.a.

HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency unit; n.a. = not applicable; PLI = price level index; PPP = purchasing power parity; XR = exchange rate.
Sources: Asian Development Bank estimates. Expenditures in local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

In Table 3.12, economies are ranked by their index (Asia and the Pacific = 100) of per capita real GFCF. Singapore has the highest index value of 765 and Cambodia has the lowest index value of 11, indicating a disparity of nearly 70:1 between these economies. In machinery and equipment, Singapore has an index value of 1,047, which is 58 times the index value for Cambodia and Nepal. Rankings of the economies differ widely for per capita real expenditures on machinery and equipment, and construction. For example, Thailand is ranked below Bhutan, the People's Republic of China, and Malaysia according to per capita GFCF, but is ranked

above these economies in per capita machinery and equipment expenditure, while showing relatively low per capita construction expenditure. Sri Lanka and Fiji both have high machinery and equipment indexes but low indexes for construction. Bhutan's per capita real expenditure index for construction (169) is higher than its index for machinery and equipment (121). However, in interpreting these indexes, which are all expressed relative to the regional average, it is important to keep in perspective the fact that the regional averages for GFCF, machinery and equipment, and construction can be all different.

Table 3.12: Per Capita Real Gross Fixed Capital Formation Indexes, 2017

Economy	Hong Kong, China = 100			Asia and the Pacific = 100		
	GFCF	Machinery and Equipment	Construction	GFCF	Machinery and Equipment	Construction
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Singapore	194	143	146	765	1,047	403
Brunei Darussalam	170	120	245	667	882	676
Hong Kong, China	100	100	100	394	735	276
Taipei,China	67	63	48	263	466	132
Maldives	65	50	94	255	368	261
Malaysia	48	29	67	187	213	185
China, People's Republic of	44	21	64	173	157	177
Bhutan	33	16	61	130	121	169
Thailand	28	33	25	112	243	68
Indonesia	26	8	52	102	56	142
Asia and the Pacific	25	14	36	100	100	100
Sri Lanka	20	20	22	77	149	60
Fiji	18	24	12	69	178	33
Mongolia	17	12	18	66	86	50
Lao People's Democratic Republic	15	8	19	61	59	52
Philippines	13	10	15	50	72	40
India	12	7	15	47	55	42
Viet Nam	11	5	19	43	37	53
Myanmar	9	7	12	35	52	33
Bangladesh	8	4	16	33	32	45
Nepal	5	2	7	20	18	20
Pakistan	4	3	5	18	23	13
Cambodia	3	2	4	11	18	11

GFCF = gross fixed capital formation.
Source: Asian Development Bank estimates.

The main message from Table 3.12 is the fact that different economies may have different mixtures of expenditures on machinery and equipment and of construction, the two components that make up GFCF.

Domestic Absorption

Domestic absorption is the aggregate of AICH, CCEG, and GCF. Domestic absorption is a measure of the actual expenditure in the whole economy, regardless of whether it is out of domestic production or from imports. Exports are not included in domestic absorption, so it is an incomplete measure of domestic production. The basic idea of domestic absorption is that it reflects the sum of goods and services available to the population of the economy, while each economy may have a different structure or allocation to different components of domestic absorption, namely, consumption, investment, and government expenditure. As a national accounts aggregate, the difference between domestic absorption and GDP is net exports, or exports minus imports, which may be positive or negative. If the world is considered as a whole, the total of net exports across all economies of the world would be zero, because exports from a given economy will be accounted as imports of other economies. Small discrepancies may arise from the recording of the transactions and their valuations. Table 3.13 presents summary results for domestic absorption.

The figures in Table 3.13 are very similar to the results in Table 3.1 for GDP. The total size of domestic absorption in the region is HK$230.4 trillion in real terms and HK$146.5 trillion in nominal terms. From Table 3.1, the GDP of the region is HK$232.3 trillion in real terms and HK$148.9 trillion in nominal terms. The total sizes of real and nominal GDP and domestic absorption are quite close to each other, though it is important to note that the PPPs used in deriving real domestic absorption and GDP are different while the exchange rates are the same.

A comparison of column 8 in Table 3.13 with that in Table 3.1 shows that the per capita real indexes relative to Asia and the Pacific are very close to each other. The exception is Singapore, where the per capita real GDP index is 921 compared to an index value of 653 for per capita real domestic absorption, because its net exports are a significant proportion of its total GDP.

Price Level Indexes for Gross Domestic Product and Its Components

PLIs, measured as the ratio of PPPs to exchange rates, are indicators of the general price levels measured relative to a reference economy or the region as a whole. These indexes reflect the relative price competitiveness of various economies and thus provide an important international perspective for domestic policy makers. By construction, a PLI less than 100 indicates a price level below the reference economy or regional average and a PLI higher than 100 indicates a price level above the reference economy or regional average. Because PPPs measure price levels of goods and services and thus cover prices of both tradables and non-tradables, PPPs differ from exchange rates and therefore PLIs differ from 100. Since services are likely to be cheaper in low income economies, PLIs tend to increase with increase in per capita real income. This tendency is partly explained by the Balassa-Samuelson effect discussed earlier in the context of explaining PLIs at GDP level.

As evident from the results presented and discussed thus far, PLIs differ across different national income aggregates and sub-aggregates. These differences need to be carefully studied before drawing conclusions and making policy decisions. Table 3.14 presents PLIs for all the 22 participating economies of the region, expressed relative to the regional average of 100, and presents economies in order of their PLIs for GDP, shown in column 2.

Table 3.13: Summary Results for Domestic Absorption, 2017
(Hong Kong, China as base)

Economy	PPPs (HK$ = 1.00)	Exchange Rates (HK$ = 1.00)	Expenditure (HK$ billion)		Expenditure per Capita (HK$)		Expenditure per Capita Indexes				Shares (Asia and the Pacific = 100.00)			PLIs		Reference Data	
							Asia and the Pacific = 100		HKG = 100		Expenditure		Population	Asia and the Pacific = 100	HKG = 100	Population (million)	Expenditure in LCU (billion)
			Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Bangladesh	4.94	10.32	4,580	2,192	28,305	13,545	47	35	8	4	1.99	1.50	4.27	75	48	161.80	22,621
Bhutan	3.27	8.36	61	24	83,514	32,638	137	84	23	9	0.03	0.02	0.02	61	39	0.73	198
Brunei Darussalam	0.11	0.18	134	81	312,153	189,322	513	489	88	53	0.06	0.06	0.01	95	61	0.43	14
Cambodia	236.24	519.75	381	173	24,017	10,916	39	28	7	3	0.17	0.12	0.42	71	45	15.85	89,928
China, People's Republic of	0.70	0.87	115,948	92,995	83,633	67,077	137	173	23	19	50.33	63.46	36.62	126	80	1,386.40	80,650
Fiji	0.15	0.27	74	43	84,339	49,279	139	127	24	14	0.03	0.03	0.02	92	58	0.88	11
Hong Kong, China	1.00	1.00	2,634	2,634	356,337	356,337	586	921	100	100	1.14	1.80	0.20	157	100	7.39	2,634
India	3.43	8.36	49,893	20,466	38,109	15,632	63	40	11	4	21.66	13.97	34.58	64	41	1,309.20	171,017
Indonesia	775.40	1,716.98	17,345	7,833	66,230	29,910	109	77	19	8	7.53	5.35	6.92	71	45	261.89	13,449,388
Lao People's Democratic Republic	462.39	1,071.64	312	135	45,250	19,524	74	50	13	5	0.14	0.09	0.18	68	43	6.90	144,385
Malaysia	0.27	0.55	4,623	2,282	144,364	71,273	237	184	41	20	2.01	1.56	0.85	78	49	32.02	1,259
Maldives	1.35	1.97	54	37	110,671	75,844	182	196	31	21	0.02	0.03	0.01	108	69	0.49	74
Mongolia	130.30	313.06	209	87	66,331	27,609	109	71	19	8	0.09	0.06	0.08	65	42	3.15	27,217
Myanmar	61.36	174.56	1,509	530	28,383	9,977	47	26	8	3	0.65	0.36	1.40	55	35	53.15	92,561
Nepal	5.39	13.41	649	261	22,497	9,036	37	23	6	3	0.28	0.18	0.76	63	40	28.83	3,494
Pakistan	5.62	13.53	6,518	2,709	32,736	13,606	54	35	9	4	2.83	1.85	5.26	65	42	199.11	36,657
Philippines	3.22	6.47	5,399	2,685	51,459	25,589	85	66	14	7	2.34	1.83	2.77	78	50	104.92	17,365
Singapore	0.16	0.18	2,229	1,973	397,138	351,465	653	908	111	99	0.97	1.35	0.15	139	88	5.61	350
Sri Lanka	8.23	19.56	1,733	730	80,834	34,030	133	88	23	10	0.75	0.50	0.57	66	42	21.44	14,275
Taipei,China	2.64	3.91	5,788	3,909	245,684	165,920	404	429	69	47	2.51	2.67	0.62	106	68	23.56	15,270
Thailand	2.11	4.36	6,309	3,057	93,248	45,191	153	117	26	13	2.74	2.09	1.79	76	48	67.65	13,315
Viet Nam	1,218.57	2,870.44	3,993	1,695	42,370	17,987	70	46	12	5	1.73	1.16	2.49	67	42	94.24	4,865,693
Asia and the Pacific	n.a.	n.a.	230,374	146,531	60,855	38,707	100	100	17	11	100.00	100.00	100.00	100	n.a.	3,785.65	n.a.

HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency unit; n.a. = not applicable; PLI = price level index; PPP = purchasing power parity; XR = exchange rate.
Sources: Asian Development Bank estimates. Expenditures in local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

A notable feature of Table 3.14 is the close alignment of PLIs for GDP, AICH, and ICEH, shown in columns 2–4. As consumption expenditure has a major share in GDP in lower-middle and low income, PLIs for these three aggregates are close to each other. Singapore is one of the economies whose PLI for AICH (164) and ICEH (169) is significantly higher than its PLI for GDP (130).

PLIs for GFCE are quite low for most economies despite adjusting for productivity levels. However, PLIs for GFCE are higher than the regional average, not only for the high income economies of Hong Kong, China and Singapore but also for the People's Republic of China, which belongs to upper-middle income group. PLIs for government expenditures are generally low because of low salaries for government employees, and government compensation in the form of wages and salaries is a major component of government expenditure.

Table 3.14: Price Level Indexes for Gross Domestic Product and Its Major Components, 2017
(Asia and the Pacific = 100)

Economy	Gross Domestic Product	Actual Individual Consumption by Households[a]	Individual Consumption Expenditure By Households[b]	Government Final Consumption Expenditure	Gross Fixed Capital Formation		
					Total	Machinery and Equipment	Construction
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hong Kong, China	156	170	173	160	136	95	185
Singapore	130	164	169	119	112	112	125
China, People's Republic of	125	132	133	123	117	110	121
Maldives	107	128	138	78	87	104	77
Taipei,China	105	112	118	85	102	105	111
Asia and the Pacific	100	100	100	100	100	100	100
Brunei Darussalam	95	103	109	62	93	110	84
Fiji	92	98	103	76	84	95	81
Malaysia	78	83	87	67	71	85	63
Philippines	78	80	83	71	81	95	74
Thailand	77	80	85	61	73	91	62
Bangladesh	75	76	79	64	81	115	64
Cambodia	71	75	80	57	72	95	58
Indonesia	71	77	82	51	66	91	54
Lao People's Democratic Republic	68	73	81	35	72	97	57
Viet Nam	67	70	76	41	71	88	62
Mongolia	66	68	77	31	73	89	63
Sri Lanka	66	69	79	27	75	92	64
Pakistan	64	66	68	62	71	87	62
India	64	64	65	79	63	76	56
Nepal	60	60	63	60	73	82	67
Bhutan	60	62	68	31	74	108	57
Myanmar	55	58	62	39	56	74	45

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.
[b] Includes expenditure by nonprofit institutions serving households.
Source: Asian Development Bank estimates.

Figures 3.10 and 3.11 and the last three columns of Table 3.14 show patterns in PLIs for GFCF and its two major components, machinery and equipment, and construction.

A closer examination of PLIs in the last two columns of Table 3.14 shows a contrasting profile of PLIs for machinery and equipment and for construction. With Asia and the Pacific = 100, PLIs for machinery and equipment are generally around 100 with a minimum of 74 and a maximum of 115. Hong Kong, China has a PLI of 95 for machinery and equipment, which is below the regional average, whereas the People's Republic of China has a PLI of 110, which is above the regional average. However,

unlike machinery and equipment, construction PLIs show a much wider spread, ranging between 45 and 185 and, relative to the PLIs of machinery and equipment are quite low for low income economies. Figure 3.10 shows PLIs for machinery and equipment against per capita real GDP and there is no significant slope for the fitted line, indicating that PLIs are randomly scattered around the horizontal line that represents the regional average, and implying that PPPs for machinery and equipment are close to exchange rates for most of the economies. Figure 3.11 plots construction PLIs against per capita real GDP and shows a significant upward sloping relationship, which is expected for an aggregate like construction which is largely non-traded.

Figure 3.10: Per Capita Real Gross Domestic Product and Price Level Indexes for Machinery and Equipment, 2017
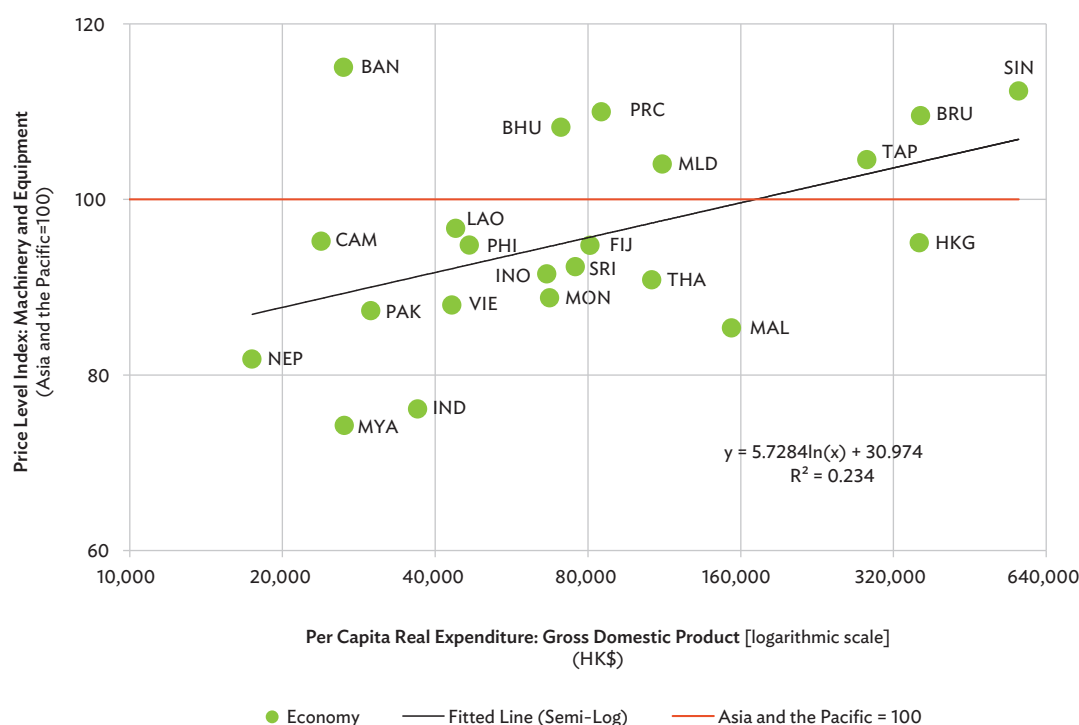
$$y = 5.7284\ln(x) + 30.974$$
$$R^2 = 0.234$$

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Source: Asian Development Bank estimates.

Figure 3.11: Per Capita Real Gross Domestic Product and Price Level Indexes for Construction, 2017
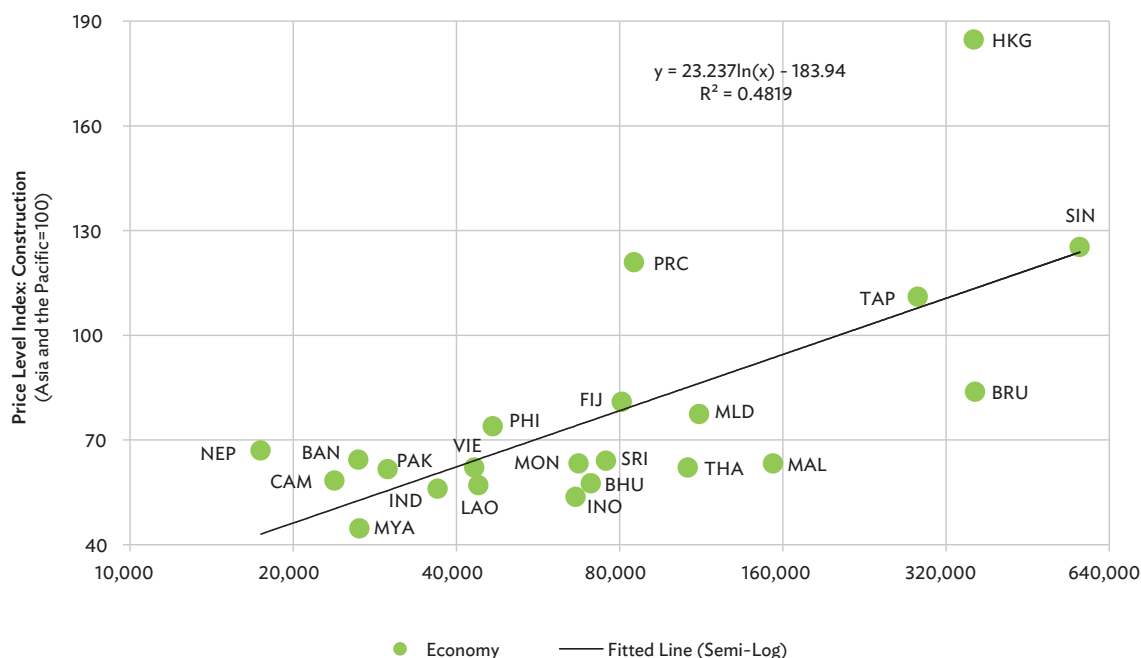
$y = 23.237\ln(x) - 183.94$
$R^2 = 0.4819$

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China;
IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar;
NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand;
VIE = Viet Nam.
Source: Asian Development Bank estimates.

Summary and Conclusion

The results of the 2017 ICP for Asia and the Pacific presented above describe the salient features of the findings that include the summary results for GDP and its major expenditure aggregates covering household consumption and its components, government consumption, and GFCF. The 2017 ICP followed the same methodology as in 2011, albeit with minor refinements (Chapter 6). All the results use Hong Kong dollar as the reference currency and Hong Kong, China as the reference economy. As different sections of this section focused on different components of GDP, it may be useful to have an overall picture of the results for all these components.

The total GDP, in real (or PPP) terms, for the 22 participating economies in 2017 ICP in Asia and the Pacific is HK$232.34 trillion. Major contributors to the total size of the economy of the region are the People's Republic of China, India, and Indonesia, in that order, which are also the three most populous economies in the region, again in that order. In terms of size of real GDP, the economies in the region vary widely, as can be seen in Figure 3.12 from the percentage shares of the top 12 economies and the rest for total real GDP, ICEH, AICH, GFCE, and GFCF. The People's Republic of China is the largest economy, with 50.76% share in the regional real GDP, with India ranking second at 20.83% and Indonesia third at 7.49%. The top 12 economies account for nearly 98.0%, while the other 10 have a combined share of about 2.0% of real

Figure 3.12: Economy Shares of Real Gross Domestic Product and Its Main Components, 2017
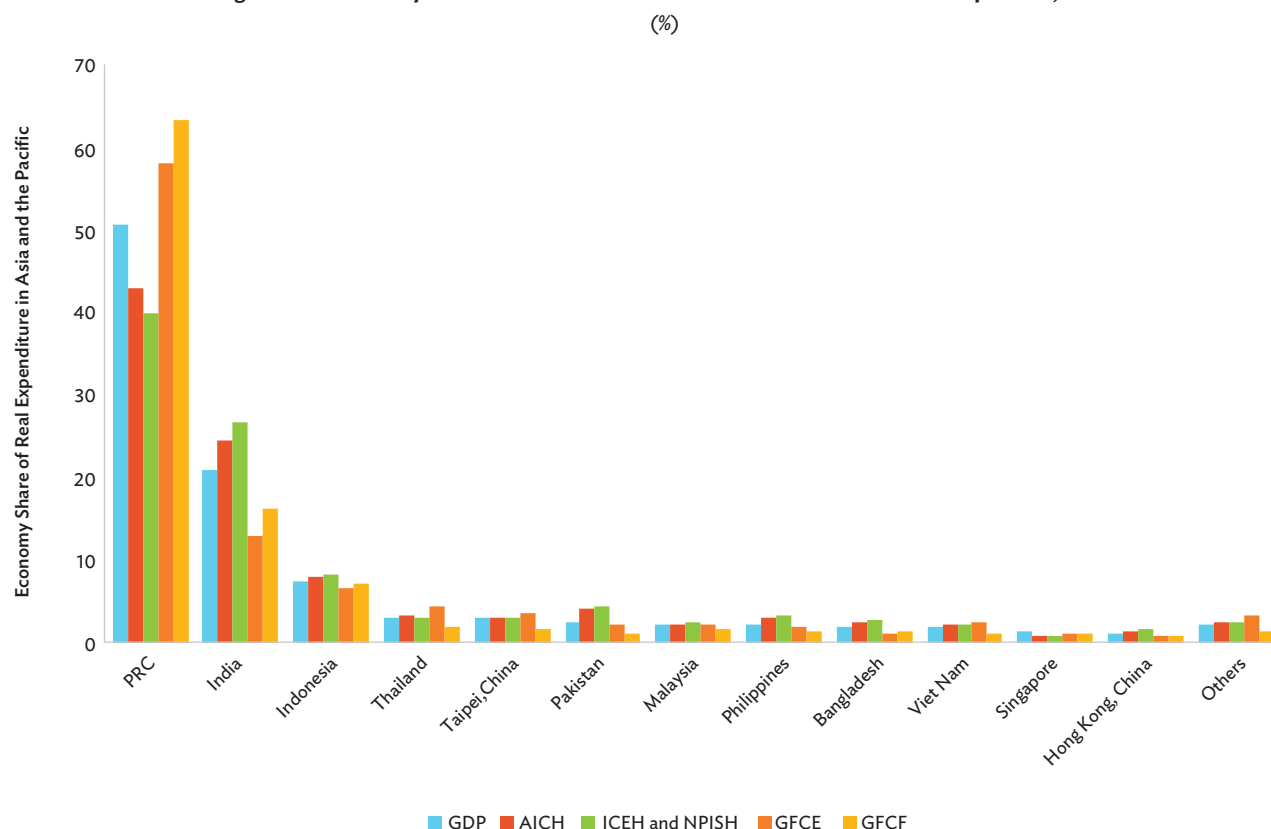
(%)

AICH = actual individual consumption by households, GDP = gross domestic product, GFCE = government final consumption expenditure, GFCF = gross fixed capital formation, ICEH = individual consumption expenditure by households, NPISH = nonprofit institutions serving households, PRC = People's Republic of China.
Source: Asian Development Bank estimates.

GDP in the region. The rankings of the top and bottom economies remain the same whether the total GDP of the economy is measured in real or nominal terms. A similar picture and rankings emerge for AICH, ICEH, GFCE, and GFCF, with the People's Republic of China, India, and Indonesia, in that order, dominating the real expenditures. Hong Kong, China and Singapore are ranked sixth and seventh largest when GDP is measured in nominal terms but slip down to 12th and 11th respectively when GDP is measured in real terms.

Figure 3.13 again serves as a reminder about the diverse nature of Asia and the Pacific and its 22 participating economies. Per capita real GDP exhibits significant diversity among the participating economies, with Singapore having the highest per capita real income followed by Brunei Darussalam and Hong Kong, China. In contrast, Nepal has the lowest per capita real income in the region followed by Cambodia and Bangladesh. The per capita real income of Singapore is more than 32 times that of Nepal. The three largest economies in terms of total GDP also have large populations, resulting in lower ranks in terms of their per capita real GDP: the People's Republic of China is ranked 8th, Indonesia is 13th, and India is 17th among the 22 participating economies.

Figure 3.13: Per Capita Real Gross Domestic Product and Its Main Components, 2017
(Hong Kong, China as base)
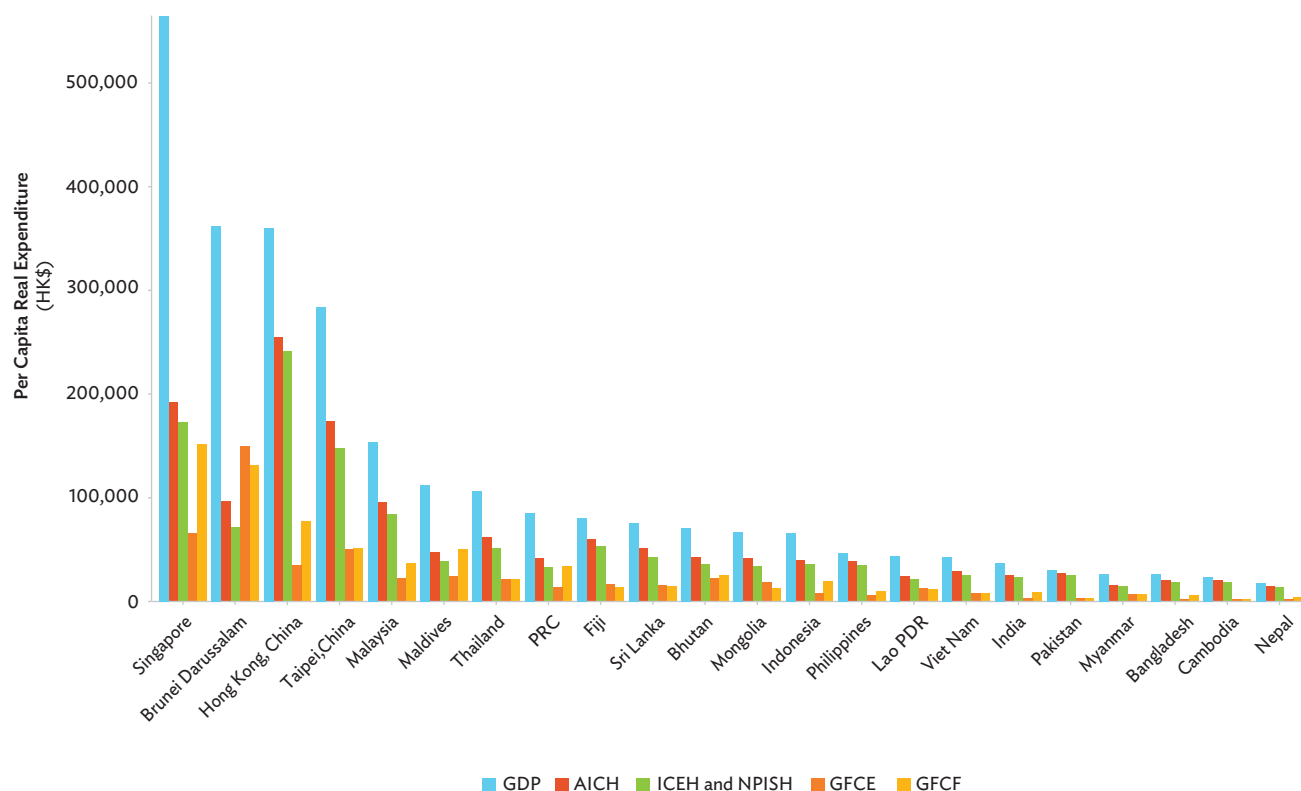
AICH = actual individual consumption by households, GDP = gross domestic product, GFCE = government final consumption expenditure, GFCF = gross fixed capital formation, HK$ = Hong Kong dollar, ICEH = individual consumption expenditure by households, Lao PDR = Lao People's Democratic Republic, NPISH = nonprofit institutions serving households, PRC = People's Republic of China.
Source: Asian Development Bank estimates.

Figure 3.14 presents the PLIs for GDP and its main components, with Hong Kong, China = 100. The first pattern that emerges is that PLIs are always highest for Hong Kong, China, with Hong Kong dollar as the reference currency, implying that values of the PPPs for these aggregates are all less than the exchange rate for all the economies. Second, PLIs for GDP and ICEH tend to be quite similar—this reflects the fact that ICEH is a major component of GDP. PLIs for government expenditure are lower than PLIs for GDP for most economies, reflecting relatively low salaries of government employees in low income economies. Third, PLIs for GFCF are above PLIs for GDP and ICEH for all the economies except for Hong Kong, China (for which, as the

reference economy, all PLIs are 100); Maldives; and Singapore. This is mainly due to the high PLIs for machinery and equipment which are generally high as most developing economies in the region depend on imports for their investments in machinery and equipment. The People's Republic of China has consistently high PLIs relative to what may be expected for an upper-middle income economy.

There is a wealth of information available from 2017 ICP in Asia and the Pacific for comparative analysis of the state of the 22 participating economies in the region and the results from the ICP are of significant use for policy makers in the participating economies. More detailed data on PPPs, PPP based expenditure

Figure 3.14: Price Level Indexes for Gross Domestic Product and Its Main Components, 2017
(Hong Kong, China = 100)
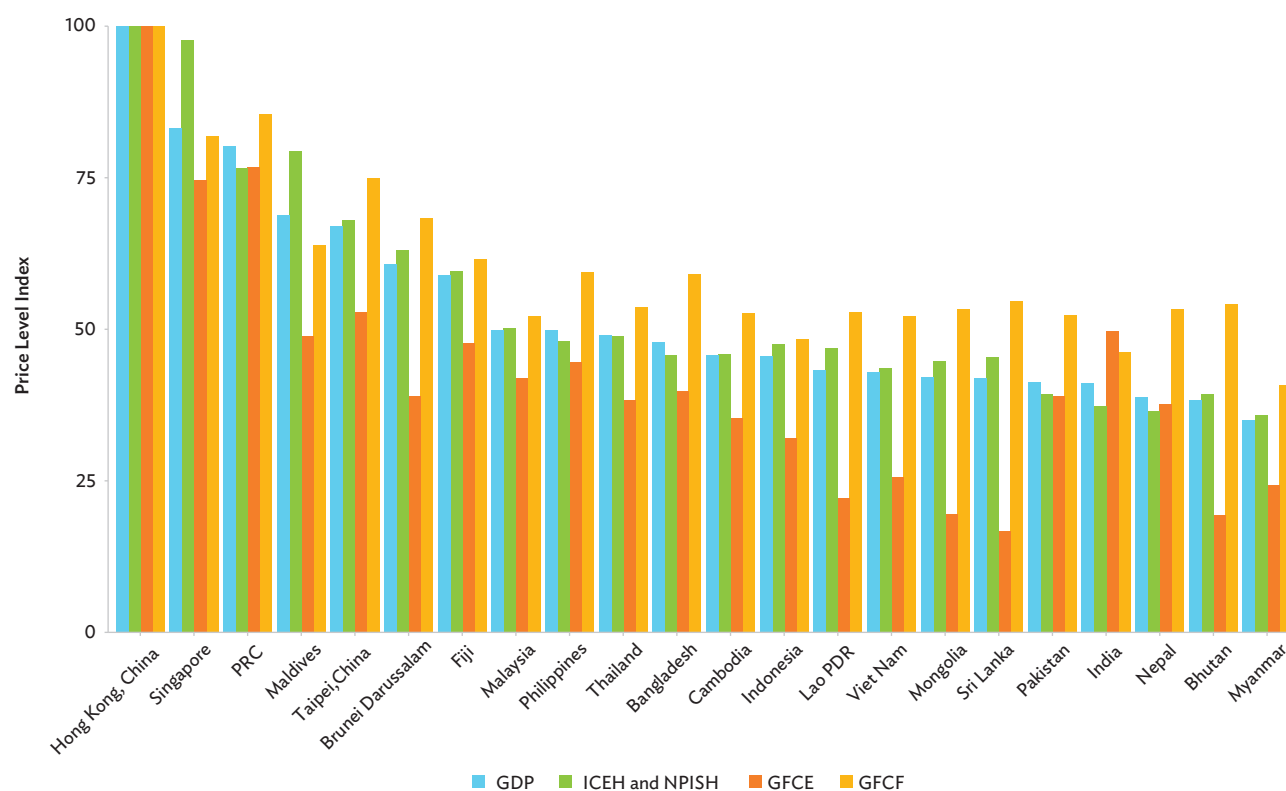
GDP = gross domestic product, GFCE = government final consumption expenditure, GFCF = gross fixed capital formation, ICEH = individual consumption expenditure by households, Lao PDR = Lao People's Democratic Republic, NPISH = nonprofit institutions serving households, PRC = People's Republic of China.
Source: Asian Development Bank estimates.

aggregates, and PLIs for 34 components of GDP are in Appendix 1, and the results for a total of 44 expenditure categories are provided through online tables and a database that can be used by researchers and government agencies to conduct in-depth analyses.

4. A Comparative Analysis of the 2011 and 2017 Regional Results

Introduction

The completion of the 2017 International Comparison Program (ICP) cycle and the simultaneous updating of the 2011 ICP cycle results provide a unique opportunity to analyze the size and distribution of the world economy in these two benchmark years and examine growth performance at the regional, subregional, and economy levels. For the first time in its 50-year history, the ICP produced estimates of purchasing power parities (PPPs), price levels, and real expenditures using identical survey frameworks and aggregation methods for two consecutive benchmarks. This was mainly due to the recommendation of the Friends of the Chair Group to the 47th Session of the United Nations Statistical Commission (UNSC) which explicitly stated that for the 2017 ICP cycle, there will be no major changes in methodology in order to ensure comparability with the 2011 results. The UNSC (ECOSOC 2016) agreed in its recommendation 47/107 that "for the 2017 cycle no major changes in the methodology should be introduced and that a research agenda, to be developed and undertaken by the Technical Advisory Task Force, should focus on methodological improvements to be considered for future comparison cycles." The ICP Global Office, regional implementing agencies, and Technical Advisory Group strictly adhered to the UNSC directive in conducting the 2017 ICP cycle.

These international comparisons of prices and real expenditures based on an unchanged methodology provide an opportunity to properly evaluate the consistency between the 2017 actual results and extrapolated results from the 2011 ICP cycle. In the past ICP cycles, such an evaluation has not been possible. For example, the published 2005 ICP results showed real expenditures in 2005 that were systematically lower than the extrapolations of real expenditures from 1993

benchmark and the world economy was deemed to have shrunk suddenly after the publication of the 2005 ICP results. Most of the explanations for the significantly lower than expected size of the world economy were built around the fact that the 2005 ICP cycle used improved survey and aggregation methodology with general emphasis placed on results from the 2005 ICP cycle. There was also a long gap of 12 years between the 2005 ICP and the 1993 ICP round. Similarly, there was considerable discussion when the 2011 benchmark results represented systematically larger expenditures than the extrapolations from 2005 had suggested. Explanations for these systematic discrepancies were again attributed to changes in methodology from the 2005 ICP cycle to 2011. The general consensus was that results from 2011 were based on improved price database and a sound aggregation and linking methodology.

Against this backdrop, the availability of results from the 2017 ICP cycle, which are based on same methodology as in 2011, assumes particular significance and provides an opportunity to undertake a comparative analysis of regional and subregional growth in Asia and the Pacific. In order to achieve full comparability, the ICP Global Office implemented the advice of the Technical Advisory Group to update the 2011 results by incorporating any revisions to national accounts and population estimates used in 2011.

To take advantage of this opportunity, the next section first lays the groundwork by describing the process and revisions to the 2011 ICP cycle results followed by the section that examines the consistency between results from the 2017 ICP cycle and extrapolated results from the revised 2011 benchmark comparisons, while the succeeding section analyzes growth performance and inflation in Asia and the Pacific as a whole and in its subregions.

Updates and Revisions to the 2011 Cycle

The ICP relies on two major inputs of data. The first and the most important input is the price data collected by all participating economies during the benchmark year. For the 2011 ICP cycle, the collected price data was for the calendar year 2011. The Asian Development Bank (ADB) (2014) provides details of the survey framework and price data collection for the 2011 ICP. Because the price data were collected specifically for the 2011 ICP, in updating the 2011 ICP results, ADB as the regional implementing agency (RIA) used the same annual average prices of the ICP basket of goods and services without any changes. This means that all the basic heading PPPs from the 2011 ICP are used in the 2011 update, except for basic headings which used reference PPPs or where there are revisions in ICP classification. The second major input into the ICP results calculations is data from national accounts from all participating economies. Gross domestic product (GDP) and its components, broken down into 155 expenditure basic headings, are used as weights in aggregating basic heading level PPPs leading to estimates of PPPs for aggregates above the basic heading level. The national accounts statistics are usually subject to revisions that may arise because of changes in the base year or improved methodology or due to updated data sources. Therefore, revisions to national accounts and the implied changes to expenditure weights at the basic heading level are an important component of updating the 2011 ICP cycle results. Changes to population data compiled by the participating economies have implications for per capita measures.

Thus, the major sources for the 2011 update are (i) revised population data and (ii) revised expenditure data at the GDP and component levels, which are the basic input data. Other factors that impact estimates of 2011 PPPs are changes in the basic headings used for reference PPPs, refinements introduced in 2017 to the productivity adjustment methodology for government compensation, and the effects of those changes on comparisons of government compensation. Lastly, minor changes to the 2017 ICP classification were also implemented for 2011 updates to ensure comparability. In brief, the refinements in the 2017 ICP were also applied to the updating of 2011 ICP results thus making the two results methodologically comparable.

Revisions to Population and Gross Domestic Product Data

Table 4.1 shows the revisions in the population and GDP estimates for 2011. Generally, population data remain stable and are revised only when new information from a more recent population census or a demographic survey serves as the basis for adjusting or revising population estimates. Changes in population size do not affect the PPPs but do affect per capita figures.

Revisions to the population figures for 2011 are minimal for most of the economies, except for (i) a big spike in the population of Maldives, due to a revised system that now includes expatriates in the resident population count, and (ii) a downward revision of population in Myanmar because of new data from the Population and Housing Census of 2014, the first population census held in 30 years.

Table 4.1 also reflects revisions in the estimates of GDP in local currency units for participating economies for 2011, the last benchmark round. Most of the revisions are upward and some economies have reported significant changes to GDP estimates and the underlying structure. Maldives has the biggest upward revision, about 28%, mainly due to rebasing and implementing the System of National Accounts 2008, along with improved methodology and data sources. Other economies with revisions exceeding 5% are Brunei Darussalam, Fiji, Indonesia, the Lao People's Democratic Republic, and Sri Lanka. GDP revisions can stem from a range of factors, including implementation of the System of National Accounts 2008, reclassifications in national accounts, more exhaustive coverage of the economy, and, more importantly, new input data from various censuses, including economic censuses and household and enterprise surveys, in different economies.

Table 4.1: Comparison of Revised and Original Population, Gross Domestic Product, Productivity Adjustment Factors, and Purchasing Power Parities, 2011

Economy	Population (thousand)			GDP in LCU (billion)			Productivity Adjustment Factors (HKG = 1.00)			Purchasing Power Parities (HK$ = 1.00)		
	Original	Revised	Ratio of Revised to Original	Original	Revised	Ratio of Revised to Original	ADB (revised) Method	Inklaar Method	Ratio of Inklaar to ADB	Original	Revised	Ratio of Revised to Original
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Bangladesh	149,700	149,700	1.00	9,703	9,855	1.02	0.33	0.21	0.62	4.24	4.47	1.06
Bhutan	708	680	0.96	86	85	0.99	0.72	0.44	0.61	3.09	3.13	1.02
Brunei Darussalam	393	393	1.00	21	23	1.11	1.30	1.21	0.93	0.13	0.13	1.03
Cambodia	14,226	14,307	1.01	52,069	52,069	1.00	0.26	0.12	0.48	246.65	262.06	1.06
China, People's Republic of	1,341,981	1,344,130	1.00	47,310	48,930	1.03	0.66	0.39	0.59	0.64	0.67	1.05
Fiji	854	854	1.00	7	7	1.09	0.68	0.32	0.47	0.19	0.18	0.95
Hong Kong, China	7,072	7,072	1.00	1,936	1,934	1.00	1.00	1.00	1.00	1.00	1.00	1.00
India	1,215,957	1,216,147	1.00	86,993	85,256	0.98	0.48	0.30	0.62	2.77	2.97	1.07
Indonesia	241,038	241,991	1.00	7,422,781	7,831,726	1.06	0.65	0.49	0.75	660.35	671.29	1.02
Lao People's Democratic Republic	6,385	6,117	0.96	64,727	71,544	1.11	0.41	0.20	0.49	451.84	509.59	1.13
Macau, China	557	553	0.99	295	294	1.00	1.13	1.08	0.96	0.84	0.85	1.01
Malaysia	28,964	29,062	1.00	884	912	1.03	0.81	0.58	0.71	0.27	0.28	1.05
Maldives	325	406	1.25	32	41	1.28	0.37	0.36	1.00	1.56	1.50	0.96
Mongolia	2,679	2,786	1.04	12,547	13,174	1.05	0.64	0.49	0.76	98.35	101.97	1.04
Myanmar	60,380	49,663	0.82	45,128	43,900	0.97	0.34	0.12	0.35	43.02	50.03	1.16
Nepal	26,494	26,490	1.00	1,450	1,441	0.99	0.24	0.14	0.58	4.51	4.83	1.07
Pakistan	177,110	177,100	1.00	19,188	19,161	1.00	0.39	0.24	0.62	4.46	4.77	1.07
Philippines	94,185	94,185	1.00	9,706	9,708	1.00	0.50	0.33	0.66	3.27	3.46	1.06
Singapore	5,184	5,184	1.00	334	351	1.05	1.14	1.08	0.95	0.16	0.16	0.99
Sri Lanka	20,869	20,195	0.97	6,543	7,219	1.10	0.63	0.46	0.72	7.08	7.51	1.06
Taipei,China	23,225	23,190	1.00	13,709	14,312	1.04	1.02	0.72	0.70	2.77	2.90	1.05
Thailand	67,597	66,214	0.98	11,121	11,307	1.02	0.67	0.48	0.73	2.26	2.37	1.05
Viet Nam	87,840	88,110	1.00	2,779,880	2,779,880	1.00	0.43	0.20	0.45	1,228.43	1,321.50	1.08

ADB = Asian Development Bank; GDP = gross domestic product; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency unit.
Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program.

Revisions Due to Changes in Productivity Adjustment Methodology

During the 2017 ICP cycle, the Technical Advisory Group and the Inter-Agency Coordination Group considered the methodology proposed in Inklaar and Timmer (2013b) and the practical proposal for productivity adjustment made by Inklaar (2019); they recommended using Inklaar's (2019) methodology uniformly at the regional level for adjusting the PPPs for government final consumption expenditure (GFCE) and for global linking. The Inklaar methodology introduces refinements to the methodology used by ADB in 2011. In particular, the Inklaar approach provides productivity adjustment factors that are transitive and base invariant, in contrast to the ADB methodology used in 2011, which was transitive but depended on the choice of the reference or base economy. The second refinement concerns data: Inklaar's estimates are based on improved estimates of capital stock (in PPP terms) and economically meaningful labor shares. The ADB approach in the 2011 ICP cycle used just three levels for labor shares—0.5, 0.6 and 0.7—for three different groups

of participating economies, based on per capita real GDP. In 2011 ICP, ADB methodology assumed a labor share of 0.5 for Bangladesh, Bhutan, Cambodia, India, the Lao People's Democratic Republic, Maldives, Mongolia, Myanmar, Nepal, Pakistan, and Sri Lanka; a labor share of 0.6 for the middle group of the People's Republic of China, Fiji, Indonesia, the Philippines, and Viet Nam; and a labor share of 0.7 for remaining economies of Brunei Darussalam; Hong Kong, China; Macau, China; Malaysia; Singapore; Taipei,China; and Thailand. In contrast, Inklaar's approach provides properly estimated and calibrated labor shares for the participating economies. Upon the recommendation of the Regional Advisory Board, ADB implemented the Inklaar method for 2017 productivity adjustments and for updating the adjustment factors for 2011 PPPs for GFCE, following same methodology and data needed. For more details of the methodology, please see Chapter 6. The effect of this shift in methodology on productivity adjustment factors for 2011 is shown in Figure 4.1.

The figure shows significant revisions to productivity adjustment factors of 2011, expressed relative to Hong Kong, China. Productivity in most economies is lower under the Inklaar methodology than the estimates used by ADB in 2011, with the exception of Maldives, where the change is negligible. For many economies, productivity estimates were revised significantly downward. A distinguishing feature of the Inklaar productivity adjustment factors is that they show a generally steady decline as the per capita real GDP decreases. These downward revisions in the productivity adjustment factors imply higher price levels and correspondingly lower real government expenditures. These downward revisions in real government expenditure in turn affected a downward revision in the real GDP for these economies. The refined methodology for productivity adjustment used in 2017 was also applied in the 2011 revisions, thus ensuring consistency for comparison across the two benchmarks.

Figure 4.1: Productivity Adjustment Factors from the ADB and Inklaar Methods, 2011
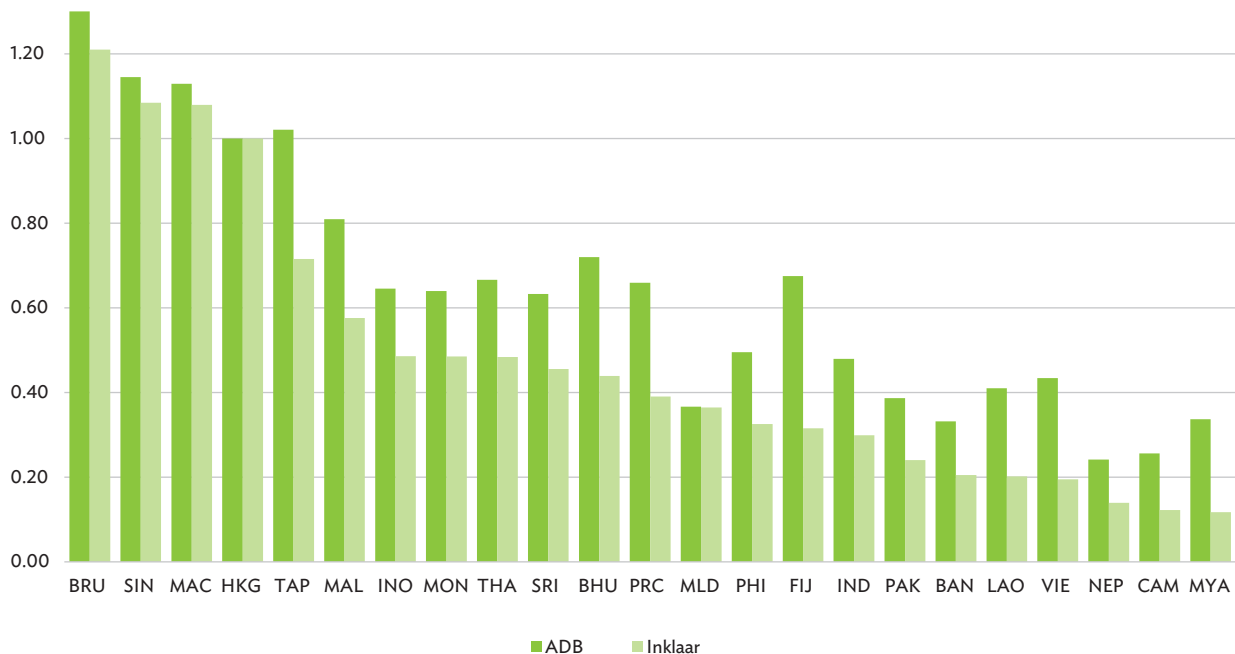
ADB = Asian Development Bank; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Source: Asian Development Bank estimates.

Revisions to Purchasing Power Parities in 2011

The basic price data that underpin the computation and revision of PPPs for 2011 were kept unchanged. Therefore, any changes to PPPs for GDP stem from changes in national accounts data (which alters the weighting structure), adoption of refinements to productivity adjustment, and changes in 2017 ICP (applied to 2011 as well) for some reference basic headings. From Table 4.1, it is clear that adopting the Inklaar methodology and data for productivity adjustments has resulted in an upward adjustment in PPPs for government final consumption expenditure and for the GDP for most regional economies. Figure 4.2 presents the ratio of revised 2011 PPPs to the original 2011 PPPs for GDP. As expected, mainly due to upward revisions in the PPPs for GFCE, revised PPPs for GDP for most of the economies are greater than the original PPPs for GDP, with the exception of Fiji, Maldives, and Singapore. Table 4.1 also shows that Maldives was not affected by changes to productivity adjustment methodology. In the case of the Lao People's Democratic Republic and Myanmar, productivity was revised significantly downward under the Inklaar methodology and, consequently, PPPs were revised significantly upward, by more than 10%. The PPP for Maldives was revised downward mainly because of GDP revisions in national accounts, as the productivity adjustment factor did not change significantly under the new approach.

Figure 4.2: Ratio of Revised to Original Purchasing Power Parities for Gross Domestic Product, 2011
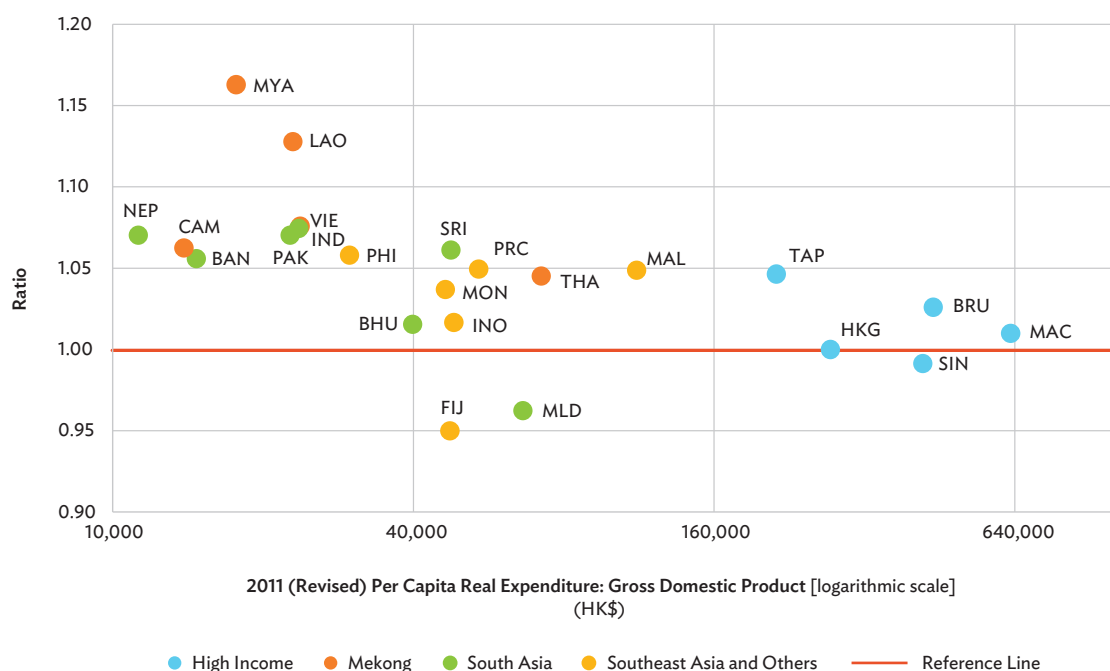
BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Source: Asian Development Bank estimates.

Consistency between the 2017 Cycle and Extrapolations from Revised 2011 Benchmark Comparisons

Given the considerable lags between successive benchmarks for the ICP—6 years between the 2005, 2011, and 2017 cycles—users of PPPs tend to extrapolate PPPs from one ICP cycle until the results from the next cycle become available. Users, analysts, and international organizations who need PPPs on an annual basis, extrapolate the 2011 results for the years between 2011 and 2017 and beyond. Such extrapolations make use of relevant indicators to update PPPs for different aggregates. For example, PPPs at the GDP level are extrapolated using GDP deflators, whereas PPPs for individual consumption expenditure by households (ICEH) are extrapolated using consumer price index (CPI) movements over time. This kind of extrapolation is perfectly defensible and represents common practice.

The most common practice for extrapolating GDP level PPPs from one benchmark to other years is to use GDP deflators of the participating economies. This fairly intuitive and commonly used procedure, described in McCarthy (2013b), is as follows. If PPP_t^A represents the PPP of the currency of economy A in period t relative to a reference economy R, then an update of the PPPs for period $t+1$ is given by:

$$PPP_{t+1}^A = PPP_t^A \times \frac{Def_{t,t+1}^A}{Def_{t,t+1}^R}$$

where $Def_{t,t+1}$ represents the price deflator measuring changes in general prices from period t to period $t+1$. For example, if the PPP for GDP between the Malaysian ringgit and Hong Kong dollar is 0.28 in 2011 and if price movements as measured by the change in GDP deflator over the period 2011 to 2017 are 9% for Malaysia and 18% for Hong Kong, China, then the extrapolated PPP for GDP for Malaysia in period 2017 is given by:

$$PPP_{2017}^{Malaysia} = PPP_{2011}^{Malaysia} \times \frac{Def_{2011,2017}^{Malaysia}}{Def_{2011,2017}^{HKG}}$$

$$= 0.28 \times \frac{1.09}{1.18} = 0.259$$

Extrapolation of PPPs using domestic price movements as indicated in this formula are transitive and base invariant, regardless of which currency is used as the reference currency.

When a new set of PPPs is released for a new benchmark year, the new PPPs and real expenditures are usually compared with extrapolations from the previous benchmark. Users expect a degree of consistency between the extrapolated and the benchmark PPPs. Where differences exist, it is desirable that there are no systematic patterns in the differences. In practice, benchmark and extrapolated PPPs diverge for a number of reasons. These inconsistencies arise because international comparisons are designed to make spatial price comparisons whereas temporal comparisons are best suited to measure price and volume changes over time within an economy. In addition, there are major differences in the selection of products for price surveys and the use of weights to compute the required price index numbers.

- The products priced for PPP surveys are selected and carefully specified so that they are representative and comparable across economies in the comparison, whereas products priced in temporal comparisons within an economy are those that are most representative of the products available in the economy.
- Differences in weighting patterns is another source for divergence. The weighting patterns used in an economy's time series price indexes are specific to that economy and usually do not exhibit dramatic changes over time. However, across economies, the weighting patterns can be quite different, and ICP comparisons between two economies can be affected by patterns from other economies. Dalgaard and Sørensen (2002) and

McCarthy (2013b) present numerical illustrations that clearly demonstrate that differences in weighting patterns can significantly impact PPPs and their consistency with national accounts.

- Index number methods used in temporal and international comparisons are also different. Computation of PPPs is based on an index number formula that satisfies the transitivity of comparisons across participating economies (see the section on aggregation methods in Chapter 6) and therefore is affected by prices and weights data available from other economies. The statistical offices tend to use the Laspeyres and chained Laspeyres indexes or chained Fisher indexes for temporal comparisons. In contrast, PPP computations rely on the Gini-Éltető-Köves-Szulc (GEKS) method, which uses Fisher binary comparisons in generating transitive PPPs.

- "Quality creep" is another source of divergence. As an economy becomes richer, the quality of goods and services priced in 2017 compared with the quality of the same products in 2011 might be higher, leading to quality creep in comparisons over time. For example, a brand specification such as "well-known" for trousers are likely to indicate a product with higher quality in 2017 compared with the quality of the product priced in 2011 for "well-known" brand trousers.

- An important factor driving divergence between the ICP and national accounts deflators is the treatment of net exports in the ICP. The ICP uses market exchange rates as the PPPs for net exports, whereas the import and export price index numbers are used in compiling GDP at current and constant prices. This approach means that the terms of trade changes are treated as volume effect in the ICP. The ICP uses the value of exports and imports for the aggregates but exchange rates as PPPs. However, exchange rates do not adequately reflect movements in import and export prices. This can indeed be a major source of discrepancy between PPPs from the ICP and movements in GDP deflator from national accounts.

- Another source of divergence between ICP and national accounts deflators is changes in net trade balance. When major changes occur in trade balance, the weights for different components used in the aggregation methodology may also change, leading to divergence.

- In addition, major changes in the methodology used for the ICP are also likely to produce discernable differences in PPPs. For example, for construction, the 2005 ICP cycle used the basket of construction components (BOCC) approach, but the 2011 cycle replaced it with a simple approach based on prices of construction inputs of materials, different types of labor, and rental for construction machinery. Further in 2005, the ICP linked regional PPPs using 18 economies, called ring economies, to calculate global PPPs. These 18 economies conducted additional surveys to collect prices for the ring product list. This approach was replaced in 2011 by a more robust linking procedure based on a global core list of goods and services which were priced by all the participating economies, instead of a select few economies as in the 2011 comparisons.

Though there are analytical and practical reasons for divergence between benchmark results and extrapolations, the size and systematic patterns observed in the results from the 2005 and 2011 ICP cycles led to considerable debate and discussion. At the release of 2005 results, analysts were surprised at big systematic upward revisions of PPPs compared to extrapolations from the 1993 benchmark. In particular, PPPs for lower-middle and low income economies were significantly higher in 2005 compared to extrapolations from 1993. Chen and Ravallion (2010) studied the effect of the new 2005 PPPs on global poverty and concluded that the developing world was poorer than was originally thought. Deaton and Heston (2010) sought to discuss the reasons for the downward revisions in the size of the People's Republic of China (40% smaller) and India (36% smaller). Feenstra et. al (2013) focused

on results for the People's Republic of China in their paper, "Who Shrunk China? Puzzles in the Measurement of Real GDP."

A similar and equally vigorous debate ensued after the release of results from the 2011 ICP cycle. The 2011 benchmark PPPs represented a significant systematic downward shift in PPPs of lower-middle and low income economies compared to extrapolations from 2005. This, in turn, meant that these economies were found to be richer than anticipated based on the 2005 results and their extrapolations. Dykstra, Kenny, and Sandefur (2014) wrote a blog post on 2 May 2014 titled "Absolute Poverty Fell by Almost Half on Tuesday," soon after the results of the 2011 ICP cycle were published (World Bank, 2014). The international poverty line, set at $1.25 per day after the 2005 ICP results, was revised to $1.90 after recalibration based on the 2011 ICP results. Estimates of global and regional poverty were accordingly revised.

Deaton and Aten (2017) observed, "The world according to ICP 2011 looks markedly more equal than the world according to ICP 2005. This paper investigates why this happened. We identify a likely source of the problem in the way that the regions of the ICP were linked in 2005." Inklaar and Rao (2017) more systematically analyzed the reasons and sources for divergence and concluded that once they accounted for differences in the methodology—by constructing a counterfactual for 2005 using 2005 data but 2011 methodology—no systematic differences were evident between the 2005 and 2011 benchmarks. The Inklaar and Rao (2017) study underscores the importance of making allowances for changes in methodology used in ICP in comparing and contrasting results for benchmarks against extrapolations from preceding benchmark comparisons.

After examining the discrepancies between the 2005 and 2011 results, in 2016 the Friends of the Chair Group of the UNSC recommended "no major changes in methodology" in the 2017 cycle "in order to ensure comparability with the 2011 results (ECOSOC 2016a, 19)." Adhering to this, the ICP Global Office and RIAs ensured that the ICP's 2017 and revised 2011 results are based on the same methodology and hence are comparable.

Are the Results from the 2017 Cycle Broadly Consistent with Extrapolations from 2011?

As mentioned earlier, inflation as measured by the change in GDP deflator between two time periods, is used to extrapolate the PPPs for GDP from the benchmark year, while the inflation measured through the CPI is used to extrapolate PPPs for ICEH. Given the difficulties in finding suitable and reliable deflators for extrapolation for expenditure components like government expenditure and gross fixed capital formation (GFCF), comparisons are presented only for GDP and ICEH.

Figure 4.3 and Figure 4.4 show that there are differences, sizable in some instances, between the actual and extrapolated PPPs and real GDP, but there are no systematic patterns in these differences. In the low to middle income level, some economies have actual 2017 estimates that are higher than extrapolations from updated 2011, and in other cases, the estimated PPPs are lower. For Hong Kong, China, by definition, there is no difference. The differences are small for Singapore and Taipei,China, possibly because of the reliability of their GDP deflators, which depends on the statistical capacity existing in these economies. These differences notwithstanding, there is no systematic pattern in the differences, unlike in the case of the 2011 or the 2005 benchmark comparisons.

A similar conclusion emerges in the case of extrapolations of PPPs and real expenditures for ICEH presented in Figure 4.5 and Figure 4.6.

Figure 4.3: Ratio of 2017 Purchasing Power Parities for Gross Domestic Product to Extrapolations from 2011 (Revised)

2017 Actual Per Capita Real Expenditure: Gross Domestic Product [logarithmic scale]
(HK$)

● High Income   ● Mekong   ● South Asia   ● Southeast Asia and Others   —— Reference Line

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Sources: Gross domestic product (GDP) in local currency units were supplied by the participating economies for the International Comparison Program. GDP deflators for Bangladesh, Cambodia, Fiji, India, Malaysia, Maldives, Nepal, and Thailand were sourced from: Asian Development Bank. 2019b. *Key Indicators for Asia and the Pacific 2019.* Manila: Asian Development Bank. GDP deflators for the Lao People's Democratic Republic were derived from: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 21 January 2020). For Fiji, GDP was rebased to 2011, noting a base year revision and a break in series in 2014. The purchasing power parities used to calculate real GDP are Asian Development Bank estimates.

Figure 4.4: Ratio of 2017 Real Gross Domestic Product to Extrapolations from 2011 (Revised)

2017 Actual Per Capita Real Expenditure: Gross Domestic Product [logarithmic scale]
(HK$)

● High Income   ● Mekong   ● South Asia   ● Southeast Asia and Others   —— Reference Line

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Sources: Gross domestic product (GDP) in local currency units were supplied by the participating economies for the International Comparison Program. GDP deflators for Bangladesh, Cambodia, Fiji, India, Malaysia, Maldives, Nepal, and Thailand were sourced from: Asian Development Bank. 2019b. *Key Indicators for Asia and the Pacific 2019.* Manila: Asian Development Bank. GDP deflators for the Lao People's Democratic Republic were derived from: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 21 January 2020). For Fiji, GDP was rebased to 2011, noting a base year revision and a break in series in 2014. The purchasing power parities used to calculate real GDP are Asian Development Bank estimates.

Figure 4.5: Ratio of 2017 Purchasing Power Parities for Individual Consumption Expenditure by Households to Extrapolations from 2011 (Revised)

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China; ICEH = individual consumption expenditure by households; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Note: In this figure, individual consumption expenditure by households (ICEH) includes expenditure by nonprofit institutions serving households (NPISH).
Source: Asian Development Bank estimates.

Figure 4.6: Ratio of 2017 Real Individual Consumption Expenditure by Households to Extrapolations from 2011 (Revised)

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HK$ = Hong Kong dollar; HKG = Hong Kong, China; ICEH = individual consumption expenditure by households; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Note: In this figure, individual consumption expenditure by households (ICEH) includes expenditure by nonprofit institutions serving households (NPISH).
Source: Asian Development Bank estimates.

Figure 4.5 and Figure 4.6 again show no systematic patterns in the differences between the actual and extrapolated PPPs and real expenditures. While the differences are scattered randomly above and below 1, lower-middle and low income economies show higher variability, possibly reflecting the reliability of the consumer price index (CPI) used for extrapolations. Further, in many lower-middle and low income economies, CPIs focus on capital cities or urban areas, whereas coverage for the ICP is economy-wide.

Overall, the results from the 2017 ICP cycle for Asia and the Pacific are broadly consistent with extrapolations from 2011, with no systematic patterns that would need further explanation or analysis. The results presented here and their apparent consistency points toward the virtue of employing the same methodology for the 2011 and 2017 ICP cycles.

Size and Distribution of the Asia and Pacific Economy, 2011 (Revised)

Table 4.2 presents the key results for nominal and real GDP, per capita measures, and other major indicators for Asia and the Pacific after data related revisions to 2011 ICP cycle. Details of the 2011 revisions are discussed earlier in this chapter. The GDP's of participating economies in local currency units (LCUs) are presented in column 18. The nominal and real GDP of each economy are obtained by converting GDP in LCU in column (18), respectively, using exchange rates (column 3) and PPPs (column 2).

The total size of the economy of Asia and the Pacific in nominal terms, in 2011 (revised), is HK$100.6 trillion. The real size of the Asia and Pacific economy, in 2011 (revised), is HK$144.4 trillion, significantly larger than its nominal GDP. A quick glance at PPPs and exchange rates for different currencies in

columns 2 and 3 shows that PPPs of currencies of all the economies with the exception of Hong Kong, China (reference economy) and Singapore are lower than the corresponding exchange rates. For Singapore the PPP and exchange rate are almost the same. The largest economies by real GDP are the People's Republic of China with HK$72.6 trillion, India HK$28.7 trillion, and Indonesia with HK$11.7 trillion. The smallest economies are Bhutan and Maldives, each with real GDP of HK$27 billion. In terms of per capita real GDP, the richest economies are Macau, China followed by Brunei Darussalam and Singapore. The economy with lowest per capita real GDP is Nepal (HK$11,270) followed by Cambodia (HK$13,888). Per capita real GDP of the People's Republic of China is estimated at HK$54,043 while for India, it is HK$23,589. Economies with the highest price levels are Hong Kong, China and Singapore with price level index of 144 relative to Asia and the Pacific, which is equal to 100. Economies with the lowest price levels are Pakistan (PLI of 62) and Bangladesh (PLI of 67). The price level index for the People's Republic of China is 116 and for India is 71. Detailed revised 2011 results for other major aggregates including ICEH, AICH, GFCE, and GCF are available in Appendix 2.

Growth and Inflation in the Economies, Subregions, and the Region, 2011–2017

The ICP is specifically designed to make comparisons of price levels and real expenditure levels across the participating economies at a given point of time. The ICP for Asia and the Pacific simultaneously released the 2017 ICP cycle results and the updated (revised) results for the 2011 ICP cycle, making available two snapshots of the regional economy of Asia and the Pacific for the reference years 2011 and 2017. Though the ICP results for these two benchmark years are based on the same methodology and are highly informative about the state of the 22 participating economies in Asia and the Pacific within each year, results from 2017 cannot be directly compared to results from 2011.

Table 4.2: Summary Results for Gross Domestic Product, 2011 (Revised)
(Hong Kong, China as base)

Economy	PPPs (HK$ = 1.00)	Exchange Rates (HK$ = 1.00)	Expenditure (HK$ billion)		Expenditure per Capita (HK$)		Expenditure per Capita Indexes				Shares (Asia and the Pacific = 100.00)			PLIs		Reference Data	
			Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Asia and the Pacific = 100		HKG = 100		Expenditure		Population	Asia and the Pacific = 100	HKG=100	Population (million)	Expenditure in LCU (billion)
							Based on PPPs	Based on XRs	Based on PPPs	Based on XRs	Based on PPPs	Based on XRs					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Bangladesh	4.47	9.53	2,203	1,035	14,715	6,911	36	24	5	3	1.53	1.03	4.20	67	47	149.70	9,855
Bhutan	3.13	6.00	27	14	39,896	20,851	98	74	15	8	0.02	0.01	0.02	75	52	0.68	85
Brunei Darussalam	0.13	0.16	173	144	439,565	366,586	1,085	1,299	161	134	0.12	0.14	0.01	120	83	0.39	23
Cambodia	262.06	521.39	199	100	13,888	6,980	34	25	5	3	0.14	0.10	0.40	72	50	14.31	52,069
China, People's Republic of	0.67	0.83	72,641	58,945	54,043	43,854	133	155	20	16	50.30	58.59	37.71	116	81	1,344.13	48,930
Fiji	0.18	0.23	40	32	47,339	37,256	117	132	17	14	0.03	0.03	0.02	113	79	0.85	7
Hong Kong, China	1.00	1.00	1,934	1,934	273,549	273,549	675	969	100	100	1.34	1.92	0.20	144	100	7.07	1,934
India	2.97	6.00	28,688	14,220	23,589	11,692	58	41	9	4	19.86	14.14	34.12	71	50	1,216.15	85,256
Indonesia	671.29	1,126.73	11,667	6,951	48,211	28,724	119	102	18	11	8.08	6.91	6.79	86	60	241.99	7,831,726
Lao People's Democratic Republic	509.59	1,031.61	140	69	22,951	11,337	57	40	8	4	0.10	0.07	0.17	71	49	6.12	71,544
Macau, China	0.85	1.03	347	286	627,887	517,164	1,550	1,832	230	189	0.24	0.28	0.02	118	82	0.55	294
Malaysia	0.28	0.39	3,254	2,319	111,962	79,804	276	283	41	29	2.25	2.31	0.82	102	71	29.06	912
Maldives	1.50	1.88	27	22	66,359	53,144	164	188	24	19	0.02	0.02	0.01	115	80	0.41	41
Mongolia	101.97	162.58	129	81	46,365	29,081	114	103	17	11	0.09	0.08	0.08	90	63	2.79	13,174
Myanmar	50.03	105.08	877	418	17,669	8,413	44	30	6	3	0.61	0.42	1.39	68	48	49.66	43,900
Nepal	4.83	9.51	299	152	11,270	5,720	28	20	4	2	0.21	0.15	0.74	73	51	26.49	1,441
Pakistan	4.77	11.09	4,017	1,727	22,680	9,754	56	35	8	4	2.78	1.72	4.97	62	43	177.10	19,161
Philippines	3.46	5.56	2,807	1,745	29,803	18,525	74	66	11	7	1.94	1.73	2.64	89	62	94.18	9,708
Singapore	0.16	0.16	2,171	2,175	418,895	419,491	1,034	1,486	153	153	1.50	2.16	0.15	144	100	5.18	351
Sri Lanka	7.51	14.20	961	508	47,607	25,167	117	89	17	9	0.67	0.51	0.57	76	53	20.20	7,219
Taipei,China	2.90	3.79	4,943	3,780	213,157	163,021	526	578	78	60	3.42	3.76	0.65	110	76	23.19	14,312
Thailand	2.37	3.92	4,776	2,886	72,134	43,593	178	154	26	16	3.31	2.87	1.86	87	60	66.21	11,307
Viet Nam	1,321.50	2,634.86	2,104	1,055	23,874	11,974	59	42	9	4	1.46	1.05	2.47	72	50	88.11	2,779,880
Asia and the Pacific	n.a.	n.a.	144,425	100,598	40,517	28,222	100	100	15	10	100.00	100.00	100.00	100	100	3,564.53	n.a.

HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency unit; n.a. = not applicable; PLI = price level index; PPP = purchasing power parity; XR = exchange rate.
Sources: Asian Development Bank estimates. Expenditure in local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

For example, Table 3.1 for 2017 and Table 4.2 for 2011 (excluding Macau, China which has not participated in the 2017 ICP cycle) show the size of real GDP in the region to be HK$232.3 trillion and HK$144.1 trillion, respectively. From these figures one cannot conclude that the economy of Asia and the Pacific in 2017 is 61% higher than in 2011. Similarly, for any individual economy, say, for the People's Republic of China in 2017, with a real GDP (in PPP terms) of HK$117.9 trillion (Table 3.1) it cannot be concluded that the economy is 62% higher than in 2011 with real GDP of HK$72.6 trillion (Table 4.2). This is because the real expenditures derived for the 2011 and 2017 reference years are calculated using the prices and expenditures in local currency units in those years—henceforth, we use the term real GDP at *current prices*. Moreover, even though all the results are expressed in Hong Kong dollars as the reference currency, the local currencies in 2017 do not have the same purchasing power with reference to Hong Kong dollars in 2011 because the relative prices for comparable commodities in these years are different. Year-to-year changes in real expenditures thus depend on changes in both relative price levels and in relative volumes. As a result, the rates of growth observed for the real expenditures at constant price in these two periods are a combination of rates of changes in relative price levels (inflation) as well as rates of changes in relative volumes (growth).

Is it possible to use the real GDP at current prices to analyze and compare the performance of the 22 participating economies across time? The following section explains and demonstrates how to use the information from the 2011 and 2017 ICP cycles to decompose the change in real GDP at current prices into the following components: domestic economic growth, domestic inflation, and PPP change effect (combining domestic inflation and the PPP change effect yields the price effect). This decomposition can apply at the level of an individual economy and also at the level of a group of economies or for

Asia and the Pacific as a whole. The measurement and analysis of growth focuses primarily on GDP, but the same techniques and analysis are equally applicable to analytical components like ICEH, AICH, GFCE, GCF, and GFCF.

Economy-Level Decomposition of Real GDP at Current Prices

This section focuses on the results compiled through the 2011 and 2017 ICP cycles, presented in Tables 3.1 and 4.2, and explains how users may undertake comparative analysis of price levels and real expenditures at the economy level. For example, in Viet Nam, the real GDP at current prices has changed from HK$2,104 billion in 2011 to HK$4,069 billion in 2017. How can this change in real GDP at current prices observed for Viet Nam be meaningfully interpreted and decomposed? The following algebraic expression provides a framework to understand the drivers of this change.

Consider the change in real GDP at current prices of an economy j from 2011 to 2017:

$$\frac{RGDP_{j,2017}}{RGDP_{j,2011}} = \frac{\dfrac{GDP_{j,2017}}{PPP_{j,2017}}}{\dfrac{GDP_{j,2011}}{PPP_{j,2011}}} = \frac{GDP_{j,2017}}{GDP_{j,2011}} \times \frac{PPP_{j,2011}}{PPP_{j,2017}}$$

where $RGDP_{j,2011}$ is the real GDP in 2011 and $RGDP_{j,2017}$ is the real GDP in 2017 for economy j, both in current prices and expressed in Hong Kong dollars; and $GDP_{j,2011}$ and $GDP_{j,2017}$, respectively, are the GDP in current prices for 2011 and 2017 expressed in local currency units. Let $Def_{j,2011,2017}$ be the inflation calculated as the change in GDP deflator from 2011 to 2017. Multiplying the equation above with $\frac{Def_{j,2011,2017}}{Def_{j,2011,2017}}$ (this equals 1 because the numerator and denominator are the same), the factors can be further re-arranged into the following components:

$$\frac{RGDP_{j,2017}}{RGDP_{j,2011}} = \underbrace{\frac{\dfrac{GDP_{j,2017}}{Def_{j,2011,2017}}}{GDP_{j,2011}}}_{\text{(i) Domestic Growth Effect}} \times$$

$$\underbrace{\underbrace{Def_{j,2011,2017}}_{\substack{\text{(ii) Domestic} \\ \text{Inflation Effect}}} \times \underbrace{\frac{PPP_{j,2011}}{PPP_{j,2017}}}_{\text{(iii) PPP Change Effect}}}_{\text{(iv) Price Effect}} \qquad (4.1)$$

This equation shows that the change in real GDP at current prices for economy j is made up of the following components:

(i) $\dfrac{\dfrac{GDP_{j,2017}}{Def_{j,2011,2017}}}{GDP_{j,2011}}$ is economy j's *domestic growth* in GDP (local currency unit at constant 2011 prices) from 2011 to 2017;

(ii) $Def_{j,2011,2017}$ is the *domestic inflation effect* measured by the change in implicit price deflators from 2011 to 2017 in economy j;

(iii) $\dfrac{PPP_{j,2011}}{PPP_{j,2017}}$ is the *PPP change effect*; and

(iv) $Def_{j,2011,2017} \times \dfrac{PPP_{j,2011}}{PPP_{j,2017}}$ is the *price effect* in economy j over the same period.

As an example, for *PPP change effect* in (iii) PPP for Bangladesh changed from 4.47 in 2011 to 4.95 in 2017; hence, the PPP change effect for Bangladesh is 0.904 which is the inverse of the 2017-to-2011 PPP ratio.

For the 22 participating economies in Asia and the Pacific, Table 4.3 shows the decomposition of change in real GDP (at current prices) (column 13) into: *domestic growth effect* (column 9); *domestic inflation effect* (column 8); the *PPP change effect* (column 10); and the *price effect* (column 12), which is the product of the domestic inflation effect and the PPP change effect.

GDP in LCU at current prices are shown in columns 2 and 3. The PPPs from the 2011 and 2017 ICP cycles are shown in columns 4 and 5. For a number of economies including the People's Republic of China and India, PPPs in 2017 are higher than the corresponding PPPs in 2011—this in turn means that their PPP change in column 11 are greater than 1, and the PPP change effect in equation 4.1 is less than 1. An increase in the PPP over time for an economy j, reflects a faster increase in prices for comparable commodities in economy j than the increase in the prices for the same comparable commodities in Hong Kong, China—the reference economy. Column 13 shows change in real GDP from 2011 to 2017 at current prices. For example, for Bangladesh, 2017 real GDP (at current prices) is 1.939 times of, or 93.9% higher than, the 2011 real GDP (at current prices).

The problem then is one of decomposing this change, of 93.9%, into growth and inflation components. The domestic price change is shown in column 8 which is used in computing growth in the economy as shown in column 9. Bangladesh's domestic inflation shows that prices in 2017 were 1.471 times the prices in 2011 (column 8), or equivalently, shows an inflation of 47.1% over the period. Column 11 shows the change in PPP from 2011 to 2017. This PPP change is greater than 1 for Bangladesh, and is equal to 1.106 (column 11) since PPP for the taka (Tk) relative to Hong Kong dollar went up by 10.6%, from Tk4.47 = HK$1 in 2011 to Tk4.95 = HK$1 in 2017. The PPP change is less than 1 for half of the 22 economies. For Hong Kong, China this effect equals 1 as PPP for HK$ is 1 as it is the reference currency in both ICP cycles. Column 12 shows the price effect which is the ratio of domestic inflation and change in PPP.

Column 9 shows the growth in GDP at constant 2011 prices observed in each of the economies—this is the first factor in the decomposition shown in equation 4.1. Bangladesh's GDP has grown by 1.458 times from 2011 to 2017 or, equivalently, has shown 45.8% increase in GDP at constant 2011 prices. The total price effect, or the ratio of the domestic inflation in column 8 and PPP change in column 11, is shown in column 12.

Table 4.3: Economy-Level Decomposition of Change in Real Gross Domestic Product, 2011–2017

Economy	GDP at Current Prices (LCU billion)		PPPs (HK$ = 1.00)		Real GDP in PPP at Current Prices (HK$ billion)		Domestic Inflation Effect 2017 / 2011	Domestic Growth Effect 2017 / 2011	PPP Change Effect 2011 / 2017	PPP Change 2017 / 2011	Price Effect 2017 / 2011	Growth in Real GDP in PPP at Current Prices (HK$) 2017 / 2011
	2011	2017	2011	2017	2011	2017						
(1)	(2)	(3)	(4)	(5)	(6) = (2)/(4)	(7) = (3)/(5)	(8)	(9) = [(3)/(2)]/(8)	(10) = (4)/(5)	(11) = (5)/(4)	(12) = (8)*(10) = (8)/(11)	(13) = (7)/(6) = (8)*(9)*(10)
Bangladesh	9,855	21,131	4.47	4.95	2,203	4,272	1.471	1.458	0.904	1.106	1.330	1.939
Bhutan	85	165	3.13	3.20	27	52	1.413	1.372	0.981	1.020	1.385	1.901
Brunei Darussalam	23	17	0.13	0.11	173	156	0.758	0.948	1.252	0.798	0.950	0.900
Cambodia	52,069	89,831	262.06	237.61	199	378	1.140	1.513	1.103	0.907	1.257	1.903
China, People's Republic of	48,930	82,075	0.67	0.70	72,641	117,929	1.107	1.515	0.968	1.033	1.071	1.623
Fiji	7	11	0.18	0.16	40	71	1.189	1.269	1.161	0.862	1.381	1.752
Hong Kong, China	1,934	2,663	1.00	1.00	1,934	2,663	1.176	1.171	1.000	1.000	1.176	1.377
India	85,256	166,226	2.97	3.43	28,688	48,395	1.289	1.512	0.865	1.156	1.115	1.687
Indonesia	7,831,726	13,587,213	671.29	781.12	11,667	17,394	1.275	1.360	0.859	1.164	1.096	1.491
Lao People's Democratic Republic	71,544	140,698	509.59	463.97	140	303	1.265	1.555	1.098	0.910	1.389	2.160
Malaysia	912	1,353	0.28	0.28	3,254	4,916	1.093	1.358	1.018	0.982	1.113	1.511
Maldives	41	75	1.50	1.36	27	55	1.327	1.393	1.107	0.904	1.468	2.045
Mongolia	13,174	27,876	101.97	131.66	129	212	1.423	1.487	0.775	1.291	1.103	1.639
Myanmar	43,900	85,981	50.03	61.00	877	1,409	1.221	1.604	0.820	1.219	1.001	1.606
Nepal	1,441	2,611	4.83	5.20	299	503	1.484	1.221	0.929	1.077	1.379	1.683
Pakistan	19,161	33,270	4.77	5.59	4,017	5,954	1.301	1.335	0.854	1.171	1.111	1.482
Philippines	9,708	15,808	3.46	3.22	2,807	4,902	1.110	1.466	1.073	0.932	1.191	1.746
Singapore	351	467	0.16	0.15	2,171	3,171	1.065	1.249	1.098	0.911	1.169	1.460
Sri Lanka	7,219	13,317	7.51	8.22	961	1,621	1.377	1.340	0.914	1.094	1.258	1.686
Taipei,China	14,312	17,501	2.90	2.62	4,943	6,688	1.068	1.145	1.106	0.904	1.182	1.353
Thailand	11,307	15,452	2.37	2.14	4,776	7,232	1.108	1.233	1.108	0.903	1.228	1.514
Viet Nam	2,779,880	5,005,975	1,321.50	1,230.21	2,104	4,069	1.265	1.423	1.074	0.931	1.359	1.934

GDP = gross domestic product, HK$ = Hong Kong dollar, LCU = local currency unit, PPP = purchasing power parity.

Note: Ratios may not be precisely replicated using the presented figures in this table due to rounding.

Sources: Gross domestic product in local currency units are from economy sources provided for the International Comparison Program. Domestic Inflation in column (8) is measured using GDP deflator for 2017 with 2011 as the base. GDP deflators for Bangladesh, Cambodia, Fiji, India, Malaysia, Maldives, Nepal, and Thailand were sourced from: Asian Development Bank. 2019b. *Key Indicators for Asia and the Pacific 2019*. Manila: Asian Development Bank; for the Lao People's Democratic Republic were derived from: International Monetary Fund. *International Financial Statistics*. http://data.imf.org/ (accessed 21 January 2020); for Fiji, GDP deflator was rebased to 2011, noting a base year revision in 2014; and the rest were from economy sources provided for ICP. The purchasing power parities used to calculate real gross domestic product are Asian Development Bank estimates.

For Bangladesh, the total price effect is 1.330. Thus, the growth in real GDP in Bangladesh over the period 2011 to 2017 at current prices, 1.939 (column 13), is the product of domestic growth of 1.458 (column 9) and the total price effect of 1.330 (column 12) (which is the ratio of domestic inflation and PPP change). This means that in the case of Bangladesh, a larger proportion of change in real GDP from 2011 to 2017 at current prices (column 13) is due to growth in GDP at 2011 constant prices (column 9).

Real Gross Domestic Product at Current and Constant Prices

The statistical offices of the participating economies compile and disseminate GDP in local currency units at current and constant prices on a regular basis. In the case of the ICP, the results released at the conclusion of each cycle provide real GDP and its components based on prices of the benchmark year. Thus, the 2017 ICP cycle in Asia and the Pacific provides real GDP for the 22 participating economies in current 2017 prices. Similarly, the 2011 ICP published real GDP in current 2011 prices, which were updated due to the revisions mainly in the GDP for 2011 for the 22 economies and released along with 2017 ICP results. It is also possible to compile real GDP figures at constant prices, anchored on a selected ICP cycle, say, real GDP from the 2011 ICP as the base. Thus, the 2017 real GDP of economy j can be obtained by extrapolating the 2011 real GDP of the economy with the domestic growth in GDP experienced over the same period:

2017 real GDP at constant 2011 prices

$$= RGDP_{j,2011} \times \underbrace{\frac{\dfrac{GDP_{j,2017}}{Def_{j,2011,2017}}}{GDP_{j,2011}}}_{\substack{\text{Domestic Growth} \\ \text{Effect}}} \qquad (4.2)$$

This measure of real GDP is based on the price structure in 2011.

In Table 4.4, columns 2 and 3 show the real GDP at current prices from the 2011 and 2017 ICP cycles. As these are in current prices, they are not comparable over time. Column 4 shows growth in GDP (local currency units at constant 2011 prices) in each of the participating economies from 2011 to 2017. The last two columns show 2011 and 2017 real GDP at constant 2011 prices. Since 2011 is the benchmark year for the 2011 ICP cycle, column 5 is identical to column 2. Column 6 shows the 2017 real GDP at constant 2011 prices—entries in this column are obtained as the product of 2011 real GDP at current prices in column 2 (or 5) and domestic growth rates in column 4. The figures in columns 5 and 6 are both intertemporally and spatially comparable for analytical purposes. It is important to note that the 2017 real GDP at constant 2011 prices does not involve the use of 2017 PPP. It is also possible to compile real GDP of the economies in 2011 at constant 2017 prices by starting with real GDP's of economies in 2017 and retropolate to 2011 using economy-specific growth rates.

A Framework for Calculating Regional and Subregional Growth and Inflation

While previous sections discussed growth performance at the economy level, the application of the 2011 and 2017 ICP, this section provides the regional context and comparability of growth performance. International organizations in their global and regional assessments also produce estimates for the growth in regional and global GDP—the key measure of economic performance. As the GDP data reported by the economies are in their local currency units, in order to obtain a global or regional growth, the economies' GDP growth rates are to be aggregated using appropriate weights that represent the relative sizes of their economies. To derive these weights, one method is to convert the GDP of an economy in local currency terms to a common currency (say, the US dollar).

Table 4.4: Real Gross Domestic Product at Constant 2011 Prices, 2011 and 2017

Economy	Real GDP in PPP at Current Prices (HK$ billion)		Domestic Growth Effect 2017 / 2011	Real GDP in PPP at Constant 2011 Prices (HK$ billion)	
	2011	2017		2011	2017
(1)	(2)	(3)	(4)	(5) = (2)	(6) = (5)*(4)
Bangladesh	2,203	4,272	1.458	2,203	3,211
Bhutan	27	52	1.372	27	37
Brunei Darussalam	173	156	0.948	173	164
Cambodia	199	378	1.513	199	301
China, People's Republic of	72,641	117,929	1.515	72,641	110,061
Fiji	40	71	1.269	40	51
Hong Kong, China	1,934	2,663	1.171	1,934	2,265
India	28,688	48,395	1.512	28,688	43,387
Indonesia	11,667	17,394	1.360	11,667	15,869
Lao People's Democratic Republic	140	303	1.555	140	218
Malaysia	3,254	4,916	1.358	3,254	4,418
Maldives	27	55	1.393	27	38
Mongolia	129	212	1.487	129	192
Myanmar	877	1,409	1.604	877	1,407
Nepal	299	503	1.221	299	365
Pakistan	4,017	5,954	1.335	4,017	5,361
Philippines	2,807	4,902	1.466	2,807	4,116
Singapore	2,171	3,171	1.249	2,171	2,712
Sri Lanka	961	1,621	1.340	961	1,288
Taipei,China	4,943	6,688	1.145	4,943	5,658
Thailand	4,776	7,232	1.233	4,776	5,890
Viet Nam	2,104	4,069	1.423	2,104	2,994

GDP = gross domestic product, HK$ = Hong Kong dollar, PPP = purchasing power parity.
Sources: Table 4.3. Gross domestic product in local currency units are from economy sources provided for the International Comparison Program. The purchasing power parities used to calculate real gross domestic product are Asian Development Bank estimates.

Another method is to use the purchasing power parity (PPP)—the rate at which the currency of one economy would have to be converted into that of another economy to represent the same amount of goods and services that can be purchased in each economy. As the PPPs for the developing economies are usually below their market exchange rates, their PPP-based GDP weights are typically higher, when compared with the weights based on exchange rates. Thus, which weights are used can make a significant difference in estimating the regional and global growth figures. The IMF's World Economic Outlook uses the PPP-based GDP as weights in calculating the global and regional growth in GDP and inflation (International Monetary Fund, 2020).

The following sections discuss a conceptual framework and an index number methodology which can be used to derive the growth and inflation measures associated with broader global and regional aggregations such as for Asia and the Pacific and its subregions.

Subregional groupings in Asia and the Pacific. The 2017 ICP in Asia and the Pacific includes 22 economies of the region. To measure and analyze growth performance, the 22 economies are clustered to form two types of subregional groupings. The first type is largely geographically based, except for the high income group.[10] The second type is income-based: it uses the World Bank's classification of economies into high income, upper-middle income, lower-middle income, and low income as a starting point, then modifies it by dividing the lower-middle income economies in two groups, I and II, and including Nepal (the lone low income economy) in the lower-middle income group II.[11]

Methodology to measure regional and subregional growth and price effect. This methodology for measuring regional and subregional growth and price effect follows the approach in Rao (2018) and Balk, Rambaldi, and Rao (2020). For the purposes of explanation, the following discussion focuses on measuring growth and price effect at the GDP level across Asia and the Pacific as a region from 2011 to 2017. The same method can be applied to other components of GDP such as ICEH and GFCF, as well as to any other grouping of economies.

In order to measure growth and price effect for Asia and the Pacific as a whole, the first step is to determine the size of the economy of the region. Since the GDPs of economies are in their respective local currency units, they cannot simply be added. Based on the conceptual framework for ICP described in Chapter 2, the total size of the regional economy can be obtained by converting the GDP of each economy into a reference or base currency using PPPs for GDP. Since PPPs are conversion factors that are designed to adjust for price level differences across economies, the size here refers to the real size of the economy of the region, or real GDP of the region in Hong Kong dollar.

Let $GDP_{j,t}$, $PPP_{j,t}$, and $RGDP_{j,t}$ represent GDP, PPP, and real GDP of economy j (with values 1 to 22) and in year t (with values either 2011 or 2017). $RGDP_{j,t}$ is simply the ratio of $GDP_{j,t}$ and $PPP_{j,t}$. Let $RGDP_{AP,2011}$ and $RGDP_{AP,2017}$ represent the real GDP of Asia and the Pacific in 2011 and 2017. The real GDP (at current prices) of Asia and the Pacific is simply the summation of the economies' real GDPs in 2011 and in 2017. Then, the change in the real GDP of the region from 2011 to 2017 at current prices is given by:

$$\frac{RGDP_{AP,2017}}{RGDP_{AP,2011}} = \frac{\sum_{j=1}^{22} RGDP_{j,2017}}{\sum_{j=1}^{22} RGDP_{j,2011}} = \frac{\sum_{j=1}^{22} \frac{GDP_{j,2017}}{PPP_{j,2017}}}{\sum_{j=1}^{22} \frac{GDP_{j,2011}}{PPP_{j,2011}}} \quad (4.3)$$

The size of the regional economy, in PPP terms and current prices, for the 22 participating economies common for the two benchmark years has increased from HK\$144,078 billion in 2011 to HK\$232,344 billion in 2017. However, the regional economy size in 2011 is in prices observed in 2011 benchmark year and, similarly, the size of the regional economy in 2017 is in the prices observed in 2017. The increase in the size of the regional economy, in 2017 over 2011 is 1.613 times, which results from a combination of regional price effect and regional growth during this period.

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[10] The first type of grouping comprises geographical groups: (i) Mekong, comprising Cambodia, the Lao People's Democratic Republic, Myanmar, Thailand, and Viet Nam; (ii) South Asia, comprising Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka; (iii) Southeast Asia and others, comprising Fiji, Indonesia, Malaysia, Mongolia, the People's Republic of China, and the Philippines; and (iv) high income, comprising Brunei Darussalam; Hong Kong, China; Singapore; and Taipei,China.

[11] The second type of grouping is formed on the basis of per capita gross national income Atlas method estimated by the World Bank for the year 2017: (i) high income, comprising Brunei Darussalam; Hong Kong, China; Singapore; and Taipei,China; (ii) upper-middle income, comprising Fiji, Malaysia, Maldives, the People's Republic of China, and Thailand; (iii) lower-middle income I, comprising Bhutan, Indonesia, the Lao People's Democratic Republic, Mongolia, the Philippines, Sri Lanka, and Viet Nam; and (iv) lower-middle income II, comprising Bangladesh, Cambodia, India, Myanmar, Nepal, and Pakistan.

The problem is here to decompose the change in the region's real GDP at current prices from 2011 to 2017 into measures of regional growth and regional price effect.

Change in Size of the Asia and the Pacific Economy

$$= \frac{RGDP_{AP,2017}}{RGDP_{AP,2011}} = \frac{HK\$232,344 \text{ billion}}{HK\$144,077 \text{ billion}} = 1.6126$$

$$= \text{Regional Growth} \times \text{Regional Price Effect}$$

Balk, Rambaldi, and Rao (2020) have recently shown that it is possible to decompose the ratio of real GDP of Asia and the Pacific's regional economy in 2011 and 2017 by using the Sato-Vartia index formula to obtain measures of global inflation and growth (Sato 1976, Vartia 1976). Following Balk, Rambaldi, and Rao (2020), first, the change in real GDP of Asia and the Pacific is expressed as a weighted geometric mean of economy level changes in real GDP from 2011 to 2017 (in equation 4.4). The weights, as defined in equation 4.5, are based on the logarithmic means of shares of economies in the region in the two periods.

Regional Level
Change in Real GDP
$$\frac{RGDP_{AP}^{2017}}{RGDP_{AP}^{2011}} = \frac{\sum_{j=1}^{22} RGDP_{j,2017}}{\sum_{j=1}^{22} RGDP_{j,2011}}$$
$$= \prod_{j=1}^{22} \left(\frac{RGDP_{j,2017}}{RGDP_{j,2011}} \right)^{\Phi_j}$$
$$\underbrace{\phantom{\prod_{j=1}^{22}}}_{\substack{\text{Economy Level} \\ \text{Change in Real GDP}}} \qquad (4.4)$$

where

$$\Phi_j \equiv \frac{L\left(\frac{RGDP_{j,2017}}{RGDP_{AP,2017}}, \frac{RGDP_{j,2011}}{RGDP_{AP,2011}} \right)}{\sum_{k=1}^{22} L\left(\frac{RGDP_{k,2017}}{RGDP_{AP,2017}}, \frac{RDP_{k,2011}}{RGDP_{AP,2011}} \right)} \quad (4.5)$$

In equation 4.5, $L(a,b) = \frac{a-b}{\ln(a)-\ln(b)}$ if $a \neq b$; otherwise, $L(a,a) = a$, is the logarithmic average of two numbers a and b. Further, $\frac{RGDP_{j,2017}}{RGDP_{AP,2017}}$ and $\frac{RGDP_{j,2011}}{RGDP_{AP,2011}}$ for $j = 1,2,...,22$ are the shares of economy j in the real GDP of Asia and the Pacific or of their corresponding subregion in years 2017 and 2011, respectively.

Now, substituting equation 4.1 into equation 4.4 gives:

$$\frac{RGDP_{AP}^{2017}}{RGDP_{AP}^{2011}} = \prod_{j=1}^{22} \left(\frac{RGDP_{j,2017}}{RGDP_{j,2011}} \right)^{\Phi_j}$$

$$= \prod_{j=1}^{22} \left(\underbrace{\frac{\frac{GDP_{j,2017}}{Def_{j,2011,2017}}}{GDP_{j,2011}} \times Def_{j,2011,2017} \times \frac{PPP_{j,2011}}{PPP_{j,2017}}}_{\text{From equation 4.1}} \right)^{\Phi_j}$$

$$= \underbrace{\prod_{i=1}^{22} \left(\frac{\frac{GDP_{j,2017}}{Def_{j,2011,2017}}}{GDP_{j,2011}} \right)^{\Phi_j}}_{\substack{\text{Regional} \\ \text{Growth}}} \times$$

$$\underbrace{\underbrace{\prod_{i=1}^{22} \left(Def_{j,2011,2017} \right)^{\Phi_j}}_{\substack{\text{Domestic} \\ \text{Inflation}}} \times \underbrace{\prod_{i=1}^{22} \left(\frac{PPP_{j,2011}}{PPP_{j,2017}} \right)^{\Phi_j}}_{\substack{\text{Regional PPP Effect or} \\ \text{Inverse of PPP change}}}}_{\text{Regional Price Effect}} \qquad (4.6)$$

Equation 4.6 provides the required decomposition of change in real GDP of the region, observed from 2011 to 2017 at current prices. The *regional growth* component in equation 4.6 is essentially the weighted geometric mean of the economies' growth in GDP (in local currency units at constant 2011 prices)—the figures in column 9 of Table 4.3. The weights used here are based on shares of the economies in both benchmark years 2011 and 2017 as defined in equation 4.5. Similarly, the *domestic inflation* component is the weighted geometric mean of economy-level domestic inflation effects (column 8 of Table 4.3). The *regional PPP effect* is the weighted geometric mean of economy-specific PPP change effects (column 10 of Table 4.3). The *regional price effect* measure is the weighted geometric mean of the economy-level *price effects* in column 12 of Table 4.3. Further details of this decomposition and its properties are in Rao (2018) and Balk, Rambaldi, and Rao (2020).

Regional and subregional growth and price effect from 2011 to 2017. Table 4.5 presents the decomposition of subregional and regional growth in real GDP from 2011 to 2017 at current prices based on the framework described by Rao (2018) and Balk, Rambaldi, and Rao (2020).

Table 4.5: Regional and Subregional Growth and Price Effect by Geographic Grouping, 2011–2017

Subregional Grouping by Geographic Grouping	Real GDP in PPP at Current Prices (HK$ billion)		Domestic Inflation Effect 2017/2011	PPP Change Effect 2011/2017	PPP Change 2017/2011	Regional and Subregional Price Effect 2017/2011		Growth in Regional and Subregional GDP at Constant 2011 Prices		Growth in Regional and Subregional Real GDP in PPP at Current Prices	
	2011	2017				2017/2011	Annualized (%)	2017/2011	Annualized (%)	2017/2011	Annualized (%)
(1)	(2)	(3)	(4)	(5)	(6) = 1/(5)	(7) = (4)*(5) =(4)/(6)	(8) = [[(7)^(1/6)]-1]*100	(9)	(10) = [[(9)^(1/6)]-1]*100	(11) = (3)/(2) = (4)*(5)*(9)	(12) = [[(11)^(1/6)]-1]*100
High Income	9,222	12,677	1.084	1.083	0.923	1.174	2.71	1.171	2.67	1.375	5.45
Mekong	8,096	13,392	1.166	1.063	0.941	1.240	3.65	1.334	4.92	1.654	8.75
South Asia	36,222	60,851	1.306	0.869	1.151	1.134	2.12	1.482	6.77	1.680	9.03
Southeast Asia and Others	90,538	145,424	1.127	0.958	1.044	1.080	1.29	1.488	6.84	1.606	8.22
Asia and the Pacific	144,078	232,344	1.170	0.947	1.056	1.108	1.72	1.456	6.46	1.613	8.29

GDP = gross domestic product, HK$ = Hong Kong dollar, LCU = local currency unit, PPP = purchasing power parity.
Source: Asian Development Bank estimates.

Figure 4.7: Annualized Regional and Subregional Growth and Price Effect at the Gross Domestic Product Level by Geographic Grouping, 2011–2017
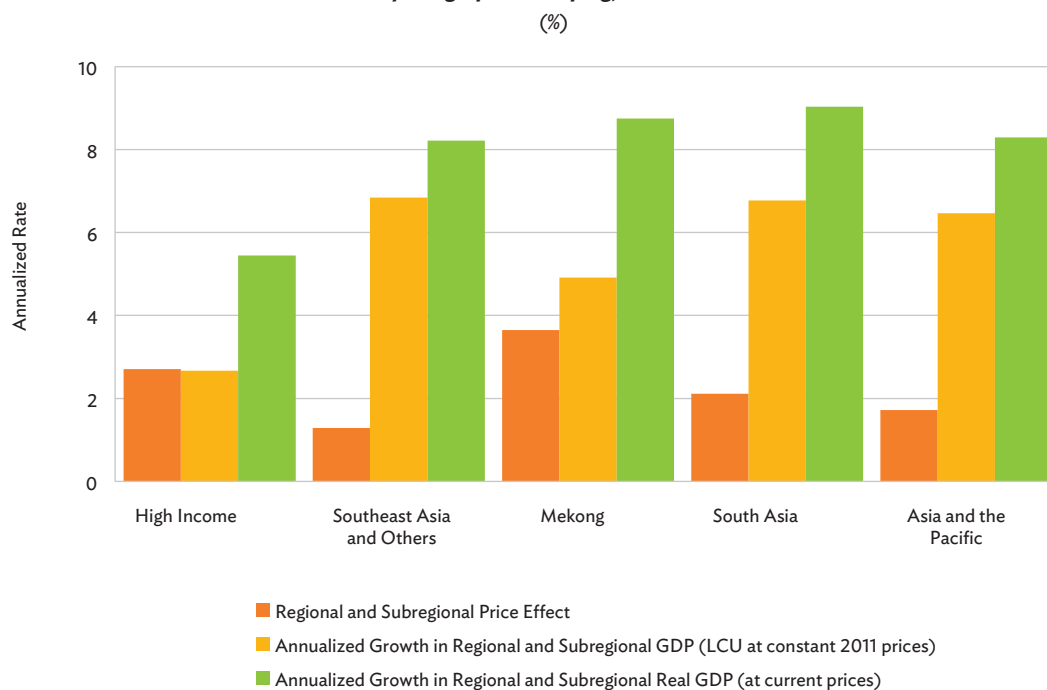
(%)

GDP = gross domestic product, HK$ = Hong Kong dollar, LCU = local currency unit, PPP = purchasing power parity.
Note: Annualized rate is based on annual compounding.
Source: Asian Development Bank estimates.

Estimates of regional and subregional growth (column 9 of Table 4.5), domestic inflation (column 4), regional and subregional PPP change effect (column 5), and regional and subregional price effect (column 7) are computed using equation 4.6 and the economy-level figures in Table 4.3.

The results in column 11 show that the real GDP of Asia and the Pacific at current prices increased by 61.3% from 2011 to 2017. A major proportion of the change in real GDP (at current prices) results from regional growth of 45.6% (last row of column 9) and regional price effect of 10.8% (last row of column 7).

A regional PPP change effect of less than 1 (column 5) dampens the regional price effect estimate in column 7. However, these results show significant variation across different subregions. In terms of subregional growth performance, the group "Southeast Asia and Others" grew at an annualized rate of 6.84% and "South Asia" at 6.77% (column 10). In contrast, the "high income" group recorded annualized growth of only 2.67% (column 10) and annualized price effect of 2.71% (column 8). The group "Southeast Asia and Others" had the lowest annualized price effect of 1.29% (column 8)—this low subregional price effect partially stems from the increase in the average PPP (manifested in a subregional PPP change greater than 1 in column 6). The growth and price effect performance of Asia and the Pacific and its geographical subregions are in Figure 4.7.

In almost all the subregions, growth in GDP (local currency units at constant 2011 prices), shown in the yellow bar in Figure 4.7, is a more significant factor than subregional price effect (orange bar) in the total change in regional and subregional real GDP at current prices from 2011 to 2017 (green bar), an exception being the high income subregion. Another interesting feature of the chart, looking at the annualized growth in subregional GDP (yellow bars), is that all the lower income regions—Mekong, South Asia, and Southeast Asia and Others—have grown at a faster rate than the high income economies. This indicates catch-up and a degree of convergence in incomes across economies in Asia and the Pacific, which are best examined by classifying the economies by their per capita incomes, shown in Table 4.6 and Figure 4.8.

Results in Table 4.6 and Figure 4.8 present strong evidence of catch-up and convergence among the economies of the region. Column 11 of Table 4.6 shows that the change in real GDP at current prices for all the income groups, excluding economies in the high income group, have increased by at least 60% from 2011 to 2017, whereas the real GDP at current prices of high income group of economies increased only by 37.5% over the same period. In terms of growth performance (column 10), the lower-middle income II group grew at an annualized rate of 6.86% compared to 2.67% by the high income group. The upper-middle income group has also posted an impressive growth rate of 6.88% (column 10), largely driven by the performance of the People's Republic of China. In terms of regional and subregional price effect (column 8), the lowest annualized price effect is posted by the upper-middle income group of economies at 1.32%, while the highest rate of 2.71% is posted by the high income economies. The results in Table 4.6 indicate that a majority of the economies have grown at an impressive annualized rate, which is supported by the annualized growth rates of all the participating economies in column 9 of Table 4.3.

Table 4.6: Regional and Subregional Growth and Price Effect by Income Classification, 2011–2017

Subregional Grouping by Income Classification	Real GDP in PPP at Current Prices (HK$ billion)		Domestic Inflation Effect 2017/2011	PPP Change Effect 2011/2017	PPP Change 2017/2011	Regional and Subregional Price Effect 2017/2011		Growth in Regional and Subregional GDP at Constant 2011 Prices		Growth in Regional and Subregional Real GDP in PPP at Current Prices	
	2011	2017				2017/2011	Annualized (%)	2017/2011	Annualized (%)	2017/2011	Annualized (%)
(1)	(2)	(3)	(4)	(5)	(6) = 1/(5)	(7) = (4)*(5) =(4)/(6)	(8) = [[(7)^(1/6)]-1]*100	(9)	(10) = [[(9)^(1/6)]-1]*100	(11) = (3)/(2)= (4)*(5)*(9)	(12) = [[(11)^(1/6)]-1]*100
High Income	9,222	12,677	1.084	1.083	0.923	1.174	2.71	1.171	2.67	1.375	5.45
Upper-Middle Income	80,738	130,203	1.107	0.977	1.023	1.082	1.32	1.491	6.88	1.613	8.29
Lower-Middle Income I	17,835	28,553	1.252	0.922	1.084	1.154	2.42	1.387	5.60	1.601	8.16
Lower-Middle Income II	36,282	60,911	1.300	0.867	1.153	1.128	2.02	1.489	6.86	1.679	9.02
Asia and the Pacific	144,078	232,344	1.170	0.947	1.056	1.108	1.72	1.456	6.46	1.613	8.29

GDP = gross domestic product, HK$ = Hong Kong dollar, PPP = purchasing power parity.
Note: Income classification is based on the per capita gross national income Atlas method for the year 2017 by the World Bank.
Source: Asian Development Bank estimates.

**Figure 4.8: Annualized Regional and Subregional Growth and Price Effect at the Gross Domestic Product
Level by Income Classification, 2011–2017**
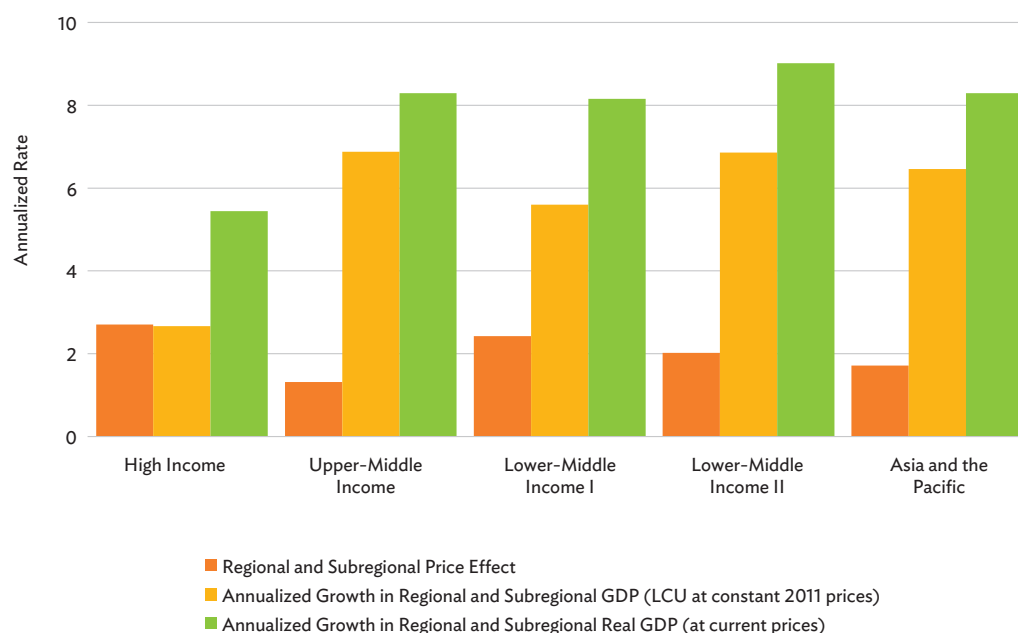
(%)

GDP = gross domestic product, HK$ = Hong Kong dollar, LCU = local currency unit, PPP = purchasing power parity.
Notes: Income classification is based on the per capita gross national income Atlas method for the year 2017 by the World Bank. Annualized rate is based on annual compounding.
Source: Asian Development Bank estimates.

Conclusion

The analysis and results in this chapter demonstrate the feasibility of evaluating the performance of individual economies, subregions, and Asia and the Pacific as a whole at different points in time. The comparison of the 2011 and 2017 ICP cycles as snapshots of Asia and the Pacific as a region are consistent with each other in the sense that extrapolations from 2011 and the actual comparisons in 2017 show no systematic bias. This chapter has shown how information from the two ICP cycles in 2011 and 2017 can be used in assessing the growth performance of the region and the participating economies.

This chapter has important implications for assessing the impact of the coronavirus disease (COVID-19) pandemic on the economic performance of the region and the 22 economies that have participated

in the 2017 ICP cycle. First, the consistency between 2011 extrapolations to 2017 and actual comparisons from 2017 provide a framework to extrapolate the 2017 ICP results to 2019 and thereby provide a detailed picture of the state of the regional economy of Asia and the Pacific before the onset of the COVID-19 pandemic. As price and national accounts statistics become available for 2020 and 2021, it will be possible to assess the effect of the shock of the COVID-19 pandemic on economies of the region. Because the ICP focuses on the expenditure side of the national accounts, it would be possible to assess the impact of the pandemic on household consumption and the burden imposed by the pandemic on government outlays as well as expenditure on health. Thus, the ICP could in principle provide a statistical framework for assessing the impact of COVID-19 on the regional economy of Asia and the Pacific.

5. Governance and Organization of the 2017 International Comparison Program

Introduction

The International Comparison Program (ICP) is a global statistical program whose principal objective is to compile purchasing power parities (PPPs) and PPP-based internationally comparable national accounts statistics, including gross domestic product (GDP) and its main components. The program has achieved impressive coverage with the 2017 ICP cycle covering 176 economies globally that account for most of the world's population and global economic activity. Successfully implementing a statistical program of this magnitude poses major logistical challenges that require a well-designed governance and organizational structure to coordinate activities of all the participating organizations at the global, regional, and economy levels.

The governance structure for the ICP has evolved over the last 50 years since its inception in 1968, as it grew from a small research project at the University of Pennsylvania into a global statistical initiative with a permanent home at the World Bank. Details of the historical development of international price and real income comparisons and the ICP can be found in Chapter 8. Major changes to the governance structure of ICP took place in response to Jacob Ryten's report on the ICP, which concluded: "No statistical programme with an international dimension needs central coordination and an effective relationship with NSOs more than ICP. The soundness of the Programme requires that both national and international offices play their role effectively" (ECOSOC 2000, 59, para. 161).

Amid the complexity of coordinating ICP data collection by dozens of statistical agencies within individual economies and the subsequent efforts at the regional and global levels, the ICP's governance framework must meet the challenges of ensuring

the production of timely and reliable estimates of purchasing power parities (PPPs) of currencies, price levels, and real expenditures that meet the international standards for statistical data established by the United Nations Statistical Commission (UNSC). In particular, the governance structure needs to establish protocols for governance that ensure effective coordination between the global, regional, and economy level organizations; institute mechanisms to identify appropriate methodologies for price and real expenditure comparisons and set in place quality assurance mechanisms designed to meet international statistical standards for the ICP results; and identify and put in place processes that ensure efficient use of the resources available for the ICP.

The process of refining and establishing an effective governance framework began in earnest from the 2005 ICP cycle. The structure set in place for the 2005 ICP responded to the increasing need for regionalization of the ICP outside the European Union and the group of economies in the Organisation for Economic Co-operation and Development (OECD). The ICP has gradually moved toward a regional approach that undertakes price comparisons first at the regional level, considering differences in types of goods and services available in different regions, and subsequently derives global comparisons using specially designed linking procedures. The governance of the ICP at the global and regional levels has undergone further changes during the 2011 and 2017 ICP cycles in response to the reviews by the Friends of the Chair Group of the UNSC and subsequent UNSC recommendations. The 47th Session of the UNSC supported the recommendations of the Friends of the Chair Group and in particular made the following recommendations: "(d) Endorsed the strengthening of the governance structure of the International

Comparison Programme, consisting of the Governing Board, the Inter-Agency Coordination Group and the Technical Advisory Task Force, to be established initially as proposed in the report, to ensure efficient functioning and balanced representation of countries and coordinating agencies in the governing bodies; (e) Welcomed and supported the proposal to establish the Global Office as a permanent team at the World Bank, responsible for the global coordination, data validation and calculation of global results and related day-to-day organizational activities;" (ECOSOC 2016). These recommendations paved the way for the governance structure established for the 2017 ICP cycle.

Governance Structure: Global Level

The ICP is conducted under the auspices of the UNSC and on the basis of the recommendations and directions by the UNSC. The UNSC provides guidelines for the establishment of the governance structures for the ICP. At its 47th session, the UNSC recommended establishing a permanent unit for the ICP at the World Bank to implement the 2017 ICP cycle and beyond. The UNSC reviews the functioning of the ICP, its governance structure, and the membership of its governing bodies on a regular basis. The UNSC may also consider specific issues related to the ICP governance structure or membership of its governance bodies, if raised in the annual reports to the UNSC.

Following the findings of the Friends of the Chair Group review of the 2011 ICP cycle and the subsequent recommendations of the UNSC, the World Bank established the following governance structure to implement the 2017 cycle of the ICP (World Bank 2016a).

At the apex of the governance structure, the UNSC oversees the ICP and its implementation, as Figure 5.1 illustrates, and decides on frequency and timing of different benchmark years for the ICP.

Figure 5.1: 2017 International Comparison Program Cycle: The Governance Structure
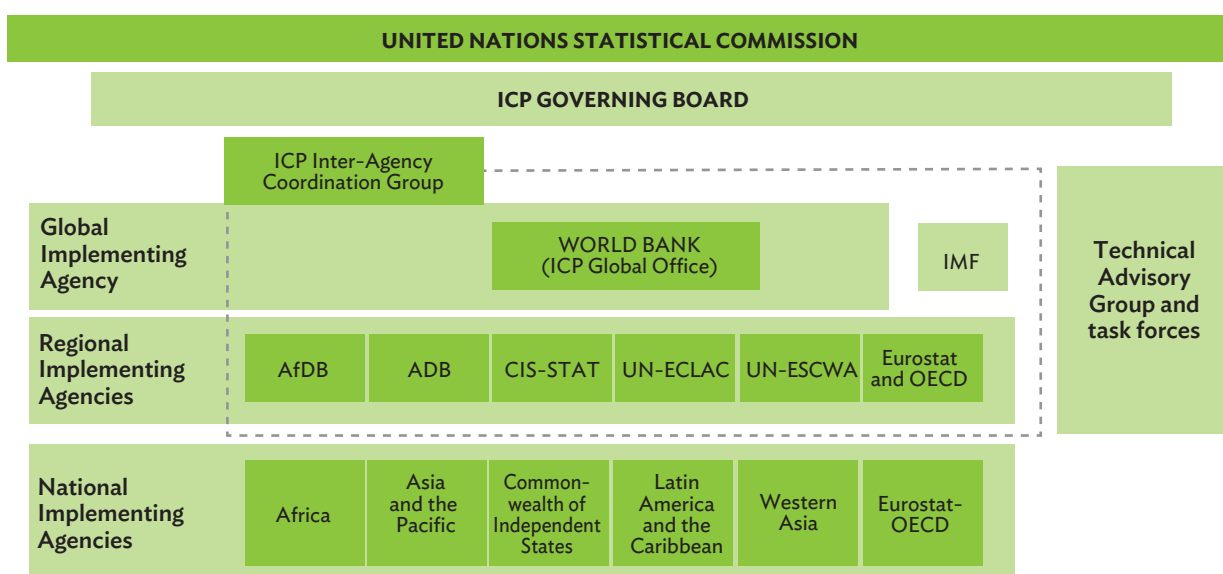
ADB = Asian Development Bank, AfDB = African Development Bank, CIS-STAT = Interstate Statistical Committee of the Commonwealth of Independent States, Eurostat = Statistical Office of the European Union, IMF = International Monetary Fund, OECD = Organisation for Economic Co-operation and Development, UN-ECLAC = United Nations Economic Commission for Latin America and the Caribbean, UN-ESCWA = United Nations Economic and Social Commission for Western Asia.

Source: World Bank. 2020. *Purchasing Power Parities and the Size of the World Economies: Results from the 2017 International Comparison Program,* 74, Figure 4.1. Washington, DC. World Bank. https://openknowledge.worldbank.org/handle/10986/33623.

The 47th meeting of the UNSC recommended increasing the frequency of ICP benchmarks to at least once in 3 years, beginning from the 2017 ICP cycle. The UNSC is responsible for establishing the ICP Governing Board and its membership and ensuring an adequate and balanced representation of economies and organizations.

There are 176 economies that participated in the 2017 ICP whose activities are conducted by their respective implementing agencies. These economies belong to different regional groups overseen by designated regional implementing agencies (RIAs). Table 5.1 shows the distribution of economies by regional grouping and the organizations responsible for different regions.

The Governing Board

The Governing Board, established by the UNSC, provides strategic leadership and is responsible for setting priorities, standards, and the work program for the ICP. The board sets the policies that govern the production of PPPs, approves methodological improvements, and conducts outreach and fundraising. It is responsible for setting up the ICP Technical Advisory Group, selecting its members, and periodically reviewing the technical research

agenda and the survey and aggregation methods. It has the ultimate responsibility to review and approve any methodological innovations and methodological improvements put forward by the Technical Advisory Group. The most important function of the Governing Board is to ensure the timeliness and reliability of the results produced by the ICP by following agreed policies, protocols, and methods and ensuring the quality and integrity of results. The board also reviews and monitors the funding of the ICP and identifies strategies for sustained funding support for the ICP. The membership of the Governing Board comprises the following:

- Chief statisticians or senior-level directors of statistics from 11 implementing agencies from the participating economies representing various ICP regions. The distribution of the board members from participating economies by region are two from Africa; two from Asia; one from Pacific Islands; and one each from Latin America, Caribbean, Western Asia, the Commonwealth of Independent States, the European Union, and non-European Union OECD. The membership is organized on a three-year rotation in order to ensure a broad representation of economies on the board over time.

Table 5.1: Distribution of Economies by Regions in the 2017 International Comparison Program

Region	Regional Implementing Agency	Number of Economies in the Region
Africa	African Development Bank (AfDB)	50
Asia and the Pacific	Asian Development Bank (ADB)	22
Commonwealth of Independent States (CIS)	Interstate Statistical Committee of the Commonwealth of Independent States (CIS-STAT)	8
Europe and Organisation for Economic Co-operation and Development (OECD)	Eurostat and OECD	49
Latin America and the Caribbean	United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC)	36
Western Asia	United Nations Economic and Social Commission for Western Asia (UN-ESCWA)	12
Special Participation	Georgia; the Islamic Republic of Iran; Ukraine	3

Notes: Arab Republic of Egypt, Morocco, and Sudan have dual participation in Africa and Western Asia. The Russian Federation has dual participation in CIS and Eurostat-OECD regions.
Source: 2017 International Comparison Program.

- In addition to 11 members representing implementing agencies from the participating economies, seven additional members represent various international and regional organizations. One member each represents the World Bank, the International Monetary Fund (IMF), United Nations Statistics Division, African Development Bank, and the Asian Development Bank (ADB). In addition, the Eurostat-OECD PPP program is represented by one seat, with Eurostat and OECD rotating on the seat. Another seat is filled by a representative from one of the following institutions in rotation: the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC), United Nations Economic and Social Commission for Western Asia (UN-ESCWA), and Interstate Statistical Committee of the Commonwealth of Independent States (CIS-STAT).

The Global Office

At the recommendation of the UNSC, the World Bank has assumed permanent responsibility for the ICP Global Office, the central and most critical unit to the ICP governance architecture. It is responsible for global coordination and implementation of the ICP. It organizes and conducts meetings of the Inter-Agency Coordination Group and acts as its secretariat. Among a multitude of functions, the ICP Global Office is responsible for day-to-day management, serves as the secretariat to the Governing Board and the Technical Advisory Group, and prepares submissions and annual reports to the UNSC.

The ICP Global Office, in addition to its administrative and coordination role, plays a major role in the actual implementation of the ICP at the economy, regional, and global levels. The ICP Global Office has the following key functions:

- carries out day-to-day management of the global program;

- prepares operational guidelines and materials to support the conduct of the program;
- provides technical support to the regions on implementation, data validation, and computation of regional results;
- assesses economy-level and regional data and metadata submitted by the regions against the quality assurance standards agreed to by the Inter-Agency Coordination Group;
- prepares global core lists for pricing by the participating economies; implements linking of regional results; compiles, validates and disseminates the ICP results at the global level as per the procedures and guidelines provided by the Technical Advisory Group; and
- is responsible for the publication and dissemination of ICP results and manages relevant databases ensuring that access to detailed ICP data and metadata is granted as per the ICP data access policy.

The Inter-Agency Coordination Group and Its Agencies

Chaired by the World Bank, this group includes the RIAs from the ICP regions, the OECD, Eurostat, and the IMF. The Inter-Agency Coordination Group determines activities for data collection, validation, calculation, dissemination, and capacity building at the regional level. This group has a critical role in ensuring that all the regions adhere to common standards and protocols to ensure comparability across regions and the participating economies; establishing and working on timetables and work plans for data collection, validation, compilation of results; and, finally, disseminating results.

Regional Implementing Agencies

The RIAs are critical to the success of the ICP as they work within their respective regions directly with the implementing agencies from the participating

economies in the process of data collection and validation and, more importantly, facilitate information flow from the ICP Global Office to the participating economies. The RIAs also play a critical role in ensuring enthusiastic participation of the economies and their implementing agencies. The RIAs carry out day-to-day management of the regional programs; plan and implement the regional ICP activities in line with the agreed timetables; ensure the quality of economy level and regional data and metadata; and conduct regular workshops on the preparation of item lists, regional validation of data, and the assessment of the ICP results for the region. The RIAs are also responsible for capacity-building activities within the region and provide technical assistance to the participating economies on the conduct of price surveys and subsequent validation of data. They provide the ICP Global Office with economy level and regional data and metadata for purposes of analysis and validation at the global level and for linking the regional results to calculate global results. The list of RIAs responsible for implementing the ICP and their regions is in Table 5.1.

Implementing Agencies from Participating Economies

The implementing agencies are responsible for ICP activities at the economy level. They are responsible for coordinating and implementing the ICP work program established at the regional level. As the timeliness and quality of price and national accounts data are fundamental to the ICP, the implementing agency in each economy plays a vital role in ensuring that the ICP surveys are conducted in a timely manner and quality assurance standards as prescribed by the regional coordinator are met. They are responsible for collecting and compiling data and metadata necessary for compiling PPPs and real expenditures. They periodically submit the data to their RIA and actively participate in regional workshops to discuss ICP operational guidelines and survey materials, undertake data validation,

examine data and metadata quality, and to discuss preliminary and final ICP results for the region.

The Technical Advisory Group

The Technical Advisory Group comprises experts in the fields of index numbers, PPPs, price statistics, and national accounts. The group is entrusted with ensuring methodological soundness and overall quality in the PPP estimates and steering the ICP research agenda. The group works in close coordination with the ICP Global Office and the Inter-Agency Coordination Group to identify and resolve technical issues on the compilation of PPPs and real expenditures. The group has been responsible for major methodological innovations in ICP since the 2005 ICP cycle.

During the 2017 ICP cycle, the Technical Advisory Group established several task forces to work on specific topics including developing methodology to construct time series of PPPs for the years between the 2011 and 2017 benchmarks; dwellings; a rolling price survey approach; consumer price index (CPI) and ICP integration; and the compilation of subnational PPPs.

The Technical Advisory Group has been proactive in ensuring the transparency of the PPP estimation process and reproducibility of ICP results. Toward achieving this objective, the group established a computational task team that played an important role in finalizing global ICP results for the 2017 ICP cycle. Members of the task team independently compiled PPP results using different software packages to ensure replicability of ICP results.

Regional Governance: Asia and the Pacific

Rigorous implementation of a regionalized ICP, outside the European Union and the OECD group of economies, began in earnest from the 2005 ICP

round. The ICP established appropriate governing structures and methods for regional comparisons and subsequent linking and global comparisons (Rao 2013). RIAs assumed responsibilities for their regions while the ICP Global Office at the World Bank coordinated activities across regions and compiled and published results at the global level. The statistical offices undertook the roles of implementing agencies in respective economies for carrying out ICP price surveys and submission of required data to their RIA. ADB took the lead and responsibility as the RIA for implementing the ICP in 2005 in Asia and the Pacific and continued its stewardship for the 2011 and 2017 ICP cycles in the region.

In implementing the ICP in Asia and the Pacific, ADB established the principles of ownership, transparency, and a commitment to the quality and integrity of the data that underpins the compilation of PPPs and real expenditures. ADB has striven to foster mutual cooperation and strong commitment among the participating economies. Throughout the implementation of the 2017 ICP, all the participating economies adhered to the guidelines developed for the ICP at the global and regional levels.

Participating Economies in the 2017 ICP Asia and the Pacific

The 22 economies that participated in the 2017 ICP are Bangladesh; Bhutan; Brunei Darussalam; Cambodia; Fiji; Hong Kong, China; India; Indonesia; the Lao People's Democratic Republic; Malaysia; Maldives; Mongolia; Myanmar; Nepal; Pakistan; the People's Republic of China; the Philippines; Singapore; Sri Lanka; Taipei,China; Thailand; and Viet Nam.

Governance Structure

After the establishment of the new ICP global governance structure in 2016, ADB established a revamped regional governing structure to smoothly

and efficiently implement the 2017 ICP. Participating economies entered into formal "no objection" agreements with ADB for participation under ADB's technical assistance and financial arrangements. A specially conducted inception workshop with the heads of the implementing agencies from each economy clearly explained these arrangements along with an informal framework of partnership that defined the roles and responsibilities of ADB and the implementing agencies within each economy.

ADB, as the RIA, was responsible for implementing the ICP in Asia and the Pacific, and it received advice and guidance from a specially constituted Regional Advisory Board. The RIA at ADB engaged closely with the ICP teams of the participating economies formed by the heads of the implementing agencies. ADB established the regional product lists in close consultations with the participating economies, prepared protocols and guidelines for ICP price surveys and tools for data entry, and intra-economy data validation. The RIA ensured active participation and close cooperation among these economies through regular regional technical workshops on product specification, ICP methodologies and, more importantly, on validation of price and national accounts data that the participating economies compiled and submitted.

Implementing Agencies from Participating Economies

Each of the 22 economies that participated in the 2017 ICP in Asia and the Pacific had established an implementing agency, which was the statistical office in most instances, and played a vital role in ensuring the implementation of the ICP at the economy level. These implementing agencies established an ICP team led by an ICP national coordinator, who in collaboration with the RIA, handled day-to-day operational matters, including the management, coordination, project development, preparation, and implementation of the procedures and methods of ICP at the

economy level. These included liaising with the regional coordinator to ensure timely and successful completion of the ICP. These implementing agencies handled the most critical and challenging ICP work in the governance chain, which involved (i) review and finalization of the regional product lists; (ii) setting up administrative structures for effective implementation of ICP at the economy level; (iii) design and implementation of price surveys for compiling annual national average prices for items in the product lists and ensuring national coverage; (iv) conducting data editing and validation at the economy level; (v) compiling basic heading level expenditures for the 155 basic headings for GDP used in the ICP; and (vi) submitting price data for GDP expenditures by 155 basic headings, and other auxiliary indicators to the RIA according to the agreed principles on data access policies.

These implementing agencies also participated in regional data review and validation workshops and periodic technical discussions, including bilateral discussions with the ADB ICP team for resolving queries arising from RIA's data validations. They also had the sole responsibility of building up and maintaining their economy-level ICP databases that include microdata and metadata archives.

The Regional Advisory Board

The Regional Advisory Board is established to provide advice to the regional coordinator of the ICP in Asia and the Pacific and it includes representatives of national, regional, and global stakeholders. It is not an executive body and is not involved in the day-to-day management of the ICP. It is both ICP's client and its ultimate custodian. The Regional Advisory Board has the following responsibilities:

- providing guidance in setting up regional goals, priorities, and objectives, taking into consideration the statistical needs of regional agencies and economies;

- guiding annual work programs prepared by the regional coordinator, who is responsible for the day-to-day management of the regional program;
- providing the mechanism for keeping all parties involved and informed;
- reviewing ICP progress;
- advising on the sustainability of the program; and
- assisting in shaping the vision of ICP for future direction.

The Regional Advisory Board for the 2017 ICP in the region comprises:

Chair
- Selected from one of the participating economies for every meeting of the Regional Advisory Board

Co-Chair
- Chief Economist and Director General, Economic Research and Regional Cooperation Department, ADB

Members from Participating Economies
- Commissioner, Census and Statistics Department, Hong Kong, China
- Chief Statistician of India and Secretary, Ministry of Statistics and Programme Implementation
- Chief Statistician, Badan Pusat Statistik, Indonesia
- Head, Lao Statistics Bureau, Lao People's Democratic Republic
- Director General, International Statistical Information Center, National Bureau of Statistics of China, People's Republic of China
- Director General, Department of Census and Statistics, Sri Lanka
- Director General, General Statistics Office, Viet Nam

Institutional Members
- Chief Economist, ADB
- General Manager, Macroeconomic Statistics Division, Australian Bureau of Statistics

- Director, Statistics Division, United Nations Economic and Social Commission for Asia and the Pacific
- Director, United Nations Statistical Institute for Asia and the Pacific

Ex-Officio Members
- Director, Development Data Group, World Bank
- Advisor, Office of the Chief Economist and Director General and Head, Statistics and Data Innovation Unit, ADB[12]

Member Secretary
- Regional Coordinator, International Comparison Program (ICP) for Asia and the Pacific, ADB

Secretariat
- The ADB ICP team served as the Secretariat to the RAB.

Experts Group

The regional implementation agency and the regional coordinator of ICP in the region made use of a specially constituted group of experts to provide technical advice on several important measurement areas. This Experts Group is somewhat similar to the Technical Advisory Group at the global level and consisted of specialists in the areas of need. The Experts Group was constituted to provide advice on measurement of PPPs and real expenditures for housing; methodology for making productivity adjustments; construction; and machinery and equipment. The Experts Group assessed the plausibility and reliability of preliminary results from the 2017 ICP in the region. These experts participated in the meetings of the Regional Advisory Board and provided technical guidance to the board in dealing with difficult measurement issues.

The ICP governance structures at the global and regional levels have served their purpose well, as evidenced by the successful completion of the 2017 ICP cycle. All the regions have accomplished their tasks and the ICP Global Office has been able to compile PPPs and real expenditures for all the 176 participating economies in the 2017 ICP. The governance structures established in Asia and the Pacific have helped ADB as the RIA navigate through the task of undertaking international comparisons in this vast and complex region.

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[12] Effective 3 February 2020 onward. Formerly, Director of Development Indicators and Policy Research Division, Economic Research and Regional Cooperation Department.

6. Methodology and Approaches

Introduction

The principal objective of the International Comparison Program (ICP) is to provide policy makers, economists, researchers, international organizations, and other users with comparable measures of economic activity, such as gross domestic product (GDP) and its components, by adjusting for spatial differences in price level using purchasing power parities (PPPs), thus expressing them in a common currency. The conceptual framework for the ICP is therefore determined by the internationally agreed conceptual framework of the System of National Accounts (SNA). The 2008 SNA, the most recent revision, served as the basis for the 2017 ICP cycle.

The general methodology and framework for the ICP is based on three key elements. The first element is the SNA, which the participating economies use to estimate final expenditures on GDP. The ICP requires breaking down the GDP expenditures in local currency units into 155 basic headings. The second element is the determination of a basket of goods and services that are representative of the final expenditures of components of GDP of the economies and that are also comparable across economies. The prices collected for this basket must represent the prices underlying the GDP expenditures estimated in the national accounts of each economy. Finally, the third element is the methodology used in computing PPPs, by making use of data from the first two elements, for comparisons within regions and then across regions for the global comparisons. The objective of this chapter is to present these elements of ICP.

National Accounts and the ICP

The ICP aims to provide internationally comparable measures of economic activity in the participating economies. The standards set in the 2008 SNA (United Nations 2009), a revision of the 1993 SNA, guide these measures of economic activity. While the 2011 ICP was based on the 1993 standards, most of the economies in Asia and the Pacific have adopted the 2008 SNA and are at various stages of its implementation. GDP is a measure of total economic activity within an economy in a given period. There are three approaches to measuring GDP: the production approach, the income approach, and the expenditure approach, all providing the same results. For the purposes of the ICP, the expenditure approach is preferred because the collection of prices and expenditure values for the GDP components is more feasible. Also, the expenditure side provides more direct measures of the standards of living of people residing in the participating economies. The accounting period for the ICP is the calendar year of 2017.

Production approach. From the production side, GDP is the value of gross output *minus* intermediate consumption *plus* any taxes less subsidies not already included in the value of the output. This measure is the sum of the value added of all resident producers adjusted to include taxes on products less subsidies on products not included in the valuation of output. The production approach is the most common and standard approach used in Asia and the Pacific to measure GDP. If the production approach is used for the ICP, then price data is needed for the final output, as well as intermediate consumption broken down into detailed categories. This type of information is difficult to obtain, and therefore the ICP does not use the production approach.

Income approach. Under this approach, GDP is computed as the sum of the value of compensation of employees and gross operating surplus (and mixed income) and taxes less subsidies on both production and imports. "Operating surplus" is a measure of surplus accruing from production processes before deducting any explicit or implicit interest charges, rent, or other property incomes payable on financial assets, land, or other natural resources required to carry out production. Business profits are a large part of the gross operating surplus. Hence, GDP from the income side is basically the sum of all producers' incomes and that of their employees. While it is possible to obtain price data for compensation of employees in wages and salaries, there are no obvious price measures related to gross operating surplus. As a result, the income approach has not been used in the ICP.

Expenditure approach. Under the expenditure approach, GDP is the sum of expenditures on final consumption by households and by government, gross capital formation (GCF), and net exports. As the main components of GDP under this approach are expenditures within different categories, it is possible to collect data on prices paid by the purchasers for goods and services belonging to different groups. The data on GDP expenditures and prices of products underlying those expenditures make it possible to complete price and quantity or volume components of GDP. Thus, the expenditure measure of GDP has been the preferred measure for purposes of ICP since its inception in 1968.

Structure and Components of Gross Domestic Product Expenditures

The main expenditure aggregates that comprise GDP are the following:

(i) individual consumption expenditure by households (ICEH);

(ii) individual consumption expenditure by nonprofit institutions serving households (NPISH);

(iii) government final consumption expenditure (GFCE), which is composed of:
   (a) individual consumption expenditure by government (ICEG); and
   (b) collective consumption expenditure by government (CCEG);

(iv) gross capital formation (GCF), which is composed of:
   (a) gross fixed capital formation (GFCF); and
   (b) changes in inventories and acquisitions less disposals of valuables; and

(v) net exports.

The main aggregates of GDP are defined in detail in Chapter 2 and are briefly described here. ICEH is the total expenditures on goods and services consumed by the individual households. NPISH also undertake expenditures for the benefit of individual households on education, health care, and cultural and religious services. ICEG relates to services produced by the government for the benefit of individual households, such as education, health care, recreation and cultural services, social protection, and housing services. This component also includes those goods and services produced by other producers but acquired by the government and distributed to households. In contrast, CCEG relates to services, such as police, firefighting, and defense, which are provided simultaneously to all members of the community or all households living within a particular economic territory. GCF is the total expenditures on GFCF, changes in inventories and acquisitions less disposals of valuables, where GFCF is the total value of acquisitions less disposals of all fixed assets in the economy and is the sum of expenditures by all resident producers on construction, machinery and equipment, and other products. Net exports represents the difference between the values of exports and imports of an economy. It may be noted that the ICP comparisons are largely based on the prices collected for ICEH, GFCE, and GFCF. The comparisons for changes in

inventories, acquisitions less disposals of valuables, and net exports are based on reference PPPs (see Appendix 5 for the list of reference PPPs).

Actual Individual Consumption by Households

A comprehensive measure of goods and services consumed by the households is the actual individual consumption by households (AICH), a concept introduced in the System of National Accounts 1993 (United Nations 1993) to capture individual ICEH and expenditure by NPISH *plus* ICEG. Thus, AICH represents the total value of final consumption of all goods and services acquired by the households either directly purchased by themselves or by the NPISH or by the government on behalf of the households. As AICH represents total consumption by households, this is the most appropriate measure for comparisons of material well-being of the households across economies with different arrangements for provision of services to individual households by the government.

Hierarchical Approach to Compilation of Purchasing Power Parities

The ICP uses a bottom-up approach to aggregate price data collected for individual items for calculation of PPPs at basic heading level, moving progressively to higher-level aggregates and ultimately leading to estimates of PPPs at the GDP level. Details of this hierarchical approach are outlined in World Bank (2013) and Rao (2013). Figure 6.1 depicts the pyramid structure for the aggregation of price data. The methodological approach is essentially the same whether price comparisons are regional or global, and these are discussed under the section on methods for computing purchasing power parities below. Further descriptions also include how the regional ICP results are linked to produce global ICP results.

Figure 6.1: Hierarchical Structure for Main Gross Domestic Product Aggregates
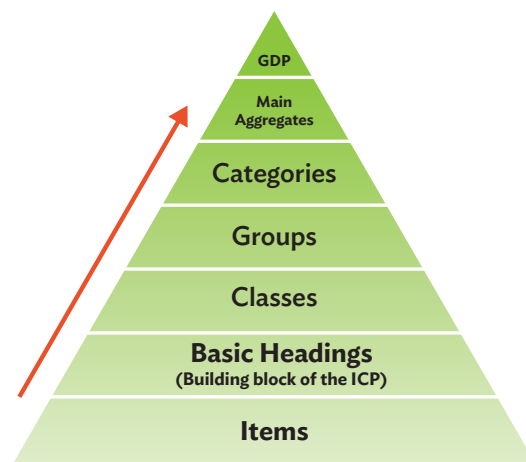
GDP = gross domestic product, ICP = International Comparison Program.
Source: Rao, D.S. Prasada. 2013. "The Framework of the International Comparison Program." In *Measuring the Real Size of the World Economy*, edited by World Bank. Washington, DC: World Bank.

At the base of this structure lies the most important input into PPP computation, the national annual average prices for a large number of comparable items (goods and services) collected and compiled by the participating economies. The processes involved in identifying and preparing the list of products to be priced by the participating economies are discussed in detail in the subsequent section.

Basic Headings: Building Blocks of the ICP

In the first stage of aggregating item level price data, individual items at the base of the pyramid are grouped into 155 basic headings. These basic headings have three important characteristics. First, products within a basic heading are expected to be homogeneous, each covering a group of similar well-defined goods or services. However, in practice, basic headings may cover a broader range of products. Second, the relative prices of goods or services within a basic heading are expected to be similar across economies. Third, basic headings are the lowest level of aggregation of items in the GDP

breakdown at which expenditures and expenditure shares are available.

Below the basic heading level, it may be possible to collect prices of items that make up the basic heading, but estimates of expenditures are not usually available or not produced by many statistical offices of the participating economies. Basic headings are the basis for estimating PPPs at higher level of aggregations and are therefore known as the building blocks for ICP. This feature of the basic headings is similar to the elementary groups of items used to compute elementary indexes in the process of consumer price index (CPI) compilation. Table 6.1 provides a view on the homogeneity of item composition for the basic heading "rice" used in Asia and the Pacific. The full classification comprising 155 basic headings along with their hierarchical groupings at higher levels up to the GDP that were used in 2017 ICP is in Appendix 4, Table A4.1.

Higher Level Aggregates

The 155 basic headings are aggregated to form 126 classes. For example, the bread and cereals class comprises the basic headings of rice; other cereals, flour, and other cereal products; bread; other bakery products; and pasta products and couscous. At the next level, these 126 classes are clustered into 63 groups. For example, the food group comprises the classes of bread and cereals; meat; fish and seafood; milk, cheese, and eggs; oils and fats; fruits; vegetables; sugar, jam, honey, chocolate, and confectionery; and food products not elsewhere classified.

The 63 groups are then clustered into 28 categories. For example, the category of food and non-alcoholic beverages comprises the groups of (i) food and (ii) non-alcoholic beverages. At the next level, the 28 categories are grouped into six main aggregates which together make up the GDP. Table 6.2 shows the six main aggregates under GDP, with the number of basic headings that are used in defining classes, groups, and categories of the ICP classification.

Table 6.1: Basic Heading for Rice and Item Composition

Code	Description	Code	Description
Basic Heading 1101111: Rice		Basic Heading 1101111: Rice	
110111101100	White rice #3, BNR	110111101200	Premium rice #3, BNR
110111101120	White rice #5, BNR	110111101210	Premium rice #4, BNR
110111101140	White rice #7, prepacked, BL	110111101240	Basmati rice, WKB
110111101150	White rice #8, prepacked, BL	11011110170	Brown rice, family pack, BL
110111101160	White rice #9, prepacked, BL	11011110171	Brown rice, loose
110111101170	White rice #10, prepacked, BL	11011110180	White rice #1, BNR
110111101180	Premium rice #1, prepacked, BL	11011110190	White rice #2, BNR
110111101190	Premium rice #2, prepacked, BL	110111102010	Sticky rice, WKB

BL = brandless, BNR = brand not relevant, WKB = well-known brand.
Source: Asian Development Bank. 2018a. "2017 International Comparison Program for Asia and the Pacific Catalogue of Household Products." Unpublished.

Table 6.2: Composition of Main Aggregates of Gross Domestic Product

Main Aggregates and Categories		Category	Group	Class	Basic Heading
Gross Domestic Product		**28**	**63**	**126**	**155**
1100000	**Individual Consumption Expenditure by Households**	**13**	**44**	**91**	**110**
1101000	Food and non-alcoholic beverages		2	11	29
1102000	Alcoholic beverages, tobacco and narcotics		3	5	5
1103000	Clothing and footwear		2	5	5
1104000	Housing, water, electricity, gas and other fuels		5	8	8
1105000	Furnishings, household equipment and routine household maintenance		6	12	13
1106000	Health		3	7	7
1107000	Transport		3	13	13
1108000	Communication		3	3	3
1109000	Recreation and culture		6	13	13
1110000	Education		1	1	1
1111000	Restaurants and hotels		2	2	2
1112000	Miscellaneous goods and services		7	10	10
1113000	Net purchases abroad		1	1	1
1200000	**Individual Consumption Expenditure by NPISH**	**5**	**5**	**5**	**5**
1201000	Housing		1	1	1
1202000	Health		1	1	1
1203000	Recreation and culture		1	1	1
1204000	Education		1	1	1
1205000	Social protection and other services		1	1	1
1300000	**Individual Consumption Expenditure by Government**	**5**	**7**	**16**	**21**
1301000	Housing		1	1	1
1302000	Health		2	7	12
1303000	Recreation and culture		1	1	1
1304000	Education		2	6	6
1305000	Social protection		1	1	1
1400000	**Collective Consumption Expenditure by Government**	**1**	**1**	**5**	**5**
1500000	**Gross Capital Formation**	**3**	**5**	**8**	**12**
1501000	Gross fixed capital formation		3	6	10
1502000	Changes in inventories		1	1	1
1503000	Aquisitions less disposals of valuables		1	1	1
1600000	**Balance of Exports and Imports**	**1**	**1**	**1**	**2**

NPISH = nonprofit institutions serving households.
Source: Asian Development Bank based on World Bank. 2016b. International Comparison Program: Classification of Final Expenditure on GDP. Washington, DC.
http://pubdocs.worldbank.org/en/708531575560035925/pdf/ICP-Classification-description-2019-1205.pdf.

Data Requirements for the ICP: Sources and Methods

The quality and reliability of the input data used in calculating PPPs in the ICP underscore the quality and reliability of the resulting estimates of PPPs and real expenditures. Therefore, data collection and its rigorous validation are critical in data quality control. The regional implementing agency (RIA) places great importance on and allocates significant amount of resources for this purpose.

The two key data requirements for the ICP are (i) the national average prices of a basket of representative and comparable goods and services underlying different basic headings in each economy, and (ii) the corresponding GDP expenditures for each of the basic headings in GDP. The data requirements in these two areas are based on different sources and methods and are dealt with separately in subsequent sections beginning with the requirements of national accounts.

National Accounts Data

The primary objective of the ICP is to provide comparable real expenditure aggregates obtained by converting GDP expenditures in different economies (which are expressed in their own local currency units) into a common currency unit. National accounts data expressed in local currency units are regularly compiled by the statistical offices of the participating economies and are at the core of international comparisons. These data serve two roles in the ICP. First, they provide estimates of the expenditures side of GDP needed to convert these aggregates into real expenditures, or what are known as volumes in ICP parlance. Second, the national accounts provide the weights necessary for aggregating basic heading level PPPs into higher level PPPs. The weights are the corresponding expenditures on each basic heading expressed as a share of GDP. Because PPPs are computed using

national accounts statistics as weights, the accuracy and comparability of national accounts values and weights can impact the accuracy and comparability of the PPPs and real expenditures.

Expenditure Weights

The 155 basic headings are grouped into 126 classes, with each class comprising at least one basic heading. PPPs are calculated for each basic heading using the item level price data or the reference PPPs for certain basic headings (see Appendix 5 for list of basic headings with reference PPPs). These basic heading PPPs are aggregated upward using GDP expenditure share weights associated with corresponding basic headings. Weights at the basic heading level are computed using final expenditures for each basic heading from national accounts data made available by the implementing agencies of the participating economies. For example, for computing PPPs for the "bread and cereals" class, it is necessary to have (i) PPPs for the five basic headings that make up this class; and (ii) corresponding basic heading level expenditures from national accounts for each of these five basic headings.

Thus, for the implementation of ICP, it is necessary to have a breakdown of GDP into 155 basic headings. However, in practice, the participating economies may compile their national accounts statistics by classifying final GDP expenditure into fewer expenditure components than the 155 basic headings in the ICP. In some economies, a detailed breakdown may be available but may not correspond to the ICP requirements. Some economies compile national accounts statistics using national classifications that may require further mapping to the ICP classification, which is based on international classifications. Therefore, an important step in implementing the 2017 ICP cycle was to harmonize the expenditure data and to ensure that comparable expenditure weights for the 155 basic headings are available. This was a major undertaking for the participating economies and an important task for the RIA as well.

Several data sources, such as household expenditure surveys, establishment surveys, economic censuses, government accounts, and other most recent available sources, were used in compiling GDP expenditure breakdown by 155 basic headings for the ICP. Regional workshops and training sessions, with assistance from experts on national accounts statistics, were conducted by the RIA to provide technical support as part of the 2017 ICP implementation in the region.

In most economies of the region, production side GDP estimates are the firmer estimates and serve as control figures, which implies that the published expenditure side estimates of GDP also have an item component of statistical discrepancy. ICP guidelines also require participating economies to allocate statistical discrepancy (if any) on the expenditure side to one or more basic headings based on their best judgment. As such, the expenditure estimates and corresponding shares or weights used in the ICP are the best possible expenditure estimates compiled by the participating economies to meet the technical requirements of ICP, and some of the breakdowns may be different from the published expenditure estimates by the participating economies.

Because of the lack of detailed and direct data, expenditure share weights at the most detailed 155 basic heading level are expected to be less reliable than weights at higher levels. Thus, weights of higher-level component aggregates and basic headings with major expenditure shares in GDP are likely to be more reliable than weights at the lower component levels and for less important basic headings. For example, the weights for important basic headings, such as rice, fruits and vegetables, meat, or garments were likely to be more accurately estimated by the statistical offices than those for smaller basic headings, such as repair of furniture, furnishings, and floor coverings; or small tools and miscellaneous accessories. Inaccuracies of weights for smaller basic headings are not likely to influence PPPs for broad categories, but there is

need for caution when comparing per capita real expenditures at the detailed or finer levels.

The accuracy and reliability of the national accounts statistics produced also depends on the statistical capacity of the government agencies responsible for their compilation, and availability of high quality input data needed for compilation of national accounts in a timely manner. While almost all economies have moved to the 2008 SNA, an indication of the accuracy and reliability of the national accounts is the extent of revisions of their 2011 nominal GDP estimates by the economies since their participation in the 2011 ICP cycle. There have been significant revisions for Maldives (+28%), Brunei Darussalam (+11%), the Lao People's Democratic Republic (+11%), and Sri Lanka (+10%). For 17 economies the revisions were within a range of (+/-)5%.

For purposes of the 2017 ICP, GDP estimates used were for the calendar year. Bangladesh and Pakistan compile their national accounts for fiscal years, from 1 July to 30 June; Myanmar and India, from 1 April to 31 March; and Nepal, from 16 July to 15 July. These economies were required to convert their national accounts aggregates to a calendar year based on their quarterly estimates, if available, or by other methods in the absence of quarterly data.

Price Data

The second and most important input into the computation of PPPs is the price data. In concept, PPPs are summary measures of prices of goods and services in the participating economies expressed in a common currency. Therefore, the RIA, in cooperation with the implementing agencies of the participating economies, undertook considerable efforts in the collection and validation of price data used in computing PPPs. As the ICP covers the whole of GDP, which comprises household consumption expenditure, government consumption expenditure, and gross capital formation (GCF), it is necessary to

devise price collection and validation procedures that are specific to each of these aggregates.

Requirements for Valid Price and Volume Comparisons

The price data collected are used in price comparisons in the form of PPPs, and subsequently used in converting GDP expenditure aggregates into real expenditures or volume measures. These premises imply that PPPs used in converting a particular expenditure aggregate must reflect the prices of goods and services that make up the aggregate under consideration. Therefore, to have PPPs that are meaningful, the prices collected must be consistent with national accounts practices. And the products priced must be representative of the aggregate under consideration, and at the same time comparable so that the price comparisons across economies obtained are appropriate for converting value aggregates into volume measures.

Consistency of Price Measures with National Accounts

"Consistency" refers to the consistency in the conceptual framework that defines the prices used in computing PPPs in the ICP and the prices that are used in compiling the GDP expenditure aggregates to which these PPPs are applied in deriving volume measures in the ICP. Since the 2008 SNA is the basis for the 2017 ICP, the underlying prices used in compiling GDP by the economies are purchasers' prices for actual transactions. This implies that the price data collected and submitted for the ICP item basket of comparable goods and services should be at the purchasers' price or the prices of goods and services actually paid to the sellers by the purchasers. It includes suppliers' retail and wholesale margins, transport and insurance charges invoiced separately, and any non-deductible value added tax on products. For machinery and equipment goods, it also includes the installation costs, if applicable.

Representativity

An important criterion in preparing the product list is that items selected for pricing are representative of the products purchased in the economy and adequately represent the particular GDP expenditure aggregate under consideration. The task of compiling a list of representative products is particularly challenging in a diverse region like Asia and the Pacific. Consequently, the regional coordinator, in cooperation with the implementing agencies of the participating economies, has taken an inclusive approach that includes products that are representative of various subregions and economies of Asia and the Pacific. This was facilitated through reviews of product lists by economies, followed by a series of regional workshops on the preparation of product lists. Participating economies were given the opportunity to identify products representative of consumption in their economies that can be included in the regional product list for price surveys.

Representativity is an important criterion in the ICP. For example, a branded men's shirt with specifications such as 100% cotton and full sleeves may be available across many economies; however, such a specified branded shirt may not necessarily be representative of the shirts purchased in every economy. The Big Mac is another item that may be available in all economies but may still not be a representative product of household consumption in all economies where it is available. Prices of nonrepresentative products tend to exhibit price relativities that deviate from the general price level differences. For example, if an item priced is a high-quality product and is not commonly consumed in a particular economy, then it is likely that the price level for that product in that economy is higher than the price level for related products that are commonly consumed. Therefore, if one economy priced representative products, while another priced unrepresentative products under the same basic heading, then price comparisons between the

economies for the basic heading are likely to be biased and distorted. As a result, a fair degree of judgment is required to identify several products in the basic heading that would be classified as representative of each basic heading and provide each economy with sufficient choice of pricing products representative of their consumption. Some guidelines are provided by the RIA to assist the economies in the process of selecting the items to be priced. For example, best-selling products in each category are likely to be representative. Similarly, any product that is included in the CPI basket of an economy could be considered representative.

Importance

Tied to the concept of representativity is the concept of the importance of items priced. To address the issue of representativity of the product list, participating economies are encouraged to indicate whether a product priced in their economy is considered *important* or *less important*, where importance is expected to be determined on the basis of its expenditure share within the basic heading. Usually, such products are popular and would generally fetch a lower price level than the products which are less important. The idea is that in the absence of expenditure weights at the item level, the basic heading level PPPs are calculated giving equal weights to all items priced in a basic heading, and the importance indicator can be incorporated into PPP computation by assigning different weights for important and less important products. In practice, it has been observed that identifying important products is not straightforward: it is subject to different interpretations because of the uncertainty regarding what objectively constitutes the importance of an item. This subjectivity may lead to unintended bias when this information is used in giving weights to products in the country-product-dummy (CPD) method described in a later section of this chapter. The experience of the 2017 ICP cycle in Asia and the Pacific, similar to the 2005 and 2011 ICP cycles, found inconsistent application of importance criteria by the participating economies,

and hence it was decided with the approval of the Regional Advisory Board not to assign weights for products priced in regional comparisons. Notwithstanding, the RIA collected and submitted information on importance indicators submitted by the 22 economies to the ICP Global Office, which used this information in global linking.

Comparability

Comparability of products priced is an essential requirement for meaningful price comparisons across economies. The general criterion of comparing "like with like" underpins the price comparisons in the ICP. If products priced are not comparable across economies, then the price relativities based on the prices collected for such products will not satisfy the ICP criterion of comparing "like with like" items. Consequently, specification of the products is an important task and is undertaken while preparing product lists to ensure that the same item is priced by all economies.

Comparability is achieved using structured product descriptions (SPDs). SPDs are essentially a set of price-determining characteristics used to specify the products to be priced. Identifying SPDs for each of the items included in the product list is a major task, but SPDs provide a way of achieving a fine balance between comparability and representativity. SPDs, for example, include quantity to be priced, type of packaging, type of outlet, and whether the product is branded or unbranded for household products. Similarly, for products of machinery and equipment, SPDs refer to the make, model, and other detailed product specific characteristics. SPDs ensure that the quality of products priced is the same across the economies when the specifications in the SPDs are followed diligently. The ICP Global Office determines the SPDs of global core lists for household consumption, government compensation of employees, machinery and equipment, and construction, and the participating regions use the same for global core lists and develop similar SPDs for the regional products specific to each region.

From the discussion on representativity and comparability, it is clear that these are two somewhat competing criteria; and it is difficult to achieve high levels in both unless the economies in the comparison are similar in their consumption patterns and characteristics. In a diverse region like Asia and the Pacific and in the context of global comparisons, it is necessary to strike a balance between these two criteria. Comparability is at the core of international comparisons of prices; it is difficult to make meaningful comparisons unless the products are comparable. On the other hand, representativity is critical as the products priced must be associated closely with the national accounts expenditure aggregate it refers to. Achieving a good balance between these two criteria requires good judgment when preparing the regional product lists and selecting products for price collection by the economies. The RIA provided training on ICP concepts and principles for the participating economies and held several workshops for preparing and finalizing the product lists in a collective fashion. The economies were also encouraged to price as many available items that are important as well as other less important items in order to have sufficient overlapping items across economies for meaningful comparisons.

Scope of Price Surveys

As the system of national accounts is the basis for inter-economy comparisons for the benchmark year in the ICP, the scope of the price surveys is also consistent with national accounts practices. The participating economies in the ICP are required to collect and submit prices for a set of goods and services representing their expenditures in the components of GDP. The scope of price collection surveys is therefore determined by the components of consumption expenditures of the households and the government, and components of GCF, namely, machinery and equipment, and construction. Further, aggregate final expenditures in the national accounts are for the calendar year for ICP purposes, implying that the expenditures are for the quantities of goods and services used in the entire year in the economy; as such, corresponding prices used in the computation of PPPs must be annual national average prices.

The availability of representative annual national average prices for goods and services used in an economy is key to PPP calculations and is also the most arduous operation, requiring the participating economies to collect prices for a large number of representative goods and services comprising final expenditures and investments. In an ideal situation, the national annual average price of a product is its average transaction value, which can be obtained by dividing its total value sold during the entire year in the economy divided by the number of units sold in the year. In practice, such data are not available for making valid price comparisons of like with like across economies, and therefore, all participating economies in the ICP adopt a survey framework for collecting prices of a large number of representative and comparable goods and services for compiling annual average prices that are representative of their particular economy.

The frequency of price collection (weekly, monthly, quarterly, semiannual, or annual) and the geographical coverage of surveys depend upon the nature of the product. Prices of food products for example, are collected more frequently during the entire year and cover rural and urban areas, whereas one-time price collection for electronic products or for machinery and equipment items in major urban centers is considered sufficient. Each economy develops a survey framework for each type of product to collect prices for the submission of nationally representative annual average prices to the RIA. The framework for each survey is guided by the nature of products, seasonality, variability in the prices, and availability of financial and human resources and price collection infrastructure. Below are the four main surveys implemented by each economy for ICP:

- **Household consumption.** The survey of household consumption captures the prices of goods and services consumed as part of the individual consumption expenditure by the households (ICEH).
- **Government consumption.** The survey of government consumption captures, either through administrative records or through a survey, data on annual average compensation paid to government employees engaged in selected occupations in health, education, and in collective services provided by the government.
- **Gross fixed capital formation in construction.** This survey collects prices of commonly used construction inputs of materials, rental of equipment, and labor used in three types of construction: residential buildings, nonresidential buildings, and civil engineering structures.
- **Gross fixed capital formation in machinery and equipment.** This is another specialized survey which collects prices for representative items of general and special purpose machinery, electrical and optical instruments, fabricated metal products, transport equipment, and other products that form part of the gross fixed capital formation (GFCF).

Price Survey Framework

At the economy level, the price surveys for the ICP were carried out by the implementing agencies of the participating economies. The price survey frameworks and design vary depending on whether the survey is for price collection of household consumption products, or for other specialized surveys of construction and machinery and equipment products related to GFCF. The implementing agencies of the participating economies designed survey frameworks based on the guidance provided by the RIA. In so doing, the implementing agencies of the participating economies adhered to the conceptual framework and pricing principles of national accounts statistics

framework that underpins the ICP to collect actual transaction prices of available products across a range of outlets and locations.

Table 6.3 provides a summary of the scope and coverage of the main ICP surveys in the Asia and Pacific region for the 2011 ICP cycle in comparison with the 2017 ICP cycle.

Economy-wide Coverage

The prices required for the ICP must be national average prices. Accordingly, the prices for items of household consumption were collected through economy-wide surveys covering both rural and urban markets of the participating economies. However, for collecting prices for non-household items, the surveys focused on major cities. For dwellings, surveys focused on areas where rental markets are prevalent; surveys for machinery and equipment and for construction were limited to capital cities or major urban centers.

Survey Reference Year

The ICP requires that prices used in PPP computation must represent annual average prices, observed during the ICP's reference year, which is the calendar year 2017. Because of delays in starting 2017 ICP survey activities and competing statistical priorities in some economies, all economies conducted household price collection surveys spread over a period of 12 months during 2017 and 2018, with the starting month of price collection varying from April to July 2017. For the purpose of the ICP price comparisons, the 12-month national average prices for household items for survey period were converted by the participating economies to the average prices for the calendar year 2017 using the consumer price index (CPI) at the most detailed level. Surveys for government compensation, construction, and machinery and equipment were conducted during 2017 and 2018, with the 2017 calendar year as reference.

Table 6.3: Scope and Coverage of Price Surveys, 2011 and 2017 Cycles in Asia and the Pacific

Price Survey	2011	2017
Individual consumption expenditure by households	Price collection covered 923 items in the list for Asia and the Pacific. The 2011 ICP list was based on the 2005 and 2009 product lists, with obsolete items dropped and new items added based on regional updates and updates from global core list for 2011 ICP.	Price collection covered 887 items in the list for Asia and the Pacific. The 2017 ICP list was based on the 2011 product list, with obsolete items dropped and new items added based on regional updates and from 2017 ICP global core list.
	Price collection occurred monthly and quarterly for most items and weekly for fruits and vegetables. Prices for less volatile items, such as utilities, were collected semiannually or annually.	Price collection occurred monthly, quarterly, semiannually, or annually, depending on the volatility of the items, with some prices collected weekly for fruits, vegetables, and fresh meat products depending on each economy's survey framework. Prices of durable and less volatile products were collected on quarterly, semiannually, or annual basis.
	Price collection occurred nationwide or throughout the economy.	Price collection occurred nationwide or throughout the economy.
Government final consumption expenditure	Price collection included average compensation for 44 government occupations; 38 occupations were included in the PPP computation, as approved by the Regional Advisory Board for the 2011 ICP in Asia and the Pacific.	Price collection included annual average compensation for 35 government occupations, with 34 occupations included in the list prepared by the ICP Global Office, and one additional occupation priced only in Asia and the Pacific.
Gross fixed capital formation in construction	Price collection covered 46 global construction input items relevant to Asia and the Pacific and used relevance indicators. Used reference PPPs from aggregate machinery and equipment for PPPs for rental equipment.	Price collection included annual average prices for 58 construction input items of materials, equipment rental, and labor; regional relevance indicators were also collected.
Gross fixed capital formation in machinery and equipment	Price collection covered 177 global items relevant to Asia and the Pacific.	Price collection included annual average prices for 196 items including other products.

ICP = International Comparison Program, PPP = purchasing power parity.
Source: Asian Development Bank.

Survey Design

Because of the larger price variability for household items as opposed to other ICP surveys, the following discussion on survey design will focus on the price survey of items of household consumption. The household consumption price surveys were implemented for a 12-month period and were economy-wide in geographical coverage within the participating economies. As the prices collected should be representative of the whole economy, which means that prices must be collected from different types of outlets, such as wet markets, open markets, supermarkets, and local stores, as well as from both rural and urban areas of the economy in a representative manner. This requires that the survey framework adopted in each economy must be designed to ensure economy-wide coverage. Following the principles of sampling design, different outlet types in sampled geographical locations should be assigned

appropriate weights in proportion to the volume of sales by outlets and by locations, including in rural and urban areas. However, because such information is generally not available in most economies, population size could be used as a proxy to volume of sales. A viable alternative is to implement a self-weighting design, whereby more price quotations are obtained from outlets and locations where most of the transactions take place. Such a design could be achieved by allocating the number of quotations to be priced across locations, frequency of price collection, and type of outlets to be sampled. An advantage of such a design is that a simple average of all the price quotations collected would be a reliable estimator of the national average price. For the household items price collection surveys, all the participating economies implemented a self-weighing sampling design for allocating number of quotations across different types of outlets, from the sampled urban and rural areas.

The survey design for ICP household surveys in many economies is very much guided by the CPI survey framework to optimize the available resources for price collection work. In implementing the price surveys for household items, ICP teams of each of the participating economies developed a suitable sampling design to collect representative prices for comparable and available products to provide reliable estimates of national average prices of goods and services used in computing PPPs. They also made important decisions such as: (i) identified the items to be priced within each basic heading in the local markets that are compliant with the SPDs to meet the ICP requirement of comparing like with like, (ii) allocated sufficient number of price quotations across different types of outlets selected to derive annual average prices, and (iii) ensured that prices were collected for selected items for each basic heading for which they compile corresponding GDP expenditure weights. It may be noted that if at least one item within a basic heading is available and priced, then they are required to provide corresponding GDP expenditure breakdown for that basic heading.

Number of Products Priced

The following discussion will focus on the number of products priced for household consumption, which constitutes a major share in the GDP for most economies. The surveys were implemented over a period of 12 months. The number of products to be priced by an economy within a basic heading depended on the importance of the basic heading as reflected by its GDP expenditure share. For example, in the regional ICP, the basic heading of garments in the clothing group has a large proportion of items priced. In the 2017 ICP in Asia and the Pacific, the total share of clothing group to regional GDP was about 1.98%, out of which the garments basic heading contributed 1.46% of GDP. As expected, out of 62 items in the garments basic heading, on average 50 products were priced in the region, with a minimum

of 26 and maximum of 59 products priced. Another example is for the basic heading of catering services, which contributed nearly 2.09% to the total regional GDP. Out of 17 items in the basic heading 12 items were priced, on an average, with all 17 items priced in some economies. In the food category, the basic heading of rice accounted for 1.11% of the regional GDP. Out of 16 items of rice included in the basic heading for regional comparisons, nine items were priced on average, with maximum of all 16 rice items being priced in some economies. Appendix 4, Table A4.1 provides the GDP structure by basic heading along with number of items priced per basic heading.

Another important criterion in pricing of products is the diversity of products within a basic heading. Continuing with the example of garments above, products in this basic heading can be further grouped into three sub-basic headings—garments for men, women, and children (boys and girls), which can be further classified into outer garments (like shirts, dresses, or trousers) and inner or under garments (like vests or bras). As prices of the products between the sub-basic headings are likely to be different, it is important to collect prices of different types of garments that belong to the basic heading. Another example of product diversity is from the basic heading of pharmaceutical items. This basic heading is comprised of items with various forms of packaging, dosage, strength, and brand types (generic or originator). These can be further subdivided into type of medical uses such as antibacterial, antidiabetic, for treating hypertension, and others. All these factors lead to 133 items in this basic heading, providing choices to the participating economies for adequate representation of items in the basic heading.

In the selection of products for household items, the participating economies were required to price both important and less important items according to their representation in the basic heading to get a fair degree of overlap of products priced in

the participating economies. This was necessary as the prices of products selected are used for comparisons of price levels across economies in the region. However, the participating economies were not required to price those items that are rarely consumed by the households and are therefore unrepresentative of the basic heading expenditures.

To ensure that the survey frameworks developed for household price surveys adhere to the basic ICP principles, a sampling expert was engaged by the RIA reviewed household survey frames of the participating economies and provided guidance. Through technical guidance from the sampling expert, preliminary survey frames submitted by ICP teams of each participating economy were further improved after the regional training workshop held in February 2017 in Bangkok, Thailand. This was to ensure that the final sampling frameworks are compliant with ICP principles.

Number of Price Quotations

The national average price for an item was derived as a simple average of the price quotations collected from all sampled outlets, in all selected locations over the entire 12 months, with the frequency of collection varying depending on the type of products. Except for a rule of thumb of a minimum of 15 price quotations for each item, there were no other specific recommendations on the number of price quotations to be submitted. The number of outlets and quotations to be collected for each item depends on the variability in the prices of the item over time, across different types of outlets, and across different regions (rural, urban, capital cities, and megacities). For example, the same product could be cheaper in a local market than in a department store in an upmarket location. Therefore, prices should be collected from different locations and from different types of outlets in each collection period. To decide the number of quotations, the economies were advised to consider their experience from 2011 ICP and consider the item level coefficients of variation (CVs)

from the 2011 ICP to determine the number of quotations and their allocation across outlets and rural and urban areas. Thus, more samples (or quotations, or outlets) must be obtained for items with high CVs than those items with relatively stable prices. To allocate the number of quotations by type of outlets, the general principle was to collect more price quotations from popular outlets in terms of volume of sales. For less volatile items such as utilities, price collection once in 6 months was deemed acceptable.

For large economies such as India and the People's Republic of China—with sizable rural and urban areas and a large number of provinces exhibiting wide variation in food habits, clothing, and cultural preferences—multistage stratified designs were used and sample size determination depended on the variability of prices of the products across different regions of the economy.

Infrastructure for Price Survey Operations

All economies made use of their existing infrastructure for consumer and other price surveys in collecting ICP prices. It would be ideal to fully integrate ICP and CPI price collection efforts for the household sector in the participating economies for more efficient use of human and financial resources. Most economies achieved integration by having the same price collection team for the CPI and ICP price surveys. By utilizing the same staff for ICP price activities, the resources for data collection, data entry, data editing, and training are optimized. Integration is also achieved through selecting overlapping locations, markets, and outlets to the extent possible for similar products, although products which are not part of usual CPI and other price collection may require selecting additional locations, markets, and outlets. Where the product specification of ICP items match the CPI items, the prices are directly taken from the CPI to avoid duplication of efforts.

Preparation of Product Lists

Background

Economies participating in the 2017 ICP collected prices for items listed for household consumption, government occupations, construction inputs, and machinery and equipment, with each list comprising a selection of goods and services relevant for the aggregates. Because of differences in product characteristics and the behavior of prices in each expenditure aggregate, separate product or item lists are prepared for household consumption, government compensation, construction, and machinery and equipment.

The preparation of product lists for ICP surveys is one of the most important steps in ICP operations. The product lists should strike a fine balance between comparability and representativity—the two principles critical to ICP. The product lists for the 2017 ICP were developed after extensive consultations among experts at the national, regional, and global levels and drew from the global core lists—the lists of goods and services prepared by the ICP Global Office and the regional product lists prepared by the RIAs for 2011 ICP. The preparation of these products lists, determination of the survey framework, and collection of prices of items and validation of price data are important steps for the ICP that increase user confidence in the reliability of the PPP estimates.

Structured Product Descriptions

The ICP has used SPDs since the 2005 round to classify and identify products for inclusion in the product lists. The starting point in developing SPDs for each item in 2005 were the detailed characteristics used by the United States Bureau of Labor Statistics in its CPI price collection, which were then adapted for ICP purposes. Essentially SPDs list all possible characteristics by which the product can be correctly identified for pricing by different economies, ensuring "like with like" price comparisons. Most of the product characteristics are price determining characteristics—the characteristics that influence the price level of the items. The SPDs of the global core lists of household consumption, machinery and equipment, construction, and government compensation were developed by the ICP Global Office. Using the SPDs from the global core lists, the RIA in each region developed SPDs for the regional product lists for these surveys.

The RIA for Asia and the Pacific used the approach similar to that of the ICP Global Office for determining the SPDs in preparing the regional product lists for household, machinery and equipment, and construction for the 2017 ICP. While the regional lists for items of machinery and equipment, construction, and government compensation surveys in 2017 ICP in Asia and the Pacific were almost similar to the global core lists, with only minor deviations in the products included, the regional list for household products included a large number of region-specific products in addition to the global products. The 2011 regional list and the 2017 ICP global core lists served as the basis for developing the regional list for household products. Special attention was paid to fast-evolving items in the list, such as electronics and personal transport vehicles, and to replacing outdated and obsolete products and models with those currently popular and available in the regional economies. For the household products, brands were specified as follows:

- **Specified brand.** Only the specified brand of the product should be priced with no substitution.
- **Well-known brand.** Unless otherwise specified, economies were instructed to price medium quality well-known brands in the economy. Also, economies were requested to identify similar brands, if a single brand could not be priced in the entire economy.

- **Brandless.** Brandless goods that may have a "label" without reputation (at the bottom range of market production). The labels if available were required to be noted at the time of price collection.
- **Brand not relevant.** Products usually sold loose.

For household items in the global core list, the ICP Global Office refined the SPDs for 2017 ICP from those used in the 2011 ICP global core list to further ease the identification of items. ADB as the RIA of Asia and the Pacific adopted the same refinements to the SPDs with minor modifications where needed to develop the regional list of household items. One unique set of SPDs was developed for each basic heading, which included price determining characteristics such as quantity, packaging, type of market, brand type, and other characteristics specific to the products in the basic heading. For example, all items in the "rice" basic heading would all have these SPDs: *brand* (such as brand specified, well-known brand, brandless, or brand not relevant); *quantity* to be priced; *minimum quantity* or minimum package size permissible*; maximum quantity* or maximum package size permissible*; unit of measurement* (e.g., kilogram for rice); *type* (such as long grain); *packaging* (type of packing if prepacked or sold loose); *quality* (such as high grade); *preparation* (parboiled or non-parboiled); *milling* (such as hulled, well-milled, or ordinary milled); *share of broken rice*; *aromatic* (fragrant or not); *variety*; *exclusions*; and *specify* (to specify brand, label, observed quantity). In another example, the basic heading of fuels and lubricants for personal transport equipment comprises the products that have these SPDs: quantity; unit of measurement; type; octane; viscosity; packaging; and exclusions.

For the specialized surveys of government compensation, construction, and machinery and equipment, ADB adopted the global SPDs. However, based on feedback from the participating economies during regional workshops conducted by ADB, additional clarifications and notes on the SPDs were provided to them, to ensure that the items priced by the economies were of same quality.

The ensuing section describes the preparation of product lists for all the major price surveys collecting prices of goods and services that constitute GDP expenditure aggregates.

Household Consumption: Regional and Global Core Lists

The ICP implementation follows a regional approach: each region is responsible for compiling regional PPPs and related results, and the ICP Global Office at the World Bank is responsible for linking regional results and compiling the global results. The process of preparing the product lists gives due consideration to the requirements of regional price comparisons as well as requirements of facilitating linking of regional results for global comparisons. The product lists used by the regions in the price collection surveys comprise items from (i) a list of global core products, developed at the global level in consultation with the RIAs, that includes products that are representative of the consumption of economies of the regions, and (ii) a regional list of products that includes region-specific items representing the goods and services consumed in the region's economies and is developed in consultation with the participating economies. Because of the wide heterogeneity in the patterns of household consumption across regions, this distinction between global and regional lists is particularly relevant for the price surveys of household items. For the price surveys of non-household items, the regional lists are almost the same as the global lists, only with some minor deviations.

The 2017 global core list of products was prepared by the ICP Global Office for pricing global core products by all economies of the world participating in the ICP. The ICP Global Office used the list of products for the 2011 ICP comparisons along with inputs from the different regions. The main purpose

of the global core list was to derive robust and reliable linking factors for the household consumption expenditure aggregate to arrive at global results. It included items not only comparable across different regions but also representative of the consumption in the different regions. As the global comparison links very diverse regions, like the Organisation for Economic Co-operation and Development (OECD) and Eurostat region, Asia and the Pacific, and Africa, the global core list also included many branded items to ensure comparability.

The 2017 regional list was prepared with the 2011 ICP Asia and the Pacific product list as the starting point. This was then revised and supplemented by those products from the 2017 ICP global core list that may be priced in the region, ensuring that at least one global item was included in each basic heading. All global core list pharmaceutical items were included in the regional list.

The SPDs for all items were constructed in joint consultation with price experts from all the participating economies in the region during regional workshops and training sessions dedicated to the preparation of the product lists. Although finalized at the beginning of the price surveys, the product lists were kept open for changes and updates based on the feedback from the field surveys in the participating economies. Thus, 18 items that were found to be obsolete, not relevant for region, or not of comparable quality, were removed from the final list. For a few items, the specifications were updated to suit the pricing needs of the economies, while keeping comparability intact.

As indicated above, the product list used for price collection in the region was prepared considering the needs of both the regional and global comparisons leading to inclusion of items specific to the needs of regional comparison and those needed only for global comparisons. The two lists—the regional items list used for regional comparisons and the global core list used for linking of the regions and calculating global PPPs—however do have an overlap

of products. Accordingly, each item in the household product list in Asia and the Pacific was classified into one of the following three groups:

- **Asia and the Pacific items (AP).** Items in this group were region-specific products that were not in the global core list but considered representative of the household consumption of the economies in the region. Prices for these items were included in the computation of PPPs for Asia and the Pacific but not for global PPPs.
- **Asia and the Pacific and global core items (AG).** This group includes products in the ICP global core list that are also considered representative of the household consumption of the economies in Asia and the Pacific. Prices for these items were used in the computation of PPPs for Asia and the Pacific and were also used for linking the region to other regions of the world to calculate global PPPs by the ICP Global Office.
- **Global core list items (GL).** This group includes products in the ICP global core list which, though available and priced in the region, are not considered for computation of regional PPPs and are only used by the ICP Global Office for linking the region to other regions of the world to calculate global PPPs.

The grouping into the AP, AG, and GL lists is illustrated for two basic headings "rice" and "nondurable household goods" in Table 6.4. Rice is an important item of consumption for most economies in the region. Several varieties of rice from low grade to very high grade are consumed by economies of the region and, therefore, 20 distinct rice items were included in the rice basic heading. Out of the 20 items in the "rice" basic heading, 12 were AP items, 4 AG items, and 4 GL items. For the basic heading "nondurable household goods", AP items included items such as laundry soap and mosquito coils, which are commonly used in Asia and the Pacific but may not be customary in another region such as OECD-Eurostat. The AG and GL items, which are required for global price comparisons and global linking, are everyday items such as detergents that were used in most economies.

Table 6.4: Sample Basic Headings and Product List, Household Consumption, 2017

Code	Description	Code	Description
1101111	**Rice**	**1105611**	**Nondurable household goods**
Asia and the Pacific List			
110111101100	White rice #3, BNR	11056110140	Laundry soap or bar
110111101120	White rice #5, BNR	11056110610	Shoe polish, WKB
110111101140	White rice #7, prepacked, BL	11056111310	Nails, BNR
110111101150	White rice #8, prepacked, BL	11056111520	Mosquito coils
110111101160	White rice #9, prepacked, BL	11056111720	Natural fiber broom
110111101170	White rice #10, prepacked, BL	11056112710	Toilet tissue, WKB
110111101180	Premium rice #1, prepacked, BL	11056113020	Wooden matches, WKB
110111101190	Premium rice #2, prepacked, BL	11056113120	Hand sewing needle, WKB
110111101200	Premium rice #3, BNR		
110111101210	Premium rice #4, BNR		
11011110171	Brown rice, loose		
11011110180	White rice #1, BNR		
Asia and the Pacific and the Global Core Lists: Common Items			
110111101240	Basmati rice, WKB	11056110110	Dishwashing detergent, WKB
11011110170	Brown rice, family pack, BL	11056110130	Laundry detergent powder, washing machine, WKB
11011110190	White rice #2, BNR	11056110710	Household candles, box, BL
110111102010	Sticky rice, WKB	11056111510	Insecticide spray, WKB
Global Core List			
110111101220	Long-grain rice, parboiled, WKB	11056110150	Laundry detergent powder, hand wash, WKB
110111101230	Long-grain rice, not parboiled, WKB	11056113210	Aluminum foil, WKB
110111101250	Broken rice, 25%, BNR		
110111101260	Short-grain rice, BNR		

BL = brandless, BNR = brand not relevant, WKB = well-known brand.
Source: Asian Development Bank. 2018a. "2017 International Comparison Program for Asia and the Pacific Catalogue of Household Products." Unpublished.

Household consumption is the biggest national accounts aggregate in most economies. It has a share of 45.2% of the region's nominal GDP and comprises 110 out of 155 basic headings into which the GDP expenditure is disaggregated. The household price survey is also the largest survey in terms of number of goods and services priced among all the price surveys conducted for the ICP. After dropping the products which were identified as obsolete or not relevant for the region or not of comparable quality, 1,054 AP, AG, and GL products remained in the household consumption list for which prices were collected in the region. The distribution of items by list group is shown in Table 6.5.

Table 6.5: Distribution of Products by Type of List, Household Consumption, 2017

Source of Items	Number of Items	Share in Total Items (%)
Asia and the Pacific list only (AP)	586	55.6
Overlaps: Global core list and Asia and the Pacific list (AG)	293	27.8
Global core list only (GL)	175	16.6
Total	**1,054**	**100.0**
Asia and the Pacific list (AP + AG)	879	83.4
Global core list (GL + AG)	468	44.4

Note: The AP count includes split pharmaceutical items, while the GL count includes original pharmaceutical items.
Source: Asian Development Bank.

The Asia and Pacific list used for pricing by participating economies was extensive and comprised 879 (83.4%) AP and AG products and 175 (16.6%) GL products. The large number of items reflects the diverse nature of the region and differences in geographies, tastes, preferences, traditions, cultures, and religions. The extensive list is intended to provide sufficient choice for even the smallest economies in the region to price adequate number of representative products within each basic heading. Obviously, not all products were priced in all the economies. Table 6.6 shows the distribution of coverage of items priced and used in computation after the completion of price surveys and validation of price data for each of the 22 economies of the region.

Table 6.6 shows that, on average, 678 items (64%) were priced by the economies out of a total of 1,054 items in the household list. The table further shows that the largest economies also priced the greatest number of products—India with 926 (88%) and the People's Republic of China with 876 (83%). Pakistan priced 875 items (83%), almost same as the People's Republic of China. The three economies pricing the lowest number of items included the two island economies of Maldives with 349 items (33%) and Fiji with 445 (42%), along with Bhutan, the third smallest economy, pricing 436 items (41%). If one looks at the distribution of items used in calculating the regional PPPs (AP and AG items), on an average 567 (65%) out of 879 regional items were priced by 22 economies in the region.

Table 6.6: Number of Items Priced, Household Consumption By Economy, 2017

Economy	Number of Items Priced					
	AP	AG	GL	Total	Asia and the Pacific List (AP + AG)	Global Core List (AG + GL)
Bangladesh	403	232	123	758	635	355
Bhutan	219	148	69	436	367	217
Brunei Darussalam	300	200	99	599	500	299
Cambodia	311	196	68	575	507	264
China, People's Republic of	451	269	156	876	720	425
Fiji	225	161	59	445	386	220
Hong Kong, China	342	228	120	690	570	348
India	493	279	154	926	772	433
Indonesia	324	225	102	651	549	327
Lao People's Democratic Republic	310	211	103	624	521	314
Malaysia	363	232	122	717	595	354
Maldives	170	117	62	349	287	179
Mongolia	396	240	136	772	636	376
Myanmar	389	236	127	752	625	363
Nepal	347	194	101	642	541	295
Pakistan	468	252	155	875	720	407
Philippines	435	256	146	837	691	402
Singapore	352	234	116	702	586	350
Sri Lanka	326	197	105	628	523	302
Taipei,China	355	231	107	693	586	338
Thailand	327	206	108	641	533	314
Viet Nam	379	252	107	738	631	359
Total Items	586	293	175	1054	879	468
Average Number of Items	349	218	111	678	567	329

AG = overlap (global core list and Asia and the Pacific list), AP = Asia and the Pacific list, GL = global core list.
Note: The AP count includes split pharmaceutical items, while the GL count includes original pharmaceutical items.
Source: Economy sources.

The percentage of items priced for regional PPP computations (AP and AG items) in each economy is also close to the percentage of items priced for the full list (AP, AG, and GL).

Health and Education

Health and education expenditures are challenging aggregates with respect to comparisons across economies, as these expenditures are incurred by both households and the government on behalf of households. In a few economies, households are mainly responsible for their health and education expenses. In some economies, health and education expenses are mainly incurred by the government on behalf of households, and services are offered free of charge or at subsidized prices. In most economies, there is a mix of private and government provision of health and education services.

Health

There are three sets of basic headings on health. One set is under household consumption. Another is under NPISH consumption, which is a new basic heading for 2017 ICP. The third set is included in government consumption or expenditure. Household consumption includes all private expenses associated with the purchase of health goods and services. NPISH consumption comprises the purchase of health goods and services of NPISH on behalf of households. Government consumption covers government expenditure associated with the purchase of goods and services by the government on behalf of households and expenditure associated with direct provision of health services through public hospitals. Table 6.7 shows the basic headings for health for households and government expenditures, while for NPISH there is one single basic heading for health.

Table 6.7: Basic Headings for Expenditures on Health Services, 2017

Code	Description	Code	Description
Individual Consumption Expenditure by Households		Individual Consumption Expenditure by Government	
Medical Products, Appliances and Equipment		Health Benefits and Reimbursements	
1106111	Pharmaceutical products	1302111	Pharmaceutical products
1106121	Other medical products	1302112	Other medical products
1106131	Therapeutic appliances and equipment	1302113	Therapeutic appliances and equipment
		1302121	Outpatient medical services
Outpatient Services		1302122	Outpatient dental services
1106211	Medical services	1302123	Outpatient paramedical services
1106221	Dental services	1302124	Hospital services
1106231	Paramedical services		
		Production of Health Services	
Hospital Services		1302211	Compensation of employees
1106311	Hospital services	1302221	Intermediate consumption
		1302231	Gross operating surplus
Individual Consumption Expenditure by NPISH		1302241	Net taxes on production
1202111	Health	1302251	Receipts from sales

NPISH = nonprofit institutions serving households.
Source: World Bank. 2016b. *International Comparison Program: Classification of Final Expenditure on GDP.* Washington, DC: World Bank.
http://pubdocs.worldbank.org/en/708531575560035925/pdf/ICP-Classification-description-2019-1205.pdf.

Household consumption expenditure included several basic headings covering medical products, appliances, and equipment; outpatient services; and hospital services. The household list included branded as well as generic pharmaceutical items that are prevalent in many economies in the region. Since health products were subsidized in some of the economies and at different levels, in principle the prices reported for ICP should reflect the full price paid to the suppliers regardless of the individual or institution paying for the goods and services. Table 6.8 shows the number of items for each of the basic headings under health for households. Hospital services under household consumption cover medical services, pharmaceuticals, food, and accommodation provided to inpatients. As there is a very wide variability in the prices of hospital services both within and across economies, a reference PPP which is based on the basic headings of medical services, dental services, and paramedical services is used as the PPP for hospital services.

Table 6.8: Number of Items for Price Surveys under Different Health Basic Headings for Household Consumption, 2017

Code	Description	Number of Items
1106111	Pharmaceutical products	133[a]
1106121	Other medical products	12
1106131	Therapeutic appliances and equipment	10
1106211	Outpatient medical services	7
1106221	Outpatient dental services	4
1106231	Outpatient paramedical services	8
1106311	Hospital services	Reference PPP

PPP = purchasing power parity.
[a] The pharmaceutical products count is comprised of the split items (categorized as Asia and the Pacific list items) which are drawn from the 57 original items (categorized as global core list items) whose average prices were derived from split items.
Source: Asian Development Bank. 2018a. "2017 International Comparison Program for Asia and the Pacific Catalogue of Household Products." Unpublished.

Product specifications were provided to the participating economies in the form of SPDs. The product list had the same corresponding basic headings listed under "health benefits and reimbursements," under government expenditures

on health services provided to the households. The following guidelines were used in collecting prices for these goods and services:

(i)   No separate price collection is undertaken for government health expenditure for the basic headings under "health benefits and reimbursements." The same set of national average prices is used to estimate PPPs for basic headings for both household and government expenditures.

(ii) The prices reflect the overall purchaser's price of the product. In practice, this may not pose a major problem if there are markets for these products and services. Full market price must be recorded for each of the products even if the costs are shared by the household and government.

Table 6.9 shows that six out of the 22 participating economies collected prices for more than 115 health items. Of these, Pakistan was able to price 149 items, the Philippines 142, and India 141. Bhutan priced fewer than 30 health items.

Because market prices were not available for the basic headings under health services produced by the government and provided to individuals through public hospitals and dispensaries, except for compensation of employees, another approach was used to determine prices. The components of government expenditure in the production of health services included compensation of employees, intermediate consumption, gross operating surplus, net taxes on production, and receipts from sales (Table 6.7). Compensation of employees of government was based on data on wages and salaries of government employees in health, collected separately under the government compensation survey. The approach used was to collect data on wages and salaries for various types of health occupations in the government, and to construct PPPs after making suitable adjustment for productivity differentials of health sector employees across the participating economies. PPPs for ICEH on the domestic market (excluding basic headings with reference PPPs) were used as reference PPPs for the basic heading intermediate consumption.

Table 6.9: Number of Items Priced for Health by Economy, 2017

Economy	Number of Items Priced					
	AP	AG	GL	Total	Asia and the Pacific List (AP + AG)	Global Core List (AG + GL)
Bangladesh	62	19	40	121	81	59
Bhutan	13	5	10	28	18	15
Brunei Darussalam	33	14	17	64	47	31
Cambodia	33	10	16	59	43	26
China, People's Republic of	64	19	44	127	83	63
Fiji	19	8	13	40	27	21
Hong Kong, China	39	16	25	80	55	41
India	83	18	40	141	101	58
Indonesia	26	17	11	54	43	28
Lao People's Democratic Republic	41	10	31	82	51	41
Malaysia	60	18	35	113	78	53
Maldives	33	15	20	68	48	35
Mongolia	75	19	38	132	94	57
Myanmar	38	17	29	84	55	46
Nepal	71	17	26	114	88	43
Pakistan	85	18	46	149	103	64
Philippines	81	18	43	142	99	61
Singapore	40	18	29	87	58	47
Sri Lanka	56	17	27	100	73	44
Taipei,China	47	19	29	95	66	48
Thailand	58	14	26	98	72	40
Viet Nam	41	17	23	81	58	40
Total Health Items	154	19	58	231	173	77

AG = overlap (global core list and Asia and the Pacific list), AP = Asia and the Pacific list, GL = global core list.
Notes: The AP count includes split pharmaceutical items, while the GL count includes original pharmaceutical items. The number of items priced for each economy excludes those items whose average prices were dropped after they were identified as outliers or as non-comparable.
Source: Economy sources.

PPPs for GFCF (excluding basic headings with reference PPPs) were used as reference PPPs for the basic heading gross operating surplus. Individual consumption expenditure on health by government included those goods and services that are directly procured by the government from market producers and provided to individuals. These were treated the same way as direct purchases by individuals, and the prices of related household products, were used to make price comparisons.

For the remaining basic headings, including health under individual consumption expenditure by NPISH, reference PPPs were used because it was difficult to collect suitable prices for the goods and services that belong to these basic headings. These reference PPPs for health are listed in Table 6.10.

Education

In general, there is no difference in the concepts, methodologies, and procedures adopted for pricing education services from those used in the context of health. A distinction is made between (i) individual expenditure on education by households or private education, (ii) individual consumption expenditure

by NPISH, and (iii) individual expenditure on education by government. The sum of expenditures by households, NPISH, and government comprised the actual expenditure on education. Table 6.11 displays the basic headings for education expenditure and

Table 6.12 shows the list of items priced for individual expenditure on education by households.

There are seven education services which are common to both regional and global core lists.

Table 6.10: Reference Purchasing Power Parities Used for Health, 2017

Code	Description	Reference Purchasing Power Parity Used
Individual Consumption Expenditure by Households		
1106311	Hospital services	Medical services Dental services Paramedical services
Individual Consumption Expenditure by NPISH		
1202111	Health	Compensation of employees from production of health services
Individual Consumption Expenditure by Government		
1302111	Pharmaceutical products	Pharmaceutical products (HHC)
1302112	Other medical products	Other medical products (HHC)
1302113	Therapeutic appliances and equipment	Therapeutic appliances and equipment (HHC)
1302121	Outpatient medical services	Medical services (HHC)
1302122	Outpatient dental services	Dental services (HHC)
1302123	Outpatient paramedical services	Paramedical services (HHC)
1302124	Hospital services	Hospital services (HHC)
1302221	Intermediate consumption	Individual consumption expenditure by households, excluding BHs with reference PPPs
1302231	Gross operating surplus	Gross fixed capital formation, excluding BHs with reference PPPs
1302241	Net taxes on production	Compensation of employees from production of health service
1302251	Receipts from sales	Compensation of employees from production of health service

BH = basic heading, HHC = household consumption, NPISH = nonprofit institutions serving households, PPP = purchasing power parity.
Source: Asian Development Bank.

Table 6.11: Basic Headings for Expenditures on Education, 2017

Code	Description	Code	Description
Individual Consumption Expenditure by Households		**Individual Consumption Expenditure by Government**	
1110111	Education	**Education Benefits and Reimbursements**	
		1304111	Education benefits and reimbursements
Individual Consumption Expenditure by NPISH			
1204111	Education	**Production of Education Services**	
		1304211	Compensation of employees
		1304221	Intermediate consumption
		1304231	Gross operating surplus
		1304241	Net taxes on production
		1304251	Receipts from sales

NPISH = nonprofit institutions serving households.
Source: World Bank. 2016b. *International Comparison Program: Classification of Final Expenditure on GDP*. Washington, DC: World Bank. http://pubdocs.worldbank.org/en/708531575560035925/pdf/ICP-Classification-description-2019-1205.pdf.

Table 6.12: Product List for Education Basic Heading, 2017

Code	Description
1110111	Education
111011110	Primary education
111011120	Lower secondary general education
1110111210	Upper secondary general education
111011130	Tertiary education (ICT degree)
111011140	Tertiary education (economics degree)
111011150	Other education programs (foreign language course or lessons)
111011160	Other education programs (private lessons in mathematics, tutoring outside school hours)

ICT = information and communication technology.
Source: Asian Development Bank. 2018a. "2017 International Comparison Program for Asia and the Pacific Catalogue of Household Products." Unpublished.

Table 6.13: Number of Items Priced for Education by Economy, 2017

Economy	Number of Items Priced	Share of Items Priced (%)
Bangladesh	7	100
Bhutan	4	57
Brunei Darussalam	7	100
Cambodia	5	71
China, People's Republic of	7	100
Fiji	2	29
Hong Kong, China	7	100
India	7	100
Indonesia	7	100
Lao People's Democratic Republic	6	86
Malaysia	4	57
Maldives	4	57
Mongolia	7	100
Myanmar	2	29
Nepal	7	100
Pakistan	7	100
Philippines	7	100
Singapore	5	71
Sri Lanka	2	29
Taipei,China	7	100
Thailand	6	86
Viet Nam	6	86
Total Education Items	**7**	**100**

Note: The number of items priced for each economy excludes those items whose average prices were dropped after they were identified as outliers or as non-comparable.
Source: Economy sources.

Table 6.13 indicates that apart from Fiji, Myanmar, and Sri Lanka, the rest of the economies in the region priced at least 50% of the education services. Eleven economies—Bangladesh; Brunei Darussalam; Hong Kong, China; India; Indonesia; Mongolia; Nepal; Pakistan; the People's Republic of China; the Philippines; and Taipei,China—priced all education services in the list.

The PPP for the basic heading of education, under individual expenditure on education by households, was computed using price data calculated for the products listed in Table 6.12. Basic headings under NPISH expenditure and government expenditure on education used reference PPPs in Table 6.14.

Table 6.14: Reference Purchasing Power Parities Used for Education, 2017

Code	Description	Reference Purchasing Power Parity Used
Individual Consumption Expenditure by NPISH		
1204111	Education	Compensation of employees from production of education services
Individual Consumption Expenditure by Government		
1304111	Education benefits and reimbursements	Education HHC
1304221	Intermediate consumption	Individual consumption expenditure by households, excluding BHs with reference PPPs
1304231	Gross operating surplus	Gross fixed capital formation, excluding BHs with reference PPPs
1304241	Net taxes on production	Compensation of employees from production of education services
1304251	Receipt from sales	Compensation of employees from production of education services

BH = basic heading, HHC = household consumption, NPISH = nonprofit institutions serving households, PPP = purchasing power parity.
Source: Asian Development Bank.

Government Services and Compensation of Employees

General government, according to the System of National Accounts 2008 (2008 SNA), consists mainly of central, federal, regional, state, and local government units together with social security funds imposed and controlled by those units. The main functions of government and the level of service provision vary across economies. For purposes of international comparisons, it is important that PPPs for general government are computed accurately.

The general government expenditures are broadly grouped into two main categories in the ICP classification: individual consumption expenditure by government (ICEG) and collective consumption expenditure by government (CCEG). ICEG relates to the government expenditures on individual services to individual households, predominantly in health and education, apart from housing, recreation and culture, and social protection. CCEG relates to the expenditures incurred by the government to provide services that collectively benefit households and cannot be identified with specific households. These include general public services, defense, public order and safety, economic affairs, environmental protection, and housing and community amenities. Collective services also include overall policy-making, planning, budgetary, and coordinating responsibilities of government ministries overseeing individual services. The distinction between individual services and collective services is based on the Classification of the Functions of Government (COFOG) (UNSD 2000). The following are the broad COFOG groups that cover individual and collective services by general government:

01 – General public services;
02 – Defense;
03 – Public order and safety;
04 – Economic affairs;
05 – Environmental protection;
06 – Housing and community amenities;
07 – Health;
08 – Recreation, culture and religion;
09 – Education; and
10 – Social protection.

Under ICEG, there are 21 basic headings; PPPs for 19 out of those 21 basic headings are reference PPPs (see Appendix 5 for list of basic headings with reference PPPs). PPPs for health and education benefits and reimbursements are referenced to the PPPs computed for individual expenditure on health and education by households that are sourced from private providers at market prices, as discussed earlier in this chapter in the section on health and education. The main components that make up production of health and education services, which are not covered in earlier discussion, are the compensation of employees working in the health and education sectors.

On collective services provided by the government, the following are the five basic headings comprising expenditure categories identified for ICP purposes:

(i)   compensation of employees;
(ii)   intermediate consumption;
(iii) gross operating surplus;
(iv)   net taxes on production; and
(v)   receipts from sales.

Of these five components, PPPs were computed only for compensation of employees through a survey of compensation of employees for selected government occupations (presented in the next section), while reference PPPs were used for the remaining four components.

Government Occupations

The PPPs for compensation of employees are calculated from the data on compensation paid to the government employees for a select group of occupations for individual (health and education) and collective services of the government. The list of

government occupations used in the ICP comprises 35 occupations: 34 occupations are from the global core list and one occupation, medical imaging and therapeutic equipment technicians, was added as a regional item in the list for Asia and the Pacific. There are 9 occupations for health services; 5 for education services; and 21 for collective services. These occupations are defined using job descriptions taken from the International Labour Organization's International Standard Classification of Occupations 2008. Examples of these government occupations are hospital manager, hospital doctor, primary school teacher, university teacher, payroll clerk, firefighter, government statistician, police officer, and office cleaner.

After considering the problem of comparability across economies in the region, the occupation of senior government official was dropped on the recommendation of the 2017 ICP Asia and the Pacific Experts Group and the Regional Advisory Board. The final list included 9 occupations from health, 5 from education, and 20 from collective services of the government.

Table 6.15 provides a summary of the coverage of the government occupations for which data on annual average compensation paid to the government employees was used in the calculation of PPPs after validation. Indonesia had the highest coverage with compensation data reported for all 34 occupations, followed by 33 occupations covered in Brunei Darussalam; India; Malaysia; Myanmar; Taipei,China; and Viet Nam. The reporting of 20 occupations was in the Lao People's Democratic Republic.

Machinery and Equipment

The GFCF category in the 2017 ICP classification is divided into three groups: (i) machinery and equipment, (ii) construction, and (iii) other products. Expenditure on machinery and equipment group is a major component of nominal expenditures on gross fixed capital formation (GFCF). Machinery

Table 6.15: Number of Occupations Priced for Government Compensation by Economy, 2017

Economy	Number of Items Priced			
	Total	Health	Education	Collective
Bangladesh	30	8	4	18
Bhutan	23	7	3	13
Brunei Darussalam	33	9	5	19
Cambodia	31	8	4	19
China, People's Republic of	32	8	5	19
Fiji	29	8	3	18
Hong Kong, China	23	7	3	13
India	33	8	5	20
Indonesia	34	9	5	20
Lao People's Democratic Republic	20	4	4	12
Malaysia	33	9	5	19
Maldives	22	6	4	12
Mongolia	32	9	5	18
Myanmar	33	9	5	19
Nepal	29	7	4	18
Pakistan	30	7	4	19
Philippines	24	5	4	15
Singapore	30	6	5	19
Sri Lanka	32	8	4	20
Taipei,China	33	9	5	19
Thailand	25	6	4	15
Viet Nam	33	8	5	20
Total Items	**34**	**9**	**5**	**20**

Notes: Government compensation data of Thailand for 2017 is estimated by extrapolating government compensation data for 2011 with the deflator of government final consumption expenditure in accordance with the recommendations of the 2017 International Comparison Program Asia and the Pacific Experts Group and the Regional Advisory Board. The number of occupations for each economy excludes those occupations whose data were dropped after they were identified as outliers or as non-comparable.
Source: Economy sources.

and equipment are purchased by producers of goods and services, including private enterprises, government, and nonprofit institutions. Not all purchases of machinery and equipment in an economy are classified as GFCF: it depends upon the purchaser and the use of the item. For example, a laptop computer or a car purchased by a household will be included in household consumption, but a purchase of the same item by a household enterprise as producer will be included in machinery and

equipment within GFCF. As machinery and equipment may be imported in many economies, it was important to specify the producer (make) and model to identify the item clearly.

The pricing of machinery and equipment items, as with other goods priced for the ICP, had to be consistent with the valuation of these goods as fixed capital assets in the national accounts. Accordingly, the following rules were to be observed by the economies in pricing machinery and equipment goods:

(i)   The transportation costs for delivering the machinery and equipment to the place of use should be included. Where the prices do not include transportation costs, either from where they are made or at the port of entry (for imports) and delivered at the factory site, the transport cost incurred must be estimated and included in the price.

(ii)   The cost of installation of fixed equipment, including physical installation as well as costs associated with testing and calibrating equipment, must be included.

(iii) The prices should include only nondeductible product taxes. In many economies, taxes on capital goods are deductible.

(iv)   The price reported must be net of any discounts received by the purchaser that are customarily available to most purchasers.

The 2017 ICP expenditure classification was revised from its 2011 version. The revisions introduced gross capital formation (GCF) as the main aggregate with GFCF, changes in inventories, and acquisitions less disposals of valuables at the category level being its three components. The 2017 ICP classification also introduced a few changes to the classification of GFCF components by combining the basic headings of "motor vehicles, trailers and semi-trailers" and "other road transport" of 2011 into a single basic heading, "road transport equipment," in 2017. In addition, the heading "other manufactured goods not elsewhere classified" of 2011 was combined with "other products" in 2017 (see Appendix 4, Table A4.2).

The machinery and equipment survey collected prices for products falling under the following basic headings:

(i)   1501111 – Fabricated metal products, except machinery and equipment;
(ii)   1501112 – Electrical and optical equipment;
(iii) 1501115 – General purpose machinery;
(iv)   1501116 – Special purpose machinery; and
(v)   1501121 – Road transport equipment.

The global core list for machinery and equipment comprising the above basic headings was prepared in consultation with the RIAs and included 176 products. "Other products," another group with one basic head "other products" under GFCF, had 20 items in the global core list to be surveyed along with the machinery and equipment survey, however, it was subsequently decided to use reference PPPs for this basic heading in all the regions.

The list for machinery and equipment for Asia and the Pacific was fully drawn from the global core list prepared by the ICP Global Office. It included items classified as "*specified*" with details of brand and model, manufacturer, and technical parameters provided by the manufacturer. Remaining items were referred to as "*unspecified*" and were generic counterparts of specified items with same technical parameters but without any brand and model specified. Table 6.16 shows the distribution of machinery and equipment items by basic heading and item type for the 161 items priced and which were finally used in calculating PPPs for GFCF after excluding 15 items that were assessed as not comparable.

Table 6.17 shows the number of items of machinery and equipment priced by the economies under different basic headings and as specified and unspecified. Out of the 75 unspecified items, 26 items were split using price clustering approach. Technical details about splitting of products are discussed later in the section on technical approaches in the 2017 ICP in Asia and the Pacific.

Table 6.16: Number of Items Priced for Machinery and Equipment by Basic Heading and by Item Type, 2017

Code	Basic Heading	Item Type		Total	Percentage of Total (%)
		Specified	Unspecified		
1501111	Fabricated metal products	3	7	10	6
1501112	Electrical and optical equipment	35	21	56	35
1501115	General purpose machinery	13	13	26	16
1501115	Special purpose machinery	24	23	47	29
1501121	Road transport equipment	11	11	22	14
Total Items		86	75	161	100

Source: Economy sources.

Table 6.17: Number of Items Priced for Machinery and Equipment by Economy, 2017

Economy	Items Priced by Basic Heading							Total	Percentage of Total (%)
	Machinery and Equipment					Item Type			
	Fabricated Metal Products, Except Machinery and Equipment	Electrical and Optical Equipment	General Purpose Machinery	Special Purpose Machinery	Road Transport Equipment	Specified	Unspecified		
Bangladesh	3	25	10	2	4	23	21	44	27
Bhutan	1	19	4	7	1	10	22	32	20
Brunei Darussalam	2	11	2	4	1	9	11	20	12
Cambodia	2	21	8	5	3	28	11	39	24
China, People's Republic of	10	50	22	35	17	66	68	134	83
Fiji	5	39	19	38	13	76	38	114	71
Hong Kong, China	2	27	8	6	8	29	22	51	32
India	4	32	13	26	8	30	53	83	52
Indonesia	8	43	19	16	7	59	34	93	58
Lao People's Democratic Republic	2	17	6	12	6	16	27	43	27
Malaysia	5	38	15	24	12	46	48	94	58
Maldives	3	6	3	2	–	1	13	14	9
Mongolia	5	33	12	14	13	35	42	77	48
Myanmar	4	14	3	7	8	6	30	36	22
Nepal	2	20	5	5	5	10	27	37	23
Pakistan	2	11	7	12	9	18	23	41	25
Philippines	4	39	15	26	12	55	41	96	60
Singapore	4	26	6	7	3	27	19	46	29
Sri Lanka	4	34	13	10	9	31	39	70	43
Taipei,China	5	35	9	20	9	32	46	78	48
Thailand	6	41	7	14	11	36	43	79	49
Viet Nam	10	51	22	35	22	75	65	140	87
Total Items	10	56	26	47	22	86	75	161	100

– = magnitude equals zero.
Note: The number of items priced for each economy excludes those items whose average prices were dropped after they were identified as outliers or as non-comparable.
Source: Economy sources.

Coverage is different across basic headings and across the participating economies. Generally, the coverage of machinery and equipment is low as compared with the other sectors. The highest percentage of products priced was observed in Viet Nam with coverage of about 87% of the total list in the region, while the lowest was in Maldives at only 9%.

Construction

Construction is another major component of GFCF. The 2017 ICP classification divides the construction group into the following three major components or basic headings that make up the construction aggregates (World Bank 2013b):

(i)   **Residential buildings.** These are buildings used entirely or primarily as residences. Examples are detached, semi-detached, and terraced houses; apartment houses with two or more dwelling units; farmhouses; and dormitories used as principal residences of households.

(ii) **Nonresidential buildings.** These are buildings other than dwellings and are used for commercial purposes. They include barns, warehouses, industrial buildings, commercial buildings, buildings for public entertainment, hotels, restaurants, schools, hospitals, churches, and stadiums.

(iii) **Civil engineering works.** These include highways, suburban roads, railways, airfields, bridges, tunnels, subways, hydroelectric projects, waterways, harbors, dams, sewer systems, pipelines, telecommunication transmission lines, electricity power lines, power plants, sport and recreation installations, and other complex industrial constructions.

Under the approach for construction surveys, similar to the 2011 ICP input approach, prices are collected for a basket of 58 construction inputs divided into three categories: (i) materials, including 40 material inputs; (ii) equipment rental, including 10 items of construction equipment rented for construction purposes; and (iii) labor, comprising eight types of skilled and unskilled construction labor. The regional list of construction inputs was largely drawn from the global core list for construction inputs: 55 out of 58 input items were drawn from the global core list while another three input items popularly used in the region for construction were added to the regional list.

In terms of coverage, most economies priced a reasonable number of construction inputs. Three economies priced at least 50 of the 58 items in the list: Indonesia (51), Singapore (50), and Viet Nam (50). Price information for equipment rental and labor items was available in all economies with the exception of Brunei Darussalam for equipment hire (with no items priced). Of the 40 materials, one item (sheet metal roofing) was eventually dropped in one of the regional validation workshops because of lack of comparability in the prices. Prices of five other material inputs (electric pump, electric exhaust fan, air-conditioning equipment, stand-by generator, and solar panel) were found non-comparable after review in the Experts Group meeting. Hence, only the remaining 52 items comprising 34 material inputs along with 10 equipment rental and 8 labor items were included in the PPP computations. Table 6.18 shows the items priced in all the economies. The survey coverage is generally high with 16 economies pricing at least 75% of the items. The average ranged from a low of 44% of the items in Bhutan to a high of 98% in Indonesia.

Dwellings

Comparisons of real expenditures on dwelling services within ICP have always been a challenge. For Asia and the Pacific, this has been particularly difficult because of the diversity in the participating economies. The ICP Technical Advisory Group has recommended two standard approaches for measuring dwelling services: (i) the rental price approach and

Table 6.18: Number of Items Priced for Construction by Economy and by Input Types, 2017

Economy	Input Types			Total	Percentage of Total (%)
	Materials	Equipment Rental	Labor		
Bangladesh	30	5	8	43	83
Bhutan	13	3	7	23	44
Brunei Darussalam	22	0	8	30	58
Cambodia	30	10	8	48	92
China, People's Republic of	31	10	8	49	94
Fiji	27	5	8	40	77
Hong Kong, China	19	4	8	31	60
India	27	5	8	40	77
Indonesia	33	10	8	51	98
Lao People's Democratic Republic	28	4	7	39	75
Malaysia	23	3	8	34	65
Maldives	19	5	8	32	62
Mongolia	28	10	8	46	88
Myanmar	24	10	8	42	81
Nepal	25	4	8	37	71
Pakistan	26	8	8	42	81
Philippines	27	5	8	40	77
Singapore	33	10	7	50	96
Sri Lanka	28	10	8	46	88
Taipei,China	26	10	8	44	85
Thailand	24	10	8	42	81
Viet Nam	32	10	8	50	96
Total Items	**34**	**10**	**8**	**52**	**100**

Note: The number of items priced for each economy excludes those items whose average prices were dropped after they were identified as outliers or as non-comparable.
Source: Economy sources.

(ii) the quantity indicator or volume approach. In Asia and the Pacific, both these approaches were attempted in the 2005 and 2011 ICP cycles, but the results from both approaches were found implausible for various reasons, such as the lack of rental data for some economies; gaps in quantity data that required too many imputations; data of uncertain quality that were often incomparable; quality differences across economies that were not adequately captured by the quality indicators used; and weaknesses in the national accounts statistics in reliably capturing housing expenditures. As a compromise, both the 2005 and 2011 rounds used the reference volume method, which is based on the assumption that relative volumes of housing services between economies are equal to the relative volume of household expenditures (without housing).

At the beginning of the 2017 ICP cycle, it was decided to again attempt both the rental price and volume approaches by taking utmost care to collect complete data, minimize data gaps, and rigorously validate data to ensure the quality of the data submitted by the economies for both the approaches.

However, not all economies could provide housing rentals surveys representative at the economy level. Results suggest that the PPPs, PLIs, and relative levels of per capita housing expenditure from the two approaches are again implausible for many economies. Both the approaches independently fail to adequately account for the differences in the quality of dwellings.

The quantity indicator approach measures volume directly from data collected on dwellings from participating economies. Under this approach, six indicators—three each for quantity and quality indicators—were collected to arrive at relative volumes of dwelling services. The three quantity indicators used as measures of dwelling volumes are (i) number of dwellings per 100 people, (ii) number of rooms per 100 people, and (iii) square meters of floor space available per person. These were combined with three quality indicators measured by the (i) number of dwellings with safe water, (ii) inside toilets, and (iii) electricity. These quality indicators reflected basic necessities and were useful in further differentiating dwellings of the economies. The RIA worked very closely with the participating economies to review all possible sources of data on housing indicators—household surveys, population and housing censuses, and housing administrative data—to mine the indicators of quantity and quality of housing used to calculate housing volumes. Indicators of housing quality available in the Water, Sanitation and Hygiene (WASH) database from the World Health Organization (WHO) and United Nations Children's Fund (UNICEF) Joint Monitoring Programme were also explored and used to fill gaps in data and to validate data submitted by the economies (WHO and UNICEF n.d.). The WASH indicators track Sustainable Development Goal (SDG) 6: "Ensure availability and sustainable management of water and sanitation for all," by collecting data on the availability of drinking water, sanitation, and hygiene.

The rental price approach was based on rental prices for a basket of dwellings identified for the housing rental surveys implemented by the participating economies. Similar to the method for calculating PPPs for the household products, the rental price approach calculates PPPs directly from the rental price data. Rental price data are expected to account for differences in the quality of dwellings within an economy that are not otherwise adequately captured by the three quantity indicators in the volume approach. For the 2017 ICP, participating economies collected rental data for 21 different dwelling types of different sizes, as measured in square meters, that were grouped into seven categories: single detached house, attached house, studio apartment, one-bedroom apartment, two-bedroom apartment, three-bedroom apartment, and traditional dwelling. The list of dwellings used in Asia and the Pacific included dwelling types from the global list as well as additional dwelling types that were specific to the region. Table 6.19 shows the number of dwelling types priced by the participating economies for the 2017 ICP in Asia and the Pacific. Housing rental surveys had full national coverage in only half of the economies, however there was a strong overlap in the dwelling types to facilitate comparisons. The rental prices were converted to rents per square meter for comparisons.

Despite vigorous efforts by the RIA to improve available data, the results from both the approaches considered separately, were found not plausible for some economies for the 2017 ICP cycle and the region had to resort to the same reference volume approach used in earlier ICP cycles. However, as part of research agenda on dwelling services, the RIA developed a new hybrid approach by mixing the two approaches. This new approach is discussed in the section on technical approaches in 2017 ICP in Asia and the Pacific.

Economy	Dwelling Type							Total	Percentage of Total (%)
	Single Detached House	Attached House	Studio Apartment	One-Bedroom Apartment	Two-Bedroom Apartment	Three-Bedroom Apartment	Traditional Dwelling		
Bangladesh	5	1	1	3	3	3	2	18	86
Bhutan	1	–	–	1	1	1	2	6	29
Brunei Darussalam	4	2	–	1	1	2	–	10	48
Cambodia	4	3	1	2	2	2	–	14	67
China, People's Republic of	5	4	1	3	3	3	–	19	90
Fiji	4	–	–	2	1	2	–	9	43
Hong Kong, China	–	–	–	3	3	3	–	9	43
India	5	–	–	3	3	3	–	14	67
Indonesia	5	4	1	3	3	3	–	19	90
Lao People's Democratic Republic	5	2	–	2	3	–	–	12	57
Malaysia	5	4	–	2	3	3	–	17	81
Maldives	–	–	–	2	3	2	–	7	33
Mongolia	1	–	1	3	3	3	1	12	57
Myanmar	5	3	1	3	3	3	2	20	95
Nepal	5	4	1	3	3	3	–	19	90
Pakistan	3	4	–	3	2	–	2	14	67
Philippines	4	3	1	2	1	1	1	13	62
Singapore	4	2	–	–	2	2	–	10	48
Sri Lanka	5	4	–	3	3	3	–	18	86
Taipei,China	–	4	1	2	3	3	–	13	62
Thailand	2	4	1	3	–	–	–	10	48
Viet Nam	3	2	1	3	3	3	2	17	81
Total Items	**5**	**4**	**1**	**3**	**3**	**3**	**2**	**21**	**100**

Table 6.19: Number of Items Priced for Housing Rental Survey by Economy and by Dwelling Type, 2017

– = magnitude equals zero.
Source: Economy sources.

Price Data Validation

PPPs are meaningful and useful only if they are estimated using reliable and accurate price data. No amount of sophistication in the index number methodology can compensate for low quality price data. These principles were emphasized to the participating economies from the inception stage of every ICP cycle. Then, throughout the implementation, the Regional Advisory Board strongly maintained these standards while the RIA provided a significant amount of human and financial resources for data validation and editing activities. Regional data validation workshops were organized every quarter. These workshops ensured active involvement of the participating economies in the process, and encouraging them to take ownership over the price data for the PPP computations.

Several tests and techniques were used at two broad levels for validating the data: (i) at the intra-economy level to identify outliers among individual price quotations within an economy; and, (ii) at the inter-economy level to identify outliers among item-level annual national average prices across economies. The regional level data validations were further

supplemented by global validation undertaken by the ICP Global Office across all economies participating in the global program adding an additional layer of validation. Outliers identified at each stage were brought to the attention of the ICP teams of the participating economies to cross-check, verify, and correct the data. The SPDs were used to make sure that the same product was priced in all the economies to ensure comparability of prices.

Intra-Economy Validation

The first step involved the implementing agencies in each economy conducting intra-economy validation of prices for all sectors to ensure that there are no outliers in the individual price quotations data supplied to the RIA. The implementing agencies maintained records of individual price quotations, sample outlets, and their geographical location information. The following checks and statistical techniques were recommended for intra-economy validation:

(i) **Number of quotations.** Within each economy, the implementing agencies must ensure that each item has a minimum of 15 quotations for every collection period for the entire economy. A larger number of quotations is expected for larger economies, for items that are deemed available and important throughout the economy (e.g., basic food items), and for those items whose prices are highly volatile. On the other hand, the minimum number of quotations is expected for items with low price variability across selected markets and over time, such as household durables (e.g., televisions or furniture). Items with fewer than 15 quotations are flagged in red by the ICP APSS.[13]

(ii) **Minimum-to-maximum ratio test.** The ratio of the minimum to maximum price quotations for a given product indicates the reliability of prices. If the ratio is less than 0.33, then the price quotations for such products are to be examined closely to identify possible outliers. The minimum-to-maximum ratio (MMR) is generated by the ICP APSS, and items with MMR less than 0.33 are flagged in red.

(iii) **Coefficient of variation.** For each item, the standard deviation of the price quotations is divided by the average price. Items with a coefficient of variation (CV) more than 30% are flagged for review by the implementing agencies for possible extreme price quotations. Along with number of quotations and MMR, the CV is included in the ICP APSS, in which items with a CV greater than 30% marked in red.

(iv) **Validation by location.** Since the ICP requires capturing the national annual average prices, the implementing agencies must ensure that the number of quotations from each domain are allocated adequately to collect prices from both urban and rural areas. This procedure helped implementing agencies to view and validate the average prices for rural and urban markets separately. For this, ICP APSS generates information on number of quotations, MMR, and CV by location, and also flags items which do not satisfy the criteria set for these parameters.

(v) **Standard deviation range limit.** For each item, individual price quotations are flagged for checking if they fall beyond the upper or lower limit determined by the magnitude of one standard deviation from the average price.

(vi) **ICP and CPI temporal price movement.** The trends of the ICP item price movements are compared with the movement in price indexes of

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the relevant basic heading or nearest aggregate for which an index is available in the CPI from 2011 to 2017. If there are differences in price trends of the CPI and ICP (e.g., prices are increasing in the CPI while decreasing in ICP) or a significant difference in rates of increase or decrease among similar items or groups in the CPI and ICP when exhibiting the same trend, economies are advised to review and document the reasons for such variations in the CPI and ICP price trends.

The indicators and procedures listed above are pure statistical measures used to flag the presence of outliers at the economy level for further verification. Any identified outlier may stem from non-sampling errors that range from mere encoding errors to something as serious as non-compliance to structured product descriptions, such as pricing an erroneous unit of measurement (e.g., pricing 1 kilogram of a rice item instead of 5 kilograms). An example of intra-economy validation results of household items in the ICP APSS are summarized in Table 6.20 to provide a condensed view of the data issues flagged in the validation process. The ICP APSS in 2017 was upgraded to provide a summary of the final 2011 ICP data for comparison at every data review cycle.

Inter-Economy Validation

The participating economies submitted the economy level price data to the RIA on a regular basis. While the intra-economy validations were aimed at checking the quality of price data at the level of each economy by the implementing agency, at the regional level, the RIA conducted a series of validations to check whether the national annual average prices are comparable across economies. The aim is to validate if the price statisticians in different economies have interpreted the product specifications correctly, and that the price collectors have priced right products in accordance with the SPDs. The inter-economy validation is mainly based on the use of Dikhanov tables.

Table 6.20: Example of Intra-Economy Validation Summary for Household Consumption

Particulars	2011	2017
Items with 0 quotation	–	–
Items with 1 quotation	–	–
Items with 2 quotations	–	–
Items with 3–5 quotations	2	7
Items with 6–10 quotations	12	15
Items with 11–14 quotations	55	28
Items with 15–30 quotations	96	79
Items with 31–90 quotations	416	474
Items with more than 90 quotations	168	78
Items with less than 3 quotations	–	–
Items with 4–15 quotations	69	50
Items with less than 15 quotations	69	50
Items with more than 15 quotations	680	631
Total items priced	749	681
Items with ICP inflation more than 10% higher than CPI inflation	n.a.	275
Basic headings with priced items (out of 91 BHs)	90	90
Basic headings not priced	1	1
Items with CV of 0	40	21
Items with CV > 0 and ≤ 5	47	41
Items with CV > 5 and ≤ 10	135	87
Items with CV > 10 and ≤ 20	322	330
Items with CV > 20 and ≤ 30	202	201
Items with CV > 30	3	1
Items with CV > 30 and ≤ 40	3	1
Items with CV > 40 and ≤ 50	–	–
Items with CV > 50 and ≤ 60	–	–
Items with CV > 60 and ≤ 70	–	–
Items with CV > 70	–	–
Total quotations	41,619	38,526
Items with MMR less than 0.33	3	–

– = magnitude equals zero, BH = basic heading, CPI = consumer price index, CV = coefficient of variation, ICP = international comparison program, MMR = minimum-to-maximum ratio, n.a. = not applicable.
Note: Counts include all items priced, split pharmaceutical items but excluding corresponding parent items.
Source: Asian Development Bank.

Dikhanov Tables

The inter-economy validation tests and techniques are summarized in the Dikhanov tables—an approach developed by Yuri Dikhanov of the World Bank and first introduced and implemented in the 2005 ICP. The Dikhanov tables are based on the country-product-dummy (CPD) method used to estimate PPPs at the basic heading level. The CPD model makes use of the following regression model:

$$\ln p_{ij} = \sum_{k=1}^{22} \pi_k D_k + \sum_{n=1}^{N} \eta_n D_n^* + u_{ij}$$

where p_{ij} is the economy-level annual average price of the i-th product reported by economy j. D_k is the economy dummy variable such that $D_k = 1$ if $k = j$ and $D_k = 0$ if $k \neq j$; and D_n^* is the product dummy variable such that $D_n^* = 1$ if $n = i$; and $D_n^* = 0$ if $n \neq i$. The last term, u_{ij}, is a random disturbance term. The $\exp(\hat{\pi}_k)$ is the CPD-based estimate of PPP_k, or, equivalently, $\hat{\pi}_k$ is the estimate of $\ln PPP_k$ for each economy $k = 1,...,22$.

The $\hat{u}_{ij}$ is the *CPD residual* which is the difference between the actual $\ln p_{ij}$ and the model-predicted value $\ln \hat{p}_{ij} = \sum_{k=1}^{22} \hat{\pi}_k D_k + \sum_{i=1}^{N} \hat{\eta}_i D_i^*$:

$$\hat{u}_{ij} = \ln p_{ij} - \ln \hat{p}_{ij}$$

By property of natural logarithm, the CPD residual can be expressed as the natural logarithm of the ratio of actual to expected price for an item i in economy j:

$$\hat{u}_{ij} = \ln \left(\frac{p_{ij}}{\hat{p}_{ij}} \right)$$

These CPD residuals are generated for each item for which prices are submitted by the economies. Exponentiating CPD residual provides the said ratio of actual to expected price:

$$\exp(\hat{u}_{ij}) = \frac{p_{ij}}{\hat{p}_{ij}}$$

Hence, each CPD residual value has a corresponding interpretation in terms of actual collected price as a percentage of the model-predicted price. Table 6.21 presents the cut-offs in CPD residual values. The color coding applied on the values, as shown in the Dikhanov table (Table 6.22), is for purposes of validation of average prices submitted by economies for each item.

Table 6.21: Country-Product-Dummy Residual Interpretation and Color Coding

CPD Residual Values	Interpretation	Color Code
Between –0.25 and 0.25	Actual price is 78% to 128% of predicted price.	None
Between –0.75 and –0.25; or 0.25 and 0.75	Actual price is 47% to 78%, or 128% to 212% of predicted price.	Yellow
Between –2.0 and –0.75; or 0.75 and 2.0	Actual price is 14% to 47%, or 212% to 739% of predicted price.	Red
Less than –2.0 or greater than 2.0	Actual price is less than 14%, or more than 739% of predicted price.	Black

CPD = country-product-dummy.
Source: World Bank. 2015. *Operational Guidelines and Procedures for Measuring the Real Size of the World Economy: 2011 International Comparison Program.* Washington, DC: World Bank. http://pubdocs.worldbank.org/en/777881487094209758/OG-eBook.pdf.

Dikhanov tables display the results based on CPD regression and item-wise CPD residuals for each economy along with other relevant information. CPD residual values are color-coded based on the criteria in Table 6.21. A detailed guide on how to read the Dikhanov table is provided in Table 6.22.

It may be noted that separate Dikhanov tables can be constructed to check the CPD residuals using national annual average prices for different set of items: (i) all items in all economies, (ii) items within the same basic heading in all economies, or (iii) items within any other analytical levels or grouping in all economies. The inter-economy price validation for household items was done for each basic heading and for all household items. Thus, when a basic heading is considered for validation, the CPD model is estimated using price data for items in the selected basic heading. All residuals with absolute values below 0.25 are considered acceptable.

Table 6.22: How to Read the Dikhanov Table

General Part

	CNT	STD	Econ1	Econ2	Econ3	Econ4
Purchasing Power Parity			1.00	0.14	5.47	3.92
Standard Deviation (STD)		0.25	0.24	0.28	0.27	0.26
Number of items priced	1006		570	500	635	367
Price Level Index			100.00	81.27	52.95	46.88
Exchange rate (LCU/Hong Kong dollar)			1.00	0.18	10.32	8.36

Item-Specific Part

BH Code	Product Code	Product Name	CNT	STD	Econ1	Econ2	Econ3	Econ4
					CPD Residuals			
1101111	110111101100	White rice #3, BNR	18	0.21	(0.10)	(0.34)	0.32	0.56
1101111	110111101120	White rice #5, BNR	12	0.17	(0.66)	-	(0.11)	0.15
1101111	110111101140	White rice #7, Prepacked, BL	10	0.15	(0.00)	-	(0.19)	-
1101111	110111101150	White rice #8, Prepacked, BL	12	0.27	-	(0.66)	(0.41)	-
1101111	110111101160	White rice #9, Prepacked, BL	8	0.14	-	-	(0.19)	-
1101111	110111101170	White rice #10, Prepacked, BL	12	0.20	(0.05)	-	(0.32)	-
1101111	110111101180	Premium rice #1, Prepacked, BL	10	0.19	-	-	(2.09)	(0.34)
1101111	110111101190	Premium rice #2, Prepacked, BL	15	0.29	(0.41)	0.15	0.52	-
1101111	110111101200	Premium rice #3, BNR	9	0.15	-	-	(0.78)	-
1101111	110111101210	Premium rice #4, BNR	13	0.22	-	(0.31)	0.34	-
1101111	110111101240	Basmati rice, WKB	11	0.36	-	0.30	0.49	(0.66)
1101111	110111110170	Brown rice, family pack, BL	14	0.31	-	0.74	(0.44)	-
1101111	11011110171	Brown rice, loose	9	0.11	(0.66)	-	0.04	0.08
1101111	11011110180	White rice #1, BNR	14	0.24	-	0.10	0.37	0.47
1101111	11011110190	White rice #2, BNR	12	0.21	-	-	(0.25)	(0.25)
1101111	110111102010	Sticky rice, WKB	15	0.28	0.57	(0.64)	-	-

Annotations:

GENERAL PART: Computed using either: (i) all available items; or (ii) items within a specific basic heading

ITEM-SPECIFIC PART: Computations for individual items.

Various Dikhanov tables can be constructed to check the CPD residuals using annual national average prices for different sets of items:
(i) all items in all economies,
(ii) items within the same basic heading in all economies, or
(iii) items within any other analytical levels or grouping in all economies.

- Names of economies
- PPP estimates from CPD using prices of all products in all participating economies
- STD of residuals for the economy
- Number of items priced in each economy
- Overall STD of the whole tableau of CPD residuals
- Number of items priced in the region
- Number of economies pricing each item (row)
- STD of residuals for each item (row)
- Residuals from CPD using either: (i) the prices of all items in all economies; or, (ii) items within the same basic heading in all economies

– = magnitude equals zero, 0.00 = magnitude is less than half of unit employed, BH = basic heading, CNT = count, CPD = country–product-dummy, Econ = economy, LCU = local currency unit, STD = standard deviation.
Note: The presented figures are for illustration purposes only. Though only 4 economies are presented in this table, actual calculations involve 22 participating economies in Asia and the Pacific.
Source: Asian Development Bank.

Residuals with absolute values in the range of 0.25 to 0.75 are highlighted in yellow; between 0.75 to 2.0 are highlighted in red; and those above 2.0 are highlighted in black. The purpose of the colored highlights is to signal the deviation of the actual prices from the estimated prices. The larger the absolute value, the bigger the deviation, as explained in the second column of Table 6.21.

When outliers are identified in the inter-economy validation using Dikhanov tables, verification also involves closer review of prices of other economies to check whether the prices of all related items used in the calculations are within the commonly acceptable range and relativities.

Table 6.22 illustrates results based on a set of prices for the basic heading of rice, which is one among 91 basic headings for which prices were collected for household products. It may be noted that Dikhanov tables were also used for inter-economy price validations in a similar manner for prices collected for the surveys of construction, machinery and equipment, government compensation, and housing rental surveys.

Comparing ICP and CPI Temporal Price Movements for Household Data Validation

The RIA used a range of statistical tools used for validating price data, including complex tools like Dikhanov tables. These tools are primarily designed to detect outliers in price data submitted by the participating economies; outliers are then further investigated and appropriate actions are taken. Additional price data validation procedures involving comparison of temporal price movements between comparable basic headings or components in the ICP and CPI were implemented for the 2017 ICP household price data for Asia and the Pacific. These procedures were conducted after the review and validation of price data based on the standard Dikhanov tables and the exchange-rate-based price analyses, which are designed to identify price outliers within and across economies.

The RIA used an additional tool involving comparison of temporal price movement of each basic heading across 2011 and 2017 ICP cycles. This tool is driven by economic considerations more than statistical ones for validating price data. The 2011 and 2017 ICP cycles have a similar framework. Specifications of a large proportion of items included in the household consumption are identical across the 2011 and 2017 cycles of the ICP. This approach leads to a validation tool that does not depend on data from any other economy: this is the main difference between this approach and the Dikhanov tables, which use cross-economy data to validate price data from each economy. In this sense, this validation tool is not influenced by any errors and quality of data from other economies.

In the 2011 and 2017 ICP cycles, the RIA strictly adhered to the basic principle of representativity of the items priced while maintaining comparability of the products. Given the consistency in approach followed in these two cycles, it was possible to obtain measures of price movements for common items of household products. For the same period, observed price movements from national CPIs (for household consumption) available at the finest possible levels provided another independent measure of price change from 2011 to 2017. Movements in the prices of goods and services in household consumption in the ICP and CPI baskets are expected to be reflecting the macroeconomic fundamentals prevailing in the economies under consideration. Under this premise, the expectation is that the 2011 and 2017 ICP-based measures of price change and the CPI-based measures of price change would be broadly aligned. Surprisingly, based on these two price movements in some participating economies, fairly significant and systematic differences in price movements were observed based on the ICP products and the national CPI counterparts. These observed systematic and significant differences between national CPI and ICP inflation observed for the participating economies called for a closer examination and possible data editing based on these observed differences in temporal price movements and were flagged by the

RIA for review by the economies. The implementing agencies in the participating economies were requested to check and either confirm the prices or undertake corrections if the investigation led to the discovery of errors, such as the wrong item quality priced, wrong units of measurement priced, or errors due to data entry in the prices, or other non-sampling errors.

A possible driver of the differences in the national CPI and ICP inflation could be differences in the quality of the products priced in the two periods in the ICP, which are 6 years apart. The main dimensions of quality, which is of importance that could be different between two time periods are (i) differences in the interpretation and pricing of products that are systematically of higher quality; (ii) pricing similar products but from more expensive, high-end, or boutique outlets, and (iii) possibly relying on a higher percentage of urban prices in computing the national average price. Also, as an economy becomes richer over time, the quality of goods and services consumed by the population also improves over time because with higher incomes, tastes and preferences are expected to change. There are several household items in ICP which require pricing a "well-known brand" for a given set of specifications. Thus, for example, a well-known brand of cotton trousers which is also popularly consumed is likely to be of a much higher end brand than a well-known and popular brand of same specifications priced 6 years ago, leading to "quality creep" in the comparison over time. Most of the evidence to support the higher quality pricing hypothesis was anecdotal and requires further detailed investigations. It is also possible to introduce a measure of quality differences, called the implicit quality index, in the products priced over the two benchmark years:

$$\text{Implicit quality index (IQI)} = \frac{\text{ICP price change}}{\text{CPI price change}}$$

The value of the implicit quality index is expected to vary across items and commodity groups. ICP price changes can be computed between 2011 and 2017, at item and commodity group levels. The CPI is typically available only for broadly defined commodity groups. As the CPI for a commodity group is an aggregate measure of price change for all the products included in the group, one would expect variations in the measure of the implicit quality index that arise purely out of the aggregation process. Dalén and Tarassiouk (2013, 14), in the context of CPI, proposed Implicit Quality Index (IQI) as "an important tool for analyzing quality adjustment (QA) methods. IQI is defined as the Average Price Change (APC) divided by the Adjusted Price Index, after applying a certain QA method."

Data validation procedures based on temporal movements in the ICP item prices and their comparison with relevant CPI index movements were used in bilateral discussions with the participating economies. These procedures helped in reviewing prices whose movements were divergent from the relevant indexes in the CPI and helped either correct or explain the findings from established validation technique such as the Dikhanov tables.

ICP Asia Pacific Software Suite for Data Management and Validation

The ICP is driven by the huge amounts of data collected by participating economies; thus, it is crucial to understand the intricacies of its data processing and management. ADB recognized the need to simplify and streamline the ICP process to effectively manage data collection, assist economies in the analysis of observed prices, and maximize the use of collected data. The ICP Asia Pacific Software Suite (ICP APSS), first developed in-house by the ADB ICP team for the 2011 ICP cycle, was relatively simple to use and accommodated basic ICP procedures such as survey

questionnaire generation and data processing, management, and validation. The ICP APSS worked with Microsoft Excel and Microsoft Access and has been very useful. However, compatibility issues emerged with the advent of new technologies. Thus, the ICP APSS was upgraded to address compatibility issues, the updating of product list, and the splitting of pharmaceutical products for the 2017 ICP cycle.

On the part of the ICP teams of the participating economies, ICP APSS catered to multiple functions: generating survey questionnaires; product and outlet mapping; data entry; basic data editing; price data analysis; and data validation reports which listed all items and quotations to be prioritized for review based on set criteria and parameters. The software also minimized non-sampling errors, as it inhibited entering units of measure and quantities outside of the required range.

The default language was English. Whenever needed, implementing agencies were requested to provide the necessary translations of SPDs for all product lists in their languages to be uploaded to the ICP APSS, thus creating local versions of the ICP APSS.

The participating economies found the ICP APSS a valuable tool in ICP implementation. The user-friendly interface developed for ICP APSS, along with its minimal system requirements, made it more accessible to all the participating economies. Through various capabilities built into the software, the economies found it easier to navigate through the complex channels and steps involved in the implementation of the ICP.

System Requirements and Installation

Recognizing that participating economies in Asia and the Pacific have various configurations of available technology, the ICP APSS was developed to run on computers that meet the following minimum system requirements:

(i) Windows 7 or higher;
(ii) Microsoft Excel 2003 or higher;
(iii) processor 2 GHz x86-bit or x64-bit processor equivalent;
(iv) 1 GB of RAM (2 GB recommended); and
(v) storage of at least 1 GB available hard disk space for installing the database and ICP APSS.

Software updates with installation instructions were downloadable at the ICP CCube—a web-based platform developed by ADB that served as a tool used by the ADB and ICP teams of 22 participating economies in ICP for exchange of data, documents, and applications related to the International Comparison Program for Asia and the Pacific. User instruction manuals for ICP APSS with details on installation procedures; protocols for data entry, security, and validation; and report preparation were distributed to all implementing agencies of the participating economies.

Economy and Regional Modules

The ICP APSS included modules to be used separately by the economies and the RIA to facilitate data management and validation. Participating economies used the economy module in generating price survey instruments, data entry, intra-economy price analysis, and generation of reports and Microsoft Excel worksheets for submission to ADB. As the 2017 ICP APSS was intended for household consumption price data only, separate price collection tools were developed for the nonhousehold sectors of construction, machinery and equipment, government compensation, housing rental, and housing volume. Each price collection tool catered to the special features and needs of the specific aggregate. For example, household

consumption items had associated information regarding availability and importance of the products and was also designed to integrate a Microsoft Excel add-in for splitting of pharmaceutical products. For machinery and equipment, the tool obtained information not only on prices but also the make, model, and other specifications of items priced. Similarly, the construction tool facilitated collection of information on resource mix, while the compensation tool standardized data collection from implementing agencies and facilitated gathering of pay-scale information by level of experience required in calculating average base pay information.

The price analysis module of economy module of the ICP APSS was designed to identify outlier price quotations based on prespecified parameters and generated several tables, listed below, to highlight data issues which need to be reviewed for possible errors.

ICP APSS Table 1: Summary Data. Automatically generated within the ICP APSS, this table presents a condensed view of the flagged issues based on the price analysis embedded in the system, employing the following prespecified parameters:

(a) Number of quotations less than 15: the table provided a distribution of products by intervals of number of quotations. The cells highlighted in red indicated the number of products for which total quotations was fewer than 15.

(b) Coefficient of variation exceeding 30%: the table provided a distribution of products by intervals of values of coefficient of variation. The cells highlighted in red indicated number of products for which coefficient of variation exceeded 30%.

(c) Minimum-to-maximum ratio (MMR) column. Summarized in red highlighted the number of products with MMR below 0.33.

It also provided information on the total number of products priced and the total number of quotations (Box 6.1).

Box 6.1: Example of ICP APSS Summary Data
ICP APSS Table 1: Summary Data

Particulars	Value
Products with Quotations	
1	19
2	27
3 - 5	96
6 - 10	109
11 - 14	64
15 - 30	164
31 - 90	138
> 90	36
Subtotals	
≥ 15	338
≤ 14	315
< 3	46
Total Number of Product Priced	653
Total Number of Quotations	16,963
Products with Minimum-to-Maximum Ratio < 0.33	145
Products with CV (in %)	
CV = 0	5
0 < CV ≤ 5	20
5 < CV ≤ 10	47
10 < CV ≤ 20	121
20 < CV ≤ 30	198
CV > 30	243
30 < CV ≤ 40	106
40 < CV ≤ 50	60
50 < CV ≤ 60	36
60 < CV ≤ 70	15
CV > 70	26

CV = coefficient of variation, ICP APSS = International Comparison Program Asia Pacific Software Suite.
Note: Items with quotations less than 15, CV greater than 30, or minimum-to-maximum ratio less than 0.33 were highlighted.
Source: 2017 ICP APSS.

ICP APSS Table 2: Summary Statistics for All Items Priced at the Economy Level. Automatically generated within the ICP APSS, this table provides item-wise statistics summarizing the collected price data in the economy. If any item does not satisfy a prespecified criteria, the corresponding value is highlighted in red in ICP APSS Table 2 (Box 6.2).

ICP APSS Table 3: Summary Statistics for All Items Priced, Urban and Rural. Also automatically generated within the ICP APSS, this table is similar to ICP APSS Table 2, but separates rural and urban price data. It also highlights cells in red for the criteria not satisfied.

Box 6.2: Example of ICP APSS Summary Statistics
ICP APSS Table 2: Summary Statistics for All items Priced at the Economy Level

Product		Average	Quotations	CV	Min	Max	Min-to-Max Ratio
Code	Name						
110111101100	White rice #3, BNR	141,992.47	89	23.65	101,616.67	246,460.00	0.41
110111101120	White rice #5, BNR						
110111101140	White rice #7, Prepacked, BL						
110111101150	White rice #8, Prepacked, BL						
110111101160	White rice #9, Prepacked, BL						
110111101170	White rice #10, Prepacked, BL	109,816.11	167	32.98	60,000.00	183,600.00	0.33
110111101180	Premium rice #1, Prepacked, BL						
110111101190	Premium rice #2, Prepacked, BL	91,168.04	27	31.46	62,500.00	169,150.00	0.37
110111101200	Premium rice #3, BNR						
110111101210	Premium rice #4, BNR	178,962.50	132	25.35	102,400.00	278,400.00	0.37
110111101220	Long-grain rice, parboiled, WKB						
110111101230	Long-grain rice, not parboiled, WKB						
110111101240	Basmati rice, WKB						
110111101250	Broken rice, 25%, BNR						
110111101260	Short-grain rice, BNR						
11011110170	Brown rice, family pack, BL	112,013.76	89	27.17	60,000.00	198,500.00	0.30
11011110171	Brown rice, loose	17,525.63	80	24.51	10,000.00	24,075.00	0.42
11011110180	White rice #1, BNR						
11011110190	White rice #2, BNR						
110111102010	Sticky rice, WKB	23,482.83	106	31.99	12,000.00	36,750.00	0.33
11011120110	Wheat flour, pre-packed, BL	13,124.84	32	19.76	10,450.00	19,500.00	0.54
110111201100	Dhal, Khesari, BL						
110111201110	Dhal, Musur, BL						
110111201120	Dhal, Split Peas, BL						
11011120120	Wheat flour, loose, BNR	8,216.90	7	11.76	7,679.93	10,250.00	0.75
11011120130	Wholemeal flour, Atta, BL						
11011120160	Corn (maize) flour, prepacked, WKB	27,847.47	172	26.25	16,000.00	41,900.00	0.38
11011120170	Rice flour, Atta, WKB	10,195.06	27	25.26	8,100.00	17,833.33	0.45

BL = brandless, BNR = brand not relevant, CV = coefficient of variation, ICP APSS = International Comparison Program Asia Pacific Software Suite, max = maximum, min = minimum, WKB = well-known brand.
Source: 2017 ICP APSS.

ICP APSS Annex 1: List of Products which Did Not Meet the Prespecified Parameters. This system-generated table lists down items that fail to meet any of the prespecified criteria as identified in ICP APSS Tables 2 and 3 above, along with the same set of summary statistics (Box 6.3).

ICP APSS Annex 2: Observed Price Data of Products That Failed the CV and MMR Criteria.

ICP APSS Annex 2 lists down individual quotations for items that fail to satisfy the MMR and CV criteria in Annex 1. Quotations highlighted in yellow are less than one standard deviation below the average price, and those highlighted in blue are greater than one standard deviation above the average price. The objective of ICP APSS Annex 2 is to help pinpoint outlier individual price data for further verification and correction (see Box 6.4).

Box 6.3: Example of ICP APSS Annex 1
ICP APSS Annex 1: List of Products which Did Not Meet the Prespecified Parameters

Required Parameters	
Quotations	≥ 15
CV	≤ 30%
MMR	≥ 0.33

Product		Average	Quotations	CV	Min	Max	Min-to-Max Ratio
Code	Name						
110111101170	White rice #10 Prepacked BL	109,816.11	167	32.98	60,000.00	183,600.00	0.33
110111101190	Premium rice #2 Prepacked BL	91,168.04	27	31.46	62,500.00	169,150.00	0.37
11011110170	Brown rice family pack BL	112,013.76	89	27.17	60,000.00	198,500.00	0.30
110111102010	Sticky rice WKB	23,482.83	106	31.99	12,000.00	36,750.00	0.33
11011120120	Wheat flour loose BNR	8,216.90	7	11.76	7,679.93	10,250.00	0.75
11011120630	Maize BL	18,135.23	84	43.47	7,000.00	30,350.00	0.23
11011130150	Roll or bun Prepacked BNR	11,905.00	5	28.79	8,250.00	17,250.00	0.48
11011130210	Bread whole wheat loaf BNR	18,625.00	2	0.00	18,625.00	18,625.00	1.00
11011140410	Cup cakes WKB	16,073.53	34	39.79	10,000.00	25,000.00	0.40
11011140420	Sponge cake WKB	34,535.45	114	33.71	22,900.00	60,000.00	0.38
11011140450	Chocolate cake whole BL	129,231.31	103	41.26	47,500.00	195,000.00	0.24
11011140510	Butter biscuits WKB	23,793.90	41	32.62	15,200.00	51,630.00	0.29
11011140520	Flavored biscuits (cookies) sweet WKB	26,378.19	102	34.88	15,031.25	42,500.00	0.35
11011140530	Sandwich biscuits (cookies) WKB	18,703.75	64	58.38	10,700.00	60,000.00	0.18
11011140620	Snack crackers WKB	9,726.30	5	16.92	7,576.33	11,387.08	0.67
11011140630	Cream crackers WKB	8,993.48	14	46.33	7,000.00	20,000.00	0.35
11011141610	Chinese cake/Moon cake BNR	11,744.44	6	24.27	10,000.00	16,666.67	0.60
110112108210	Beef fillet frozen tenderloin	87,547.62	6	0.94	86,571.43	89,000.00	0.97
11011210910	Buffalo without bones non-specific cut	94,668.33	8	20.35	53,333.33	123,666.70	0.43
11011210920	Beef without bones non-specific cut	61,513.40	12	22.79	40,500.00	80,458.33	0.50
11011210930	Beef with bones non-specific cut	93,635.70	9	28.87	65,000.00	146,250.00	0.44
11011220410	Pork ribs	62,225.00	1		62,225.00	62,225.00	1.00
11011220420	Pork shoulder	82,500.00	1		82,500.00	82,500.00	1.00
11011220430	Pork thigh with bones	35,000.00	1		35,000.00	35,000.00	1.00

BL = brandless, BNR = brand not relevant, CV = coefficient of variation, ICP APSS = International Comparison Program Asia Pacific Software Suite, max = maximum, min = minimum, MMR = minimum-to-maximum ratio, WKB = well-known brand.
Source: 2017 ICP APSS.

Box 6.4: Example of ICP APSS Annex 2
ICP APSS Annex 2: Observed Price Data of Products with Coefficient of Variation and Minimum-to-Maximum Ratio Error

Survey Period Code	Outlet Code	Outlet Name	Observed Data			Converted Price	Remarks
			Date	Quantity	Price		
	Product Code:	11011110170					
	Product Name:	Brown rice family pack BL		Obs:	89.00		
	Price Lower Limit:	81,578.16		CV:	27.17		
	Price Upper Limit:	142,449.37		MMR:	0.30		
Observed Data							
MN201705	XXX001001000000245	OUTLET	05/15/2017	5	119,000.00	119,000.00	revised price
MN201706	XXX001001000000245	OUTLET	06/15/2017	5	119,000.00	119,000.00	revised price
MN201707	XXX001001000000245	OUTLET	07/15/2017	5	119,000.00	119,000.00	revised price
MN201708	XXX001001000000245	OUTLET	08/15/2017	5	119,000.00	119,000.00	revised price
MN201709	XXX001001000000245	OUTLET	09/15/2017	5	119,000.00	119,000.00	revised price
MN201710	XXX001001000000245	OUTLET	10/15/2017	5	119,000.00	119,000.00	revised price
MN201711	XXX001001000000245	OUTLET	11/15/2017	5	119,000.00	119,000.00	revised price
MN201712	XXX001001000000245	OUTLET	12/15/2017	5	119,000.00	119,000.00	revised price
MN201801	XXX001001000000245	OUTLET	01/15/2018	5	119,000.00	119,000.00	revised price
MN201802	XXX001001000000245	OUTLET	02/15/2018	5	119,000.00	119,000.00	revised price
MN201803	XXX001001000000245	OUTLET	03/15/2018	5	119,000.00	119,000.00	revised price
MN201705	XXX001001000000247	OUTLET	05/15/2017	5	60,000.00	60,000.00	revised price
MN201706	XXX001001000000247	OUTLET	06/15/2017	5	60,000.00	60,000.00	revised price
MN201707	XXX001001000000247	OUTLET	07/15/2017	5	60,000.00	60,000.00	revised price
MN201708	XXX001001000000247	OUTLET	08/15/2017	5	60,000.00	60,000.00	revised price
MN201709	XXX001001000000247	OUTLET	09/15/2017	5	60,000.00	60,000.00	revised price
MN201710	XXX001001000000247	OUTLET	10/15/2017	5	60,000.00	60,000.00	revised price
MN201711	XXX001001000000247	OUTLET	11/15/2017	5	60,000.00	60,000.00	revised price
MN201712	XXX001001000000247	OUTLET	12/15/2017	5	60,000.00	60,000.00	revised price
MN201801	XXX001001000000247	OUTLET	01/15/2018	5	60,000.00	60,000.00	revised price
MN201802	XXX001001000000247	OUTLET	02/15/2018	5	60,000.00	60,000.00	revised price
MN201803	XXX001001000000247	OUTLET	03/15/2018	5	60,000.00	60,000.00	revised price
MN201705	XXX004001000000005	Foodmart	05/26/2017	4	111,800.00	139,750.00	
MN201709	XXX004001000000005	Foodmart	09/19/2017	4	111,800.00	139,750.00	
MN201708	XXX004001000000005	Foodmart	10/08/2017	4	111,800.00	139,750.00	
MN201710	XXX004001000000005	Foodmart	10/18/2017	4	111,800.00	139,750.00	
MN201711	XXX004001000000005	Foodmart	11/16/2017	4	111,800.00	139,750.00	
MN201801	XXX004001000000005	Foodmart	01/17/2018	4	117,400.00	146,750.00	
MN201802	XXX004001000000005	Foodmart	02/20/2018	4	117,400.00	146,750.00	
MN201803	XXX004001000000005	Foodmart	03/21/2018	4	117,400.00	146,750.00	

BL = brandless, CV = coefficient of variation, ICP APSS = International Comparison Program Asia Pacific Software Suite, MMR = minimum-to-maximum ratio.
Source: 2017 ICP APSS.

The ICP APSS has all essential features to scrutinize the price data and identify potential errors in individual quotations which could help the ICP teams of the participating economies in monitoring the quality of prices collected by the field offices. In addition to the presented system-generated tables that help identify potential errors in basic price data, the ICP APSS also generates the following reports:

(i)   Report 1. Number of Available Products by Basic Heading;
(ii) Report 2. Number of Outlets by Location and by Outlet Type;
(iii) Report 3. Number of Quotations by Product, Location, and Location Type;
(iv) Report 4. Number of Outlets with at Least One Price Quotation;
(v)   Report 5. Number of Quotations by Product and Outlet Type;
(vi) Report 6. Summary Statistics by Product; and
(vii) Report 7. Summary Statistics by Location.

Furthermore, the ICP APSS had system development updates, including a major transition from a Windows-based desktop application to a browser-based system. Pilot testing of this new system began in the fourth quarter of 2018 and the system was deployed to some of the implementing agencies in February 2020. This is an important development in the management of ICP data and will be used in the implementation of future ICP cycles.

Expenditure Data from National Accounts

Participating economies were tasked to provide detailed GDP expenditure data, broken down by 155 basic headings and following the 2017 ICP expenditure classification, to be used as weights for computing PPPs above basic headings and corresponding real expenditures. It is the task of the RIAs to ensure that participating economies observe uniform standards in data collection and expenditure compilation. This section describes activities implemented related to the compilation and validation of expenditure data for the 2017 ICP for Asia and the Pacific.

Gross Domestic Product Expenditures: Compilation Methods

The System of National Accounts 2008 (2008 SNA) is the latest international standards on national accounts statistics. Almost all the participating economies in Asia and the Pacific have already moved to implementing the 2008 SNA framework, although they may be at different stages in implementing several recommendations. Table 6.23 shows the SNA compliance by participating economies in the 2011 and 2017 ICP cycles. Bhutan, Cambodia, Myanmar, Nepal, and Viet Nam have yet to implement the 2008 SNA, although these economies have indicated that migration to 2008 SNA will take place by 2020.[14]

Differences in the adoption of different versions of the SNA have the potential to raise comparability issues. Hence, it is worthwhile to understand the metadata behind the expenditure estimates. Table 6.24 shows a summary of responses from the participating economies to the national accounts practices questionnaire submitted to ADB. Further, it may also be useful to note the recommendations from the 2008 SNA affecting the GDP, which include capitalization of research and development and weapons systems; the output for own final use by households and corporations is valued with a return to capital; and the method for calculating and allocating "financial intermediation service indirectly measured", also known as FISIM.

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[14]   Available from the National Accounts Country Practices Metadata submitted to the RIA by the participating economies.

Table 6.23: System of National Accounts Compliance by Participating Economies, 2011 and 2017

Economy	2011 ICP Cycle	2017 ICP Cycle
Bangladesh	1993	2008
Bhutan	1968/1993	1993
Brunei Darussalam	1993	2008
Cambodia	1993	1993
China, People's Republic of	1993	2008
Fiji	2008	2008
Hong Kong, China	2008	2008
India	1968/1993/2008	2008
Indonesia	1968/1993	2008
Lao People's Democratic Republic	1993	2008
Malaysia	1993/2008	2008
Maldives	1993	2008
Mongolia	1993	2008
Myanmar	1968/1993	1968/2008
Nepal	1993	1993
Pakistan	1993	2008
Philippines	1993	2008
Singapore	1993	2008
Sri Lanka	1968/1993	2008
Taipei,China	1993	2008
Thailand	2008	2008
Viet Nam	1993	1993

ICP = International Comparison Program.
Source: Economy sources.

ADB, through the regional capacity and development technical assistance (R-CDTA 8838) Updating and Constructing Supply and Use Tables for Selected Developing Member Economies (ADB 2017) assisted 20 participating economies in the implementation of the 2008 SNA recommendations through the standard compilation of supply and use tables (SUT).[15] However, as shown in the table, Bhutan, Cambodia, Nepal, and Viet Nam were yet to extend the adoption of 2008 SNA into the compilation of their national accounts statistics.

Fiscal versus Calendar Year GDP Estimates

For the 2017 ICP, the accounting period is the calendar year of 2017. Since national average prices were converted to reflect 2017 national average prices, it is only appropriate that GDP estimates also reflect calendar year estimates. In Asia and the Pacific, Bangladesh, India, Myanmar, Nepal, and Pakistan compile their GDP according to the fiscal year, which is different from the calendar year. As the ICP requires calendar year GDP expenditures from the economies in local currency units, the fiscal year based estimates were converted to the 2017 calendar year estimates using different approaches, depending on the availability of detailed expenditure estimates by quarters in each of these economies. India and Myanmar used their quarterly national accounts estimates to derive the calendar year GDP estimates, while Bangladesh, Nepal, and Pakistan used pro-rata allocation from the two adjacent fiscal years in the absence of quarterly data.

Expenditure Weights

The lowest level of aggregate for which expenditure estimates is required for the ICP is the basic heading. Most economies do not publish the detailed 155 basic headings in their own national accounts publication and in some cases, only higher level aggregates of expenditure are available. Table 6.25 shows the breakdown of GDP expenditure into different aggregation levels used in the ICP.

Similar to the 2011 ICP cycle, various data sources were used by the economies to split higher level aggregates into basic heading estimates. Most economies do not produce estimates from expenditure side following the basic headings of the ICP classification.

[15]   The 20 economies that participated in R-CDTA8838 project were Bangladesh; Bhutan; Brunei Darussalam; Cambodia; Fiji; Hong Kong, China; India; Indonesia; the Lao People's Democratic Republic; Malaysia; Maldives; Mongolia; Nepal; Pakistan; the People's Republic of China; Singapore; Sri Lanka; Taipei,China; Thailand; and Viet Nam.

Table 6.24: National Accounts Country Practices Questionnaire: Summary of Responses from Asia and the Pacific Participating Economies, 2017

Questions/Particulars		YES	NO	N.A.
I. Approach and Documentation				
1. Approach and the System of National Accounts (SNA)				
Q1	Which SNA version do you implement?			
	1968	1		
	1993	4		
	2008	17		
Q2	If you have not yet migrated to 2008 SNA, when do you plan to do so?		a	
Q3	What approach(es) do you use when estimating gross domestic product (GDP)?			
	Production	22	–	
	Income	11	11	
	Expenditure	21	1	
Q4	Does your estimate of final expenditures on GDP exhaustively cover all the expenditures defined in the International Comparison Program (ICP) Classification?	13	9	–
2. Source Information				
Q5	Has your country compiled supply and use tables (SUTs)?	22	–	–
Q6	If YES: Please indicate the reference year of the latest one.			
	before 2011	4		
	2011 - 2015	15		
	after 2015	3		
Q7	What is the reference year of your most recent household expenditure/budget survey?			
	before 2011	1		
	2011 - 2015	4		
	after 2015	17		
3. Documentation				
Q8	Do you maintain and disseminate detailed methodological notes about your national accounts compilation process?	20	2	–
Q9	If YES: please provide the latest report or its URL (web address).		a	
Q10	How do you publish national accounts data? Please provide the latest report or its URL (web address)		a	
4. Technical Assistance				
Q11	Do you receive external technical assistance related to the compilation of GDP?	16	6	–
Q12	If YES: From which organizations and for which areas?		a	
II. Methodology				
1. Classification				
Q13	Do you classify the institutional units into five institutional sectors – non-financial corporations, financial corporations, general government, nonprofit institutions serving households (NPISH) and households – for compilation of national accounts statistics?	16	6	–
Q14	If NO: please explain how you classify the institutional units into institutional sectors?		a	
2. General Valuation				
Q15	In general, are transactions valued at purchasers' prices, that is at the actual prices agreed by transactors?	20	2	–
Q16	If YES: Are the purchasers' prices net of discounts and rebates?	17	3	2
3. Household Consumption				
Q17	Are GDP expenditure components (household consumption, government consumption, gross capital formation, and balance of imports and exports) all derived independently?	20	2	–
Q18	If NO: Do you derive household final consumption expenditure as a residual from total GDP?	1	1	20
Q19	Do you include goods produced for own consumption?	19	3	–
Q20	If YES: Do you value goods produced for own consumption at basic prices?	13	6	3
4. Housing				
Q21	Do you impute rents for owner-occupied dwellings?	22	–	–
Q22	If YES: Do you use actual rents for comparable dwellings? [Please specify in the comment box if multiple or a combination of methods are used]	14	8	–
Q23	If YES: Do you use rents estimated by owner-occupiers? [Please specify in the comment box if multiple or a combination of methods are used]	13	9	–
Q24	If YES: Do you apply the "user cost method"? [Please specify in the comment box if multiple or a combination of methods are used]	12	10	–
Q25	If other methods are used, please explain:		a	

Table 6.24: *continued*

Questions/Particulars		YES	NO	N.A.
5. Financial Intermediation Services Indirectly Measured (FISIM)				
Q26	Do you assign consumption of FISIM to households as well as to producers?	20	2	–
6. Nonprofit Institutions Serving Households (NPISH)				
Q27	Do you report NPISHs separately in your national accounts?	11	11	–
Q28	Do you classify consumption expenditures of NPISHs according to the Classification of the Purposes of Nonprofit Institutions Serving Households (COPNI)?	4	18	–
Q29	If YES: Please list the breakdown of individual outlays of NPISHs (e.g. Housing; Health; Recreation and culture; Education; Social protection; Religion; Political parties, labor and professional organizations; Environmental protection; or Services n.e.c.)		a	
Q30	If NO: Please explain how consumption expenditures of NPISHs are treated		a	
Q31	Do you include consumption of fixed capital in the final consumption expenditures of NPISHs?	11	10	1
7. Informal sector				
Q32	Does GDP compilation include informal sector estimates?	18	4	–
Q33	If YES: Please explain the methodology		a	
8. Government				
Q34	Do you include consumption of fixed capital in the final expenditure of government?	22	–	–
Q35	Are the purchases of goods and services by government that are passed on to households without any further processing by government valued at purchasers' prices?	22	–	–
Q36	Is income-in-kind valued at purchasers' prices, in cases where the government has purchased/produced the goods or services? [Please specify in the comment box if the treatment is different for goods and services purchased versus goods and services produced by the government itself]	19	2	1
9. Gross capital formation				
Q37	Is gross fixed capital formation, other than own-account construction, valued at purchasers' prices?	22	–	–
Q38	Are own-account produced fixed capital assets valued at basic prices?	18	4	–
Q39	Do you include estimates for own-construction of dwellings?	19	3	–
Q40	If YES: Do you value such construction at basic prices?	15	4	3
Q41	Do you include estimates for own-construction of other buildings?	20	2	–
Q42	If YES: Do you value such construction at basic prices?	16	4	2
Q43	Do you treat expenditure on software by producers as capital formation?	22	–	–
Q44	Do you treat mineral exploration as capital formation?	18	4	–
Q45	Do you include expenditure on military weapon systems such as vehicles, warships, etc. used continuously in production of defense services as capital formation?	15	7	–
Q46	If NO: how do you treat government expenditures on weapons systems?		a	
Q47	Do you include expenditure on research and development as capital formation?	20	2	–
Q48	If NO: how do you treat expenditure on research and development?		a	
Q49	How do you treat ownership transfer costs on non-produced assets and ownership transfer costs relating to land?		a	
10. Inventories and valuables				
Q50	Is change in inventories estimated as the difference between the beginning and closing inventories for the year?	16	6	–
Q51	If YES: do you use (A) the average of prices over the year?	15		
	If YES: do you use (B) the prices prevailing in the middle of the year?	1		
Q52	Do you estimate net acquisitions of valuables, in other words, are valuables measured as acquisitions less disposals?	10	12	–
11. Balance of exports and imports				
Q53	Are total exports of goods and services valued on a free-on-board (f.o.b.) basis?	22	–	–
Q54	Are total imports of goods and services valued on a:			
	(A) free-on-board (f.o.b.) basis?	14		
	(B) cost-insurance-freight (c.i.f.) basis?	8		

– = magnitude equals zero, N.A. = not applicable; n.e.c. = not elsewhere classified, SUT = supply and use table, URL = uniform resource locator.
Note: Options shaded are not applicable to the question.
a Refers to individual explanations and details not summarized in the table.
Source: Economy sources.

Additionally, many do not regularly publish data at that detailed level of breakdown as required by the ICP. As a result, economies make their best efforts by employing several sources of data such as household expenditure surveys, surveys of business enterprises, government expenditure

accounts, capital expenditure surveys, supply use tables, and in some cases, where the expenditures details are not available from any recent data source, borrowing structure from the 2011 ICP expenditures. Table 6.26 shows shares in the nominal GDP for the region as a whole, by main components of GDP and number of products priced through ICP surveys.

Table 6.25: Aggregation Levels of Gross Domestic Expenditure, 2017

Code	Aggregate	Number
2-digit level	Main aggregate	6
4-digit level	Category	28
5-digit level	Group	63
6-digit level	Classes	126
7-digit level	Basic heading	155

Source: World Bank. 2016b. *International Comparison Program: Classification of Final Expenditure on GDP.* Washington, DC: World Bank. http://pubdocs.worldbank.org/en/708531575560035925/pdf/ICP-Classification-description-2019-1205.pdf.

It is interesting to note that the combined nominal share of GDP of individual consumption expenditure by households (ICEH) and nonprofit institutions serving households (NPISH) in Asia and the Pacific is about 45.4%. This same aggregate also has the largest number of items priced. Within the household categories, food and non-alcoholic beverages account for 10.6%, followed by housing, water, electricity, gas and other fuels (7.2%) and transportation and communication (6.7%). Gross fixed capital formation (GFCF) accounts for 36.9% of GDP, while individual consumption expenditure by government (ICEG) accounts for about 7.6% and collective consumption expenditure by government (CCEG) accounts for about 6.6%. No price data is collected for changes in inventories, net acquisitions of valuables, and balance of exports and imports, and reference PPPs were used to deflate these expenditure aggregates. References used for the computation of PPPs for these aggregates are available in Appendix 5. Asia and the Pacific nominal GDP and corresponding shares are based in Hong Kong dollars.

Table 6.26: Gross Domestic Product and Its Structures: Number of Basic Headings and Items and Expenditure Shares in Asia and the Pacific, 2017

Category	Components	Number of Basic Headings	Number of Products	Share in GDP (%)
Gross Domestic Product	A, B, C, D, E, F	155	1,126	100.0
A. Individual consumption expenditure by households and nonprofit institutions serving households	A1–A8	115	879	45.4
A1. Food and non-alcoholic beverages		29	248	10.6
A2. Clothing and footwear		5	82	2.5
A3. Housing, water, electricity, gas and other fuels		9	17	7.2
A4. Health and education[a]		10	180	5.2
A5. Transportation and communication		16	105	6.7
A6. Recreation and culture		14	60	2.0
A7. Restaurants and hotels		2	21	2.3
A8. Other consumption expenditure items		30	166	8.9
B. Individual consumption expenditure by government		21	14	7.6
C. Collective consumption expenditure by government		5	20	6.6
D. Gross fixed capital formation		10	213	36.9
E. Changes in inventories and net acquisitions of valuables		2	b	2.0
F. Balance of exports and imports		2	b	1.6

GDP = gross domestic product.
Notes: Share in the region's GDP is based on exchange rate converted GDP estimates of 22 participating economies. The components may not add up to total due to rounding.
[a] Number of products includes split items for pharmaceutical products. Number of products was based on the final list of items.
[b] Reference purchasing power parities, listed in Appendix 5, were used.
Source: Asian Development Bank estimates.

The GDP structure by main aggregates for the 22 participating economies is shown in Table 6.27. One may notice that regional shares are very different from the shares across economies. For instance, ICEH and NPISH shares of GDP range from 20% (Brunei Darussalam) to about 82% (Pakistan). Further, ICEH and NPISH is not always the main aggregate that has the highest share of GDP across economies: GFCF contributes large shares to GDP in Bhutan (51%), Brunei Darussalam (41%), Maldives (42%), and the People's Republic of China (43%). Of the main aggregates, (i) changes in inventories and acquisitions less disposals of valuables and (ii) balance of exports and imports may have negative values; hence, a negative share in balance of exports and imports is most likely to be significant, as observed in Nepal (at about –34%) and Bhutan (at about –20%).

Statistical Discrepancy

In accordance with the ICP guidelines, the implementing agencies in the participating economies were also required to allocate statistical discrepancy (if any) on the expenditure side to one or more basic headings, based on their best judgment. Statistical discrepancy is the difference between the production-based measure of GDP and the expenditure-based estimates of GDP.

Table 6.27: Shares of Nominal Gross Domestic Product by Main Aggregates within Each Economy, 2017 (%)						
Economy	GDP	ICEH+NPISH	GFCE	GFCF	INV+VAL	X–M
Bangladesh	100.00	69.81	6.19	30.90	0.15	–7.05
Bhutan	100.00	52.77	16.44	51.31	–0.05	–20.46
Brunei Darussalam	100.00	20.48	26.48	41.07	–2.00	13.97
Cambodia	100.00	80.37	8.41	10.80	0.53	–0.11
China, People's Republic of	100.00	37.73	15.89	42.85	1.79	1.74
Fiji	100.00	67.49	17.19	17.78	1.13	–3.59
Hong Kong, China	100.00	67.05	9.82	21.63	0.41	1.09
India	100.00	58.84	10.78	28.40	4.87	–2.88
Indonesia	100.00	57.32	9.09	32.17	0.41	1.01
Lao People's Democratic Republic	100.00	54.33	14.88	33.40	0.00	–2.62
Malaysia	100.00	55.33	12.17	25.24	0.32	6.94
Maldives	100.00	39.86	15.33	41.83	1.31	1.68
Mongolia	100.00	53.53	12.74	24.64	6.73	2.37
Myanmar	100.00	56.95	18.51	30.87	1.33	–7.65
Nepal	100.00	76.70	11.35	31.81	13.92	–33.79
Pakistan	100.00	82.22	11.50	14.86	1.60	–10.18
Philippines	100.00	73.47	11.24	25.01	0.13	–9.85
Singapore	100.00	35.90	10.51	26.40	1.98	25.21
Sri Lanka	100.00	62.05	8.49	26.30	10.36	–7.19
Taipei,China	100.00	52.94	14.07	20.48	–0.24	12.75
Thailand	100.00	47.75	16.04	22.70	–0.32	13.83
Viet Nam	100.00	59.07	11.54	23.78	2.80	2.80

0.00 = magnitude is less than half of the unit employed, GDP = gross domestic product, GFCE = government final consumption expenditure, GFCF = gross fixed capital formation, ICEH+NPISH = individual consumption expenditure by households *plus* nonprofit institutions serving households, INV+VAL = changes in inventories *plus* acquisitions *less* disposals of valuables, X-M = exports *less* imports.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

Source: Asian Development Bank estimates.

In Asia and the Pacific, most of the economies compile GDP using the production approach as the firmer estimates compared with the expenditure approach. Hence, the production side GDP estimate is used as the control figure and statistical discrepancy, if any, is explicitly shown in the expenditure-based estimates of GDP. For the 2017 ICP cycle, different approaches were followed to allocate the statistical discrepancy by the national accountants of the participating economies. It was either merged to specific basic headings such as changes in inventories or distributed over one or more basic headings of main aggregates such as household, government, and capital formation. The requirement of the ICP to present expenditure side without any statistical discrepancy may also result in estimates for certain components which may not match with the published expenditure side estimates.

Net Purchases Abroad

Not all economies reported expenditures on net purchases abroad separately. For economies who reported net purchases abroad as a separate item, net purchases abroad were not distributed to household expenditure's international tourism-related basic headings, as was done in the 2011 ICP cycle. This was based on the decision taken by the ICP Inter-Agency Coordination Group for uniform treatment of available data on net purchases abroad to be followed by all regions.

Nonprofit Institutions Serving Households

In some economies, data for household expenditures are inclusive of the expenditures undertaken by NPISH on behalf of households because it is difficult to segregate NPISH data. In the case of the People's Republic of China, however, NPISH data is included with government expenditures. In some economies, only total expenditure by NPISH was provided and these were broken down into relevant NPISH components using ratios from

household consumption. It may be noted that the NPISH expenditures were not allocated to household expenditures, unlike in the 2011 ICP cycle, according to the decision taken by the Inter-Agency Coordination Group for uniform treatment of NPISH expenditures by all RIAs.

Validation of Gross Domestic Product Weights

Similar to price validation, the GDP expenditure validation process is also implemented prior to the submission of GDP data to the ICP Global Office. In general, basic heading expenditures are assessed by a given economy to examine the completeness and plausibility of the shares within different levels of expenditure aggregates. Changes in structures over the years are explained by the use of the most recent available survey results, GDP rebasing activities, and adoption of the 2008 SNA framework, which includes the revision in ICP classification. Although each economy has its own structure of GDP depending upon the consumption and investments in the economy, the RIA also compares the GDP at various levels of aggregation across economies and with economies at similar levels of development and seeks clarifications if there are wide variations from expectations.

Gross Domestic Product: Data Management and Validation Tools

For Asia and the Pacific, national accounts data validation was done at two stages: intra-economy validation carried out by the individual participating economies and inter-economy validation carried out by ADB as the RIA. There was also a third level of inter-regional validation performed by the ICP Global Office.

The implementing agencies were required to submit GDP expenditures data from 2011 and 2017 using the ADB-developed GDP price collection tool (PCT). The PCT had built-in validation checks which include additivity checks from the basic heading level to higher levels of aggregation;

completeness of entries for the 155 basic headings; completeness of entries for the years 2011 and 2017; and presence of negative values where it was not expected or acceptable among others. The PCT also automatically mapped the 2011 GDP data, prepared using the 2011 ICP classification, into the revised 2017 ICP classification whenever applicable. Other useful information in the PCT included the methodology for estimating basic headings based on recommended splitting methods; confirmation of estimates with updated descriptions for the 2017 ICP, such as the basic headings for vegetables. Likewise, the PCT flagged for review and confirmation any absolute differences at the category and basic heading levels that exceeded specified thresholds and expected category shares.

The ICP Global Office also provided a tool for intra-economy validation of GDP expenditures that complemented the RIA's PCT. In addition to issues that the RIA's PCT could identify for implementing agencies' actions, the ICP Global Office's validation tool had consistency checks to identify basic headings with expenditure estimates for which no prices were reported or basic headings without expenditure estimates but with prices reported; and different aggregate level analysis that checked for extreme structural variations.

The RIA's intra-economy data validation analyzed the shares between 2017 and revised 2011 GDP estimates across economies within each of the main aggregates. Issues and concerns arising from the intra-economy validation done by the RIA were communicated to the implementing agencies for their required action.

Two regional workshops were dedicated to analyzing the economy estimates with technical advice from an international expert on national accounts. The

hands-on session for economy validation and documentation was conducted in one of the regional workshops specifically to assist national accounts experts from the participating economies in GDP data validation. Documentation of estimation methodologies was deemed an important step taken by the ICP teams of implementing agencies for reference and guidance in future ICP cycles.

To assist the RIA in validating GDP expenditures across economies, the ICP Global Office provided the RIA with a tool for inter-economy validation of GDP expenditures. This tool provided four types of validation analyses, such as comparison of nominal expenditures in US dollars and US dollar per capita expenditures for economies within the same level of development or similar consumption patterns, per capita standard deviation diagnostics, correlation tables based on expenditures, and quintile analysis for nominal expenditures in US dollars.

Outside of the RIA's and ICP Global Office's validation tools, GDP and main aggregates levels data submitted by economies were validated with other sources of national accounts data such as ADB's *Key Indicators for Asia and the Pacific 2018* (ADB 2018b) and the Compendium of Supply and Use Tables (ADB 2017). The latter publication, which is an output of an ADB technical assistance, was a valuable reference in compiling detailed estimates required by the ICP.

Revised data based on comments and findings using the ADB's and ICP Global Office's GDP validation tools, verification with relevant ADB publications, discussions during the regional workshops, and technical advice of the international national accounts expert all contributed to the submission of GDP expenditures data required for robust PPP estimation for the region.

Technical Approaches in the 2017 ICP in Asia and the Pacific

The ICP Global Office, in accordance with the advice of the Technical Advisory Group and in consultation with the members of the Inter-Agency Coordination Group, sets the methods, guidelines, and frameworks to ensure the quality and comparability of regional comparisons. As the regional results are linked by the ICP Global Office to estimate the final set of global comparisons for the ICP, the availability of high quality regional comparisons following standard frameworks and methods is essential for high quality of global comparisons. The ICP methodology is documented in detail in *Measuring the Real Size of the World Economy: The Framework, Methodology, and Results of the International Comparison Program* (World Bank 2013) and in *Operational Guidelines and Procedures for Measuring the Real Size of the World Economy* (World Bank 2015).

Regionalization of ICP implementation was designed to provide the RIAs with the flexibility and independence necessary to implement the ICP by taking into consideration the regional context and specificity while adhering to ICP global methods and standards in the process. In implementing the 2017 ICP cycle, similar to the 2005 and 2011 rounds, the responsibility for the regional comparisons rested with the RIAs. While operationalizing the 2017 ICP following the global methods and guidelines, the RIA for Asia and the Pacific had to resolve methodological and data quality related challenges for ensuring high data quality and resulting comparisons. This in practice implies that the RIA had to modify or devise methods to resolve practical issues specific to the region, some of which arise because Asia and the Pacific represents a wide variety of economies in terms of economic development, geography, and populations, with heterogeneous preferences and tastes.

The next sections describe (i) methodological and data challenges faced by the RIA for Asia and the Pacific in 2017 ICP operations and (ii) the technical approaches adopted by the RIA to resolve each of the major price surveys of household, government compensation, machinery and equipment, construction, and dwellings. The RIA conducted two Experts Group meetings to discuss issues and the Experts Group made recommendations on approaches to be adopted to meet specific issues. The practices adopted for similar situations in the past ICP rounds also provided guidance. These processes helped the RIA to finalize the basic input data of annual average prices used in computing PPPs at the basic heading and at higher level aggregates.

Household Prices

The price data collection and its validation for the household products is the biggest element of ICP survey operations. For the RIA and the participating economies it is imperative to ensure that the prices collected by all 22 participating economies and used in the calculation of PPPs are comparable and representative of the quality of goods and services in the ICP product list. The size of this operation can be gauged from the fact that (i) more than a thousand products comprise the household product list (inclusive of the global core products); and (ii) the household surveys are implemented for a period of 12 months in both rural and urban parts of the entire economy to ensure that the prices are representative of the prices underlying the GDP expenditures compiled in the national accounts statistics of the economy. The previous sections have already discussed the process of developing product lists, survey framework and design, as well as price data validation procedures adopted by the Asia and Pacific region. Some other practical issues encountered and approaches adopted by the RIA in finalizing the price data for household items are discussed in the next section.

Product Splitting

In the 2011 ICP round, a number of products in the final household product list had to be split because of brand clustering, which occurs when another brand of a product with similar characteristics emerges as a price substitute for the original product and is available in at least two economies for reporting the prices. For example, in 2011 ICP, the item "men's belt" was split into three: "belt, men's (Hickok)"; "belt, men's (Mc Jim)"; and "belt, men's (others)". Learning from the 2011 ICP experience, the 2017 ICP Asia and the Pacific household product list already incorporated the split list of items coming from the 2011 ICP Asia and the Pacific household list, except for items under the basic heading of pharmaceutical products. Pharmaceutical products were based on the 2017 ICP global core list taken from World Health Organization's List of Essential Medicines, which is updated from time to time. The pharmaceutical products were classified into originator and generic items. Due to high variability observed in the prices reported for pharmaceutical products, the RIA decided to split these items. The originator items were split by brands specified in the global core list, while the generic items were split according to their source (local or imported). Thus, for the 2017 ICP round, splitting of products was only applied to the pharmaceutical items. The original 57 pharmaceutical items in the product list termed as "parent items" were split into 133 "child items" for the purpose of data collection and the economies were required to report prices for the child items. The prices of individual child items were used for computation of the PPPs for the basic heading pharmaceutical products in regional comparisons.

Importance

The basic notion of importance came from the use of weighted price relatives in computing price index numbers. In practice, weights are not available at the product level within a basic heading, and all items, regardless of their expenditure share in the basic heading, get equal weight in the computation of PPPs if no other weights are assigned. To assign weights to the individual items within a basic heading, participating economies were encouraged to indicate whether each item priced in their economy within each basic heading is considered important or less important. Importance was expected to be determined based on an item's expenditure share within the basic heading. The broad guidelines for assigning importance were (i) whether the item is included in the CPI basket of the economy, (ii) whether price experts judge an item to be important, and (iii) whether market and business owners considered items important from perspective of volume of sales. However, similar to the experience of the 2011 ICP, there were considerable variations in the percentage of items identified as important or less important among the participating economies. This observation casts serious doubts about the usability of the importance indicator in 2017 ICP for assigning weights to the individual products. The matter was discussed in the Experts Group meeting and further presented to the Regional Advisory Board. In both these meetings, after assessing the importance indicators data, it was recommended not to use any weights for priced items in estimating basic heading PPPs, similar to the decision taken in 2011 ICP round practices. However, while the RIA did not use weights for regional PPPs, each economy was requested to review its submission of importance indicators as similar to the 2011 ICP, the importance indicators for the global core items were used by the ICP Global Office for linking of regional results to estimate the global results.

Identification of Outliers

Outlier is a term generally used to describe any extreme value in a set of survey data. As described in the previous sections, the RIA together with the participating economies undertook several rounds of data validation to identify and review prices which were considered doubtful and not comparable for the product under consideration. While this process

led to substantial improvements in the quality of data as seen from the reductions in the standard deviation of the CPD residuals, there were still item prices considered as not comparable. The remaining data issues were discussed in the two meetings of the Experts Group in detail. For the household consumption items, based on the recommendation of the Experts Group and as further approved by the ICP Asia and the Pacific Regional Advisory Board, an annual average price for an item was considered an outlier if the item's absolute CPD residual exceeded a prespecified threshold of the standard deviation of the CPD residual of the reported prices of the concerned item price. Similar criteria were used in the 2011 ICP; the Experts Group reviewed their application in the 2017 ICP and observed that applying these criteria led to substantial improvements in the data quality as measured by the standard deviation of all CPD residuals. The outlier prices so identified were further examined against the prices of other economies and also considering the price of other items representing the basic heading after exclusion of this item price.

Data and Purchasing Power Parity Computations for Household Consumption

Based on the final set of annual average prices of 879 items from the 22 participating economies, i.e. prices that were available after rigorous data validation as described above, PPPs were computed for each of the 91 basic headings, for which price data was collected, using unweighted country-product-dummy (CPD) method with Hong Kong, China as the reference economy. Reference PPPs were used for the remaining 19 basic headings of individual consumption expenditure by households (see Appendix 5 for the list of reference basic headings). To aggregate PPPs into higher level categories—such as group, class, category and main aggregate—basic heading expenditure weights were attached to the corresponding basic heading PPPs using the Gini-Éltető-Köves-Szulc (GEKS) method (see the section on methodology for PPP calculations). Table 6.28

provides the number of items by major categories per economy, for 879 items, that were finally used in the computation of regional PPPs for components of household consumption across economies.

Compensation of Employees for General Government

The basic framework for price comparisons under this aggregate was to (i) select a number of typical government occupations in the government system to provide individual and collective government services and (ii) collect their annual average compensation paid during 2017, to be used as a price for the government output. Compensation of employees following the national accounts pricing concepts included, in addition to wages and salaries, the employers' and imputed social security contributions, value of free and subsidized food and accommodation, and various allowances. Allowances such as performance bonuses paid to employees as a regular part of salary (and paid to all employees regardless of the amount) are also included if the economy treats this as part of compensation of government employees in the national accounts. Average annual compensation of government employees at the entry level, at 5–10 years, 10–20 years, and 20 years and above, were collected for each economy, along with information about the number of staff working at those four levels. The annual average compensation resulted from a weighted average of the four levels with number of staff working at each level as weights. In the absence of the availability of data by number of years of experience, the economies were asked to submit annual average compensation based on available salary scales for each staff position. Data on the number of working hours, days, weeks worked, and the number of holidays, were also collected and used in normalizing the average annual compensation to be used for PPP computations. Unfortunately, in the 2017 ICP, Thailand was unable to provide complete data on compensation of employees as per the ICP's technical and conceptual requirements.

Table 6.28: Number of Items Priced by Major Categories for Household Consumption, 2017

Economy	Total Number of Items Priced	1101 Food and Non-Alcoholic Beverages	1102 Alcoholic Beverages, Tobacco and Narcotics	1103 Clothing and Footwear	1104 Housing, Water, Electricity, Gas and Other Fuels	1105 Furnishings, Household Equipment and Routine Household Maintenance	1106 Health	1107 Transportation	1108 Communication	1109 Recreation and Culture	1110 Education	1111 Restaurants and Hotels	1112 Miscellaneous Goods and Services
Bangladesh	635	209	2	70	12	93	81	48	23	43	7	13	34
Bhutan	367	109	7	60	11	77	18	17	8	20	4	7	29
Brunei Darussalam	500	181	–	57	8	79	47	23	20	33	7	10	35
Cambodia	507	176	12	64	10	78	43	26	13	37	5	9	34
China, People's Republic of	720	223	14	74	14	102	83	72	17	54	7	21	39
Fiji	386	115	8	56	7	71	27	17	6	30	2	13	34
Hong Kong, China	570	181	11	72	11	79	55	41	14	51	7	15	33
India	772	243	16	78	15	107	101	62	27	56	7	21	39
Indonesia	549	184	9	63	6	87	43	43	15	46	7	14	32
Lao People's Democratic Republic	521	170	13	58	10	76	51	38	14	37	6	13	35
Malaysia	595	177	11	69	10	83	78	41	24	46	4	17	35
Maldives	287	76	1	35	9	41	48	14	12	17	4	9	21
Mongolia	636	158	13	75	12	100	94	42	26	55	7	14	40
Myanmar	625	224	16	71	11	91	55	46	21	36	2	17	35
Nepal	541	145	13	66	12	82	88	40	11	28	7	17	32
Pakistan	720	228	3	77	7	106	103	54	25	54	7	21	35
Philippines	691	195	14	66	14	103	99	54	26	56	7	21	36
Singapore	586	189	13	73	11	81	58	41	18	46	5	17	34
Sri Lanka	523	143	11	73	10	76	73	29	15	43	2	16	32
Taipei,China	586	172	14	71	10	89	66	41	17	53	7	12	34
Thailand	533	168	13	54	9	70	72	40	9	44	6	18	30
Viet Nam	631	194	14	73	15	90	58	55	15	53	6	21	37
Total by Major Category	879	248	16	82	17	110	173	74	31	60	7	21	40

– = magnitude equals zero.
Note: The number of items priced for each economy excludes those items whose average prices were dropped after they were identified as outliers or as non-comparable.
Sources: Economy sources and Asian Development Bank estimates.

The issue of data gap for Thailand for government compensation survey was discussed in the Experts Group meeting, which recommended to extrapolate the annual average compensation for each occupation for Thailand by extrapolation of the compensation data of 2011 ICP by the inflation index from the GDP deflator between 2017 and 2011. The recommendation was subsequently endorsed by the Regional Advisory Board in its second meeting.

Productivity Adjustment Method for Wages and Salaries of Government Employees

The RIA at ADB championed the need for productivity adjustment for comparisons of government compensation in the 2005 ICP in Asia and the Pacific. While comparing compensation data for government occupations, it was observed that wages and salaries of government employees in many low income economies of the region were too low, resulting in lower price levels and higher volume or real expenditure measures of government expenditure. In some instances, the real per capita government expenditure in some low income economies were at implausibly high levels, most likely because the low wages also reflect low productivity levels of employees in these economies, which in turn reflect low levels of capital employed per labor unit. In 2011, the RIA used a methodology for productivity adjustments which was a refinement of the method used in 2005. The refinements in the methodology continued in the 2017 ICP cycle. The 2011 and the refined 2017 methods for productivity adjustments of government compensation are discussed below.

Productivity Adjustment Method for 2011: The ADB Method

Labor productivity in the government sector is difficult to measure because of a variety of measurement issues, including obtaining suitable measures of capital stock in the government sector. The ADB approach makes

the simplifying assumption that productivity of labor in the government sector is at a constant proportion to productivity of labor in the whole economy across all the participating economies. This means that if labor productivity in Malaysia is 50% of that in Hong Kong, China at the economy level, then productivity of labor in government sector is also assumed to be 50% of productivity in the sector in Hong Kong, China.

Productivity levels in different economies are estimated under the assumption that all of them follow a Cobb-Douglas production function with constant returns to scale.[16] For economy j, the production function with capital and labor as inputs is given by:

$$Y_j = A \cdot K_j^{\alpha_j} \cdot L_j^{\beta_j} \text{ with } \alpha_j + \beta_j = 1$$
$$\text{(constant returns to scale)}$$

where Y_j is output (GDP), K_j is capital stock, and L_j is labor input in economy j. Coefficients α_j and β_j represent respectively income shares of capital and labor in j-th economy. This equation can be rewritten to express labor productivity as a function of capital–labor ratio:

$$\frac{Y_j}{L_j} = A \left(\frac{K_j}{L_j}\right)^{\alpha_j}$$

To compare labor productivity across economies, the estimate of capital stock of economy j must be expressed in a common currency unit converted using a suitable PPP. Labor is measured in physical units, such as the number of hours worked. If the income share of capital is known, then this formula can compute labor productivity for different economies. If k_j represents the capital–labor ratio in the j-th economy, then labor productivity (LPROD) can be written as:

$$\text{LPROD}_j = \frac{Y_j}{L_j} = A\left(k_j\right)^{\alpha_j} \text{ where } k_j = \frac{K_j}{L_j}$$

Then the productivity adjustment is made by dividing wages and salaries with the productivity ratio relative to the base economy of Hong Kong, China:

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[16] The Cobb–Douglas production function reflects the relationship between the output produced and the corresponding inputs: physical capital and labor.

$$\frac{\text{LPROD}_j}{\text{LPROD}_{HKG}} = \frac{A(k_j)^{\alpha_j}}{A(k_{HKG})^{\alpha_{HKG}}} = \frac{(k_j)^{\alpha_j}}{(k_{HKG})^{\alpha_{HKG}}}$$

This is the productivity ratio used for adjustment in 2011.[17] In order to implement this, it is necessary to have estimates of capital shares in different economies. It was assumed that (i) income shares of labor takes the values 0.5, 0.6, and 0.7 for three groups characterized as low, middle, and high income economies for this purpose as given below and (ii) the capital share is one minus the labor share.

Labor share of 0.5 and capital share of 0.5 were assumed for Bangladesh, Bhutan, Cambodia, India, the Lao People's Democratic Republic, Maldives, Mongolia, Myanmar, Nepal, Pakistan, and Sri Lanka.

Labor share of 0.6 and capital share of 0.4 were assumed for Fiji, Indonesia, the People's Republic of China, the Philippines, and Viet Nam.

Labor share of 0.7 and capital share of 0.3 were assumed for Brunei Darussalam; Hong Kong, China; Macau, China; Malaysia; Singapore; Taipei,China; and Thailand.[18]

Productivity Adjustment Method for 2017: The Inklaar Method

The Inklaar method (Inklaar, 2019) represents a further refinement to the productivity adjustment method introduced and implemented by ADB in the 2005 and 2011 ICP cycles. It addresses two critical deficiencies of the ADB method described above. First, although the ADB method of 2011 provided a set of transitive labor productivity adjustment factors, it is not base invariant: use of PPPs relative to a reference currency other than the Hong Kong dollar would give a different set of adjustment factors. Second, in the ADB method, the assumed

estimates of income shares of labor and capital for the three economy groupings were somewhat ad hoc and broad based. The Inklaar productivity adjustments make use of properly estimated and calibrated labor shares (Inklaar and Timmer 2013b; and Inklaar 2019).

The transitive and base-invariant measures of labor productivity from the Inklaar method are given by:

$$LPROD_j = \left(\frac{k_j}{\bar{k}}\right)^{\frac{\alpha_j + \bar{\alpha}}{2}} \text{ where } \bar{k} = \prod_{j=1}^{22} (k_j)^{1/22}$$

$$\text{and } \bar{\alpha} = \frac{1}{22} \sum_{j=1}^{22} \alpha_j$$

Productivity of economy j relative to the economy of Hong Kong, China is simply the ratio of labor productivities in economy j and in Hong Kong, China.

The new income shares of labor and real per worker capital stock used in the 2017 ICP round is presented in Table 6.29. The per worker capital stock was converted in real terms using the PPPs under the expenditure aggregate gross fixed capital formation (GFCF).[19]

The methodological issues about productivity adjustment factors were discussed in great detail in the August 2019 Regional Advisory Board Meeting, and the board agreed to use Inklaar's methodology in comparisons for Asia and the Pacific. The 2017 ICP Technical Advisory Group and the Inter-Agency Coordination Group also decided that the Inklaar methodology should be uniformly applied and used by all regions and the global office for consistency. Table 6.30 presents the estimated productivity adjustment factors using the Inklaar method and the unadjusted and adjusted price level indexes (PLIs) of the economies. As a result of application of Inklaar's methodology, PLIs for all the economies have increased and real expenditures were adjusted

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[17] While this is essentially the method used in 2011, the actual implementation was slightly more complicated.
[18] Macau, China participated in the 2011 cycle of the ICP but not the 2017 cycle.
[19] It is assumed that the PPP of capital stock is equal to the PPP of GFCF.

downward (except for the reference economy Hong Kong, China). The same refined methodology was also applied in the revisions of 2011 ICP for productivity adjustments and have led mostly to upward revisions in the PPPs for government for a number of developing economies, thus leading to a downward revisions in the real expenditures of the government.

Table 6.29: Labor Shares and Per Worker Real Capital Stock, 2017

Economy	Labor Shares (%)	Per Worker Real Capital Stock[a] (HK$)
(1)	(2)	(3)
Bangladesh	0.422*	178,405
Bhutan	0.452*	683,308
Brunei Darussalam	0.479*	4,135,061
Cambodia	0.376*	82,828
China, People's Republic of	0.583	541,308
Fiji	0.489	360,642
Hong Kong, China	0.516	2,936,715
India	0.518	266,215
Indonesia	0.464	647,589
Lao People's Democratic Republic	0.398	203,292
Malaysia	0.380	964,726
Maldives	0.410*	672,943
Mongolia	0.423	581,393
Myanmar	0.444*	85,208
Nepal	0.371*	94,987
Pakistan	0.422*	155,645
Philippines	0.357	294,659
Singapore	0.439	2,675,542
Sri Lanka	0.329	669,505
Taipei,China	0.651	1,507,493
Thailand	0.393	606,781
Viet Nam	0.405*	143,240

HK$ = Hong Kong dollar.
Note: * indicates that Inklaar estimates are not available and were sourced from labor shares from the International Labour Organization.
[a] Real refers to purchasing power parity-adjusted values.
Sources: Groningen Growth and Development Centre. Penn World Table version 9.1. https://www.rug.nl/ggdc/productivity/pwt/ (accessed 9 December 2019); Robert C. Feenstra et al. 2015. The Next Generation of the Penn World Table. *American Economic Review*. 105 (10). pp. 3150–3182. www.ggdc.net/pwt; and International Labour Organization. SDG Labour Market Indicators. https://www.ilo.org/shinyapps/bulkexplorer20/?lang=en&segment=indicator&id=SDG_1041_NOC_RT_A (accessed 28 November 2019).

Construction

In Asia and the Pacific, construction is a fast-growing sector. In 2017, the share of construction in the nominal GDP of the 22 participating economies of Asia and the Pacific was 24.3%. Residential construction accounted for 5.3% of GDP, nonresidential construction for 8.8%, and civil engineering for 10.2%, which highlights its importance in the region. Given the importance of construction as reflected by its high share in GDP, it is essential that PPPs derived for construction and its components provide meaningful real volume comparisons. However, experience has shown that collection of construction prices and compilation of PPPs pose special problems for the ICP. The problem arises mainly because of the comparability of construction projects selected for pricing. Finding comparable construction projects across economies is almost impossible, especially because of very diverse economies in the region in terms of development, urbanization, climatic conditions, and terrain.

In the 2005 ICP, the basket of construction components (BOCC) approach was introduced and implemented by the RIAs. Further details of the BOCC approach can be found in Chapter 13 on construction in the World Bank's report on ICP framework, methodology and results (World Bank 2013). Serious problems were encountered in the implementation of the BOCC approach, and recognizing these difficulties, the ICP Global Office recommended the use of input approach for 2011 ICP round. The input approach required collecting prices of a basket of construction inputs of materials, equipment rental, and skilled and unskilled labor that are used in the construction of residential, nonresidential, and civil engineering construction. The input approach was used by all RIAs in 2011 except for the Eurostat-OECD comparisons which has been using what is known as the Bills of Quantity approach. This approach is discussed in the Chapter 6 of the Eurostat-OECD Methodological Manual on PPPs (Eurostat and OECD 2006).

Table 6.30: Productivity Adjustment Factors and Government Compensation Price Level Indexes, 2017
(Hong Kong, China as base)

Economy	Unadjusted Government Compensation PLIs (HKG = 100)			Productivity Adjustment Factors (HKG = 1.00)	Adjusted Government Compensation PLIs (HKG = 100)		
	Health	Education	Collective		Health	Education	Collective
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bangladesh	5.55	6.67	9.07	0.22	24.96	29.98	40.77
Bhutan	5.02	5.76	5.53	0.47	10.59	12.16	11.67
Brunei Darussalam	24.48	33.55	27.87	1.25	19.65	26.94	22.38
Cambodia	3.33	3.29	5.75	0.14	24.10	23.81	41.59
China, People's Republic of	28.81	32.59	35.68	0.41	69.93	79.12	86.60
Fiji	10.22	12.76	14.43	0.33	30.57	38.16	43.15
Hong Kong, China	100.00	100.00	100.00	1.00	100.00	100.00	100.00
India	15.08	13.84	18.16	0.29	52.64	48.32	63.39
Indonesia	10.70	9.99	11.22	0.46	23.30	21.76	24.42
Lao People's Democratic Republic	2.20	2.86	3.36	0.24	9.26	12.04	14.16
Malaysia	16.82	18.86	21.70	0.59	28.54	31.99	36.81
Maldives	14.11	15.89	17.90	0.47	29.77	33.53	37.76
Mongolia	2.76	3.15	4.94	0.44	6.33	7.24	11.36
Myanmar	1.90	1.80	3.07	0.15	12.73	12.07	20.61
Nepal	4.41	4.21	6.34	0.15	29.55	28.20	42.46
Pakistan	6.53	7.53	9.61	0.21	31.73	36.60	46.71
Philippines	9.91	11.40	11.55	0.29	33.98	39.07	39.59
Singapore	55.22	73.54	50.25	1.02	54.14	72.10	49.27
Sri Lanka	3.13	3.61	4.93	0.48	6.52	7.51	10.27
Taipei,China	25.59	32.21	32.66	0.65	39.27	49.43	50.12
Thailand	12.20	10.64	17.05	0.45	27.25	23.76	38.07
Viet Nam	2.74	2.68	3.73	0.19	14.08	13.78	19.20

HKG = Hong Kong, China; PLI = price level index.
Source: Asian Development Bank estimates.

The input approach used in 2011 ICP was found much more practical and less data intensive than the BOCC approach used in 2005 ICP. As it was already decided that there will be no major methodological changes from the 2011 ICP, the same input approach was used in the 2017 ICP and was also adopted by the RIA for Asia and the Pacific.

Relevance Indicators

The construction group comprises three basic headings: (i) residential buildings, (ii) nonresidential buildings, and (iii) civil engineering works. While the construction inputs survey collected prices for 40 material inputs, it is recognized that not all the 40 material inputs would be relevant for all the three basic headings. For example, materials like solid concrete blocks or double glazing units may not be considered relevant for residential buildings; likewise, common bricks or facing bricks may not be considered relevant for civil engineering works. The economies were requested to consult construction experts to help them identify relevant material items for each construction type. Based on the inputs from the participating economies, these were consolidated to construct a table of regional relevance indicators common for all the economies (Table 6.31).

Table 6.31: Relevance Indicators for Different Basic Headings for Construction, 2017

Code	Material or Product	Use in		
		Residential Buildings	Nonresidential Buildings	Civil Engineering Works
TOTAL		30	34	21
1501200101	Aggregate, for concrete	1	1	1
1501200102	Sand, for concrete and mortar	1	1	1
1501200103	Softwood, for carpentry	1	1	1
1501200104	Softwood, for joinery	1	–	–
1501200105	Exterior plywood	1	1	–
1501200106	Interior plywood	1	1	–
1501200107	Chipboard sheet	1	1	–
1501200108	Petrol (gasoline)	1	1	1
1501200109	Diesel fuel	1	1	1
1501200110	Oil paint	1	1	–
1501200111	Emulsion paint	1	1	–
1501200112	Ordinary Portland cement	1	1	1
1501200113	Ready mix concrete	1	1	1
1501200114	Precast concrete slabs	–	1	1
1501200115	Common bricks	1	–	–
1501200116	Facing bricks	1	–	–
1501200117	Concrete blocks, hollow	1	1	1
1501200118	Concrete blocks, solid	–	1	1
1501200119	Clay roof tiles	1	–	–
1501200120	Concrete roof tiles	1	1	–
1501200121	Float (sheet) glass	1	1	–
1501200122	Double glazing units	–	1	–
1501200123	Ceramic wall tiles	1	1	–
1501200124	Plasterboard	1	1	–
1501200125	Hand wash basin	1	1	–
1501200126	High yield steel reinforcement	1	1	1
1501200127	Mild steel reinforcement	1	1	1
1501200128	Structural steel sections	1	1	1
1501200129	Sheet metal roofing	1	1	1
1501200130	Metal storage tank	–	1	–
1501200131	Cast iron drain pipe	–	1	1
1501200132	Copper pipe	1	1	1
1501200132.1	Steel pipe	1	1	1
1501200132.2	Plastic (PVC) pipe	1	1	1
1501200133	Electric pump	–	1	1
1501200134	Electric exhaust fan	–	1	1
1501200135	Air-conditioning equipment	–	1	–
1501200136	Stand-by generator	–	–	–
1501200137	Solar panel	–	–	–
1501200138	Electricity	1	1	1

– = magnitude equals zero, PVC = polyvinyl chloride.
Source: Asian Development Bank. 2019. "Agreements from the Second Regional Advisory Board Meeting, Bangkok, Thailand, 26–27 August." Unpublished.

It can be seen that for residential buildings, 30 out of 40 material items were identified as relevant; for nonresidential buildings 34 items; and for civil engineering works, only 21 items were considered as relevant. Only those materials considered relevant for a basic heading were used in computing the PPPs for the three basic headings. All items of equipment rental and labor were considered for all three construction types.

Resource Mix by Type of Construction

In the estimation of PPPs for construction basic headings, apart from relevance indicators, it is also important to account for a differential mix of materials, equipment rental, and labor (resource mix) for each type of construction. For example, equipment may not be used substantially in residential buildings, whereas it will have a higher share of input costs in civil engineering works and nonresidential works. Again, each participating economy was requested to consult local construction experts and provide appropriate resource mix ratios for each type of construction for their economy. The resource mix ratios were further validated in one of the meetings of the Experts Group. After a thorough review and validation for consistency of these ratios, the Experts Group recommended classifying the economies in income groups based on gross national income per capita in US dollars

(World Bank's Atlas method). Economies were first grouped into (i) high income, (ii) upper-middle income, (iii) lower-middle income and (iv) low income; Hong Kong, China was considered as a separate group because its resource mix ratio was very different from the rest, with a substantially big share of labor costs because of the very high wages for labor in Hong Kong, China's economy. The average of the resource mix ratios of individual economies each group were calculated and used in Asia and the Pacific. This approach of group-wise resource mixes was also endorsed by the Regional Advisory Board in its meeting in 2019. The resource mix data shown in Table 6.32 were used in computing PPPs for the three basic headings.

Identification of Outlier Prices in Construction

Similar to the process adopted in finalizing the household item prices, the RIA adopted certain quality criteria recommended by the Experts to identify the outlier prices with the objective to improve the quality and comparability of data across economies. For materials and equipment rental the procedure was to identify prices as outliers if the item price CPD residual exceeded a threshold value. Only about 1% of the total number of prices were excluded as outliers and not included in calculating PPPs.

Table 6.32: Resource Mix for Residential, Nonresidential, and Civil Engineering Construction, 2017

Income Groups (GNI Per Capita, US$)	Residential Buildings			Nonresidential Buildings			Civil Engineering Works		
	Materials	Equipment Rental	Labor	Materials	Equipment Rental	Labor	Materials	Equipment Rental	Labor
20,000 and above (Hong Kong, China)	44.0	11.0	45.0	43.0	10.0	47.0	40.0	22.0	38.0
20,000 and above (excl. Hong Kong, China)	53.8	10.2	36.1	55.7	11.7	32.7	51.5	20.8	27.8
4,000–19,999	61.3	11.3	27.5	60.3	10.5	29.3	51.8	23.8	24.5
1,500–3,999	61.5	12.6	25.9	62.5	14.2	23.3	60.6	19.9	19.5
Below 1,500	69.0	8.1	23.0	66.5	9.3	24.2	65.5	12.8	21.8

GNI = gross national income, US$ = United States dollar.
Notes: The income group with per capita GNI of US$20,000 and above comprises Brunei Darussalam; Hong Kong, China; Singapore; and Taipei,China. The income group with per capita GNI of US$4,000 to US$19,999 comprises Fiji, Malaysia, Maldives, the People's Republic of China, and Thailand. The income group with per capita GNI of US$1,500 to US$3,999 comprises Bhutan, India, Indonesia, the Lao People's Democratic Republic, Mongolia, Pakistan, the Philippines, Sri Lanka, and Viet Nam. While the income group with per capita GNI of below $1,500 comprises Bangladesh, Cambodia, Myanmar, and Nepal. The GNI per capita values are for the year 2017.
Sources: For GNI per capita: World Development Indicators database. World Bank. World Development Indicators. https://databank.worldbank.org/source/world-development-indicators (accessed 18 June 2019). Asian Development Bank. 2019. "Agreements from the Second Regional Advisory Board Meeting, Bangkok, Thailand, 26–27 August." Unpublished.

Approach for Computing Purchasing Power Parities for Construction

Using the CPD method, the PPPs for residential, nonresidential, and civil engineering construction were computed, taking into account the relevance indicators and weights (resource mix) according to materials, labor, and equipment rental.

The following is the standard regional approach for estimating construction PPPs:

- Prices collected for the subheading (materials, equipment rental, and labor) were distributed to the three construction basic headings (residential buildings, nonresidential buildings, and civil engineering works) using relevance indicators. Only those prices that are relevant to the basic heading will be included in calculating subheading PPPs.
- PPPs for the subheading were calculated using the CPD method, resulting in nine sets of subheading PPPs.
- The subheading PPPs were aggregated using resource mix ratios as weights, resulting in the PPPs for three basic headings—residential, nonresidential, and civil engineering.
- PPPs for the three basic headings were aggregated using national accounts expenditure data as weights, resulting in PPPs for the construction group.

Machinery and Equipment

The machinery and equipment survey is another challenging survey to implement in practice from the perspectives of ensuring both comparability and representativeness. The staff of the statistical agencies generally do not have in-house expertise and professional knowledge about the technical aspects of detailed product characteristics of machinery and equipment products. Major items of equipment—which are generally imported in most developing economies and have specified makes and models—will have suppliers and it is relatively easier to collect prices for specified items. However, it is often not as easy to find the suppliers for the counterpart unspecified items (or products with characteristics identical with the specified item but with no make or model specified). Such products may be locally manufactured or imported from within the region and may not exactly match the listed specifications.

Considering these problems at the outset, and with the objective to tackle this knowledge gap in the ICP teams of participating economies, the RIA requested the ICP Global Office to provide support from an international expert on equipment products. The RIA organized three regional workshops devoted to discussions on product identification, conduct of price surveys, and validation of price data, which were facilitated by the international expert. Each machinery and equipment product has well-defined product-specific characteristics that identify the quality of the product. One common challenge faced by many economies was the non-availability of a product with all characteristics exactly matching the specifications in the product list, with uncertainty about whether an available product with closely matching specifications could be considered as an equivalent product for pricing purposes. Considering this practical problem, the international expert helped the RIA to identify for each item the product specifications which are essential for comparable quality and sensitive to price. The ICP teams of the economies were also advised to work with local experts on machinery and equipment for additional technical guidance. They were also requested to take note of the detailed specifications, along with makes and models of equipment they have priced. The international experts helped the RIA review the specifications noted by the economies that deviated from the listed product characteristics and to validate whether the product can be considered as equivalent and of comparable quality. The extensive experience of the international expert was immensely helpful in ensuring high data quality and comparability, especially for the unspecified products.

The RIA encountered problems of non-comparability and suspected outlier prices during the validation of prices on machinery and equipment. The RIA sought several clarifications on prices and specifications of items priced from the economies leading to corrective actions and further improving the quality of data prior to the conduct of regional price data validation workshops. Two regional workshops, with the help of the international expert on machinery and equipment, focused on validating the price data. For item prices considered as outliers, the workshops reviewed the technical specifications for each of these items. Economies were provided with extensive feedback so they could further verify the product specifications and the price quotations after the workshop and resubmit the prices to the RIA. Rigorous review by the RIA of the price data and technical specifications of items submitted by the economies, and extensive bilateral communications between the RIA and the economies on the identified issues, greatly improved the data quality for machinery and equipment. The ICP Global Office also undertook another level of price validation across all economies participating in the global program, thus giving another opportunity to confirm the validity of data and give clarifications on a few issues identified in the global data validation.

Subsequent to the bilateral and regional discussions, the data quality was discussed in a meeting of the Experts Group to further validate the prices. Detailed analysis of prices was conducted based on Dikhanov Tables: first, with CPD residuals for analysis at the basic heading level; and second, at the global level with all machinery and equipment items included in the CPD analysis. Table 6.33 provides some summary statistics of inter-economy price data validation in Asia and the Pacific for machinery and equipment for the 22 economies. It shows that at the basic heading and the global level, none of the items exhibited an absolute value of CPD residual exceeding 2.00, and only 24 items for all 22 economies reflected CPD residuals exceeding 0.75 in absolute value. It implies that the reported prices of the 24 items were more than two times of the prices estimated by the CPD model. An analysis of the CPD residuals at the global level also reflected 27 items with CPD residuals in excess of 0.75 in absolute value. While these results were indicative of serious issues with the prices of these items, it also revealed that the prices for specified items were fairly comparable and did not show any major issues because the identified outlier prices related only to the unspecified items. Dropping these prices would lead to a reduction in price data and therefore further detailed analysis was conducted on a product by product basis.

Table 6.33: Summary Statistics on Inter-Economy Data Validation for Machinery and Equipment and Other Products, 2017

Particulars	Econ1	Econ2	Econ3	Econ4	Econ5	Econ6	Econ7	Econ8	Econ9	Econ10	Econ11	Econ12	Econ13	Econ14	Econ15	Econ16	Econ17	Econ18	Econ19	Econ20	Econ21	Econ22
Original Priced Items																						
Standard Deviation	0.28	0.24	0.35	0.16	0.16	0.22	0.33	0.22	0.22	0.22	0.25	0.16	0.44	0.32	0.35	0.24	0.18	0.31	0.26	0.24	0.23	0.24
With Country–Product–Dummy Residuals																						
Aggregate Level Selected: Basic Heading																						
>2.00 or < -2.00	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
>0.75 or < -0.75	1	–	2	–	–	–	2	–	1	1	–	–	5	1	3	1	–	3	1	–	1	2
>0.25 or < -0.25	23	10	10	4	14	18	44	23	13	22	6	10	23	20	18	32	24	16	27	26	23	42
Global Level																						
>2.00 or < -2.00	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
>0.75 or < -0.75	2	–	1	–	3	2	2	1	1	–	–	–	2	3	1	4	–	1	1	–	2	1
>0.25 or < -0.25	9	8	6	12	11	8	21	27	9	13	14	11	37	17	21	28	31	9	22	17	16	33

– = magnitude equals zero, Econ = economy.
Source: Asian Development Bank estimates.

This analysis revealed certain patterns and clustering in the price data. Recognizing these clustering patterns, the Experts Group suggested actions for identifying outlier prices and exploring options for product splitting (based on quality or price clustering). This was similar to price clustering approach adopted in 2011 ICP.

Identification of Outliers

Dikhanov tables analysis provided the basis for identifying the outlier item prices through the analysis of CPD residuals for individual item prices for each economy. As the CPD method can be applied for items in each basic heading as well as for all items together or at the global level, identifying outliers was conducted simultaneously at the basic heading level and global level. In consultation with the Experts Group a stricter criteria to identify outliers was adopted for specified items whose prices are expected to be fairly homogeneous, compared with the criteria adopted for unspecified items. Price of a specified item was considered as an outlier when absolute value of CPD residual exceeded 0.5 at the basic heading level and 0.7 at the global level. For an unspecified item, when the absolute value of CPD residual exceeded 0.7 at the basic heading level and 1.0 at the global level, the price of the item was considered as an outlier. Once these prices were confirmed as outliers, these were excluded from further analysis after careful review, and further price variations were addressed by adopting quality or price splitting of items based on price clustering as explained below.

Quality and Price Splitting Procedure

The RIA followed the Experts Group advice in deciding whether quality or price splitting was needed for an item. The following summary statistics for item prices were computed based on the prices submitted by the economies for each item: average, coefficient of variation (CV), and the standard deviation of CPD residuals from Dikhanov tables. If for an item, the original price CV is less than or equal to 40 and the standard deviation of CPD residuals is less than or equal to 0.3, then no splitting is required, and the prices for the item are considered comparable. However, if item's price CV is greater than 40 or the standard deviation of CPD residuals is greater than 0.3, then the decision is to proceed with the splitting of the item using price clustering as the basis. This criteria was applied to only 25 unspecified items, which is much less than the number of items that were split using such an approach in 2011 ICP round. The quality of data as measured in terms of reductions in CPD residuals for all economies exhibited substantial improvements at the end of this exercise.

For items identified for splitting based on above criteria, splitting of items was based on price clustering for which the parameters are established as follows:

(i) the economy average item price in local currency unit was converted in Hong Kong dollars;

(ii) the regional average price in Hong Kong dollars as the geometric mean of prices of economies that priced the item under reference in Hong Kong dollars; and

(iii) the following rule was applied to split a set of product prices into two homogeneous clusters:

    (a) low cluster: if the observed item price for an economy is below or equals the regional average price; and

    (b) high cluster: if the observed item price for an economy is above the regional average price.

Figure 6.2 shows an illustration of splitting price data for the item "professional digital camera – unspecified (body only)," priced by 18 economies. As this is an unspecified item, the heterogeneity that remains in the item prices after thorough validation could be attributed to differential quality in the item priced and is therefore considered for splitting. Taipei,China recorded the lowest price while Singapore recorded the highest price.

Figure 6.2: Splitting of Items Based on Price Clustering: Professional Digital Camera
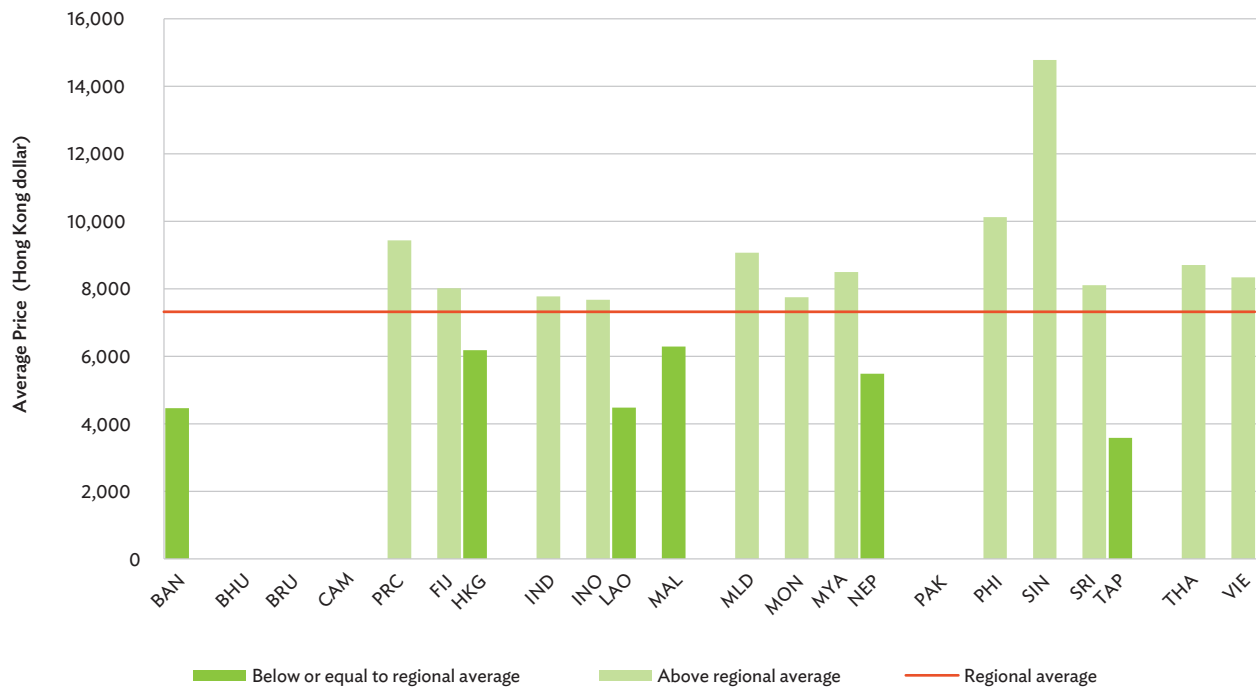
BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Source: Asian Development Bank estimates.

The observed prices for the item from 18 economies were classified into two clusters, high—comprising 12 economies where price reported is above the geometric mean, and low—for six economies where price is below the geometric mean based on the above procedure for price clustering.

Table 6.34 shows the final result of applying the splitting procedure on 25 items. The first column shows the number of items classified as those with price CV for less than or equal to 40 and standard deviation of CPD residuals less than or equal to 0.3 for the five basic headings of machinery and equipment. Column 2 shows the number of items classified with price CV greater than 40 or standard deviation of CPD residuals greater than 0.3. Column 3 shows the original number of (unsplit) items,

while column 4 shows the additional split items, which is equal to column 2. For example, the basic heading of fabricated metal products had 10 items (column 3), out of which one item (column 2) has standard deviation of CPD residuals greater than 0.30 or CV greater than 40. The item prices corresponding to this item are divided into two (low and high) split items, based on the price clustering approach described above, resulting in 11 items, of which 9 are original and one item is split into two. At the end of the price clustering exercise, a total of 186 items (161 original plus 25 additional items) were formed. Column 5 shows the distribution of the new products by basic headings. The price data for the clustered products were used in computing basic heading PPPs.

Table 6.34: Price Clustering and Item Splitting for Machinery and Equipment, 2017

Code	Basic Heading	Original Items			Split Price Clusters	
		SD of CPD Residual ≤ 0.30 and CV ≤ 40	SD of CPD Residual > 0.30 or CV > 40	Total	Additional items from Splitting Process	Total (Original and Split)
		(1)	(2)	(3)	(4)	(5) = (3) + (4)
1501111	Fabricated metal products	9	1	10	1	11
1501112	Electrical and optical equipment	49	7	56	7	63
1501115	General purpose machinery	22	4	26	4	30
1501116	Special purpose machinery	36	11	47	11	58
1501121	Road transport equipment	20	2	22	2	24
Total		136	25	161	25	186

CPD = country-product-dummy, CV = coefficient of variation, SD = standard deviation.
Source: Asian Development Bank estimates.

Effect of Price Clustering on Basic Heading Purchasing Power Parities

The effects of quality or price clustering on PPPs for different basic headings on the resulting PLIs is shown in Figure 6.3, which shows the PLIs with Hong Kong, China = 100, before and after price clustering for the basic heading "electrical and optical equipment." It shows that clustering reduced the price levels of 17 economies: Brunei Darussalam; Cambodia; Fiji; India; Indonesia; Malaysia; Maldives; Mongolia; Myanmar; Pakistan; the Philippines; the People's Republic of China; Singapore; Sri Lanka; Taipei,China; Thailand; and Viet Nam. It had an opposite effect on PLIs for Bangladesh, Bhutan, the Lao People's Democratic Republic, and Nepal.

The price clustering method adopted in Asia and the Pacific enabled the RIA to make the best possible use of all the price data submitted by the economies, and most of the price data were used in computing PPPs for machinery and equipment. The final results in Chapter 3 show that the PPPs for machinery and equipment are closer to the market exchange rates and that the PLIs for the 22 economies range between 74 to 115, with Asia and the Pacific = 100. Compare this with the range of the PLI for individual consumption expenditure by the households (ICEH), which range

between 62 and 173. In Asia and the Pacific, as most of the machinery and equipment items are imported in many of the participating economies, this is consistent with the intuition that PPPs tend to be closer to market exchange rates for goods that are traded internationally and the differences could stem from differences in transport costs, marketing margins, and product taxes. Additional discussions on this topic can be found in the appendix of Chapter 14 on machinery and equipment in the World Bank's report on ICP framework, methodology and results (2013).

Dwellings

For Asia and the Pacific, measuring real volumes of dwelling services has been particularly difficult because of the diversity in the composition of the participating economies, ranging from high income economies—such as Brunei Darussalam; Hong Kong, China; and Singapore—to low income economies like Cambodia, Myanmar, and Nepal. The participating economies include some of the largest and most populous economies of the world such as the People's Republic of China, India, and Indonesia (in order of size). The region also includes economies like Hong Kong, China and Singapore, which are models for high-density fully urbanized living and stand in sharp contrast to landlocked economies like Bhutan,

Figure 6.3: Price Level Indexes for Basic Heading: Electrical and Optical Equipment, Before and After Splitting
(Hong Kong, China = 100)
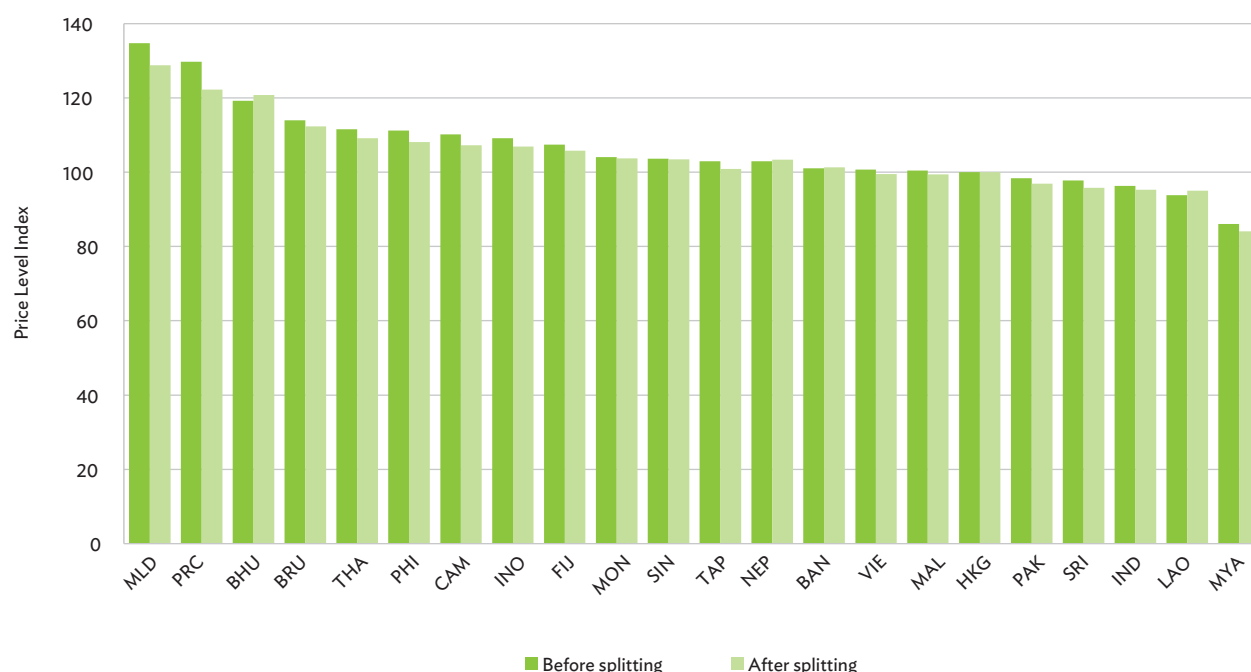
■ Before splitting ■ After splitting

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Source: Asian Development Bank estimates.

the Lao People's Democratic Republic, and Mongolia, or with the most populated economies of the People's Republic of China and India.

In the 2005 and 2011 ICP rounds, both the quantity indicator approach and rental price approach were attempted. As already discussed above under the section on product list development, the comparisons based on both these approaches posed insurmountable problems, requiring the RIA to adopt the suboptimal solution of using the reference volume approach.

For the 2017 ICP in Asia and the Pacific, both the standard approaches were again attempted to estimate comparisons on dwelling services. For 2017 ICP, a multi-pronged approach was adopted to resolve the data issues encountered in compiling PPPs and real expenditure for dwelling services.

These improvements are

- improvements in the rental survey framework, including changes to the dwelling specifications, better coverage and representativity of rental data, and enhancing quality of rental data through rigorous data validations;
- improvements in data required for the implementation of direct quantity approach including extensive mining of data from surveys and censuses implemented by the economies; identification of quality indicators in addition to the standard indicators of electricity, water, and toilet; supplementation of economy data with data from international databases such as the WASH database; and
- improved coverage of expenditures on owner-occupied housing in the GDP of economies since the 2011 ICP.

Quantity Indicator or Volume Approach

The quantity indicator or volume approach measures per capita volume directly from data collected on dwellings from the participating economies. This approach has the advantage of not depending on rental markets and data on rents. The quantity indicator (QI) approach involves collection of data on quantity of dwellings and related indicators, and indicators of quality characteristics of dwellings. While the quantity indicators are used to derive the housing (unadjusted) volume aggregate for each economy, the quality indicators are used to derive volume aggregates adjusted for quality of housing.

Three main quantity indicators used as measures of dwelling volumes are

(i)   QI1, number of dwellings per 100 people;
(ii) QI2, number of rooms per 100 people; and
(iii) QI3, square meters of floor space available per person.

Of these three indicators, QI3 is considered the most accurate measure of quantity of dwelling services as compared with the other two indicators—number of dwellings and number of rooms. However, in terms of data availability and reliability of measurements, QI3 is the weakest of the three. Obviously, counting the number of rooms and number of dwellings is much more straightforward than measuring of floor space in housing surveys and censuses, which are generally based on oral enquiry. Because of non-availability of data on floor space, only the two indicators of QI1 and QI2 were considered in developing a composite weighted volume index. Since the number of rooms is a better measure of quantity of dwelling space per person than number of dwellings, it was given a higher weight to derive quantity values for each economy as follows:

$$QN = QI2^{0.67} \times QI1^{0.33} \quad (1)$$

Even if quantity indicators of dwellings may be the same in all economies, these indicators could still differ in terms of quality of dwellings, so it was recommended that some quality indicators be used in conjunction with the quantity measures to adjust for the quality of housing across economies. The three quality indicators (QL) supplemented are

(i)   QL1, indicator of whether clean water is available inside the dwelling (piped into the dwelling, yard, or plot);
(ii) QL2, indicator of whether a toilet is in the dwelling (connected to sewer or septic tank); and
(iii) QL3, indicator of the availability of electricity to the dwelling.

These quality indicators, reflecting necessities, were useful in further differentiating dwellings of the economies, and were captured from the household surveys and censuses conducted by the economies. Utmost care was taken to ensure that the indicators across economies match with the standard definitions of the quality indicators. WASH indicators from the WHO/UNICEF Joint Monitoring Program were also explored and used to fill gaps.[20] A simple geometric mean of the three quality indicators served as a composite indicator of housing quality:

$$QL = (QL1*QL2*QL3)^{1/3} \quad (2)$$

The housing quantity index QN was adjusted by the QL to obtain a direct measure of housing volume QI (QI = QN*QL) for each economy. This volume indicator QI served as the measure to derive per capita volume measures for each economy. The housing PPPs based on the quantity approach were obtained by dividing the expenditures on dwelling services from national accounts in local currency units by QI. This allowed comparison of dwelling services in Asia and the Pacific using the quantity indicator or volume approach.

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[20] The WASH indicators track Sustainable Development Goal (SDG) 6: "Ensure availability and sustainable management of water and sanitation for all" through collecting data on the availability of drinking water, sanitation, and hygiene.

Rental Price Approach

The *rental approach* or the *direct rent* approach (Heston 2013) is similar in concept to the standard compilation of PPPs used in the ICP. Under this approach, market rents for a selected list of dwellings that are representative of housing stock in the region are collected and directly used in computing PPPs for housing services, which can then be used in computing real housing expenditure.

The rental approach is likely to work well if there are well-functioning rental markets in the participating economies. The rental markets need to be large and representative of the dwellings in the economies. It is likely that in some economies, rental markets may be restricted to capital cities or large metropolitan cities and may not represent housing in rural and semi-urban areas. In many economies, dwellings for rent may differ significantly from owner-occupied housing, in which case the rental data from rental surveys may not be appropriate for imputing housing service for owner-occupied dwellings. In some economies, rental markets may be regulated with rents subsidized by the government. In such cases, the use of the rental approach to impute housing expenditures of owner-occupied housing would be problematic. In such cases, the user-cost approach proposed by Diewert (2009) is recommended.

For the 2017 ICP, participating economies collected rental data for 21 different dwelling types, which were converted to rents per square meter for comparisons. The data was either collected from a survey conducted specially for ICP requirements or was drawn from an existing housing rental survey by identifying suitable dwelling types for ICP. For Asia and the Pacific, the list of dwellings was prepared using the global list and supplementing the same with some additional dwelling types that are region-specific after consultations with the economies. Dwellings are classified into modern and traditional type dwellings. Traditional dwellings are designed to represent housing in rural regions as well as housing in low income economies. Rents are collected for dwellings with the following facilities: electricity, inside water, private toilet with water, and private kitchen. Rents exclude furniture materials, services for maintenance, and energy.

After collecting the rental data for the list of dwelling types, the participating economies and the RIA conducted a rigorous intra- and inter-economy data validation to ensure the quality and reliability of the rental data. Rental surveys, however, had full national coverage in only half of the economies and only seven out of 22 economies priced traditional dwellings. Data on traditional dwellings was not included in the PPP computations.

The rental data was then used to estimate PPPs for housing, under the assumption that the housing rentals are representative of the housing prices of the owner-occupied dwellings as well, which is a strong assumption considering that the rental markets in most economies are small in size and largely concentrated in urban cities. These PPPs were used to derive real housing expenditures (or volumes) by dividing the expenditures on dwelling services from national accounts in local currency units by the estimated PPPs for each economy.

Analysis of Housing Results from Quantity and Rental Approaches

The ratios of real per capita housing expenditures to real per capita ICEH (excluding housing) derived for each economy based on the two approaches—quantity approach and rental approach are presented in Figure 6.4. Figure 6.4 shows that these ratios from the quantity or volume approach range from a high of 90% for Nepal and 85% in the People's Republic of China to only around 16% for Hong Kong, China, and for most economies the ratio is close to 50%. At the same time, the PPPs and PLIs derived from the rental approach also exhibit implausible values. These results indicated the failure of the two approaches again in 2017 ICP to provide meaningful comparisons in Asia and the Pacific.

Figure 6.4: Ratio of Per Capita Real Housing to Per Capita Real ICEH without Housing, 2017
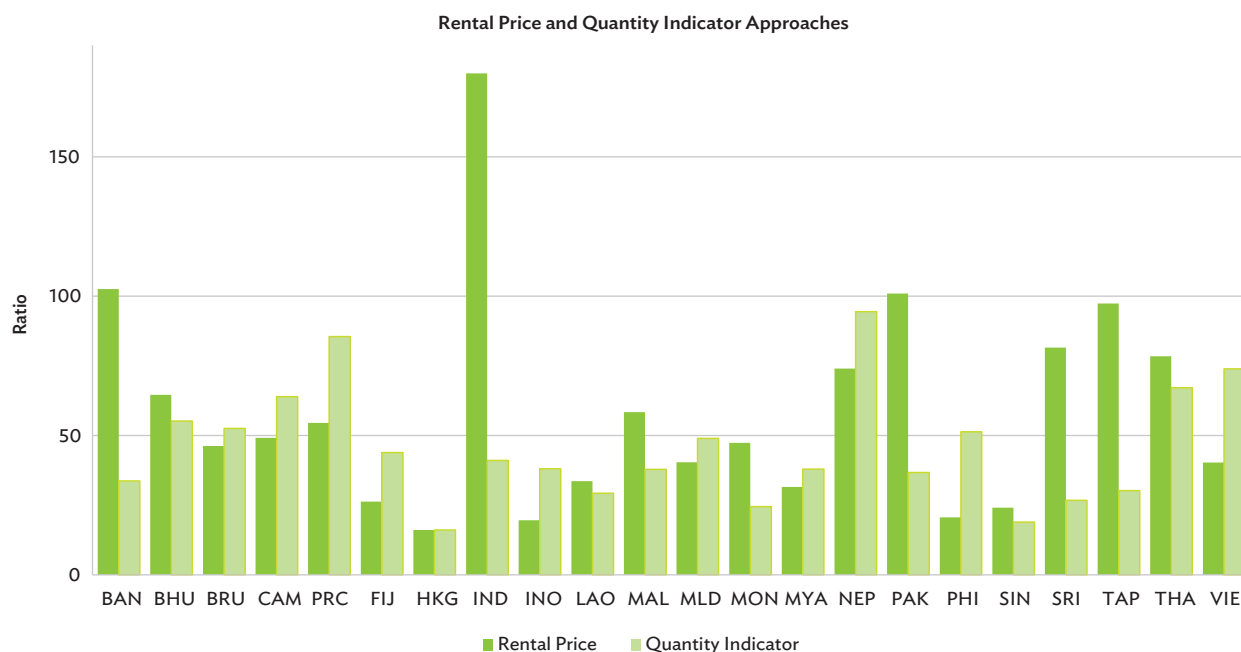
(%)

Rental Price and Quantity Indicator Approaches

■ Rental Price ■ Quantity Indicator

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; ICEH = individual consumption expenditure by households; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Source: Asian Development Bank estimates.

The New ADB Approach: Linked Rental Price and Quantity Indicator Purchasing Power Parities with Quality Adjustments

Extensive analyses of results from the rental price and quantity indicator approaches suggest that the PPPs, PLIs, and relative levels of per capita housing from these approaches are implausible for many economies. The main conclusion that emerges from these results is that the rental and quantity indicator approaches fail to adequately measure and account for the true differences in the quality of dwellings in the participating economies. The quality indicators such as electricity, water, and sanitation are just basic indicators and do not reflect the real and significant quality differences in dwellings across the economies of the region.

The RIA, in consultation with the Experts Group, devised an approach which combines the best of the rental and volume approaches after making additional adjustments for accounting quality differences that remain unaccounted for in the current rental and direct quantity approaches. It was agreed that the rental PPPs will be adjusted using a measure of income gradient for dwelling quality and that indirect PPPs from volume approach will be adjusted for quality through relative rates of urbanization. Both of these adjustments are, in concept, similar to the productivity adjustments made to wages and salaries of government employees in the process of comparing government compensation across the economies. The adjusted rental and quantity data were then used in conjunction with an assessment of the data on dwelling expenditures in GDP to devise a mixed approach which is explained below.

A schematic diagram of the steps involved in the new approach is shown in Figure 6.5.

Figure 6.5: Schematic Diagram of the New Approach to Housing Comparisons
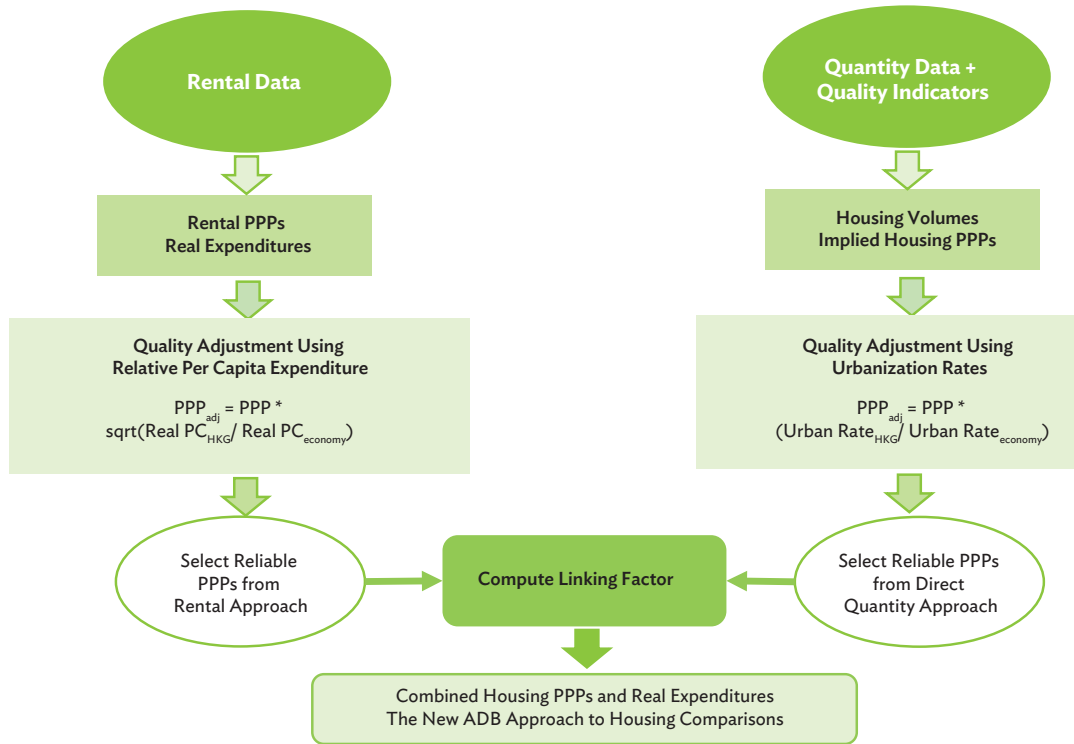
ADB = Asian Development Bank; HKG = Hong Kong, China; PC = per capita, PPP = purchasing power parity; sqrt = square root.
Source: Asian Development Bank.

Quality Adjustment for Quantity Indicator Approach Using Urbanization Rates

Recognizing the inadequacy of indicators of electricity, water, and sanitation in capturing quality differences in dwellings in the participating economies, it was decided that PPPs from the quantity indicator approach will be additionally adjusted using rates of urbanization. Urbanization rates are available from the World Development Indicators database (World Bank n.d.). The basic idea behind this proposal is that in economies where large proportions of people live in urban areas, the average quality of dwellings is likely to be higher. In the absence of knowledge on the nature of the relationship between urbanization and quality of dwellings, it was decided that a simple proportional adjustment will be made to the housing volume data. Urbanization-adjusted housing real value or volume for each economy j is computed as:

$$\text{Urbanization} - \text{adjusted Real Volume}_j = \text{Real Volume}_j \times \left(\frac{\text{urbanization rate}_j}{\text{urbanization rate}_{HKG}} \right)$$

where real volume refers to real expenditures adjusted for basic quality indicators such as electricity, water, and sanitation.

Quality Adjustment for Rental Purchasing Power Parities Using Relative Real per Capita Expenditure Differentials

This adjustment applied to the rental approach is based on the general notion that the quality of dwellings increases with the affluence of the general population, measured in this instance by real per capita expenditure (without housing). While the notion of a positive relationship between real per capita income and the average quality of dwellings is intuitive, the exact relationship is not clear.

In Asia and the Pacific, per capita income relativities (with Hong Kong, China as the reference economy) range from a low of 0.06 for Nepal to a high of 0.71 for Singapore. For the People's Republic of China this ratio is 0.14 and for India it is 0.10. Such a relationship could be just proportional, or it may exhibit a complex non-linear relationship. In the absence of any formal basis for identifying the relationship between quality of dwellings and real income, the new method employs a simple non-linear adjustment based on the square root of the ratio of per capita expenditure.[21] These adjustments are transitive and base invariant. Thus if per capita real expenditure (without housing) in an economy is 50% of that in Hong Kong, China, the quality adjustment factor for rental PPP for this economy is given by:

$$Quality - adjustment\ factor = \sqrt{\frac{1}{0.50}} = 1.41$$

This means that rental PPP for economy A is multiplied by a factor of 1.41 in the process of quality adjustment. The idea is that economies with lower average per capita real expenditures are likely to have lower average qualities of dwellings (relative to the reference economy). Hence, PPPs for such economies should be adjusted to account for quality differences.

Steps in Linking the Rental and Quantity Approaches

The next step in the new approach to comparisons of housing expenditure is to select reliable PPP from the quality-adjusted rental approach and PPPs from the urbanization adjusted volume approach and use an approach that is somewhat similar to the methodology used in the Eurostat-OECD for linking rental-based and volume-based comparisons.

Step 1: Identification of good and reliable rental PPPs and indirect PPPs from direct quantity approach. First, economies with rental PPPs that do not have economy-wide coverage of rental surveys are excluded. The next criterion for identifying "good" PPPs is to further exclude economies from other approaches for which the ratio of "per capita real housing expenditure" to "per capita real household expenditure without housing" is not in the acceptable range of 5%–35%. In addition, it is essential that after application of these exclusion criteria, each economy is included under at least one of the two approaches.

Step 2: Identification of economies for linking and filling gaps in PPPs. After discarding direct rental PPPs and indirect PPPs from the volume approach that are deemed to be outside the range for plausible comparisons in Step 1, a filtered set of PPPs from both the approaches is generated. Again, it is crucial for each economy to have a PPP from at least one of the two approaches. It was observed that 10 economies remained from the rental price approach (12 economies were excluded), and 20 remained on the quantity indicator approach (only two were excluded) having satisfied the criteria for retention. Moreover, seven economies—Singapore, Bangladesh, Bhutan, Myanmar, Fiji, Mongolia, and the Philippines—have PPPs from both the approaches. Of the seven economies, Singapore, Bhutan, and Mongolia were selected for linking rental and volume-based PPPs because these are the three economies with the closest alignment between the PPPs calculated from the rental and volume approaches.

Step 3: The new approach for Asia and the Pacific based on linking rental and volume based PPPs. As indicated in step 2, 12 economies were excluded from the rental approach and hence the PPPs from the rental approach are not available for them. Similarly, for two economies, the PPPs from the

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21 This adjustment is similar to the use of square root of household size instead of household size in measuring per adult-equivalent income or consumption.

quantity approach were excluded and they do not have PPPs from the quantity approach. In step 3, these gaps are filled by making use of a linking factor derived as the ratio of geometric means of the PPPs from rental approach to the geometric mean of the PPPs from the quantity approach for the three economies of Singapore, Bhutan, and Mongolia. This gap filling results in the availability of PPPs for each economy from both sides.

How this linking is achieved is illustrated in Table 6.35. In this illustration, economy A is the reference economy and economies C, F, and I are the selected economies for linking. Gaps in income-adjusted rental price PPPs are filled using the urban-adjusted PPPs from quantity indicator approach and the linking factor, which is the ratio of 0.89 and 0.87 (last row of Table 6.35). Similarly, gaps in urban-adjusted quantity approach PPPs are filled by linking the income-adjusted rental price PPPs with the linking factor based on the ratio of 0.87 and 0.89.

The final step in deriving PPPs in this approach, which can be termed as a linked or a mixed approach for dwellings services, is to use the geometric mean of the two sets of PPPs as the final PPPs, as illustrated in the last column of Table 6.35.

Comparison of Results between Various Approaches

Having derived the new set of PPPs, which make use of the best available data collected from the two approaches, results from this approach need to be assessed and compared with the results from the rental price and quantity indicator approaches and the reference volume approach used in 2005 and 2011.

For this purpose, Figure 6.6 presents the ratio of real per capita housing expenditure to real per capita individual consumption expenditure without housing from four different approaches (rental price, quantity indicator, new mixed, and reference volume). As seen earlier in Figure 6.4, Figure 6.6 shows the inadequacy of the rental price and quantity indicator approaches in providing meaningful comparisons of housing expenditures across economies. These two methods applied to economies in Asia and the Pacific yield implausible relativities, because the ratio for many economies is around 100% or even higher.

Table 6.35: Illustration of the Linking Process for the Mixed Approach to Housing Purchasing Power Parities

Economy	Rental PPPs (RP)	Quantity PPPs (QP)	Deriving RP[a]	Deriving QP[a]	Linked PPP
(1)	(2)	(3)	(4) = (2) × (0.89/0.87)	(5) = (3) × (0.87/0.89)	(6) = [(4) × (5)]$^{1/2}$
A	1.00	1.00	1.00	1.00	1.00
B	0.25	**	0.25	0.24**	0.25
C	0.16	0.15	0.16	0.15	0.15
D	*	1.95	2.00*	1.95	1.98
E	*	3.87	3.96*	3.87	3.91
F	1.41	1.42	1.41	1.42	1.41
G	*	3.68	3.76*	3.68	3.72
H	2.25	**	2.25	2.20**	2.22
I	3.15	3.03	3.15	3.03	3.09
J	7.89	5.92	7.89	5.92	6.83
Geomean of PPPs of C, F, and I	0.89	0.87			

PPP = purchasing power parity, QP = quantity purchasing power parity, RP = rental purchasing power parity.
Note: * indicates a gap in PPPs from rental approach and ** indicates a gap in PPPs from the quantity approach.
[a] Columns 4 and 5 are filled with values from columns 2 and 3 when rental and/or quantity PPPs of the economies are available. Derivation formula is used only for economies with gaps (* and **) in their rental and quantity PPPs (columns 2 are 3).
Source: Asian Development Bank.

Figure 6.6: Ratio of Per Capita Real Housing Expenditure to Per Capita Real ICEH without Housing, 2017
(%)

Different Approaches to Housing Expenditure Comparisons

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; ICEH = individual consumption expenditure by households; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.
Source: Asian Development Bank estimates.

The reference volume method, which was used in 2005 and 2011 ICP rounds, is based on the assumption that the relative volumes of housing services between economies are equal to the relative volume of household expenditures (without housing) and therefore yields a constant of 16% for all economies. Finally, the new housing approach, in contrast, yields more meaningful and tenable ratios ranging from 10% to 35%.

Conclusion

Comparisons of real expenditures on dwelling services within the ICP have always been a challenge in Asia and the Pacific for a variety of reasons. Given these problems, in 2017 ICP, considerable efforts were devoted by the RIA and the economies for improving the comparability and reliability of rental as well as dwelling quantity data and quality

indicators. Despite these efforts, application of the standard rental and direct volume approaches, recommended for the ICP, failed to produce meaningful results. A conclusion that emerged from the standard methods is that there is an inherent problem in the context of housing expenditure comparisons in Asia and the Pacific because of the enormous differences in the quality of dwellings across participating economies.

The above problem is akin to the problem encountered in comparisons of wages and salaries in the region, which led to the introduction of productivity adjustments introduced in the 2005 round of ICP in Asia and the Pacific. Taking a cue from these productivity adjustments for government services, which have now become standard for global comparisons of government compensation, the RIA developed a new approach that introduces

adjustments to rental price PPPs and quantity indicators PPPs. Moreover, the new approach is a mixed approach by linking plausible results from both rental and quantity or volume comparisons, a modification of the Eurostat-OECD approach to dwelling comparisons.

A close examination of results from the new approach suggests that it is vastly superior to the rental approach, the direct volume approach, and the reference volume approach.

This approach, after consultations in the meeting of the Experts Group, was presented to the Regional Advisory Board for its advice. With the endorsement of the Regional Advisory Board in Asia and the Pacific, this approach was presented to the 2017 ICP Technical Advisory Group, which considered the new approach as plausible for measuring housing in Asia and the Pacific, but suggested adopting this new approach in the next ICP cycle, when results for the new method are available for two consecutive cycles. For the 2017 ICP cycle, the Technical Advisory Group recommended continuing with the reference volume approach.

Methods for Computing Purchasing Power Parities

The above sections have discussed in detail the operations part of the regional ICP for 2017 for conducting price surveys and finalizing the price data collected for a basket of comparable goods and services representing final demand, and corresponding GDP expenditure data broken down by 155 basic headings compiled by each of the 22 participating economies. These data are the basic inputs in the compilation of PPPs. Computation of PPPs is a critical step in the ICP. Reliable and carefully compiled PPPs are essential to the comparison of total and per capita real expenditures of GDP and its components across the economies in the region.

The PLIs are estimated from the PPPs and exchange rates of currencies.

This section describes index number methods commonly used in the computation of PPPs and those recommended for use in the ICP. The methods for computing PPPs vary depending on the level of aggregation. The finest level at which price comparisons can be made is at the item level; however, corresponding expenditure data at the item level are not available from the national accounts. The next level is the aggregation of item level prices to obtain price comparisons of PPPs at the basic heading level, which is the lowest level of aggregation at which expenditure data are available from the national accounts. This is the second tier in the hierarchical structure in Figure 6.1. The third tier is the step to compute PPPs at any desired level of aggregation above the basic heading level, by aggregating the basic heading level PPPs using the corresponding basic heading level expenditure weights from national accounts. The most commonly used aggregate is GDP, followed by main aggregates and categories representing broadly defined goods and services. The list of these categories is in Table 6.2.

Index Number Methods for Computing Purchasing Power Parities of Currencies

Many index number formulas are available for making price comparisons. Some of the well-known formulas include Jevons; Dutot; Laspeyres, Paasche, Fisher; Törnqvist; Lowe; and the geometric Young index. Only formulas which satisfy several important criteria can be used for the purpose of international comparisons. Of these several properties, three most important are transitivity, economy symmetry or economy base invariance, and characteristicity.

Transitivity. Transitivity is an internal consistency requirement that states that PPPs computed using a given index number formula must satisfy the following equation for any three economies, for example j, k, and l:

$$PPP_{jk} = PPP_{jl} \cdot PPP_{lk} \text{ for all } j, k, l = 1, 2, \ldots, 22$$

This property requires that a PPP for economy k with reference economy j must be identical to a PPP computed indirectly through link economy l. For example, if three economies of interest are Hong Kong, China; India; and Malaysia, then transitivity implies that:

$$PPP_{\text{HKG, India}} = PPP_{\text{HKG, Malaysia}} \cdot PPP_{\text{Malaysia, India}}$$

To compute PPPs, the ICP uses only index number formulas that satisfy this property. With transitivity satisfied, it is sufficient to publish PPPs with one selected economy as the base or reference economy, thus the ICP for Asia and the Pacific publishes only PPPs with Hong Kong, China as the reference. All other PPPs can be computed using PPPs with Hong Kong, China as the base. Continuing from the example above, the PPP for India with Malaysia as base can be computed as:

$$PPP_{\text{Malaysia, India}} = \frac{PPP_{\text{HKG, India}}}{PPP_{\text{HKG, Malaysia}}}$$

Exchange rates also satisfy transitivity, implying absence of any possibility for arbitrage—the activity of buying and selling a currency for pure profit arising from the differences in exchange rates for the same currency.

Economy symmetry or base economy invariance. For international comparisons, it is important that all the participating economies are treated symmetrically, without giving a special place or significance to any one of the economies. Economy symmetry is satisfied if the relativities in PPPs between any two economies are not affected by either the choice of the reference economy or the reference currency.

Characteristicity. The property of transitivity necessarily implies that a PPP between two economies, say India and Malaysia, would be influenced by price and expenditure data from all the remaining 20 economies. Therefore, a bilateral comparison between these two economies (when transitivity is not required) will differ from a bilateral comparison when transitivity is imposed. The property of characteristicity advocates that PPPs satisfying transitivity in multilateral comparisons must be as close as possible to direct bilateral comparisons between pairs of economies. The Gini-Éltető-Köves-Szulc (GEKS) method is specially formulated to maintain a high degree of characteristicity in a multilateral context.

Following the hierarchical scheme outlined above, PPPs can, in principle, be compiled at three different levels: (i) the item level; (ii) the basic heading level; and (iii) at all levels of aggregation above the basic heading level. Different index number methods are used for price comparisons at different levels of aggregation, reflecting the nature of data available at each level.

Item Level Price Comparisons

At the item level, there is no index number problem. The PPP for the currency of a given economy with currency of a reference economy based on a single item is simply the ratio of prices of the item observed in the two economies. The Big Mac index discussed in Chapter 2 (Box 2.3) of this report is a good example of an item level comparison.

The ICP does not publish item level PPPs because such PPPs cannot be defined unless the product is priced in both economies. For example, if Big Mac is not available in Cambodia, then it is not meaningful to have a PPP for the Big Mac for Cambodia with Hong Kong, China as the reference economy.

Basic Heading Level Price Comparisons: The Country-Product-Dummy Method

In calculating PPPs for each basic heading, the only data available are the prices of items included in the basic heading. It is almost impossible to collect data on expenditures or quantities consumed in the whole economy at the item level. Also, economies usually price only a subset of items in a basic heading, generally those items which are representative of expenditures for that basic heading.

The ICP uses the country-product-dummy (CPD) method—recommended by the Technical Advisory Group since the 2005 ICP cycle—for aggregating item-level price data to compute PPPs at the basic heading level. Details of the method along with a comparison of its properties with other methods are in Rao (2013). The method regresses the logarithm of observed prices on country-specific and product-specific dummy variables, hence the label country-product-dummy method.

Consider a basic heading which has N items. For example, the basic heading of rice contains 20 items, $N = 20$. Let p_{ij} be the observed or reported price of commodity i in j-th economy $\{i = 1,2,..., N; j = 1,2,...., 22\}$. Conceptually, every p_{ij} may be decomposed into a commodity-specific factor, η_i; an economy-specific factor, π_j; and a factor of ε_{ij} to account for the deviation of $\eta_i \times \pi_j$ from the actual price p_{ij}:

$$p_{ij} = \eta_i \times \pi_j \times \varepsilon_{ij}$$

Taking the natural logarithm of both sides and invoking the property of logarithm, we have:

$$\ln p_{ij} = \ln \eta_i + \ln \pi_j + \ln \varepsilon_{ij}$$

Because $\ln \pi_j$ is economy-specific and $\ln \eta_i$ is product-specific, they can be estimated by the CPD method using the following regression model with economy and product fixed effects using dummy variables:

$$\ln p_{ij} = \sum_{k=1}^{22} \pi_k D_k + \sum_{n=1}^{N} \eta_n D_n^* + u_{ij}$$

where p_{ij} is the annual national average price of the i-th product reported by economy j. D_k is the economy dummy variable such that $D_k = 1$ if $k = j$ and $D_k = 0$ if $k \neq j$; and D_n^* is the commodity dummy variable such that $D_n^* = 1$ if $n = i$ and $D_n^* = 0$ if $n \neq i$. The last term, u_{ij}, is a random disturbance. The goal is to estimate $\hat{\eta}_n$ and $\hat{\pi}_k$.

The CPD method estimates this regression model using price data for the basic headings by ordinary least squares after imposing one parameter restriction.[22] Since Hong Kong, China is the base economy, this model is estimated after imposing the restriction that $\pi_{HKG} = 0$. Any standard statistical package such as Stata can be used to implement the estimation of this model. Let the estimated values of the parameters be denoted by $\{\hat{\pi}_k : k = 1, 2, \ldots., 22\}$ and $\{\hat{\eta}_n : n = 1, 2, \ldots, N\}$. Then a $PPP_{HKG,j}$ for economy j with Hong Kong, China as the base is given by:

$$PPP_{HKG,j} = \exp(\hat{\pi}_j) \quad j = 1, 2, \ldots., 22$$

Note that the PPP for Hong Kong, China is equal to 1 since $\exp(\hat{\pi}_{HKG}) = \exp(0) = 1$.

The CPD method is fairly simple but has many useful properties:

- If all the items are priced in all the economies, then the PPP formula simply reduces to the Jevons index, used as the elementary index in CPI computations. The PPP is given by the unweighted geometric average of the price ratios:

$$PPP_{HKG,j} = \prod_{n=1}^{N} \left[\frac{p_{ij}}{p_{i,HKG}} \right]^{1/N}$$

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[22]   The model as specified suffers from perfect multicollinearity and therefore can be estimated only after imposing restriction on one of the parameters.

- The method can be applied in the practical scenario where not all commodities are priced in all the economies, provided there is connectivity in the observed price matrix.[23]

- With the CPD method, it is possible to attach weights to individual price observations. In the CPD method described here, all the items have the same weight equal to 1. Note that not all the items priced by an economy in the basic heading would be representative or equally important in the basic heading expenditure of the economy. If the implementing agencies from participating economies can meaningfully identify products which are important, such products may be given a higher weight. The issue of whether to attach weights and, if so, what weights should be selected, were discussed at several meetings of the Technical Advisory Group during the 2011 ICP cycle. After serious deliberations, the group finally recommended assigning a weight of 3 to products labeled as important and a weight of 1 to the remaining products.

- Identifying important products is not straightforward and is subject to interpretation by the implementing agencies from participating economies. Uncertainty regarding what constitutes the importance of an item may create unnecessary bias when this information is used in giving weights to products in the CPD method. The 2017 ICP in Asia and the Pacific, similar to the 2005 and 2011 ICP cycles, opted not to use weights for products priced. Notwithstanding, the RIA collects this information for the global core products and submits it to the ICP Global Office for use in global linking.

- Finally, residuals of the estimated CPD models form the basis for Dikhanov tables, which are used in identifying outliers during data validation.

Reference Purchasing Power Parities for Some Basic Headings

Out of the 155 basic headings used in the ICP, there are some basic headings for which it is difficult to (i) specify the products and (ii) collect product prices that can be used in the CPD model. In such instances, PPPs of other basic headings which are considered similar are used as proxies or reference PPPs. For example, PPPs for the basic heading "maintenance and repair of dwelling" serve as a reference PPP for repair of household appliances. A full list of reference PPPs is in Appendix 5.

Computing Purchasing Power Parities for Higher Level Aggregates: The Gini-Éltető-Köves-Szulc Method

After computing PPPs for the 155 basic headings, the RIA compiles a complete table of PPPs for 155 basic headings for the 22 participating economies, along with expenditure or expenditure share data from national accounts corresponding to each basic heading for all the economies.[24] The basic heading PPPs are treated like price data associated with the composite group of items which the basic heading represents. To implement the index number formulas below, the following data structure is available:

$$\{p_{ij}, e_{ij} : i = 1,2,..., 155; \text{ and } j = 1,2,..., 22\}$$

where p_{ij} and e_{ij} are, respectively, price (PPP) and expenditure (in local currency units) for i-th basic heading in j-th economy.

To compute PPPs at higher levels of aggregation, it is necessary to identify the aggregate of interest first and then consider all the basic headings that make up this aggregate. If the aggregate "food and

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[23] Connectivity here simply means that price data are such that it is not possible to group the economies into two sets such that no item priced in one set of economies is priced in the other. In such cases, there is no basis for making price comparisons.
[24] Since GDP is known, if expenditure shares are known then expenditure associated with each basic heading can be computed. Similarly, if expenditure for each basic heading is given, shares can be computed.

non-alcoholic beverages" is of interest, then it is necessary to include all the 29 basic headings that comprise this aggregate. Similarly, if GDP is of interest, then all the 155 basic headings are included. The formulas given below are for the whole GDP, but the same formula applied to different sets of basic headings can be used for other analytical components.

Since the 2005 ICP cycle, the Technical Advisory Group has recommended using the GEKS method as the index number method to compute PPPs for higher level aggregates above the basic heading.

The GEKS method builds on the well-known Fisher binary index number formula, chosen because it satisfies a number of axiomatic and economic theoretic properties, including the country reversal test, factor reversal test, and commensurability test. The Fisher index is also known to be superlative from an economic theoretic viewpoint (Diewert 2013).

The GEKS PPPs are computed in two stages. In the first stage, the Fisher binary index, denoted by F_{jk}, is computed for each pair of economies as the geometric mean of the Laspeyres and Paasche price indexes denoted, respectively, L_{jk} and P_{jk}. Therefore

$$\text{Fisher index} = F_{jk} = \left[L_{jk} \cdot P_{jk}\right]^{1/2} =$$

$$\left[\left(\sum_{i=1}^{155} \frac{p_{ik}}{p_{ij}} \cdot e_{ij}\right) \times \frac{1}{\left(\sum_{i=1}^{155} \frac{p_{ij}}{p_{ik}} \cdot e_{ik}\right)}\right]^{1/2}$$

where $e_{ij} = \frac{p_{ij} \cdot q_{ij}}{\sum_{i=1}^{155} p_{ij} \cdot q_{ij}}$ is the national accounts' expenditure share of i-th basic heading in j-th economy.

This Fisher index is not transitive and therefore cannot be used for international comparisons. The GEKS formula for computing PPP for economy k with economy j as the base is:

$$PPP_{jk} = \prod_{l=1}^{22} \left[F_{jl} \cdot F_{lk}\right]^{\frac{1}{22}} \text{ for } j, k = 1, 2, \ldots, 22$$

The GEKS index provides PPPs that are transitive and base invariant and at the same time, by construction, close to the Fisher binary index. Therefore, the GEKS index also possesses the property of characteristicity. It is due to these desirable properties that this index has been the main aggregation procedure used in Eurostat and OECD comparisons since 1990. During the 2005 ICP cycle, the Technical Advisory Group considered a number of alternative methods and recommended the use of the GEKS procedure.

Non-Additivity of Sub-Aggregates in Real Terms

From the national accounts, it is clear that all the sub-aggregates expressed in local currency units add up to higher level aggregates. For example, the sum of the values of the six main aggregates add up to GDP: this is known as the additivity property. When these aggregates are converted using exchange rates, the resulting nominal aggregates are also additive: for example, nominal values of the six main aggregates in HK\$ also sum to nominal GDP in HK\$. This is because the exchange rate used to convert each component is same across all aggregates. However, the additivity property does not hold for real aggregates obtained by converting aggregates in local currency units into a common currency unit using PPPs. This is because each aggregate has its corresponding PPP which is different across aggregates. For example, nominal individual consumption expenditure by households (ICEH) is converted into real expenditures by using a PPP specific for ICEH, which is estimated using data on PPPs and expenditures for 110 basic headings. The gross fixed capital formation (GFCF) is converted using 10 PPPs and corresponding expenditures of headings. However, GDP is converted using PPP which is calculated by aggregating PPPs and expenditures data for all the 155 basic headings. Users of real or volume comparisons from the ICP must be aware of lack of additivity when PPPs are used in deriving real expenditures and, therefore, refrain from using the real aggregates to study the

structure of GDP or computing shares of each real aggregate in real GDP.

Methodology for Global Linking: Linking Asia and the Pacific to the Rest of the World

The most important task performed by the ICP Global Office in any given ICP cycle is to bring together price and real expenditure comparisons from different regions and produce global comparisons expressed relative to a selected reference economy. The regionalization of the program means that each region conducts the ICP by adhering to the general principles, guidelines, and methods provided by the ICP Global Office, and produces a complete set of results including PPPs and real expenditures for GDP level, and its components for all the participating economies of the region. In the case of Asia and the Pacific, the PPPs, real size of the economies, and shares of the economies are compiled using Hong Kong, China as the reference economy and the Hong Kong dollar as the reference currency.

While the results from the regional ICP are of intrinsic interest to the region, the utility and relevance of these results are enhanced when they are embedded into a set of global comparisons which facilitate comparisons of economies from different regions of the world. Where would the biggest economies of Asia and the Pacific—the People's Republic of China, India, or Indonesia, in order of size—be placed in the global rankings? What would be the ranking of Brunei Darussalam; Hong Kong, China; and, Singapore based on per capita real GDP? In a globalized world where price competitiveness is a crucial factor, it is critical to know the relative price levels of the economies of Asia and the Pacific relative to Europe, North America, and other regions. These questions can be adequately answered only when a full set of world comparisons are compiled by linking various regional comparisons using appropriate methodology.

Reflecting the significance of global comparisons, there has been considerable emphasis on the methodology for linking regional comparisons. In the 2005 ICP, regional comparisons were linked through a set of 18 ring economies selected from different regions. These ring economies including six from Africa; four from Asia and the Pacific; two from Latin America; three from Western Asia; and four from Eurostat-OECD, collected additional prices for a ring basket of goods and services identified specifically for the purpose of linking. This approach was reviewed by the Technical Advisory Group prior to the 2011 ICP cycle. After careful evaluation, the Technical Advisory Group recommended a more robust approach to linking for the 2011 ICP based on all the participating economies of all the regions instead of a selected set of ring economies. For the 2017 ICP cycle, the linking or regional comparisons was based on price data collected by all the 176 economies for a global core list of products in household consumption, government compensation, housing, construction, and machinery and equipment (World Bank 2019a).

While the general philosophy that underpins the linking methodology is simple, complexities arise when different regions use slightly different approaches to price collection for real expenditure comparisons for different aggregates. For example, the regional implementing agencies (RIAs) for Africa, Asia and the Pacific, Latin America and the Caribbean, and Western Asia regions applied productivity adjustments for comparisons of government compensation whereas no such adjustments are made in Eurostat-OECD and Commonwealth of Independent States (CIS) region (World Bank 2020, 84). In the case of construction aggregates, most regions use the recommended 2017 ICP approach which is based on prices of construction materials, labor, and rental of machinery and equipment. However, the Eurostat-OECD comparisons use the bill of quantities approach (World Bank 2019b, 2). For the health and education aggregates, the Eurostat-OECD

comparisons use the output approach whereas the other regions use input approach (Koechlin and Konijn 2019). Housing or dwelling services is another aggregate where the approaches in different regions differ significantly. The two recommended approaches to housing are the rental price and quantity indicator approaches. However, in the case of Asia and the Pacific neither of these approaches are used; instead the reference volume approach has been used during the 2005, 2011 and 2017 ICP cycles. In contrast, all other regions make use of the rental price or quantity approach. As different regions follow different procedures for certain aggregates, in order to take care of these differences the actual linking procedures can deviate from the general linking methodology recommended by the Technical Advisory Group (World Bank 2019a, 2).

Global Linking and the Fixity Principle

The fixity principle is designed to ensure the integrity of the regional comparisons when they are linked in the process of compiling global level comparisons. The principle requires the global comparisons to maintain the within region relativities of the economies. For example, if the real size of the People's Republic of China, in Hong Kong dollar PPP terms, is 2.44 times that of the size of India in the comparisons within Asia and the Pacific, then the real size of the People's Republic of China

within global comparisons, expressed in global PPPs with the US dollar as the reference currency, should still be 2.44 times the size of India. The fixity principle guarantees that the price relativities, real expenditure, volume relativities, and relative shares in the regional comparisons remain unchanged when these are combined in the compilation of global comparisons. The global linking procedure used in the ICP strictly adheres to this principle of fixity.

Columns 2 to 4 in Table 6.36 are drawn from 2017 ICP global comparisons compiled by the ICP Global Office after linking regional comparisons including results from Asia and the Pacific. The reference currency for the global results is the US dollar. The last three columns are from Asia and the Pacific comparisons with Hong Kong dollar as reference currency. The relative levels—that is, ratios of figures for any two economies for the same indicator—are identical in the global and regional comparisons. This fixity stems from the specially designed linking procedures that guarantee fixity in the results.

Linking at Different Levels of Aggregation

The linking of regional comparisons occurs at two levels. The first linking is done at the level of the basic headings, which are the building blocks for price and real expenditure comparisons.

Table 6.36: Fixity in Global Results: Selected Economies from Asia and the Pacific, 2017

Economy	Global Comparisons			Regional Comparisons		
	Real GDP (US$ billion)	Per Capita Real Income Index (World = 100)	PLI (World = 100)	Real GDP (HK$ billion)	Per Capita Real Income Index (Asia and the Pacific = 100)	PLI (Asia and the Pacific = 100)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
China, People's Republic of	19,617.4	85.3	92.8	117,929	139	125
India	8,050.5	37.1	47.5	48,395	60	64
Singapore	527.4	566.3	96.2	3,171	921	130
Thailand	1,203.0	107.1	56.8	7,232	174	77

GDP = gross domestic product, HK$ = Hong Kong dollar, PLI = price level index, US$ = United States dollar.
Sources: Global results in columns 2 to 4 are from World Bank. 2020. *Purchasing Power Parities and the Size of World Economies: Results from the 2017 International Comparison Program*. Washington, DC. Results for Asia and the Pacific in columns 5 to 7 are Asian Development Bank estimates.

For each basic heading, the PPPs from regional comparisons—expressed relative to the regional reference currency—are linked to the PPPs for all the participating economies of the world, ultimately expressing them relative to the US dollar which is the global reference currency. For the next level, these linked basic heading PPPs (now relative to US dollars) are then aggregated, along with the expenditure shares as weights, to compile PPPs and real expenditures for aggregates above the basic heading including the GDP level.

Linking at the Basic Heading Level

There are a total of 155 basic headings that need to be linked and these are first grouped into two categories: (i) basic headings for which PPPs can be computed from observed price data collected by the economies of the region; and (ii) basic headings for which direct price data is not collected and for which PPPs cannot be computed directly. For the basic headings in the first group, PPPs are computed using the country-product-dummy (CPD) method. The second group are basic headings for which it is difficult to specify the products to be priced or to collect prices that can be used in the CPD model. In such instances, PPPs of other similar basic headings are used as proxies or references. Appendix 5 provides a list of all the basic headings for which reference PPPs are used at the regional level. A total of 53 basic headings belong to this category. For example, the PPP for tobacco is used as a reference PPP for the basic heading "narcotics." In this case, a single PPP for tobacco is used for referencing. Consider the basic heading "other products" under GFCF, the reference PPP estimated for this basic heading is the geometric mean of the PPPs for "general purpose machinery," "special purpose machinery," "electrical and optical equipment," and "transport equipment." In this case, PPPs of four other basic headings are used in constructing a reference PPP. Linking of these two types of basic headings are discussed here.

Linking Basic Headings for which Global Core Prices are Available

There are two inputs into the process of linking a basic heading when global core prices are available: (i) regional PPPs for the basic heading under consideration from all regions for all economies; and (ii) prices for global core products belonging to the basic heading under consideration in local currency units for all economies.

The linking method can be explained using a simple numerical example. Suppose there are three regions and nine economies, with region 1 consisting of three economies, A, B, and C; region 2 consisting of two economies, D and E; and region 3 consisting of four economies, F, G, H, and I. The following steps are involved.

Step 1. Regional PPPs are available for each basic heading for participating economies within each region using price data on regional product lists. These are available from respective regional results. The PPPs in different regions for one basic heading are given in the Table 6.37, for illustration. The reference economies are A for region 1; D for region 2; and F for region 3.

Table 6.37: Basic Heading Purchasing Power Parities from Three Regions

Region	Region 1			Region 2		Region 3			
Economy	A	B	C	D	E	F	G	H	I
PPP	1.00	30.00	5.00	1.00	6.00	1.00	7.00	16.00	12.00

PPP = purchasing power parity.
Source: Asian Development Bank.

Suppose the basic heading under consideration consists of five global core products. The prices collected by the economies for these products in local currency units are shown in Table 6.38. This table shows that not all global core products are priced in all the economies, with "n.a." entries indicating unpriced items.

Table 6.38: Prices in Local Currency Units for Linking Basic Heading Purchasing Power Parities

Product	Region 1			Region 2		Region 3			
	Economy A	Economy B	Economy C	Economy D	Economy E	Economy F	Economy G	Economy H	Economy I
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	p_{1A}	n.a.	p_{1C}	p_{1D}	n.a.	p_{1F}	p_{1G}	n.a.	n.a.
2	p_{2A}	p_{2B}	p_{2C}	p_{2D}	p_{2E}	p_{2F}	n.a.	p_{2H}	p_{2I}
3	n.a.	p_{3B}	p_{3C}	p_{3D}	p_{3E}	p_{3F}	n.a.	p_{3H}	p_{3I}
4	n.a.	p_{4B}	n.a.	n.a.	p_{4E}	p_{4F}	p_{4G}	p_{4H}	p_{4I}
5	p_{5A}	p_{5B}	p_{5C}	n.a.	p_{5E}	p_{5F}	p_{5G}	n.a.	p_{5I}

n.a. = price not available, p = price in local currency unit.
Note: The subscript numbers associated with the price represent the product and the economy.

Step 2. All the prices in Table 6.38 are then converted into their respective region's reference currency using PPPs in Table 6.37. Table 6.39 shows prices of all the global core products expressed in respective reference currencies. For example, for Region 1, prices from economy B are all converted to currency units of reference economy A using PPP value of 30, and for economy C by using PPP value of 5.

Step 3. A weighted CPD model is applied to the price data in Table 6.39, selecting one of the regions as the reference. The ICP Global Office makes use of the information on importance indicators for the products from the economies of all the regions. Following a Technical Advisory Group recommendation, the CPD model is estimated after assigning a weight of 3 to

products that are tagged as "important" and a weight of 1 to products that are tagged as "less important." Suppose region 1 is chosen as reference, the weighted CPD model then estimates PPPs for other regions for the basic heading under consideration. These PPPs are then referred to as *linking factors*. For illustration purposes, the application of weighted CPD on the prices in Table 6.39 produces the following linking factors: region 1 = 1.00; region 2 = 10.00; and region 3 = 3.00. This means that what can be purchased in region 1 with 1 unit of reference currency (of economy A) needs 10 units of region 2's reference currency (economy D's currency); or, 3 units of region 3's reference currency (economy F's currency).

Step 4. The regional PPPs for all the economies expressed relative to their respective region's reference currency (Table 6.37) are then multiplied by their respective region's *linking factors* from Step 3. After this linking, the resulting globally linked PPPs for the basic heading are now expressed relative to economy A's currency—the chosen global reference currency, as presented in Table 6.40.

Table 6.40: Linked Purchasing Power Parities for Basic Headings Using Linking Factors in Step 4

Region	Region 1			Region 2		Region 3			
Economy	A	B	C	D	E	F	G	H	I
PPP	1.00	30.00	5.00	10.00	60.00	3.00	21.00	48.00	36.00

PPP = purchasing power parity.
Source: Asian Development Bank.

Table 6.39: Price Data for Global Core Products

Product	Region 1			Region 2		Region 3			
	Economy A	Economy B	Economy C	Economy D	Economy E	Economy F	Economy G	Economy H	Economy I
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	$\dfrac{p_{1A}}{1}$	...	$\dfrac{p_{1C}}{5}$	$\dfrac{p_{1D}}{1}$	...	$\dfrac{p_{1F}}{1}$	$\dfrac{p_{1G}}{7}$	...	...
2	$\dfrac{p_{2A}}{1}$	$\dfrac{p_{2B}}{30}$	$\dfrac{p_{2C}}{5}$	$\dfrac{p_{2D}}{1}$	$\dfrac{p_{2E}}{6}$	$\dfrac{p_{2F}}{1}$	...	$\dfrac{p_{2H}}{16}$	$\dfrac{p_{2I}}{12}$
3	...	$\dfrac{p_{3B}}{30}$	$\dfrac{p_{3C}}{5}$	$\dfrac{p_{3D}}{1}$	$\dfrac{p_{3E}}{6}$	$\dfrac{p_{3F}}{1}$	...	$\dfrac{p_{3H}}{16}$	$\dfrac{p_{3I}}{12}$
4	...	$\dfrac{p_{4B}}{30}$	...	...	$\dfrac{p_{4E}}{6}$	$\dfrac{p_{4F}}{1}$	$\dfrac{p_{4G}}{7}$	$\dfrac{p_{4H}}{16}$	$\dfrac{p_{4I}}{12}$
5	$\dfrac{p_{5A}}{1}$	$\dfrac{p_{5B}}{30}$	$\dfrac{p_{5C}}{5}$	...	$\dfrac{p_{5E}}{6}$	$\dfrac{p_{5F}}{1}$	$\dfrac{p_{5G}}{7}$	...	$\dfrac{p_{5I}}{12}$

... = price not available, p = price in local currency unit.
Notes:
1. The price data are expressed in the respective region's reference currencies.
2. The subscript numbers associated with the price represent the product and the economy.
Source: Asian Development Bank.

For example, in Table 6.40, the globally linked PPP for the basic heading under consideration for economy G is calculated by multiplying the linking factor for region 3 (that is, 3.00) to the economy G's PPP (that is, 7.00 in Table 6.37). The resulting globally linked PPP for economy G (that is, 21.00 in Table 6.40) is expressed as local currency unit per one unit of the global reference currency—which is economy A's.

Steps 1 to 4 are repeated for all the basic headings for which price data are available. It is easy to check that the price relativities between economies within each of the regions are maintained at the global level because the linking factors are specific to each region and basic heading.

In the actual implementation of this procedure for global linking, the Eurostat-OECD region is used as the reference region and the US dollar is used as the reference currency. This is the reason why the results published by the ICP Global Office at the World Bank (World Bank 2020) are all expressed in US dollars.

Linking Reference PPPs for which Global Core Prices are not Available

A complete list of all the basic headings for which reference PPPs are used is in Appendix 5. There are two types of reference PPPs, and each type has its unique method. These are described below.

First type: single reference basic heading. The first type are those basic headings for which the reference PPPs relate to a single basic heading whose global core price data are available. For example, global core price data are available for the "tobacco" basic heading; its PPP is the reference PPP for the basic heading "narcotics." A globally linked reference PPP for this first type is simply the globally linked PPP for the basic heading which is used as the reference. In this case, the globally linked PPPs for "tobacco" basic heading are simply used as reference PPPs for "narcotics."

Second Type: Multiple Reference Basic Headings. The second type are those basic headings for which the reference PPP is a combination of the PPPs of more than one basic heading whose global core price data are available. For example, reference PPP for the basic heading "hospital services" relies on several basic headings: "medical services"; "dental services"; and "paramedical services". The PPPs for latter three are available from the global core prices. For this type, the linking method involves the following steps:

Step 1. Map or identify the basic headings that are used as reference for the basic heading under consideration. In the above example, for "hospital services" is mapped with three basic headings: "medical services"; "dental services"; and "paramedical services."

Step 2. For each set of reference basic headings, the globally linked PPPs are then aggregated using Gini-Éltető-Köves-Szulc (GEKS) method by using corresponding basic heading expenditures of the three basic headings as weights. In the example above, this entails applying the GEKS formula on three basic headings—"medical services," "dental services," and "paramedical services"—along with their expenditure weights. The resulting PPPs for these referenced basic headings are referred to as "unrestricted global basic heading PPPs."

Step 3. For each basic heading, the geometric mean of PPPs (results from the regional comparisons) is calculated at the regional and global levels.

Step 4. Each region's geometric mean is divided by the global geometric mean.

Step 5. Linking factors are calculated by normalizing the ratios from Step 4 relative to Eurostat-OECD which is the reference region.

Step 6. The globally linked basic heading PPPs are calculated by multiplying the basic heading PPPs

from the regional comparisons with the normalized linking factors from Step 5.

The above steps ensure that the reference headings are linked, and that fixity of the regional results is maintained—a result of using region-specific and basic-heading-specific normalized linking factors. This procedure also ensures that the reference PPPs are also invariant to the choice of the reference region (Eurostat-OECD in this case) and the reference currency (the US dollar).

Global Linking and Aggregation above Basic Heading Level

For each basic heading (1 to 155), PPPs for economies from each of the regions are linked using the method discussed in Tables 6.37 to 6.40 and, where appropriate, the method discussed for reference PPPs. Since the United States (US) is the reference economy, the PPP for the US equals 1 for all the basic headings.

At the conclusion of the process of linking PPPs at the basic heading level, the following data are available at the global level: (i) PPPs for each of the basic heading levels for each of the economies with the US as the reference economy, and (ii) expenditures, in local currency units, for 155 basic headings for all the 176 economies. The format of the data available for aggregation is shown in Table 6.41.

For global linking at the levels above basic heading, the Technical Advisory Group recommended the use of the *country aggregation with volume redistribution (CAR-volume) procedure*. The description below refers to the application of CAR-volume procedure at the GDP level, but it is equally applicable for other aggregates above the basic heading level. At the GDP level, all the 155 basic headings are used in the aggregation process. However, if a different aggregate such as individual consumption expenditure by households (ICEH) or gross fixed capital formation (GFCF) is of interest, then the CAR-volume procedure is applied to only those basic headings that make up the aggregate. For example, ICEH (including NPISH) comprises 115 out of 155 basic headings, while the GFCF aggregate includes only 10 basic headings.

The following steps are involved in the application of the CAR-volume procedure for aggregation at the GDP level:

Step 1. Apply the GEKS method to the 155 basic heading PPPs for the 176 participating economies, shown in Table 6.41 below. This leads to aggregated PPPs at the GDP level for each of the 176 economies.

Step 2. Compute the real GDP of all the 176 economies by converting GDPs in their respective local currency units into US dollars using PPPs from Step 1.

Table 6.41: Price and Expenditure Data at the Basic Heading Level

Basic Heading	Economy 1	Economy 2	Economy 3	...	United States	...	Economy 176
Basic Heading 1 (rice)	$PPP_{1,1}$; $E_{1,1}$	$PPP_{1,2}$; $E_{1,2}$	$PPP_{1,3}$; $E_{1,3}$	..	$PPP_{1,US} = 1$; $E_{1,US}$	..	$PPP_{1,176}$; $E_{1,176}$
Basic Heading 2	$PPP_{2,1}$; $E_{2,1}$	$PPP_{2,2}$; $E_{2,2}$	$PPP_{2,3}$; $E_{2,3}$	..	$PPP_{2,US} = 1$; $E_{2,US}$	..	$PPP_{2,176}$; $E_{2,176}$
..	..	..	..	..	..	..	..
Basic Heading 155	$PPP_{155,1}$; $E_{155,1}$	$PPP_{155,2}$; $E_{155,2}$	$PPP_{155,3}$; $E_{155,3}$	..	$PPP_{155,US} = 1$; $E_{155,US}$	..	$PPP_{155,176}$; $E_{155,176}$

E = expenditure, PPP = purchasing power parity, US = United States.
Note: The reference economy is the United States.
Source: Asian Development Bank.

Step 3. Compute the real GDP for each region by adding the real GDP of each of the region's economies from Step 2. For example, in the case of Asia and the Pacific, the total real GDP of the region from global linking is the sum total of real GDP for the 22 economies. For the 2017 ICP report (World Bank 2020), the total real GDP for Asia and the Pacific is equal to $38.6 trillion.

Step 4. Distribute the total real GDP of each region from the global linked results using the economy shares within each region. Table 6.42 shows the shares of the 22 economies in Asia and the Pacific and the distribution of the region's real GDP from global linking, which is $38.6 trillion in column 6. The CAR-volume procedure redistributes the regional total in US dollars according to the shares of these economies from the regional comparisons given in column 5 of Table 6.42.

Table 6.42: CAR-Volume Procedure to Global Linking: Results for Economies of Asia and the Pacific						
Economy	Asia and the Pacific				World	
	GDP in LCU (billion)	PPPs (HK$ = 1.000)	Real GDP (HK$ billion)	Share of the Economy in Real GDP (%)	Real GDP (US$ billion)	PPPs (US$ =1.000)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
China, People's Republic of	82,075.40	0.696	117,929	50.756	19,617	4.184
India	166,225.64	3.435	48,395	20.829	8,051	20.648
Indonesia	13,587,212.60	781.122	17,394	7.487	2,894	4,695.659
Pakistan	33,270.44	5.588	5,954	2.563	991	33.589
Bangladesh	21,131.47	4.947	4,272	1.838	711	29.738
Philippines	15,807.60	3.225	4,902	2.110	815	19.385
Viet Nam	5,005,975.49	1,230.212	4,069	1.751	677	7,395.338
Thailand	15,451.96	2.137	7,232	3.112	1,203	12.845
Myanmar	85,980.80	61.003	1,409	0.607	234	366.713
Malaysia	1,353.38	0.275	4,916	2.116	818	1.655
Nepal	2,611.20	5.196	503	0.216	84	31.235
Taipei,China	17,501.18	2.617	6,688	2.879	1,113	15.730
Sri Lanka	13,317.29	8.216	1,621	0.698	270	49.390
Cambodia	89,830.52	237.607	378	0.163	63	1,428.354
Hong Kong, China	2,662.84	1.000	2,663	1.146	443	6.011
Lao People's Democratic Republic	140,697.75	463.967	303	0.131	50	2,789.109
Singapore	467.31	0.147	3,171	1.365	527	0.886
Mongolia	27,876.30	131.655	212	0.091	35	791.436
Fiji	11.06	0.156	71	0.030	12	0.939
Bhutan	164.63	3.195	52	0.022	9	19.208
Maldives	74.87	1.358	55	0.024	9	8.161
Brunei Darussalam	16.75	0.108	156	0.067	26	0.647
Asia and the Pacific	n.a.	n.a.	232,344	100.000	38,650	n.a

GDP = gross domestic product, HK$ = Hong Kong dollar, LCU = local currency unit, n.a. = not applicable, PPP = purchasing power parity, US$ = United States dollar.
Notes: For CAR-volume procedure, see pages 174–175 above. Economies are listed in order of population, from largest to smallest.
Sources: GDP in local currency units were supplied by the participating economies for the International Comparison Program. GDP in US dollars are based on CAR-volume procedure. The total real GDP for Asia and the Pacific is from World Bank. 2020. *Purchasing Power Parities and the Size of World Economies: Results from the 2017 International Comparison Program*. Washington, DC. Shares in column 5 are Asian Development Bank estimates for the 2017 ICP cycle.

Finally, the PPPs for the 22 economies expressed relative to the US dollar as the reference currency unit are finally obtained by simply dividing the GDP of each economy in local currency units (LCUs) (column 2 of Table 6.42) by the GDP of each economy in US dollars (column 6 of Table 6.42). The resulting PPPs with US dollar as the reference currency are shown in column 7 of Table 6.42 and are the same as the PPPs for these economies published in the global 2017 ICP report (World Bank 2020, 20–25).

The CAR-volume procedure is the main linking procedure at the GDP level and for most other aggregates. The important difference is the basic headings included in the aggregation. For GDP, all the 155 basic headings are included. For other analytical components such as ICEH, actual individual consumption by households (AICH), and GFCF, the method is applied to the corresponding basic headings that make them up.

Global Linking: Special Procedures for Selected Aggregates

The ICP Global Office implemented the linking methodology described above when all the regions follow the same methodology on the same sets of basic headings. While there is general concurrence in the methods across all the regions, there are some exceptions. As RIAs for some regions followed different procedures for certain aggregates, the actual implementation of the general linking methodology described in the previous was modified accordingly. For example, the Eurostat-OECD region used different methods for health, education, and construction components compared with other regions. In Asia and the Pacific, the RIA used the reference volume approach for comparisons of prices and real expenditures in housing. The linking procedures used are different for each such aggregates. A brief description of the specially designed linking methods is provided in the next section.

Construction

Construction is one of the aggregates that required a special linking procedure. For all the regions, with the exception of the Eurostat-OECD region, RIAs followed the method recommended by the ICP Global Office, which is based on prices of construction inputs of building materials, labor, and equipment. These prices are aggregated using additional information on relevance of various building materials and cost shares of these inputs to the three basic headings of construction: residential, nonresidential, and civil engineering works. The Eurostat-OECD region has been using the bill of quantities approach. This means that simple linking procedure previously described could not be used in this case.

In order to facilitate linking construction in 2017 ICP, 11 economies from the Eurostat-OECD comparisons provided additional data for construction inputs following the ICP approach in addition to the data for bill of quantities approach. These economies are Belgium, Bulgaria, Germany, Finland, the Netherlands, Norway, Portugal, Slovenia, the Russian Federation, the United Kingdom, and the US (World Bank 2019b).

The following steps are used in the linking process.

Step 1. Regional item prices in local currency units were used to calculate sub-heading level (materials, labor, and equipment hire) PPPs using the CPD method for all regions and economies participating in the global linking. This yielded three sets of sub-heading PPPs under each of the three construction basic headings (residential buildings, nonresidential buildings, and civil engineering works).

Step 2. The nine sets of sub-heading PPPs were subsequently aggregated using the GEKS method. This yielded three basic heading PPPs for residential buildings, nonresidential buildings, and civil engineering works.

Table 6.43: Basic Headings for Health

Number	Basic Heading Code	ICP Combined Expenditure Breakdown
1	1106111 + 1302111	Pharmaceutical products
2	1106121 + 1302112	Other medical products
3	1106131 + 1302113	Therapeutic appliances and equipment
4	1106211 + 1302121	Outpatient medical services
5	1106221 + 1302122	Outpatient dental services
6	1106231 + 1302123	Outpatient paramedical services
	Health remaining	
7	1106311 + 1302124	Hospital services
8	1302211	Compensation of employees
9	1302221	Intermediate consumption
10	1302231	Gross operating surplus
11	1302241	Net taxes on production
12	1302251	Receipts from sales
13	1202111	NPISH expenditure on health

ICP = International Comparison Program, NPISH = nonprofit institutions serving households.
Source: F. Koechlin and P. Konijn. 2019. "Note on the Treatment of Health and Education in the 2017 ICP Round." Paper presented at the Fourth Meeting of the International Comparison Program Technical Advisory Group, October 28–29, World Bank, Washington, DC.

Step 3. Linking factors for the three construction basic headings were calculated as geometric means of the aggregated PPPs for the economies in a region.

Step 4. The basic heading PPPs in the regional comparisons were then linked to the reference region using the linking factors from Step 3.

Housing

Dwellings are a problem area for linking regions at the global level. For Asia and the Pacific, the RIA, after exploring various alternatives, retained the reference volume approach which was first implemented during the 2005 and then in 2011 ICP cycle. Three approaches were canvassed for linking housing: (i) the rental or indirect volume approach; (ii) the volume or PPPs from the region indirect PPP approach; and, (iii) the mixed rental and volume approach. After considering several alternative proposals for linking, the Technical Advisory Group recommended that the linking approach used in the 2011 ICP cycle be implemented for the 2017 ICP cycle.

In 2011, the linking of the regions was based on a mixture of these rents and volume data. The regions of Africa, Latin America and the Caribbean, and Western Asia all used the rental approach and their regional comparisons were linked using the rental data. As Asia and the Pacific used the reference volume approach, the Technical Advisory Group decided to link Asia and the Pacific and Eurostat-OECD using a simple volume approach based on quality adjusted number of dwellings per capita.

Health

Health is a component where different approaches are used by Eurostat-OECD and the RIAs for the rest of the ICP regions. The Eurostat-OECD economies have implemented an output approach for comparing health prices and real expenditures. The approach used for health is somewhat similar to that used for education. The linking procedure is described in Koechlin and Konijn (2019) and this approach was endorsed by the Technical Advisory Group for the 2017 ICP cycle. In order to obtain a reliable linking factor between the input and output approaches, it is necessary to compute PPPs similar to those in the ICP. The basic headings in Table 6.43 are relevant for health within the ICP.

In order to compile PPPs for health for the Eurostat-OECD economies, it is necessary to find a source of PPPs for the 13 basic headings and appropriate weights.

Since the 13 basic headings under the first six categories refer to prices of health services, these data are available under the output approach of the Eurostat-OECD. Reference PPPs are used for hospital services under item 7 in Table 6.43. PPPs for compensation of employees for government health services are based on salaries adjusted for productivity differences. For the basic headings under categories of intermediate consumption, gross operating surplus, and for expenditures by nonprofit institutions serving households (NPISH), suitable reference PPPs are used.

The Eurostat-OECD made use of data from the System of Health Accounts to derive expenditures and expenditure share weights for the private and publicly provided health services. Health expenditures on the first six categories were allocated to private and public expenditures using the broad economy-wide mix of public and private expenditures. In the absence of reliable information, a weighting scheme similar to that used for education was used: 75% for compensation of employees (item 8 in Table 6.43), 15% for intermediate consumption (item 9 in Table 6.43) and 5% for gross operating surplus (item 10 in Table 6.43).

Once PPPs and expenditures are defined for all ICP basic headings, the linking can be done at the level of actual individual consumption on health (individual consumption on health by households, *plus* expenditure by NPISH, *plus* government expenditure on health on behalf of households) by considering the ratio of input-based and output-based PPPs for health.

Education

The main problem encountered in linking education is the same as for health because the Eurostat-OECD used an output approach for estimating education PPPs, while the RIAs for the remaining regions of ICP followed an input approach. The Eurostat-OECD approach compares the volume of quality-adjusted teaching services across economies. In contrast, the input approach uses prices or unit costs of relevant inputs including compensation of employees for government consumption. Hence, a special approach is required at the global level to link Eurostat-OECD results to results from the other regions. The methodology for education and health is described by Koechlin and Konijn (2019).

In 2011, a link between the Eurostat-OECD region and the other ICP regions could be established because several economies were able to implement both an input and an output approach. However, because of data availability and data quality, this link could only be based on five Latin American economies (Brazil, Colombia, Panama, Peru, and Uruguay) which gives rise to questions about representativeness of the linking so that results had to be interpreted with a great deal of caution.

For the 2017 ICP cycle, the Eurostat-OECD region organized collection of data on compensation of employees in Eurostat-OECD economies so that a bridge between the output and input-based approaches could be built based on the Eurostat-OECD datasets. Though compensation data could be collected, there was no information on weights at the basic heading level to implement the input approach. On the basis of an OECD-UNESCO database, a fixed set of weights, was assumed: 75% for compensation of employees; 20% share for intermediate consumption; and 5% for gross operating surplus were assumed. The basic heading PPPs for government education services including compensation of employees are readily available. However, for final household expenditure on education, it was difficult to collect prices for education. So, reference PPPs for education from government services are used for PPPs for education from final household expenditure.

Once PPPs for basic headings are obtained for Eurostat-OECD economies, these are combined with the simple weighting scheme described above leading to PPPs for education from the input side. The PPPs from input and output approaches for the Eurostat-OECD economies are then used to compute the required linking factors that link results from Eurostat-OECD to those of other ICP regions.

Conclusions

The main objective of this chapter is to provide the interested reader with a comprehensive account of the architecture and inner workings of the ICP at the regional level. The chapter is designed to

document the detailed procedures and methods and to provide the interested readers and users of the ICP results with an appreciation of the complex nature of the methodology used in the compilation of PPPs, real expenditures, and estimates of price levels. The level of detail presented here is aimed at those users who may be interested in understanding the methodology and various steps involved in the practical implementation of the general methodology. The chapter also stands as a record of the practical steps and decisions taken at each step of the process in the data validation and compilation of regional PPPs and results—documentation that may help economic statisticians who may be interested in joining or will be involved in the conduct of future ICP cycles in the region and at the global level.

The chapter began with an overview of the framework for ICP, the pyramid structure for price comparisons, and the national accounts concepts and measures that are basic to the ICP. The index number foundations are explained for the decomposition of GDP across different economies into: (i) the price component leading to estimates of PPPs; and, (ii) the volume component in the form of real expenditures comparable across the participating economies. The notion of basic headings and broader components of GDP are explained, and a technical exposition of the index number methods used for aggregating price data at the basic heading level and at higher levels is provided.

The focus of the chapter then shifted to more practical aspects of ICP, including the steps involved in the preparation of product list and the guiding principles for conducting surveys for collecting prices of goods and services relevant for different components of GDP. As the quality and reliability of data is central to the credibility of the ICP, methods and techniques used in data validation, data editing and identifying outliers are described and illustrated with examples from the current ICP cycle implementation. Special procedures and approaches are necessary to deal with GDP components that are comparison-resistant and difficult to compare, such as housing, education, health, and construction. A significant part of the chapter is devoted to a description of the progress made in dealing with these issues as well as the areas that need further research in the near future.

The last part of the chapter focused on the methods and operational procedures used in linking the regional level price and real expenditure comparisons leading to global comparisons covering all the 176 participating economies in the world. This chapter may be concluded by noting that the ICP is continuously evolving and introducing refinements to the existing methods. Further, finding solutions to many challenging measurement problems encountered during the course of ICP is an ongoing process. Progress in this direction is possible only after gaining a good grasp of the current methods and an appreciation of the outstanding issues—it is hoped that the contents of this chapter contribute to this process.

7. Economy Results and Experiences in Implementing the 2017 International Comparison Program

Introduction

This chapter presents the key results, economy by economy, of the 2017 International Comparison Program (ICP) in Asia and the Pacific, as well as the experiences of the implementing agencies in each of the 22 participating economies as they conducted their activities in the 2017 ICP cycle. The discussions of the 2017 ICP economy-level results in this chapter are designed to aid the reader in analyzing the data and indicators in the summary economy tables for each of the participating economies. This chapter also encourages readers and users from participating economies to pursue ways and means of using the ICP results for their economic analysis and for gaining a better understanding of the performance of their economies in an international comparative perspective. In order to fully appreciate the results in this chapter, the reader is referred to the basic concepts and measures discussed in Chapter 2. Box 3.1 presents special notes that readers should keep in mind when using 2017 ICP in Asia and the Pacific results.

In line with the objectives of ICP, the short economy-level narratives offer a comparative perspective on the real and nominal expenditures, per capita levels, shares of the region, relative price levels, and rankings of the economies in the region for the major aggregation levels, such as gross domestic product (GDP), individual consumption expenditure by households (ICEH), and gross fixed capital formation (GFCF). Beyond these short

narratives, readers may explore the tables, which contain 16 indicators and 34 analytical components of GDP for each economy. Readers can see the inter-economy comparisons for each ICP indicator using the tables in Appendix 1.

Using Hong Kong, China as the reference economy, and the Hong Kong dollar (HK$) as the reference currency, the volume measures or real expenditures are derived by converting the national accounts components from respective local currencies to the common reference currency using relevant purchasing power parities (PPPs). To facilitate more meaningful discussion of the relative price levels, the price level indexes (PLIs) in this chapter are referenced to the regional average (Asia and the Pacific = 100), unless stated as referenced to Hong Kong, China.[25]

Following each narrative of the key results of each economy, a short report discusses the operational experiences of the economy's implementing agency during the 2017 ICP cycle, based on its report submitted to the Asian Development Bank (ADB). The experiences include administrative setup; use of existing infrastructure to collect data; survey frameworks for the household consumption and non-household components; estimation procedures for the GDP expenditure values; challenges in the implementation; intra- and inter-economy data validation; evaluation of price collection tools; and lessons learned and future directions of ICP in the economy.

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[25] For more discussion on the calculation and interpretation of PLI (Asia and the Pacific = 100), please refer to Appendix 6.

The evaluation of economy-level relative performance and implementation experience of the participating economies demonstrate the vast diversity among the region's economies and the challenges faced and lessons learned in implementing this complex operation in economies with diverse statistical capacities.

Bangladesh

Economy Results

As Table 7.1 shows, Bangladesh's real GDP of HK$4,272 billion (column 3) is the ninth largest among the 22 participating economies, more than twice the size of the economy's nominal GDP of HK$2,047 billion (column 7), indicating that the exchange rate is more than twice the PPP at GDP level. Compared to its population share of 4.27% of the region, Bangladesh contributes a smaller share of 1.84% to the region's total real GDP (column 4), though this is larger than Bangladesh's nominal share of 1.38% of the region's total nominal GDP (column 8). Bangladesh's economy is mostly driven by household consumption, in which nominal ICEH has a relatively high share of 69.81% of Bangladesh's nominal GDP (the fifth highest in the region) (column 11). With a household consumption-based economy, Bangladesh's real ICEH share of the region at 2.66% (column 4) is larger than its real GDP share of 1.84% of the region's total real GDP (column 4), and real GFCF share of 1.43% of the region's total real GFCF (column 4).

Being the fifth most populous economy in the region with a population size of 161.80 million, Bangladesh's per capita real GDP, estimated at HK$26,401 (column 5), is the third lowest in the region, and is only 43% of the region's per capita real GDP (column 6). The economy also registers the lowest per capita real expenditures for health (index of 21 relative to regional average of 100) and government final consumption expenditure (GFCE) (index of 22 relative to regional average of

100) (column 6). However, in contrast, Bangladesh also posts per capita real expenditures that are higher than the regional per capita real levels in the following components (with corresponding per capita real index relative to regional average of 100 in parentheses as drawn from column 6): food and non-alcoholic beverages (120); food (124); and bread and cereals (232).

With the local currency of the taka (Tk), Bangladesh's PPP at GDP level of Tk4.95 = HK$1 (column 2) is only 48% of the exchange rate of Tk10.32 = HK$1, implying that the overall price level in Bangladesh is only 48% of (or 52% lower than) that in Hong Kong, China (column 12), and only 75% of (or 25% lower than) the region's average price level (column 13). Though both PLIs of 48 (Hong Kong, China = 100) (column 12) and 75 (Asia and the Pacific = 100) (column 13) are lower than 100, these PLIs are 11th highest in the region. The PLI for ICEH is 79 and GFCF is 81 (column 13), ranking 14th for ICEH and a much higher ranking at ninth for GFCF, implying that price levels for investments are relatively more expensive compared to three-fifths of the 22 participating economies in the region. Among the 22 economies, Bangladesh registers the highest PLI of 115 (column 13) for machinery and equipment, and the third lowest PLI of 85 (column 13) for transport and communication and PLI of 77 (column 13) for fruits and vegetables.

Economy Experience in Program Implementation

Administrative Setup

The Price and Wage Statistics Section of the National Accounting Wing, Bangladesh Bureau of Statistics (BBS), collects monthly retail prices of selected commodities for the consumer price index (CPI). For the 2017 International Comparison Program (ICP), the deputy director for the Price and Wage Statistics Section was appointed deputy national coordinator while the director of the National Accounting Wing served as the national coordinator.

Table 7.1: Summary Results for Bangladesh, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Real Expenditure HK$	Per Capita Real Expenditure Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Nominal Expenditure HK$	Per Capita Nominal Expenditure Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	4.95	4,271.6	1.84 [09]	26,401	43 [20]	2,047.3	1.38 [11]	12,654	32 [18]	100.00 [n.a.]	48	75 [11]	21,131.47
Actual Individual Consumption by Households[a]	4.58	3,284.7	2.45 [08]	20,301	57 [20]	1,456.8	1.85 [10]	9,004	43 [20]	71.16 [06]	44	76 [12]	15,036.64
Food and non-alcoholic beverages	5.42	1,412.0	5.14 [06]	8,727	120 [13]	741.4	4.72 [05]	4,582	110 [15]	36.21 [03]	53	92 [13]	7,652.67
Food	5.38	1,415.4	5.31 [04]	8,748	124 [12]	738.4	4.90 [04]	4,563	115 [14]	36.07 [02]	52	92 [13]	7,621.07
Bread and cereals	6.17	551.2	9.92 [03]	3,407	232 [03]	329.4	9.61 [04]	2,036	225 [04]	16.09 [02]	60	97 [10]	3,399.54
Meat and fish	5.57	263.2	3.79 [06]	1,627	89 [17]	142.0	3.41 [05]	877	80 [17]	6.93 [07]	54	90 [08]	1,465.27
Fruits and vegetables	3.88	265.9	3.68 [05]	1,643	86 [12]	100.0	2.81 [06]	618	66 [16]	4.88 [05]	38	77 [20]	1,032.24
Other food and non-alcoholic beverages	5.74	305.6	3.78 [06]	1,889	88 [19]	170.1	3.72 [06]	1,051	87 [17]	8.31 [04]	56	98 [11]	1,755.62
Alcoholic beverages, tobacco and narcotics	6.07	49.4	1.96 [09]	305	46 [20]	29.0	1.59 [07]	179	37 [20]	1.42 [10]	59	81 [13]	299.69
Clothing and footwear	5.74	156.4	3.13 [16]	967	73 [16]	87.0	2.34 [07]	538	55 [16]	4.25 [03]	56	75 [12]	897.67
Clothing	5.55	144.1	3.51 [05]	891	82 [15]	77.5	2.63 [06]	479	62 [16]	3.79 [02]	54	75 [13]	800.14
Housing, water, electricity, gas and other fuels[a]	3.30	742.7	3.27 [05]	4,591	77 [17]	237.7	2.21 [08]	1,469	52 [17]	11.61 [04]	32	68 [15]	2,453.24
Furnishings, household equipment and routine household maintenance	5.75	84.0	2.05 [11]	519	48 [19]	46.8	1.49 [11]	289	35 [18]	2.29 [11]	56	73 [11]	483.40
Health and education[a]	2.66	516.1	1.24 [10]	3,190	29 [21]	133.2	0.78 [12]	823	18 [20]	6.51 [19]	26	63 [11]	1,375.15
Health[a]	2.47	217.6	0.90 [09]	1,345	21 [22]	52.2	0.58 [12]	322	14 [20]	2.55 [20]	24	64 [12]	538.29
Education[a]	2.80	298.5	1.62 [10]	1,845	38 [21]	81.1	1.02 [12]	501	24 [20]	3.96 [16]	27	63 [09]	836.86
Transportation and communication	5.07	137.3	0.79 [13]	848	18 [20]	67.4	0.67 [13]	417	16 [20]	3.29 [21]	49	85 [20]	695.82
Transportation	5.16	120.9	0.88 [12]	747	21 [20]	60.5	0.78 [13]	374	18 [20]	2.95 [19]	50	89 [17]	624.00
Communication	4.68	15.4	0.45 [12]	95	10 [21]	7.0	0.30 [12]	43	7 [21]	0.34 [21]	45	68 [17]	71.82
Recreation and culture[a]	6.34	37.7	0.96 [13]	233	22 [20]	23.2	0.67 [13]	143	16 [20]	1.13 [19]	61	70 [17]	239.40
Restaurants and hotels	4.76	72.4	1.34 [12]	447	31 [20]	33.4	0.96 [12]	206	22 [20]	1.63 [16]	46	71 [15]	344.43
Miscellaneous goods and services[a]	5.51	108.0	0.80 [12]	668	19 [19]	57.7	0.57 [12]	356	13 [19]	2.82 [17]	53	71 [12]	595.17
Individual Consumption Expenditure by Government	3.51	81.1	0.43 [13]	502	10 [22]	27.6	0.24 [13]	171	6 [21]	1.35 [22]	34	57 [12]	284.87
Collective Consumption Expenditure by Government	4.60	222.3	1.47 [12]	1,374	34 [21]	99.1	1.01 [12]	612	24 [21]	4.84 [20]	45	69 [11]	1,022.71
Gross Fixed Capital Formation	6.10	1,070.4	1.43 [07]	6,616	33 [19]	632.6	1.15 [07]	3,909	27 [18]	30.90 [08]	59	81 [09]	6,528.86
Machinery and equipment	12.49	153.1	1.36 [10]	946	32 [19]	185.3	1.57 [08]	1,145	37 [18]	9.05 [10]	121	115 [01]	1,912.92
Construction	3.59	1,275.6	1.91 [04]	7,884	45 [15]	443.8	1.23 [04]	2,743	29 [16]	21.68 [06]	35	64 [10]	4,580.58
Other products	12.20	2.9	0.04 [17]	18	1 [21]	3.4	0.05 [17]	21	1 [21]	0.17 [21]	118	113 [01]	35.35
Changes in Inventories and Acquisitions Less Disposals of Valuables	5.77	5.7	0.13 [13]	35	3 [17]	3.2	0.11 [13]	20	3 [17]	0.15 [16]	56	85 [11]	32.62
Balance of Exports and Imports	10.32	-144.3	-6.16 [19]	-892	-144 [16]	-144.3	-6.16 [19]	-892	-144 [16]	-7.05 [16]	100	100 [n.a.]	-1,489.36
Individual Consumption Expenditure by Households[b]	4.73	3,119.9	2.66 [08]	19,282	62 [19]	1,429.2	2.12 [09]	8,833	49 [19]	69.81 [05]	46	79 [14]	14,751.77
Individual Consumption Expenditure by Households without Housing[b]	5.03	2,686.9	2.67 [08]	16,606	62 [19]	1,309.5	2.17 [09]	8,093	51 [18]	63.96 [06]	49	81 [13]	13,515.99
Government Final Consumption Expenditure	4.11	318.0	0.94 [13]	1,966	22 [22]	126.7	0.60 [12]	783	14 [21]	6.19 [22]	40	64 [10]	1,307.58
Domestic Absorption	4.94	4,579.8	1.99 [09]	28,305	47 [20]	2,191.6	1.50 [10]	13,545	35 [19]	107.05 [07]	48	75 [11]	22,620.83

Reference Data

Exchange rate (LCU/HK$)	10.32
Total population (in million)	161.80
Population share to AP (%) [ranking]	4.27 [05]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

b Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

In April 2018, the deputy national coordinator replaced the national coordinator to continue with rest of the activities of the 2017 ICP round. A core group of 16 officials from the National Accounting Wing helped implement the 2017 ICP round. For ICP price collection, 23 officers and staff from the BBS headquarters and 93 officers and staff from the field offices participated.

Use of Existing Infrastructure in Collecting Data

The members of the Price and Wage Statistics Section who are responsible for the CPI also conducted price collection and data management for the ICP, thus minimizing the costs for data collection and editing, training, and capacity building. However, because of differences in the ICP and CPI baskets and price collection schedule, the section experienced difficulties in fully integrating the ICP into its regular CPI price collection activities. Because of this, none of the CPI item prices were used for the ICP.

Housing volume indicators were estimated from the 2017 Sample Vital Registration System, 2016 Household Income and Expenditure Survey, and the 2011 Population and Housing Census. Government compensation data and other relevant information were obtained from administrative records of the Ministry of Finance. The BBS ICP team conducted special surveys for machinery and equipment and for construction for the 2017 ICP round because there were no other existing surveys.

Survey Framework

As in the 2011 ICP cycle, the 2017 ICP price survey for household products covered the entire economy to provide reliable national average prices for the ICP product list. For the selection of samples, Bangladesh was divided into two "sub-universes," namely, urban and rural areas. Bangladesh has 64 administrative districts in which each district contains urban and rural areas. The ICP covered 25 out of these 64 administrative districts. Urban areas include city corporation and municipalities along with district towns and headquarters. For the 2017 ICP price survey, out of the 720 outlets selected for price collection, 516 were in urban and 204 were in rural areas. Prices for food and non-alcoholic beverages items were collected monthly, while prices for nonfood items were collected in the middle of each quarter.

A special housing and rental survey with national coverage was conducted only for the 2017 ICP. The price surveys for machinery and equipment and construction were conducted in divisional cities. Finally, government compensation data and other related indicators were collected from administrative sources.

Gross Domestic Product Expenditure Values

The gross domestic product (GDP) expenditure values were required for 155 basic headings according to the 2017 ICP classification. The National Accounting Wing of BBS provided the breakdown of GDP into detailed basic headings relevant for Bangladesh. Individual consumption expenditure by households was (i) estimated through a commodity flow approach based on the 2010 Household Income and Expenditure Survey for breaking down into basic headings of household consumption expenditure and nonprofit institutions serving households (NPISH), and (ii) adjusted with the production account of various commodities, and other data sources along with certain conceptual adjustments. For years in which household income and expenditure data are not available, the BBS ICP team applied the consumption expenditure growth rates of various groups from the benchmark household income and expenditure in order to arrive at the estimates. Some adjustments and indirect methods were applied to derive reliable expenditure estimates for the basic headings under financial services, NPISH, and other goods and services, for which availability of direct data is very much limited. NPISH estimates were based on the NPISH surveys, conducted in 2010 and 2016. There were no disaggregated data for net purchases abroad.

Government budget documents and administrative records from the Ministry of Finance were used to compile the GDP expenditure values for the basic headings of government final consumption expenditure, which was broken down into individual and collective consumption. With regard to gross fixed capital formation, the BBS ICP team applied the commodity flow method to estimate the components using budget documents from public investments, the 2013–2014 Construction Survey, and the 2012 Survey of Manufacturing Industries. On imported items, detailed information was gathered from the Bangladesh Bank and the National Board of Revenue. Imports and exports are based on International Monetary Fund's Balance of Payments and International Investment Position Manual (sixth edition) compiled by Bangladesh Bank and Bangladesh Customs records.

National accounts of Bangladesh are compiled for the fiscal year starting from July 1 of the current year to June 30 of the following year. These estimates are converted to calendar year estimates by apportioning 50% of the estimates from 2016/2017 and the other 50% from 2017/2018 annual estimates. The statistical discrepancy is added to changes in inventories.

Because the rebasing of GDP has not occurred since 2005/2006, the BBS ICP team experienced some of the limitations in the GDP values estimation in the 2017 ICP cycle that were also encountered during the 2011 ICP cycle. These limitations include non-availability of estimates for financial intermediation services indirectly measured and for changes in inventories and acquisitions less disposals of valuables. BBS plans to resolve these shortcomings in the next GDP rebasing.

Challenges in Implementation

For some machinery and equipment items, it was difficult for the price collectors to access large companies. For construction items, units for some items differed from those in the questionnaire. For housing rental, some specifications were difficult to match.

Data Validation

Similar to the data validation process in the 2011 ICP cycle, prices from the ICP survey were compared with prices for similar CPI items. Statistical methods, such as the minimum-to-maximum ratio and coefficient of variation, were used to check and validate individual price quotations and to improve the quality of national average prices. The BBS ICP team checked and corrected errors due to data entry mistakes and incorrect units of measurement, and prices that were identified as unusual were double checked during field visits and follow-ups. Meanwhile, prices flagged from the inter-economy validations undertaken by the Asian Development Bank (ADB) and discussed in the regional data validation workshops were also verified and revised when needed after cross-checking with the field offices.

Price Collection Tools

The ICP Asia Pacific Software Suite (ICP APSS) was useful for data entry, processing, and validation. The BBS ICP team encountered some difficulties in the initial stages of using the ICP APSS but resolved the difficulties with the support of the ADB ICP team.

Lessons Learned and Future Directions

From its experience implementing the 2017 ICP round, BBS has gained sufficient capacity to carry out future rounds of the ICP, which is now a permanent element of global statistical work that will be conducted more frequently. The National Accounting Wing of BBS has plans to institutionalize the ICP in its regular work program as follows:

(i) For the ICP product lists with structured product descriptions deemed important in the Bangladesh economy based on the household income and expenditure survey, the agency will make efforts

to include a number of products in its regular price collection survey for CPI compilation. Currently, most of the items and their specifications in the CPI and ICP are different.

(ii) GDP expenditures for the 155 basic headings and their shares in total GDP will be compiled on a regular basis and included in BBS publications.

(iii) Data on government compensation will be regularly collected, compiled, and integrated in BBS publications.

(iv) Shared sample markets for the CPI and ICP would be better for operational efficiency.

The regional training with international experts for machinery and equipment and for construction was useful in gaining better understanding of product specifications and validating the prices. Especially in the case of Bangladesh, there was difficulty in finding an engineer or expert on machinery and equipment to consult with BBS. Hence, the assistance was a great opportunity for the participating economies, with hopes that this will continue in the next ICP round.

For smoother conduct of the future ICP rounds, BBS would need technical and financial support to strengthen its activities related to price and national accounts statistics, especially for the work dedicated to the ICP. With BBS's limited budget for the ICP, the agency experienced difficulty in complying with the government rules on providing an allowance for trainees and trainers. An increase in the budget for the next ICP round would be beneficial.

Bhutan

Economy Results

As Table 7.2 shows, among the 22 participating economies, Bhutan has the smallest real GDP of HK$51.5 billion (column 3), which is about 2.6 times its nominal GDP of HK$19.7 billion (column 7) indicating that the exchange rate is about 2.6 times the PPP at GDP level. With a population share of

only about 0.02% of the region, Bhutan's economy contributes about the same fraction (0.02%) of the region's total real GDP (column 4). Although, this share is much larger than the share in nominal terms at 0.01% (column 8), it can be seen from the table that Bhutan is the smallest economy in terms of its share in the real or nominal GDP in the region as depicted by the rank of 22. Bhutan's nominal ICEH-to-GDP ratio of 52.77% (column 11) ranks 17th in the region, while the economy's nominal GFCF-to-GDP ratio of 51.31% is the highest in the region (column 11). Relative to the region, the economy's real ICEH of HK$26.5 billion (column 3) comprises 0.02% of the region's total real ICEH (column 4)—the second smallest in the region after Fiji. Bhutan's real GFCF of HK$18.7 billion (column 3) composes 0.02% of the region's total real GFCF (column 4)—also the second smallest in the region after Maldives.

Even though Bhutan is the smallest economy and the third least populous in the region, Bhutan's per capita real GDP of HK$70,855 (column 5) is ranked 11th in the region and is 15% above the regional per capita real GDP (column 6). Bhutan also posts per capita real expenditures higher than the regional per capita real expenditure levels in almost three-quarters of the components of GDP as shown in Table 7.2, and even registers more than double the regional average per capita expenditure levels for other food and non-alcoholic beverages (with index of 215 relative to regional average of 100); and government final consumption expenditure (with index of 258 relative to regional average of 100) (column 6).

With the local currency of ngultrum (Nu), Bhutan's PPP at GDP level of Nu3.20 = HK$1 (column 2) is only 38% of the economy's exchange rate of Nu8.36 = HK$1, resulting in a low PLI of 38 (with Hong Kong, China = 100) (column 12), or a PLI of 60 (with Asia and the Pacific = 100) (column 13) for GDP. This makes Bhutan's overall price level the second least expensive in the region, behind Myanmar, which is the least expensive economy in the region with the lowest PLI at the level of GDP.

Table 7.2: Summary Results for Bhutan, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure		Per Capita Real Expenditure		Nominal Expenditure		Per Capita Nominal Expenditure		Nominal Expenditure Shares, (%) [ranking]	PLIs		Expenditure (billion LCU)
		(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]	(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]		(HKG = 100)	(AP = 100) [ranking]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	3.20	51.5	0.02 [22]	70,855	115 [11]	19.7	0.01 [22]	27,094	69 [13]	100.00 [n.a.]	38	60 [21]	164.63
Actual Individual Consumption by Households[a]	3.05	31.4	0.02 [21]	43,196	122 [10]	11.5	0.01 [22]	15,752	76 [14]	58.14 [16]	36	62 [20]	95.71
Food and non-alcoholic beverages	3.92	8.3	0.03 [20]	11,369	157 [08]	3.9	0.02 [20]	5,337	129 [12]	19.70 [09]	47	82 [19]	32.43
Food	3.83	7.8	0.03 [20]	10,702	152 [08]	3.6	0.02 [20]	4,904	123 [10]	18.10 [09]	46	81 [19]	29.80
Bread and cereals	4.50	1.8	0.03 [20]	2,535	173 [06]	1.0	0.03 [20]	1,366	151 [09]	5.04 [10]	54	87 [15]	8.30
Meat and fish	3.58	1.0	0.01 [22]	1,367	74 [19]	0.4	0.01 [22]	585	53 [19]	2.16 [18]	43	72 [19]	3.56
Fruits and vegetables	3.92	2.0	0.03 [19]	2,791	146 [06]	1.0	0.03 [19]	1,308	139 [07]	4.83 [06]	47	95 [16]	7.95
Other food and non-alcoholic beverages	3.78	3.3	0.04 [20]	4,591	215 [05]	1.5	0.03 [20]	2,077	172 [09]	7.67 [06]	45	80 [19]	12.62
Alcoholic beverages, tobacco and narcotics	3.69	0.6	0.03 [20]	894	134 [11]	0.3	0.02 [21]	395	82 [14]	1.46 [09]	44	61 [16]	2.40
Clothing and footwear	3.87	1.9	0.04 [19]	2,564	194 [04]	0.9	0.02 [20]	1,187	121 [08]	4.38 [07]	46	62 [18]	7.21
Clothing	3.46	1.5	0.04 [20]	2,059	190 [04]	0.6	0.02 [21]	853	110 [08]	3.15 [04]	41	58 [21]	5.19
Housing, water, electricity, gas and other fuels[a]	2.02	5.6	0.02 [21]	7,690	128 [08]	1.4	0.01 [22]	1,857	65 [15]	6.86 [15]	24	51 [21]	11.29
Furnishings, household equipment and routine household maintenance	4.52	0.7	0.02 [22]	1,006	93 [14]	0.4	0.01 [22]	545	66 [14]	2.01 [13]	54	71 [14]	3.31
Health and education[a]	1.29	10.2	0.02 [21]	14,074	128 [11]	1.6	0.01 [22]	2,166	48 [13]	7.99 [14]	15	38 [18]	13.16
Health[a]	1.13	6.6	0.03 [19]	9,103	143 [06]	0.9	0.01 [22]	1,233	52 [10]	4.55 [09]	14	36 [22]	7.49
Education[a]	1.42	4.0	0.02 [21]	5,470	113 [16]	0.7	0.01 [22]	933	44 [14]	3.44 [18]	17	39 [15]	5.67
Transportation and communication	4.35	3.5	0.02 [21]	4,862	106 [17]	1.8	0.02 [22]	2,530	95 [12]	9.34 [07]	52	90 [16]	15.37
Transportation	4.06	3.1	0.02 [21]	4,244	116 [11]	1.5	0.02 [21]	2,061	101 [12]	7.61 [06]	49	87 [18]	12.53
Communication	5.84	0.5	0.01 [22]	670	74 [12]	0.3	0.01 [22]	468	77 [13]	1.73 [07]	70	105 [08]	2.84
Recreation and culture[a]	5.14	0.5	0.01 [22]	730	70 [15]	0.3	0.01 [22]	449	49 [14]	1.66 [16]	62	70 [16]	2.73
Restaurants and hotels	3.18	0.6	0.01 [21]	887	62 [15]	0.2	0.01 [22]	337	37 [17]	1.24 [20]	38	59 [21]	2.05
Miscellaneous goods and services[a]	3.43	1.7	0.01 [22]	2,309	65 [14]	0.7	0.01 [22]	949	36 [14]	3.50 [14]	41	55 [21]	5.77
Individual Consumption Expenditure by Government	1.50	5.9	0.03 [20]	8,087	161 [11]	1.1	0.01 [22]	1,455	49 [11]	5.37 [10]	18	30 [19]	8.84
Collective Consumption Expenditure by Government	1.74	10.5	0.07 [20]	14,383	359 [05]	2.2	0.02 [22]	2,998	116 [10]	11.07 [05]	21	32 [21]	18.22
Gross Fixed Capital Formation	4.53	18.7	0.02 [21]	25,672	130 [08]	10.1	0.02 [21]	13,903	96 [08]	51.31 [01]	54	74 [11]	84.47
Machinery and equipment	9.51	2.6	0.02 [22]	3,588	121 [11]	3.0	0.03 [22]	4,085	131 [11]	15.08 [02]	114	108 [05]	24.82
Construction	2.60	21.7	0.03 [21]	29,896	169 [07]	6.8	0.02 [21]	9,305	97 [08]	34.34 [01]	31	57 [18]	56.54
Other products	9.48	0.3	0.00 [21]	452	26 [16]	0.4	0.01 [21]	513	28 [15]	1.89 [15]	113	109 [04]	3.12
Changes in Inventories and Acquisitions Less Disposals of Valuables	3.92	-0.0	0.00 [19]	-31	-3 [19]	-0.0	0.00 [19]	-15	-2 [19]	-0.05 [19]	47	72 [20]	-0.09
Balance of Exports and Imports	8.36	-4.0	-0.17 [15]	-5,544	-895 [22]	-4.0	-0.17 [15]	-5,544	-895 [22]	-20.46 [21]	100	100 [n.a.]	-33.69
Individual Consumption Expenditure by Households[b]	3.28	26.5	0.02 [21]	36,422	118 [11]	10.4	0.02 [22]	14,296	80 [14]	52.77 [17]	39	68 [19]	86.87
Individual Consumption Expenditure by Households without Housing[b]	3.46	22.8	0.02 [21]	31,349	118 [10]	9.4	0.02 [22]	12,986	81 [14]	47.93 [15]	41	69 [18]	78.90
Government Final Consumption Expenditure	1.62	16.7	0.05 [20]	22,991	258 [06]	3.2	0.02 [22]	4,453	80 [10]	16.44 [04]	19	31 [21]	27.06
Domestic Absorption	3.27	60.7	0.03 [21]	83,514	137 [10]	23.7	0.02 [22]	32,638	84 [11]	120.46 [02]	39	61 [21]	198.31

Reference Data

Exchange rate (LCU/HK$)	8.36
Total population (in million)	0.73
Population share to AP (%) [ranking]	0.02 [20]

0.0 or 0.00 = magnitude is less than half of the unit employed; AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

b Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Bhutan posts the lowest PLI of 36 for health (column 13) in the region. Meanwhile, Bhutan registers the fifth highest PLI of 108 (column 13) for machinery and equipment and eighth highest PLI of 105 (column 13) for communication.

Economy Experience in Program Implementation

Administrative Setup

The Economic and Environment Statistics Division (EESD) within Bhutan's National Statistics Bureau (NSB) is mandated to undertake the activities of the International Comparison Program (ICP). Because the ICP activities entail similar set up and processes as the consumer price index (CPI) compilation, the national and deputy national coordinators roles were delegated to members of the price section of the EESD. The 2017 ICP team comprised staff from the price and national accounts sections and district statistical officers.

Use of Existing Infrastructure in Collecting Data

The statistical office carried out ICP activities using its existing infrastructure and human resources. Experienced statistical district personnel carried out the household price survey for the ICP as well as CPI data collection. They used prices of 174 out of 432 CPI items for the ICP, with necessary adjustments in units and other specifications. For the remaining ICP items, they surveyed CPI outlets and a few additional ones from rural areas. Data for non-household items such as construction and machinery and equipment were collected in a few urban areas through special surveys by headquarters staff. The team used secondary data, such as the data already collected from the household expenditure survey (Bhutan Living Standard Survey 2017), for the housing rental survey, and used administrative data for compensation of government occupations.

Since 2017, the NSB has incorporated ICP activities in its annual work plan and the National Strategy for Development of Statistics 2018–2023 document.

Therefore, all future rounds of ICP will be reflected in the statistical work plan as and when the ICP is conducted.

Survey Framework

The 2017 ICP price collection for household consumption items covered both urban and rural areas in all 20 districts covering the entire economy. Due to lack of data or sampling frame of establishments, the outlet selection and allocation across 20 districts and rural and urban areas was based on purposive sampling depending on popularity and availability of items. Out of the 482 outlets surveyed, 407 of them were in urban areas and only 75 were in rural ones. Fewer outlets were selected in rural areas because these outlets mainly concentrated on the sale of grocery items. Rural households purchase nonfood items mostly from urban areas and consume food items such as vegetables from their own production.

Geographic coverage and outlet selection of the special surveys for construction and machinery and equipment were limited to the capital city and a few urban centers. Government compensation data were sourced from the Ministry of Finance. Rental data were collected from both rural and urban areas.

The frequency of price collection was monthly, quarterly, semiannual, or annual, depending on the price volatility of the items. Prices for the majority of items were collected quarterly, while more volatile prices for items prices such as vegetables, fruits, and fuel were collected monthly. For items such as education, electricity, water charges, and communications prices were collected semiannually and annually.

Gross Domestic Product Expenditure Values

Out of 155 basic headings, gross domestic product expenditure values for most were successfully estimated. The household consumption expenditure weights for various basic headings were estimated from the 2017 Bhutan Living Standard Survey.

The consumption expenditure by nonprofit institutions serving households was subsumed in the household consumption expenditures and is not estimated separately. The statistical discrepancy between production and expenditure is added to individual consumption expenditure by households.

Government final consumption expenditure is derived from the annual financial statement from the Department of Public Accounts, Ministry of Finance (MOF). The data source for export and import of goods and services is the balance of payment statistics, including estimates of informal trade. However, the balance of payments trade data does not provide detailed breakdown of goods, therefore, import data from the Bhutan Trade Statistics published by the Department of Revenue and Customs, MOF, were used for the machinery and equipment.

For construction, total expenditure was distributed based on ratios derived from the construction worksheet prepared by the National Accounts officers. Estimates of the changes in inventories were based on data available from various establishments.

Data Validation

The regional ICP workshops conducted by the Asian Development Bank helped the implementing agencies conduct ICP activities within their economies. It provided a platform for the economies to share a common understanding of the concepts and discuss issues and challenges faced by different economies. The inter-economy data validation workshops were necessary to resolve data inconsistencies and ensure price collection for the same items across economies.

The knowledge gained from these workshops was also helpful for conducting intra-economy validation. The NSB conducted preparatory activities such as training on concepts, definitions, and uses of ICP and preparation of a customized

product catalogue to ensure quality of data collection from the field. Further, the NSB undertook intra-economy data validation workshops to resolve data inconsistencies.

The periodic regional and intra-economy validation workshops provided an opportunity to discuss issues and find practical solutions and a way forward.

Price Collection Tools

Microsoft- Excel-based data entry and report generation in the household consumption module of ICP's Asia Pacific Software Suite (ICP APSS) has made the software very user-friendly. Aside from the ICP APSS, the Microsoft-Excel-based price collection tools for machinery and equipment, construction, and government compensation were indispensable to users. With NSB plans to compute subnational purchasing power parities (PPPs) in the future, the Microsoft-Excel add-in functions would be very useful for data analysis and compilation of subnational PPPs.

Challenges in the ICP Implementation

Similar to the experience of the 2011 ICP round, for a small-sized economy like Bhutan, one of the main challenges was the difficulty in getting items that meet the structured product descriptions for both household and non-household surveys. Most of the items in the ICP were not available in Bhutan. For those available, specifications for some did not match in terms of quantity, brand, or quality. In case the quantity available was not within the specified range, it was converted to the preferred quantity. For the brands or qualities that were difficult to identify, data collectors reached a common understanding of pricing items that best fitted the description, determined with the help of the shopkeepers.

For non-household components, especially heavy machinery and equipment, dealers and distributors were not able to provide the detailed specifications required in ICP. In such cases, NSB explored online

sources to obtain detailed information of the items. Information like sizes of dwelling rentals was not available and was estimated with the help of experts.

Another challenge was the human resource constraint. The price section of the EESD comprised only two staff members who were also responsible for compiling the CPI and the producer price index. With the additional work of the ICP, it was difficult for the section to deliver the outputs on time. Many of the field officers also had to conduct other major surveys or censuses by the NSB.

Lessons Learned and Future Directions

Since the 2005 round, the NSB has benefited from the ICP in terms of building capacity for compiling price statistics. The NSB adapted data validation techniques, learned through the ICP, to the validation process for the CPI. The international experts for machinery and equipment and construction were resourceful and helped the participants better understand the product specification and price determining characteristics that needed to be captured while collecting the price. Given the importance of the ICP and plans to conduct it more frequently, it was necessary to include the ICP as a regular statistical activity. Since 2017, the NSB has incorporated the ICP in its annual work plan, ensuring well-planned implementation and allocation of required resources in the future.

One of the challenges in implementing the ICP was the lack of support or cooperation of the respondents in providing the data, mainly due to lack of knowledge about the importance of the ICP statistics. For the 2011 ICP, the NSB conducted an advocacy workshop on the importance of price statistics with the business units in all the districts. However, the NSB could not conduct any workshops for the 2017 ICP because the office was engaged in the population and housing census and the living standard survey, conducted in the beginning of 2017. Given the cooperation gained through the advocacy

workshop, periodically conducting such a workshop with the respondents and business units is important for future rounds of ICP.

Although the NSB expressed interest in computing subnational PPPs in the 2011 round of the ICP, it was not possible due to limited staff and capacity. The subnational PPP will be very useful for policy makers and it is something that the NSB would like to pursue in the future.

Brunei Darussalam

Economy Results

Home to 429,500 residents, or 0.01%, of the region's population, Brunei Darussalam is the least populous among the 22 participating economies. In contrast, Brunei Darussalam's nominal GDP of HK$94.5 billion, in Table 7.3 (column 7) is the fifth smallest, constituting 0.06% of the region's total nominal GDP (column 8). After adjusting for spatial price differences, its share of the region's total real GDP as estimated in 2017 ICP for Asia and the Pacific is slightly higher at 0.07% (column 4), with real GDP of HK$155.6 billion (column 3)—the fourth smallest in the region. Brunei Darussalam has the lowest nominal ICEH-to-GDP ratio of 20.48% (column 11), contributing the third smallest share to the region's total, at around 0.03% in both real (column 4) and nominal terms (column 8). In terms of investments, the economy has the fourth highest nominal GFCF-to-GDP ratio at 41.07% (column 11). With nominal GFCF of HK$38.8 billion (column 7) and real GFCF of HK$56.7 billion (column 3), Brunei Darussalam constitutes 0.07% of the region's total nominal GFCF (column 8) and 0.08% of the region's total real GFCF (column 4).

Taking into account its population size, Brunei Darussalam has the third highest per capita nominal GDP of HK$220,065 (column 9), which is 560% of the regional per capita nominal GDP (column 10).

Table 7.3: Summary Results for Brunei Darussalam, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure		Per Capita Real Expenditure		Nominal Expenditure		Per Capita Nominal Expenditure		Nominal Expenditure Shares, (%) [ranking]	PLIs		Expenditure (billion LCU)
		(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]	(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]		(HKG = 100)	(AP = 100) [ranking]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	0.11	155.6	0.07 [19]	362,379	590 [02]	94.5	0.06 [18]	220,065	560 [03]	100.00 [n.a.]	61	95 [06]	16.75
Actual Individual Consumption by Households[a]	0.11	41.7	0.03 [20]	97,121	274 [04]	25.3	0.03 [20]	58,920	283 [04]	26.77 [22]	61	103 [06]	4.48
Food and non-alcoholic beverages	0.12	4.7	0.02 [21]	10,950	151 [09]	3.3	0.02 [21]	7,582	183 [06]	3.45 [21]	69	121 [05]	0.58
Food	0.12	4.3	0.02 [21]	9,993	142 [10]	2.9	0.02 [21]	6,813	171 [06]	3.10 [21]	68	121 [05]	0.52
Bread and cereals	0.12	1.0	0.02 [21]	2,219	151 [11]	0.7	0.02 [21]	1,531	169 [08]	0.70 [21]	69	112 [06]	0.12
Meat and fish	0.11	1.7	0.02 [21]	3,936	214 [07]	1.0	0.03 [20]	2,441	222 [05]	1.11 [21]	62	104 [06]	0.19
Fruits and vegetables	0.16	0.6	0.01 [21]	1,349	71 [15]	0.5	0.01 [22]	1,227	131 [08]	0.56 [21]	91	185 [03]	0.09
Other food and non-alcoholic beverages	0.12	1.6	0.02 [21]	3,662	172 [10]	1.0	0.02 [21]	2,383	197 [06]	1.08 [21]	65	115 [06]	0.18
Alcoholic beverages, tobacco and narcotics	0.12	0.1	0.01 [22]	314	47 [18]	0.1	0.01 [22]	217	45 [17]	0.10 [22]	69	95 [11]	0.02
Clothing and footwear	0.20	0.7	0.01 [22]	1,688	128 [09]	0.8	0.02 [21]	1,908	194 [04]	0.87 [21]	113	152 [02]	0.15
Clothing	0.18	0.7	0.02 [21]	1,517	140 [08]	0.7	0.02 [20]	1,583	203 [04]	0.72 [21]	104	145 [02]	0.12
Housing, water, electricity, gas and other fuels[a]	0.06	8.3	0.04 [19]	19,297	322 [04]	2.9	0.03 [20]	6,723	237 [05]	3.05 [22]	35	74 [10]	0.51
Furnishings, household equipment and routine household maintenance	0.10	1.8	0.04 [20]	4,107	379 [05]	1.0	0.03 [20]	2,371	286 [04]	1.08 [21]	58	76 [10]	0.18
Health and education[a]	0.07	15.7	0.04 [19]	36,636	334 [04]	6.6	0.04 [18]	15,377	343 [04]	6.99 [17]	42	102 [04]	1.17
Health[a]	0.09	3.4	0.01 [21]	7,943	125 [08]	1.7	0.02 [20]	3,950	166 [06]	1.79 [22]	50	133 [03]	0.30
Education[a]	0.06	14.1	0.08 [19]	32,719	673 [01]	4.9	0.06 [18]	11,427	542 [03]	5.19 [08]	35	80 [08]	0.87
Transportation and communication	0.16	4.8	0.03 [20]	11,210	244 [05]	4.4	0.04 [19]	10,170	384 [04]	4.62 [18]	91	157 [04]	0.77
Transportation	0.14	4.3	0.03 [20]	9,967	274 [05]	3.4	0.04 [19]	7,907	387 [04]	3.59 [17]	79	141 [04]	0.60
Communication	0.28	0.6	0.02 [21]	1,449	159 [07]	1.0	0.04 [20]	2,262	372 [05]	1.03 [16]	156	234 [01]	0.17
Recreation and culture[a]	0.19	1.5	0.04 [19]	3,471	334 [06]	1.6	0.05 [18]	3,727	409 [04]	1.69 [15]	107	122 [02]	0.28
Restaurants and hotels	0.10	2.1	0.04 [20]	4,774	335 [06]	1.2	0.03 [20]	2,740	297 [05]	1.25 [19]	57	89 [07]	0.21
Miscellaneous goods and services[a]	0.11	2.1	0.02 [20]	4,926	139 [07]	1.3	0.01 [20]	3,033	114 [07]	1.38 [22]	62	82 [07]	0.23
Individual Consumption Expenditure by Government	0.07	14.9	0.08 [18]	34,673	689 [01]	5.9	0.05 [16]	13,851	464 [03]	6.29 [05]	40	67 [09]	1.05
Collective Consumption Expenditure by Government	0.07	48.6	0.32 [16]	113,259	2,830 [01]	19.1	0.20 [15]	44,416	1,721 [01]	20.18 [01]	39	61 [15]	3.38
Gross Fixed Capital Formation	0.12	56.7	0.08 [17]	132,105	667 [02]	38.8	0.07 [17]	90,377	623 [02]	41.07 [04]	68	93 [05]	6.88
Machinery and equipment	0.20	11.3	0.10 [17]	26,197	882 [02]	13.0	0.11 [16]	30,187	965 [02]	13.72 [03]	115	110 [04]	2.30
Construction	0.08	51.3	0.08 [17]	119,441	676 [01]	23.3	0.06 [16]	54,172	567 [01]	24.62 [04]	45	84 [05]	4.12
Other products	0.21	2.2	0.03 [18]	5,114	292 [04]	2.6	0.04 [18]	6,019	330 [04]	2.74 [12]	118	113 [02]	0.46
Changes in Inventories and Acquisitions Less Disposals of Valuables	0.12	-2.7	-0.06 [20]	-6,342	-534 [22]	-1.9	-0.06 [20]	-4,391	-564 [22]	-2.00 [22]	69	106 [06]	-0.33
Balance of Exports and Imports	0.18	13.2	0.56 [09]	30,743	4,966 [02]	13.2	0.56 [09]	30,743	4,966 [02]	13.97 [02]	100	100 [n.a.]	2.34
Individual Consumption Expenditure by Households[b]	0.11	30.7	0.03 [20]	71,556	231 [05]	19.4	0.03 [20]	45,068	253 [04]	20.48 [22]	63	109 [06]	3.43
Individual Consumption Expenditure by Households without Housing[b]	0.12	26.4	0.03 [20]	61,494	231 [05]	17.2	0.03 [20]	40,083	251 [04]	18.21 [22]	65	109 [07]	3.05
Government Final Consumption Expenditure	0.07	64.3	0.19 [16]	149,626	1,680 [01]	25.0	0.12 [15]	58,267	1,046 [01]	26.48 [01]	39	62 [11]	4.43
Domestic Absorption	0.11	134.1	0.06 [19]	312,153	513 [03]	81.3	0.06 [19]	189,322	489 [03]	86.03 [21]	61	95 [06]	14.41

Reference Data

Exchange rate (LCU/HK$)	0.18
Total population (in million)	0.43
Population share to AP (%) [ranking]	0.01 [22]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Considering spatial price differences, its per capita real GDP of HK$362,379 (column 5) is 590% of the region's per capita real GDP, the second highest in the region (column 6). Though the economy has the third smallest real ICEH (column 4), its per capita real ICEH of HK$71,556 (column 5) is the fifth highest in the region, which stands at 231% of the region's per capita real ICEH (column 6). Among the notable expenditure components in Table 7.3, Brunei Darussalam has the highest per capita real expenditures among 22 economies for the following (with the corresponding per capita real index relative to the regional average of 100 in parentheses, as drawn from column 6): education (673); construction (676); and government final consumption expenditure (1,680).

With the local currency of Brunei dollars (B$), Brunei Darussalam's PPP at GDP level of B$0.11 = HK$1 (column 2) in 2017 is only 61% of the exchange rate of B$0.18 = HK$1, implying that the overall price level is 61% of (or 39% lower than) Hong Kong, China's (column 12) and 95% of (or 5% lower than) the region's average price level (column 13) making Brunei Darussalam's overall price level to be the sixth most expensive economy in the region. For almost three-fifths of the components shown in Table 7.3, the PLIs are greater than the regional average of 100 (column 13). Among them, communication has the highest PLI in the region at 234 (column 13).

Economy Experience in Program Implementation

Administrative Setup

The Department of Statistics (DOS) is under the Department of Economic Planning and Statistics, Ministry of Finance and Economy. The Price Section, along with the National Accounts Section, implemented the Asian Development Bank (ADB)-funded regional technical assistance for the 2017 ICP for Asia and the Pacific. The head of the Price Section served as the national coordinator. An ad hoc working group, headed by the director of statistics with DOS officers as members, assisted the national coordinator.

Use of Existing Infrastructure in Collecting Data

For the 2017 ICP, the consumer price index (CPI) infrastructure was used for price collection activities. About 47% of the household items in the CPI basket were used for the ICP. Using CPI infrastructure proved an advantage, because the staff was familiar with collecting prices and identifying correct items according to the specifications. However, CPI staff experienced an additional workload since most of the CPI and ICP items did not match. Special surveys were conducted to accommodate the non-overlapping items. Both CPI and ICP data collections are integrated in the DOS work program as a regular activity.

Some of the housing rental data were taken from the existing data sources such as the CPI, housing rental survey, real estate agency survey, and an internet-based survey in 2018. Housing volume indicators were sourced from the 2011 ICP (and 2016 update), Population and Housing Census and the 2015–2016 Household Expenditure Survey.

Compensation data were collected for government occupations from administrative documents related to salary scale released through circular letters from the Prime Minister's Office. Special surveys were also conducted for machinery and equipment and construction and covered select outlets in Brunei-Muara District.

Survey Framework

The 2017 ICP covered only the urban areas of all four districts of Brunei-Muara, Belait, Tutong, and Temburong. It was not feasible to cover the remote rural areas given the limited facilities and human resources. The team selected areas based on density of population and business activity and selected outlets based on purposive sampling according to the contribution of the revenue gathered from the Economic Census of Enterprises.

The team reviewed samples of outlets regularly to ensure that they represented the places where the majority of the population purchased their basket of goods and services. The team revised the outlets when necessary because of events such as change of business and entrance of new retailers in the market. The team also ensured that replacements were in the same general locality. The team collaborated with selected outlets in a special survey for non-household categories.

The frequency of the survey depended on the price behavior of the item. Items with volatile prices (e.g., perishable food items) were surveyed weekly and monthly, while items with more stable prices, such as service and conservancy charges, utility tariffs, bus and air fares, school fees, medical services, and household durables, were surveyed quarterly, semiannually, or as and when the prices or rates changed. Price collection was done consistently on the same weekday in each month from the same outlet.

Because the existing types of dwelling covered in CPI price collection did not match the ICP specifications, the team conducted a separate survey for rental housing information with selected real estate agencies covering only urban areas. Meanwhile, housing volume indicators were taken from 2015-2016 Household Expenditure Survey and extrapolated for national coverage. For machinery and equipment and construction, a special survey covered only Brunei-Muara District, based on a mutual agreement with a selected outlet that was willing to provide prices. Average compensation data and other relevant indicators were collected for government occupations sourced from administrative documents released through circular letters from the Prime Minister's Office. However, for implementing non-household surveys in future ICP rounds, the DOS is planning to work together with other relevant departments and agencies for better ICP implementation.

Gross Domestic Product Expenditure Values

Brunei Darussalam was able to estimate gross domestic product (GDP) expenditure values for most of the basic headings. A few basic headings were not covered because they were not applicable in the economy (e.g., passenger transport by railways, alcoholic drinks, and prostitution) and for which breakdown of data were not available (e.g., individual consumption expenditure by nonprofit institutions serving households). The following data sources and methodology were adopted in splitting GDP expenditures into the required basic headings.

Individual consumption expenditure by households. Data sources used for estimating the main aggregates and in breaking them down into basic headings were the Household Expenditure Survey 2010–2011, quarterly survey of businesses, balance of payments statistics, and external trade statistics. Compilation methodologies were based on extrapolation, commodity flow method, and direct estimates. Due to the lack of data on nonprofit institution serving households, value of consumption expenditure was estimated to reduce statistical discrepancy.

Government final consumption expenditure. The source of estimates for the main aggregates was from the Treasury Department. However, the structure from the 2011 ICP was used to break them down into the required basic headings. Methodologies used for compilation were based on direct estimates and extrapolation.

Gross fixed capital formation. Main aggregates were estimated using the Economic Census 2011, Government Finance Statistics 2010, quarterly survey of businesses, balance of payments statistics, and external trade statistics. However, the 2011 purchasing power parity structure was used to break them down into the required basic headings.

Methodologies for compilation were based on extrapolation, commodity flow method, and direct estimates.

Changes in inventories and acquisitions less disposals of valuables. Main aggregates used direct estimation using data from Economic Census 2011 and Quarterly Survey of Business. The 2011 ICP structure was used to break them down into the required basic headings.

Balance of exports and imports. Data sources were the balance of payments statistics and external trade statistics. Methodology for compilation was based on direct estimates.

Data Validation

A software system named ICP Asia Pacific Software Suite (ICP APSS) was developed by ADB for the participating economies to record prices and conduct validation of prices collected and submitted every month to ADB quarterly. ICP APSS enabled the participating economies to check the consistency of the prices collected based on statistical criteria using the coefficient of variation, standard deviation, and the minimum-to-maximum ratio.

Similar items in the CPI and ICP were compared to validate price movements. Most of the 2017 ICP prices collected were compared with those collected for the 2011 ICP surveys to check whether the same or similar products were priced. The regional data validation workshops conducted by ADB were very useful for discussing and addressing issues encountered on price collection.

The data issues and concerns raised before and during the workshops were revisited either through telephone or e-mail. Continuous interaction with the ADB ICP team was important to the success of the regional technical assistance for the 2017 ICP for Asia and the Pacific.

Price Collection Tools

ICP APSS was used for the ICP price collection, especially for household products. Meanwhile, for machinery and equipment, construction, government compensation, and housing rental, the data were recorded with the user-friendly price collection tool provided by the ADB team.

Challenges in Implementation

Challenges included tightly defined product specifications on ICP lists, differing from those used in the CPI, and for which prices had to be collected often. The tight specification of items made it difficult to price under machinery and equipment, housing rentals, and construction. As a way forward, the DOS will collaborate with other relevant departments and agencies for better ICP implementation in future.

Lessons Learned and Future Directions

The units in the DOS directly involved in the 2017 ICP benefited from the regional technical assistance project. The knowledge and experience from the ICP helped improve the price collection activities of the DOS. The project also introduced DOS officers to a network of regional counterparts with whom they communicated on related issues.

For better integration of the CPI and ICP surveys, the DOS finds it important that some of their items match and their price collection periods coincide. The data validation techniques in ICP were extremely useful, which motivated the DOS to introduce similar techniques on the CPI. The price collection tools were also very useful. Though machinery and equipment and construction items are not yet included in the routine CPI data collection, the DOS plans to adopt some of the ICP methodologies and to produce new datasets based on the collected prices for these non-household components.

To further improve the price data for machinery and equipment and construction, the DOS plans to collaborate with relevant stakeholders to widen awareness and understanding of the usefulness of these data for policy making. Advocacy activities on uses of PPPs are important in promoting wider exposure among the users.

Cambodia

Economy Results

As Table 7.4 shows, Cambodia has the 14th largest population share of the region with 15.85 million or 0.42% of the region; while, in contrast, its nominal GDP of HK$173 billion (column 7) constitutes only 0.12% of the region's total nominal GDP, ranking 16th largest in the region (column 8). Adjusting for spatial price differences expands its share to 0.16% of the region's total real GDP (column 4) registering a higher real GDP figure of HK$378 billion (column 3) but remained at 16th place in terms of ranking. Cambodia's nominal ICEH comprises 80.37% of the economy's nominal GDP (column 11)—the second highest share of nominal ICEH-to-GDP in the region, after Pakistan. Its real ICEH of HK$303 billion (column 3) comprises only 0.26% of the region's total real ICEH, placing it 16th in the region (column 4). Cambodia's real GFCF of HK$36 billion (column 3) is equivalent to 0.05% of the region's total, ranking 19th place in the region (column 4).

Cambodia has the third lowest per capita nominal GDP of HK$10,904 (column 9), which is only 28% of the region's average per capita nominal GDP (column 10). After factoring in spatial price differences, Cambodia's per capita real GDP is estimated at HK$23,853 (column 5), which is 39% of the region's average per capita real GDP (column 6), ranking second lowest, after Nepal. Although Cambodia's nominal ICEH has a high

share of 80.37% of the economy's nominal GDP (column 11), Cambodia's per capita real ICEH of HK$19,097 (column 5) is the third lowest in the region, following Myanmar and Nepal. Cambodia has the lowest per capita real expenditures for the following components (with the corresponding per capita real index relative to the regional average of 100 in parentheses, as drawn from column 6): clothing (15); communication (5); GFCF (11); and construction (11).

With the local currency of riels (KR), Cambodia's PPP at GDP level of KR237.61 = HK$1 (column 2) is 46% of the exchange rate of KR519.75 = HK$1, implying that the overall price level in Cambodia is 46% of (or 54% lower than) that in Hong Kong, China (column 12) and 71% (or 29% lower than) the region's average price level (column 13). The PLIs for 30 out of 34 expenditure components in Table 7.4 are below the regional average of 100 (column 13).

Economy Experience in Program Implementation

Administrative Setup

The 2017 International Comparison Program (ICP) activities were implemented by a core group within the National Institute of Statistics (NIS). This core group comprised technical staff in the Department of National Accounts, mostly from the Price Statistics Office. The NIS director general led the group, with the assistance of a national coordinator and a deputy national coordinator for the ICP.

Use of Existing Infrastructure in Collecting Data

Similar to the 2011 ICP cycle, the central office and provincial staff responsible for the consumer price index (CPI) also collected prices for the 2017 ICP cycle. The data collectors gathered both ICP and CPI prices during the same visit and from the same outlets.

Table 7.4: Summary Results for Cambodia, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Real Expenditure HK$	Per Capita Real Expenditure Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Nominal Expenditure HK$	Per Capita Nominal Expenditure Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	237.61	378.1	0.16 [16]	23,853	39 [21]	172.8	0.12 [16]	10,904	28 [20]	100.00 [n.a.]	46	71 [12]	89,830.52
Actual Individual Consumption by Households[a]	227.84	335.4	0.25 [16]	21,161	60 [19]	147.0	0.19 [16]	9,276	45 [19]	85.07 [02]	44	75 [13]	76,416.27
Food and non-alcoholic beverages	274.33	123.0	0.45 [15]	7,758	107 [16]	64.9	0.41 [15]	4,095	99 [17]	37.55 [02]	53	92 [12]	33,732.31
Food	270.90	119.3	0.45 [15]	7,527	107 [15]	62.2	0.41 [15]	3,923	99 [16]	35.98 [03]	52	92 [14]	32,317.57
Bread and cereals	276.89	37.4	0.67 [14]	2,357	161 [10]	19.9	0.58 [14]	1,256	139 [13]	11.52 [03]	53	86 [17]	10,345.52
Meat and fish	288.16	34.6	0.50 [13]	2,186	119 [16]	19.2	0.46 [14]	1,212	110 [15]	11.11 [01]	55	93 [07]	9,982.34
Fruits and vegetables	268.30	18.1	0.25 [15]	1,141	60 [19]	9.3	0.26 [16]	589	63 [19]	5.40 [04]	52	105 [14]	4,852.75
Other food and non-alcoholic beverages	270.59	31.6	0.39 [15]	1,994	93 [18]	16.5	0.36 [16]	1,038	86 [18]	9.52 [03]	52	92 [13]	8,551.69
Alcoholic beverages, tobacco and narcotics	186.32	15.9	0.63 [12]	1,005	151 [10]	5.7	0.31 [17]	360	75 [15]	3.30 [05]	36	50 [19]	2,967.21
Clothing and footwear	287.62	5.0	0.10 [16]	313	24 [21]	2.7	0.07 [17]	173	18 [21]	1.59 [16]	55	74 [13]	1,426.04
Clothing	291.31	2.5	0.06 [18]	158	15 [22]	1.4	0.05 [17]	89	11 [22]	0.81 [20]	56	78 [11]	731.49
Housing, water, electricity, gas and other fuels[a]	219.78	53.9	0.24 [16]	3,398	57 [21]	22.8	0.21 [15]	1,437	51 [18]	13.18 [03]	42	89 [06]	11,836.17
Furnishings, household equipment and routine household maintenance	283.64	5.0	0.12 [17]	313	29 [20]	2.7	0.09 [17]	171	21 [20]	1.57 [17]	55	72 [12]	1,409.10
Health[a]	94.01	110.5	0.27 [15]	6,973	64 [17]	20.0	0.12 [15]	1,261	28 [18]	11.57 [03]	18	44 [16]	10,390.09
Education[a]	116.49	45.4	0.19 [15]	2,866	45 [17]	10.2	0.11 [15]	642	27 [17]	5.89 [05]	22	60 [15]	5,291.70
Education[a]	77.49	65.8	0.36 [15]	4,151	85 [17]	9.8	0.12 [15]	619	29 [17]	5.68 [06]	15	34 [17]	5,098.39
Transportation and communication	306.87	18.9	0.11 [15]	1,193	26 [19]	11.2	0.11 [15]	704	27 [19]	6.46 [13]	59	102 [08]	5,803.60
Transportation	315.26	17.8	0.13 [15]	1,124	31 [18]	10.8	0.14 [15]	682	33 [17]	6.25 [11]	61	108 [08]	5,616.00
Communication	272.76	0.7	0.02 [20]	43	5 [22]	0.4	0.02 [21]	23	4 [22]	0.21 [22]	52	79 [15]	187.60
Recreation and culture[a]	354.03	5.8	0.15 [16]	368	35 [18]	4.0	0.12 [15]	251	28 [17]	2.30 [11]	68	78 [13]	2,065.62
Restaurants and hotels	242.71	14.9	0.28 [15]	939	66 [14]	7.0	0.20 [16]	439	48 [14]	4.02 [07]	47	72 [14]	3,612.97
Miscellaneous goods and services[a]	272.74	7.6	0.06 [17]	479	14 [20]	4.0	0.04 [17]	251	9 [20]	2.31 [20]	52	70 [13]	2,071.68
Individual Consumption Expenditure by Government	140.26	30.1	0.16 [16]	1,899	38 [17]	8.1	0.07 [15]	513	17 [18]	4.70 [12]	27	45 [15]	4,222.44
Collective Consumption Expenditure by Government	233.89	14.2	0.09 [19]	898	22 [22]	6.4	0.07 [19]	404	16 [22]	3.71 [22]	45	70 [09]	3,329.22
Gross Fixed Capital Formation	273.33	35.5	0.05 [19]	2,240	11 [22]	18.7	0.03 [19]	1,178	8 [22]	10.80 [22]	53	72 [16]	9,703.36
Machinery and equipment	520.78	8.5	0.08 [18]	535	18 [21]	8.5	0.07 [18]	536	17 [21]	4.91 [21]	100	95 [09]	4,414.09
Construction	164.05	31.5	0.05 [18]	1,991	11 [22]	10.0	0.03 [18]	628	7 [22]	5.76 [21]	32	58 [17]	5,175.74
Other products	507.50	0.2	0.00 [22]	14	1 [22]	0.2	0.00 [22]	14	1 [22]	0.13 [22]	98	94 [11]	113.53
Changes in Inventories and Acquisitions Less Disposals of Valuables	286.26	1.7	0.04 [15]	106	9 [15]	0.9	0.03 [15]	58	7 [15]	0.53 [12]	55	84 [12]	479.02
Balance of Exports and Imports	519.75	-0.2	-0.01 [12]	-12	-2 [12]	-0.2	-0.01 [12]	-12	-2 [12]	-0.11 [12]	100	100 [n.a.]	-97.34
Individual Consumption Expenditure by Households[b]	238.51	302.7	0.26 [16]	19,097	62 [20]	138.9	0.21 [16]	8,763	49 [20]	80.37 [02]	46	80 [13]	72,193.83
Individual Consumption Expenditure by Households without Housing[b]	250.10	255.8	0.25 [16]	16,141	61 [20]	123.1	0.20 [16]	7,767	49 [20]	71.23 [02]	48	80 [15]	63,986.47
Government Final Consumption Expenditure	183.79	41.1	0.12 [19]	2,592	29 [20]	14.5	0.07 [18]	917	16 [20]	8.41 [21]	35	57 [15]	7,551.66
Domestic Absorption	236.24	380.7	0.17 [16]	24,017	39 [21]	173.0	0.12 [16]	10,916	28 [20]	100.11 [11]	45	71 [12]	89,927.86

Reference Data

Exchange rate (LCU/HK$)	519.75
Total population (in million)	15.85
Population share to AP (%) [ranking]	0.42 [14]

0.00 = magnitude is less than half of the unit employed; AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.
b Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Out of the 258 CPI items, 156 of them overlapped with the ICP items. For the housing rental survey, existing data sources such as the 2017 CPI and 2016 Cambodia Socio-Economic Survey were supplemented with special housing rental price collection. Government compensation information was collected from existing administrative sources. The NIS staff collected data for machinery and equipment and for construction from experts in various companies.

Survey Framework

For the 2017 ICP cycle, the household consumption survey covered the entire economy of Cambodia. The coverage includes five provinces (accounting for 10 districts) and for Phnom Penh City (accounting for five districts) where 1,244 outlets were selected for price collection. Out of these outlets, 908 were urban and 336 were rural. Prices for items under food, clothing, and housing were collected monthly, while the rest of household consumption categories were collected quarterly.

For housing rental data, the NIS ICP team collected prices from urban areas in five selected provinces. Surveys for construction and for machinery and equipment covered five provinces and the capital. Compensation data for government occupations and other related indicators were collected from administrative sources.

Gross Domestic Product Expenditure Values

Gross domestic product (GDP) expenditure values were estimated for most of the 155 basic headings according to the 2017 ICP classification. Some basic headings (i.e., narcotics and prostitution) were not estimated as they are not applicable in Cambodia. The GDP value estimate for individual consumption expenditure by nonprofit institutions serving households was available only at the aggregate level. The NIS ICP team estimated basic headings under household consumption using

the household consumption expenditure survey in 2017 and information from the CPI. The GDP expenditure value estimate for net purchases abroad was estimated separately. The statistical discrepancy observed in the expenditure side of GDP estimates was added to the estimates of inventories with relatively weaker data sources. The total gross capital formation came from investment data and was broken down into different categories using data from the establishment survey. Imports and exports data are generally available from the Imports and Exports Statistics Report from General Department of Customs, and balance of payments from the Central Bank of Cambodia.

Data Validation

The regional validation workshops held by the Asian Development Bank (ADB) helped in checking the consistency of prices in the provinces across the economy. Initially, prices in the questionnaire were checked for item specification, measure, and quantities, then compared with the movement of prices of similar products in the CPI. Checking was then done in each province across the economy. Then, the NIS ICP team compared the prices with the data collected during the 2011 ICP price survey, using the validation worksheet provided by ADB. Data validation using the ICP Asia Pacific Software Suite (ICP APSS) helped the NIS in responding to queries during the regional workshops.

Price Collection Tools

ADB designed and developed price collection tools (PCTs) and the ICP APSS—a program designed for data entry and management, and generation of summary statistics. Along with these useful tools, ADB provided guidelines and manuals for data processing and editing. The NIS handled arrangements for the use of existing facilities, such as equipment, network, and office space, to implement the project.

Challenges in Implementation

In implementing ICP activities for household consumption items, the difficulty was in finding branded consumer items available in the region, and the quality of clothing. For the non-household items, the challenge was the availability of construction materials and machinery and equipment with the same specification and model described in the structured product descriptions (SPDs). Similarly, new products for heavy machinery and equipment were not included in price collection because these were not available and secondhand products are more common in Cambodia.

Lessons Learned and Future Directions

Since the 2017 ICP cycle, the NIS integrated ICP price collection as a regular activity in the NIS's work program by including the ICP items from data collection surveys in Cambodia.

The NIS staff gained and benefited from their experience in the ICP activities. Because of lessons learned in the 2017 cycle, the NIS staff in the price statistics section of the National Accounts Department and the provincial staff are better prepared to join the 2020 ICP round.

For future ICP rounds, there is a need to standardize packaging units across economies to better reflect actual prices. There is also a need for rigorous workshops on understanding the SPDs of items and for intra-economy validation of price data to review the collected prices from urban and rural areas.

People's Republic of China

Economy Results

With a population of about 1.39 billion, the People's Republic of China is the most populous economy, with a share of more than a third or 36.62% of the region's population. As Table 7.5 shows, the economy has the highest nominal GDP of HK$94,638 billion (column 7), which is more than three-fifths (63.57%) of the region's total nominal GDP (column 8). After adjusting for spatial price differences across 22 participating economies, the People's Republic of China registered a real GDP of HK$117,929 billion, highest in the region, but with a lower share of 50.76% of the region's total real GDP. A higher real GDP than nominal GDP indicates that the general price level in the People's Republic of China is lower than in Hong Kong, China, whereas a lower share in region's real GDP than in region's nominal GDP shows that general price level in the People's Republic of China is higher than the region's average price levels. In terms of the structure of the economy, the People's Republic of China's nominal share of ICEH to GDP at 37.73% is among the lowest in the region, ranking 20th (column 11), while its nominal share of GFCF to GDP at 42.85% (column 11) is the second highest, behind Bhutan. Despite having a relatively smaller nominal share of ICEH in its GDP, its real ICEH of HK$46,611 is the largest (column 3)—almost two-fifths (39.80%) of the region's total real ICEH (column 4). The People's Republic of China has the biggest share of real investment in the region with real GFCF of HK$47,428 billion (column 3), which constitutes more than three-fifth or 63.29% of the total real GFCF of the region (column 4).

Factoring in the People's Republic of China's large population, its per capita real GDP is estimated at HK$85,061 (column 5), which is 39% higher than the regional per capita real GDP (column 6) and the eighth highest in the region (column 6). Though the People's Republic of China has the largest real GFCF (column 4), its per capita real GFCF of HK$34,209 (column 5) ranks at seventh place in the region, but it is still 73% higher than the regional level (column 6).

Table 7.5: Summary Results for the People's Republic of China, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure		Per Capita Real Expenditure		Nominal Expenditure		Per Capita Nominal Expenditure		Nominal Expenditure Shares, (%) [ranking]	PLIs		Expenditure (billion LCU)
		(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP=100) [ranking]	(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP=100) [ranking]		(HKG = 100)	(AP=100) [ranking]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	0.70	117,928.5	50.76 [01]	85,061	139 [08]	94,637.9	63.57 [01]	68,262	174 [07]	100.00 [n.a.]	80	125 [03]	82,075.40
Actual Individual Consumption by Households[a]	0.67	57,691.5	42.96 [01]	41,613	117 [11]	44,670.2	56.64 [01]	32,220	155 [08]	47.20 [19]	77	132 [03]	38,740.57
Food and non-alcoholic beverages	0.67	8,641.1	31.46 [01]	6,233	86 [22]	6,656.3	42.36 [01]	4,801	116 [13]	7.03 [19]	77	135 [04]	5,772.70
Food	0.66	8,421.7	31.61 [01]	6,075	86 [22]	6,452.3	42.84 [01]	4,654	117 [12]	6.82 [18]	77	136 [04]	5,595.82
Bread and cereals	0.79	1,250.2	22.49 [02]	902	61 [22]	1,144.0	33.39 [01]	825	91 [18]	1.21 [18]	92	148 [04]	992.14
Meat and fish	0.61	3,391.1	48.79 [01]	2,446	133 [14]	2,383.6	57.32 [01]	1,719	157 [08]	2.52 [15]	70	117 [04]	2,067.21
Fruits and vegetables	0.58	2,419.2	33.45 [02]	1,745	91 [11]	1,627.7	45.80 [01]	1,174	125 [09]	1.72 [17]	67	137 [07]	1,411.65
Other food and non-alcoholic beverages	0.73	1,788.5	22.13 [02]	1,290	60 [21]	1,500.9	32.82 [01]	1,083	90 [16]	1.59 [19]	84	148 [02]	1,301.70
Alcoholic beverages, tobacco and narcotics	0.76	1,037.4	41.13 [01]	748	112 [12]	912.6	49.96 [01]	658	136 [11]	0.96 [17]	88	121 [07]	791.45
Clothing and footwear	1.29	1,383.8	27.72 [02]	998	76 [14]	2,053.1	55.21 [01]	1,481	151 [06]	2.17 [13]	148	199 [01]	1,780.59
Clothing	1.27	1,093.9	26.65 [02]	789	73 [17]	1,596.1	54.18 [01]	1,151	148 [06]	1.69 [14]	146	203 [01]	1,384.22
Housing, water, electricity, gas and other fuels[a]	0.56	9,596.3	42.29 [01]	6,922	115 [12]	6,142.5	57.21 [01]	4,431	156 [07]	6.49 [17]	64	135 [05]	5,327.11
Furnishings, household equipment and routine household maintenance	0.87	1,870.2	45.55 [01]	1,349	124 [09]	1,885.8	60.18 [01]	1,360	164 [08]	1.99 [14]	101	132 [02]	1,635.46
Health and education[a]	0.47	22,460.2	54.16 [01]	16,200	148 [10]	12,222.8	71.92 [01]	8,816	196 [05]	12.92 [01]	54	133 [03]	10,600.34
Health[a]	0.39	15,269.3	63.38 [01]	11,014	173 [05]	6,815.7	75.67 [01]	4,916	207 [04]	7.20 [01]	45	119 [04]	5,910.99
Education[a]	0.58	8,110.3	44.07 [01]	5,850	120 [13]	5,407.1	67.70 [01]	3,900	185 [05]	5.71 [05]	67	154 [03]	4,689.35
Transportation and communication	0.56	7,849.7	45.17 [01]	5,662	123 [10]	5,047.7	50.29 [01]	3,641	137 [10]	5.33 [17]	64	111 [06]	4,377.68
Transportation	0.52	5,930.6	43.00 [01]	4,278	117 [10]	3,584.3	46.33 [01]	2,585	127 [09]	3.79 [16]	60	108 [09]	3,108.48
Communication	0.68	1,859.9	53.90 [01]	1,342	147 [08]	1,463.5	63.60 [01]	1,056	174 [08]	1.55 [11]	79	118 [05]	1,269.20
Recreation and culture[a]	0.86	2,168.6	55.14 [01]	1,564	151 [08]	2,143.0	62.13 [01]	1,546	170 [07]	2.26 [12]	99	113 [04]	1,858.50
Restaurants and hotels	0.74	2,088.7	38.67 [01]	1,507	106 [10]	1,773.2	50.81 [01]	1,279	139 [09]	1.87 [15]	85	131 [02]	1,537.84
Miscellaneous goods and services[a]	0.85	5,960.6	44.36 [01]	4,299	121 [09]	5,833.2	58.13 [01]	4,207	159 [05]	6.16 [10]	98	131 [03]	5,058.91
Individual Consumption Expenditure by Government	0.60	12,874.0	67.55 [01]	9,286	184 [10]	8,966.8	79.26 [01]	6,468	216 [05]	9.47 [01]	70	117 [03]	7,776.51
Collective Consumption Expenditure by Government	0.72	7,282.5	48.06 [01]	5,253	131 [11]	6,075.7	62.17 [01]	4,382	170 [08]	6.42 [15]	83	129 [02]	5,269.16
Gross Fixed Capital Formation	0.74	47,427.8	63.29 [01]	34,209	173 [07]	40,555.8	73.82 [01]	29,253	202 [06]	42.85 [02]	86	117 [02]	35,172.31
Machinery and equipment	1.00	6,465.1	57.47 [01]	4,663	157 [09]	7,478.7	63.18 [01]	5,394	173 [08]	7.90 [14]	116	110 [03]	6,485.94
Construction	0.57	43,267.1	64.72 [01]	31,208	177 [06]	28,311.4	78.23 [01]	20,421	214 [04]	29.92 [02]	65	121 [03]	24,553.31
Other products	0.99	4,167.0	62.87 [01]	3,006	172 [05]	4,765.7	68.93 [01]	3,437	188 [05]	5.04 [07]	114	110 [03]	4,133.05
Changes in Inventories and Acquisitions Less Disposals of Valuables	0.76	1,935.0	43.01 [02]	1,396	117 [07]	1,693.2	57.45 [01]	1,221	157 [05]	1.79 [07]	88	134 [03]	1,468.43
Balance of Exports and Imports	0.87	1,643.0	70.11 [01]	1,185	191 [08]	1,643.0	70.11 [01]	1,185	191 [08]	1.74 [08]	100	100 [n.a.]	1,424.94
Individual Consumption Expenditure by Households[b]	0.66	46,610.8	39.80 [01]	33,620	109 [14]	35,703.4	52.85 [01]	25,753	144 [08]	37.73 [20]	77	133 [04]	30,964.06
Individual Consumption Expenditure by Households without Housing[b]	0.68	40,057.4	39.78 [01]	28,893	109 [14]	31,635.0	52.39 [01]	22,818	143 [09]	33.43 [19]	79	132 [03]	27,435.70
Government Final Consumption Expenditure	0.67	19,609.0	58.17 [01]	14,144	159 [12]	15,042.4	71.34 [01]	10,850	195 [06]	15.89 [06]	77	123 [02]	13,045.67
Domestic Absorption	0.70	115,947.8	50.33 [01]	83,633	137 [09]	92,994.8	63.46 [01]	67,077	173 [07]	98.26 [15]	80	126 [03]	80,650.46

Reference Data

Exchange rate (LCU/HK$)	0.87
Total population (in million)	1386.40
Population share to AP (%) [ranking]	36.62 [01]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

With the local currency of yuan (CNY), the People's Republic of China's PPP at GDP level of CNY0.70 = HK$1 (column 2) is 80% of the exchange rate CNY0.87 = HK$1, implying that the general price level in the People's Republic of China is 80% of (or 20% lower than) the price level in Hong Kong, China (column 12), but it is 125% of (or 25% higher than) the regional average price level (column 13). The People's Republic of China has the third highest PLI at GDP level in the region, behind Singapore and Hong Kong, China. The PLIs for all 34 components in Table 7.5 are greater than the regional average of 100 (column 13). The highest PLI for the household consumption category is for clothing and footwear, at 199, or 99% higher than the regional average (column 13).

Economy Experience in Program Implementation

Administrative Setup

In the People's Republic of China, the International Comparison Program (ICP) is implemented under the organization and guidance of the National Statistical Society of China (NSSC) with the main vision of strengthening statistical capability and international cooperation. The national ICP office, set in the International Statistical Information Center under the National Bureau of Statistics of China (NBS), People's Republic of China, is responsible for the survey design, data aggregation, knowledge, and advocacy. In 31 provinces and autonomous regions, the ICP offices at provincial (regional) level are set up to collect prices and carry out specific survey activities.

Use of Existing Infrastructure in Collecting Data

The existing infrastructure, including the consumer price index (CPI) survey, household survey, and national accounts was used in the 2017 ICP round.

The price data were collected by the CPI survey team. Some of the CPI pricing outlets were included in the ICP outlets. The advantages of using the CPI

survey team were obvious: it was efficient, cost effective, and could secure better quality of the data. However, it still had some disadvantages. In the People's Republic of China, the components of the CPI and ICP were quite different, resulting in low coincidence rates of outlets and items (both are about 20%) between the two surveys. This increased the burden for the CPI team to a certain degree.

The NSSC ICP team used existing data from the household income, expenditure, and consumption survey, as well as population census and statistical yearbook. Price data for machinery and equipment, construction, and government compensation were obtained from the specific surveys launched by the national ICP office.

Household consumption expenditure obtained from the survey also significantly helped in splitting the gross domestic product (GDP) expenditure. The splitting of basic heading expenditures was successfully made by using consumption data from household survey and expenditure data from national accounts.

Survey Framework

Eighty-four regions at prefecture-level were selected for the 2017 ICP price surveys. These regions were selected from 31 provincial regions (including 27 provinces and 4 municipalities) according to economic development, population, and capacity of the survey team, among other issues. The coverage was as follows:

(i)   27 provinces (including autonomous regions), with each province selecting the capital city and two prefecture-level regions and for each city selecting four urban areas and two rural areas; and

(ii) four municipalities (Beijing, Tianjin, Shanghai, and Chongqing).

The survey framework represented 100% of the national population located in the 84 regions. Urban areas, rural areas, and all types of outlets were included. The total number of outlets is 39,587.

The frequency of price collection of categories depended on the seasonal nature of the items within the category. Food and non-alcoholic beverages were priced monthly. Items under the categories of alcoholic beverages, tobacco and narcotics, restaurants and hotels, and miscellaneous goods and services were priced quarterly. Others were priced semiannually.

A high percentage of the total number of items were collected for most household categories. But the collection rates for categories health and communication were quite low. The pharmaceutical products were split in a more detailed way after launching the survey activity and the survey did not cover the increased numbers of items, causing a low collection rate. Items under the category of communication were either outdated or mostly not applicable, therefore, the collection rate was also very low. Great efforts in household price consumption survey were made for the success of the 2017 ICP.

For non-household price surveys, the number of samples was satisfactory. Prices for items were collected in the machinery and equipment price survey, construction price survey, and housing rental survey. The housing rental survey had national coverage and was conducted in the first quarter of 2018. The machinery and equipment price survey, construction price survey, and housing rental survey also had national coverage and all were implemented in the first quarter of 2018. All basic headings in the non-household surveys were covered. These surveys provided enough price information for non-household products. The government compensation survey was implemented in the fourth quarter of 2018 and represented the national average compensation in 2017 on government services.

Gross Domestic Product Expenditure Values

Although the GDP by expenditure approach is in accordance with System of National Accounts 2008, its classification in the People's Republic of China

is not detailed enough at present. In order to split GDP expenditure into 155 basic headings, existing expenditure data of major categories for 2017 were employed as the control numbers. The household survey data in 2017, financial data, input–output table, and total investment in fixed assets in the whole economy were used to estimate the expenditure of basic headings.

The GDP expenditure values for the main aggregate and components of individual consumption expenditure by nonprofit institutions serving households were subsumed in the government final consumption expenditure and separate estimates are not available. The GDP expenditure value estimate for net purchases abroad was also not estimated separately. Since the released official GDP value in the People's Republic of China is based on the production approach, statistical discrepancy between the production approach and the expenditure approach was allocated to all the 155 basic headings evenly.

Data Validation

Two-stage validation was employed in the data validation process in the 2017 ICP. At the first stage, the provincial ICP offices validated the data after the price data were collected. The provincial ICP offices were responsible for the quality of the prices collected. The data were then submitted to the NBS ICP national office. At the second stage, the NBS ICP national office would put the data collected from 31 provincial regions together, and parameters such as the minimum-to-maximum ratio and coefficient of variation were used for data validation. If the prices were problematic, the NBS ICP national office would give feedback for a re-checking by the provincial offices. Thus, data validation was an iterative process.

To improve and ensure data quality, the price validation workshop for each survey was held before the prices were submitted to the Asian

Development Bank (ADB). Experts from the NBS ICP national office, some departments, and universities participated in the workshops. The measure was very effective, especially for the data for the machinery and equipment price survey and construction price survey.

Price Collection Tools

The ICP Asia Pacific Software Suite (ICP APSS), developed by ADB to process data from household price survey, was not used for household price collection. The price collection tools for machinery and equipment, construction, housing, and compensation developed by ADB were used and were useful for data validation.

Challenges in Implementation

The first challenge was the difficulty in finding comparable items. For the ICP, the items have very detailed specifications for keeping comparability, but finding comparable items was still difficult. For example, it was required to collect prices for medium quality types of some items in household price survey, but different enumerators had different understandings of the concept of "medium," which might lead the enumerators to collect prices for different quality products. Another issue of concern was lack of professional knowledge on the machinery and equipment survey. Usually, enumerators had limited professional knowledge about different types of machinery. They might know what items should be surveyed, but they did not understand the differences in specification on some technical parameters. Thus, they might collect prices for non-comparable items. During the 2017 ICP cycle, ADB organized many regional trainings which definitely improved the NSSC ICP team's understanding of item specifications for machinery and equipment and for construction, and the requirements of data validation in these two fields.

The second challenge was not having enough data from the routine surveys. The ICP is an international statistical program, and data for the ICP cannot always be acquired from the existing statistics activities. Lacking the related data meant the national ICP office had to launch a new survey according to ICP requirements.

The last challenge was lack of sufficient time to prepare for activities because of tight time arrangements. Once a specific ICP survey started, the NBS ICP national office needed to undertake a series of activities, for example translating the materials, designing the survey system, and training statisticians. All of these activities required a lot of time.

Lessons Learned and Future Directions

So far, the ICP in the People's Republic of China is still a research and exploratory international cooperation program. The NBS and the NSSC are strengthening research on both ICP methodology and its implementation.

The effort of applying ICP's advanced methods is in progress. Many statisticians in provincial regions tried to integrate the CPI and ICP outlets and items together as far as possible. More than 100 subnational items were added to the list of the household price survey in the People's Republic of China (items' prices were collected from CPI survey) in the 2017 ICP cycle. The measure will strengthen the data comparability and representativeness of subnational purchasing power parities (PPP), which may be calculated by the national ICP office in the future. Moreover, more data from regular statistics were employed in the 2017 ICP cycle compared with previous rounds.

In this case, the NBS hopes that ADB strengthens the trainings for the economies in many ways so that the statisticians could understand the ICP quite deeply. The training courses could invite ICP experts and could include frontiers from data production to data application, such as quality adjustment, productivity adjustment, subnational PPP calculation, and economic activity analysis.

Economies will benefit from these trainings and the region will ultimately benefit from the improved quality of data.

Although limitations exist both in data and method, the ICP activities were very beneficial. During the 2017 ICP cycle, different data sources and institutions were integrated to ensure the smooth implementation of ICP activities. With the participation in 2017 ICP and its implementation, relevant knowledge has increased and statistical capability was enhanced, which will significantly help other routine statistical activities.

Fiji

Economy Results

Fiji has the fourth smallest population, with 0.88 million or only 0.02% of the region's total. In contrast, as Table 7.6 shows, Fiji's economy has the third lowest real and nominal GDP, with real GDP of HK$70.8 billion (column 3) and nominal GDP of HK$41.7 billion (column 7), constituting the same fraction (0.03%) of the region's total nominal and real GDP (columns 8 and 4). Fiji's nominal ICEH accounts for 67.49% of its nominal GDP (column 11), the sixth highest nominal ICEH-to-GDP ratio in the region. In PPP terms, real ICEH is estimated at HK$47.3 billion (column 3) and is only 0.04% of the region's total real ICEH, ranking 19th in the region (column 4). Fiji has the lowest real GFCF share at 0.02% of the region's total real GFCF (column 4). Fiji also ranks lowest for health, with a real expenditure share of 0.01% in region's total real health (column 4); and restaurants and hotels, with a real expenditure share of 0.01% of the region (column 4).

Despite being the third smallest economy in the region, factoring its small population improves Fiji's rank, ninth in terms of its per capita nominal

GDP of HK$47,572 (column 9) in the region, which is 21% higher than the regional per capita nominal GDP (column 10). Further adjusting for spatial price differences, Fiji maintains its rank at ninth place with a per capita real GDP of HK$80,772 (column 5), which is 32% higher than the regional per capita real GDP (column 6) and 70% higher than its per capita nominal GDP. Fiji ranks sixth in both per capita real and nominal ICEH: its per capita real ICEH of HK$53,908 (column 5) is 74% higher than the regional level (column 6); and per capita nominal ICEH of HK$32,106 (column 9) is 80% higher than the regional level (column 10). Though ranking lowest in terms of real (column 4) and nominal (column 8) investments in the region, Fiji has the 12th highest per capita real GFCF of HK$13,726 (column 5), which is 31% lower than the regional level (column 6); and 11th highest nominal GFCF of HK$8,460 (column 9), which is 42% lower than the regional level (column 10). Notable among the components in Table 7.6, Fiji has the highest per capita real expenditures for fruits and vegetables (with index of 268 relative to regional level of 100), and alcoholic beverages, tobacco and narcotics (with index of 715 relative to regional level of 100) (column 6).

With the local currency of Fiji dollars (F$), Fiji's PPP at GDP level of F$0.16 = HK$1 (column 2) is 59% of exchange rate of F$0.27 = HK$1, implying that overall price level in Fiji is 59% of (or 41% lower than) that in Hong Kong, China (column 12) and 92% of (or 8% lower than) the region's average price levels (column 13)—at the GDP level Fiji is the seventh most expensive commodities in the region. The PLIs for about two-fifths of the expenditure components in Table 7.6 are well above the regional average 100 (column 13). Among them, the following components register the fourth highest PLIs in the region: alcoholic beverages, tobacco and narcotics (PLI of 138) and restaurants and hotels (110) (column 13).

Table 7.6: Summary Results for Fiji, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Real Expenditure HK$	Per Capita Real Expenditure Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Nominal Expenditure HK$	Per Capita Nominal Expenditure Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	0.16	70.8	0.03 [20]	80,772	132 [09]	41.7	0.03 [20]	47,572	121 [09]	100.00 [n.a.]	59	92 [07]	11.06
Actual Individual Consumption by Households[a]	0.15	52.7	0.04 [19]	60,057	169 [07]	30.4	0.04 [19]	34,687	166 [07]	72.91 [05]	58	98 [07]	8.07
Food and non-alcoholic beverages	0.17	14.4	0.05 [19]	16,471	227 [04]	9.2	0.06 [19]	10,485	253 [04]	22.04 [08]	64	111 [06]	2.44
Food	0.17	13.9	0.05 [19]	15,796	224 [04]	8.6	0.06 [19]	9,842	247 [04]	20.69 [07]	62	110 [06]	2.29
Bread and cereals	0.18	2.6	0.05 [19]	3,012	205 [05]	1.8	0.05 [19]	2,034	225 [05]	4.28 [11]	68	110 [07]	0.47
Meat and fish	0.17	2.8	0.04 [19]	3,229	176 [09]	1.8	0.04 [19]	2,077	189 [07]	4.37 [10]	64	107 [05]	0.48
Fruits and vegetables	0.15	4.5	0.06 [18]	5,122	268 [01]	2.6	0.07 [18]	2,947	314 [03]	6.19 [03]	58	117 [09]	0.69
Other food and non-alcoholic beverages	0.18	4.5	0.06 [19]	5,093	239 [04]	3.0	0.07 [19]	3,428	284 [03]	7.21 [10]	67	119 [05]	0.80
Alcoholic beverages, tobacco and narcotics	0.27	4.2	0.17 [19]	4,761	715 [01]	4.2	0.23 [18]	4,761	987 [01]	10.01 [01]	100	138 [04]	1.11
Clothing and footwear	0.20	1.8	0.04 [20]	2,021	153 [06]	1.3	0.04 [19]	1,521	155 [05]	3.20 [06]	75	101 [06]	0.35
Clothing	0.19	1.6	0.04 [19]	1,802	166 [06]	1.1	0.04 [19]	1,262	162 [05]	2.65 [06]	70	98 [05]	0.29
Housing, water, electricity, gas and other fuels[a]	0.09	6.3	0.03 [20]	7,159	119 [11]	2.1	0.02 [21]	2,420	85 [10]	5.09 [20]	34	71 [12]	0.56
Furnishings, household equipment and routine household maintenance	0.21	2.5	0.06 [18]	2,811	259 [06]	2.0	0.06 [18]	2,247	271 [05]	4.72 [01]	80	105 [06]	0.52
Health and education[a]	0.11	10.8	0.03 [20]	12,291	112 [12]	4.3	0.03 [20]	4,913	109 [09]	10.33 [08]	40	98 [07]	1.14
Health[a]	0.09	3.4	0.01 [22]	3,822	60 [13]	1.2	0.01 [21]	1,357	57 [09]	2.85 [18]	36	95 [07]	0.32
Education[a]	0.11	7.5	0.04 [20]	8,565	176 [09]	3.1	0.04 [20]	3,556	169 [07]	7.47 [01]	42	96 [06]	0.83
Transportation and communication	0.15	7.3	0.04 [19]	8,291	181 [06]	4.1	0.04 [20]	4,690	177 [06]	9.86 [06]	57	98 [12]	1.09
Transportation	0.16	4.7	0.03 [19]	5,410	148 [08]	2.9	0.04 [20]	3,260	160 [08]	6.85 [08]	60	107 [10]	0.76
Communication	0.13	2.6	0.07 [17]	2,937	322 [05]	1.3	0.05 [18]	1,430	235 [07]	3.01 [02]	49	73 [16]	0.33
Recreation and culture[a]	0.20	0.7	0.02 [20]	762	73 [13]	0.5	0.01 [21]	585	64 [12]	1.23 [18]	77	88 [07]	0.14
Restaurants and hotels	0.19	0.5	0.01 [22]	579	41 [19]	0.4	0.01 [21]	413	45 [15]	0.87 [22]	71	110 [04]	0.10
Miscellaneous goods and services[a]	0.19	3.3	0.02 [19]	3,793	107 [10]	2.3	0.02 [19]	2,651	100 [09]	5.57 [11]	70	94 [05]	0.62
Individual Consumption Expenditure by Government	0.11	5.3	0.03 [22]	6,002	119 [12]	2.3	0.02 [21]	2,581	86 [09]	5.43 [08]	43	72 [07]	0.60
Collective Consumption Expenditure by Government	0.14	9.5	0.06 [21]	10,782	269 [07]	4.9	0.05 [20]	5,595	217 [06]	11.76 [04]	52	80 [07]	1.30
Gross Fixed Capital Formation	0.16	12.0	0.02 [22]	13,726	69 [12]	7.4	0.01 [22]	8,460	58 [11]	17.78 [20]	62	84 [07]	1.97
Machinery and equipment	0.26	4.6	0.04 [21]	5,300	178 [08]	4.6	0.04 [21]	5,285	169 [09]	11.11 [07]	100	95 [12]	1.23
Construction	0.12	5.2	0.01 [22]	5,913	33 [18]	2.3	0.01 [22]	2,590	27 [17]	5.44 [22]	44	81 [06]	0.60
Other products	0.26	0.5	0.01 [19]	599	34 [14]	0.5	0.01 [19]	585	32 [14]	1.23 [20]	98	94 [12]	0.14
Changes in Inventories and Acquisitions Less Disposals of Valuables	0.18	0.7	0.02 [16]	778	65 [10]	0.5	0.02 [17]	538	69 [09]	1.13 [11]	69	106 [07]	0.13
Balance of Exports and Imports	0.27	-1.5	-0.06 [13]	-1,707	-276 [18]	-1.5	-0.06 [13]	-1,707	-276 [18]	-3.59 [15]	100	100 [n.a.]	-0.40
Individual Consumption Expenditure by Households[b]	0.16	47.3	0.04 [19]	53,908	174 [06]	28.2	0.04 [19]	32,106	180 [06]	67.49 [06]	60	103 [07]	7.47
Individual Consumption Expenditure by Households without Housing[b]	0.17	40.9	0.04 [19]	46,641	175 [06]	27.0	0.04 [19]	30,772	193 [06]	64.69 [05]	66	110 [06]	7.16
Government Final Consumption Expenditure	0.13	15.0	0.04 [21]	17,113	192 [10]	7.2	0.03 [20]	8,176	147 [09]	17.19 [03]	48	76 [07]	1.90
Domestic Absorption	0.15	74.0	0.03 [20]	84,339	139 [08]	43.2	0.03 [20]	49,279	127 [08]	103.59 [08]	58	92 [07]	11.46

Reference Data

Exchange rate (LCU/HK$)	0.27
Total population (in million)	0.88
Population share to AP (%) [ranking]	0.02 [19]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

b Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Economy Experience in Program Implementation

Administrative Setup

The Fiji Bureau of Statistics, Prices Unit in the Economic Division, was responsible for implementing the International Comparison Program (ICP) activities. The chief executive, with the support of the chief statistician (Economic Division), designated the national and deputy national coordinators. The head of the Prices Unit assumed the national coordinator position while the head of the National Accounts Unit took the role of deputy national coordinator. The national coordinator is assisted by eight members of the Price Statistics Unit. The ICP price collection was conducted in parallel with the consumer price index (CPI) price collection every month. After price collection and data entry, the national coordinator conducted field visits to check, determine, and amend prices that were identified as outliers.

Use of Existing Infrastructure in Collecting Data

Since Fiji is a small island economy, the same outlets for the CPI were used for ICP purposes, but additional stalls were included, such as shoeshine, shoe repair, hair salon, and other related small activities. Transport category from the CPI price collection was also used for the ICP since the two surveys were conducted in parallel. Though some of the products' structured product descriptions (SPDs) did not match with those available from the CPI, the majority of the CPI items were included in the ICP compilation. For household consumption, 201 out of 349 CPI items were used for the ICP. The building material price index data were used in some of the ICP non-household goods survey of construction. For the housing rentals survey, data were collected from different types of buildings because the quarterly survey did not cover housing types such as villas and flats included in the ICP housing rental survey. The Household Income and Expenditure Survey did not cover the finer details of the required specifications on types of dwellings. Data were manually collected for CPI and likewise for ICP. The ICP price collection was not integrated in the national statistics office's work program as a regular activity and were collected separately. Compensation data were gathered from annual general government accounts.

Survey Framework

Sixteen urban areas in the Central, Western, and Northern divisions were covered. All geographic coverage was urban because rural dwellers usually did their shopping in towns and cities. All major outlets were selected by a top-down approach, resulting in the inclusion of all existing outlets from the CPI survey. Data were collected twice in every quarter, for 2–3 weeks covering both household and non-household components. Based on purposive sampling, the outlets were selected from the retail sales survey, which involved the following stages of selection: location of the outlets, industrial and/or commodity classification of the outlet, and volume of sales.

The following types of outlets were covered based on the CPI framework: large shops, medium and small shops, markets, specialized shops, private service providers, public or semi-public services, and other kinds of trade.

For the survey of household consumption, 878 outlets from urban areas were selected for price collection. The majority of household consumption categories were surveyed monthly, except for education which is surveyed annually. Although the household consumption survey covered only urban areas, the housing rental data was supplemented with the existing Household Income and Expenditure Survey 2014 to cover all of Fiji. The price surveys for machinery and equipment and construction were conducted only in urban areas. Compensation data for government occupations and other related indicators were collected from administrative sources.

Gross Domestic Product Expenditure Values

Gross domestic product (GDP) expenditure values were estimated for most of the 155 basic headings according to the 2017 ICP classification. Household consumption expenditure was estimated using the data from Household Income and Expenditure Survey conducted in 2013–2014 and the 2013 supply and use table. Some basic headings, such as narcotics, prostitution, and passenger transport by railway, are not applicable to Fiji. The GDP value for individual consumption expenditure by nonprofit institutions serving households was estimated separately. Statistical discrepancy is allocated to the weak components of households and gross fixed capital formation.

Data Validation

Before the price collection started, the CPI unit made sure that the product descriptions were strictly followed. The officers were trained in the SPDs by visiting the outlets and physically examining the products before price collection started. The national coordinator headed the price collection and supervised solving the price variation issues. Once the prices were collected, the officers validated the prices by comparing them with products from other divisions and outlets. Outliers, which could be the result of pricing of wrong items or wrong units and specifications, were also immediately addressed.

The team gained significant experience from attending the regional data validation workshops organized by the Asian Development Bank (ADB) and the staff understood better the price differences among the participating economies and between subregions within the economy. The prices of most products of an island economy, such as Fiji, are relatively higher because of the costs of freight, insurance, and duty owing to its location in the Pacific. Regional data validation workshops thus provided a useful platform in comparing prices

across the economies. The workshops also indicated whether price differences could be due to the actual price difference or caused by pricing a wrong item or wrong units of measurement. The workshops addressed useful issues, such as price variation and clarification of SPDs. The staff also learned methodologies for compiling purchasing power parities (PPPs) and its importance to the economy.

Price Collection Tools

The ICP Asia Pacific Software Suite for household, machinery and equipment, construction, and government compensation was easy to use and access. Initially, however, there were minor problems in the installation of the software to personal computers because of incompatibility issues. After the staff uploaded the software to a laptop, all data entry processing was successfully and easily completed.

Challenges in Implementation

Similar to the experience in 2011 ICP cycle, the price collection for ICP took 12 months with the number of items changing to match the specification or unit. Splitting of items was also done to ensure that the items priced were comparable across economies. The pricing officers had to keep up with the splitting of items when requested by ADB. The incompatibility of the existing computer systems with the software during the implementation also affected the speed of data entry.

Lessons Learned and Future Directions

A significant amount of knowledge was gained from all ICP activities, which improved the staff statistical capacity on price statistics. The introduction of PPP compilation and computation was new for Fiji, which implemented the ICP activities in response to a request by ADB. Fiji's Bureau of Statistics does not have an immediate plan to include the ICP activities to its work plan but may do so in the near future.

Hong Kong, China

Economy Results

With a population of 7.39 million or 0.20% of the region, Hong Kong, China has an estimated nominal GDP of HK$2,663 billion, as Table 7.7 shows (column 8), equivalent to 1.79% of the region's total nominal GDP, ranking sixth highest in the region. Hong Kong, China being the reference economy and Hong Kong dollar being the reference currency for the region, the value of real GDP expenditure for Hong Kong, China is the same as its nominal expenditure. However, when adjusting for spatial price differences across the 22 participating economies in the region lowers Hong Kong, China's share to 1.15% of the region's total real GDP (column 4), with a lower ranking at 12th place. Hong Kong, China's nominal GDP mainly comes from ICEH, with a share of 67.05% (column 11), the highest nominal ICEH-to-GDP ratio observed among high income economies in the region. With real ICEH totaling HK$1,785 billion (column 3), its share is only 1.52% of the region's total real ICEH, placing it 11th in the region (column 4). It has a lower share in real GFCF at 0.77% of the region's total real GFCF.

Hong Kong, China's per capita nominal GDP of HK$360,247 (column 9) is the second highest among the 22 participating economies of the region, about nine times of the regional per capita nominal GDP (column 10). In PPP terms, Hong Kong, China has the third highest per capita real GDP, nearly six times of the regional per capita real GDP (column 6). Hong Kong, China's per capita real ICEH of HK$241,555 (column 5) is the highest in the region. It also has the highest per capita real expenditures for the following components (with the corresponding per capita real index relative to the regional average of 100 in parentheses, as drawn from column 6): actual individual consumption by households (720); food and non-alcoholic beverages (358); food (346); meat and fish (675); other food and non-alcoholic

beverages (351); clothing and footwear (927); clothing (742); housing, water, electricity, gas and other fuels (665); furnishings, household equipment and routine household maintenance (1,174); communication (661); recreation and culture (2,528); restaurants and hotels (1,581); miscellaneous goods and services (1,493); and individual consumption expenditure by households.

Hong Kong, China's overall price level is 156% of region's average price level (column 13), the highest in the region. The PLIs for almost all expenditure components are well above the regional average of 100 (column 13) with the exception of machinery and equipment (95).

Economy Experience in Program Implementation

Administrative Setup

The Census and Statistics Department implemented the International Comparison Program (ICP) data collection in Hong Kong, China. The ICP activities were supervised by an assistant commissioner, who also served as the coordinator for the Census and Statistics Department for the ICP. A senior statistician was appointed as the deputy coordinator to help the coordinator in implementing the project. A team of 10 professional and subprofessional staff from the department's Price Statistics Branch and National Income Branch was involved.

Use of Existing Infrastructure in Collecting Data

Similar to the setup in the 2011 ICP cycle, the ICP data collection for household sector was integrated into the regular retail price survey, which collects price data for compiling the consumer price index (CPI), to achieve optimum efficiency and cost-effectiveness. This avoids duplication in pricing similar items for different programs. For household consumption, prices of 319 items collected for the CPI were directly used for the ICP.

Table 7.7: Summary Results for Hong Kong, China; 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Real Expenditure HK$	Per Capita Real Expenditure Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Nominal Expenditure HK$	Per Capita Nominal Expenditure Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	1.00	2,662.8	1.15 [12]	360,247	587 [03]	2,662.8	1.79 [06]	360,247	916 [02]	100.00 [n.a.]	100	156 [01]	2,662.84
Actual Individual Consumption by Households a	1.00	1,887.2	1.41 [11]	255,310	720 [01]	1,887.2	2.39 [08]	255,310	1,225 [01]	70.87 [07]	100	170 [01]	1,887.18
Food and non-alcoholic beverages	1.00	191.9	0.70 [14]	25,959	358 [01]	191.9	1.22 [11]	25,959	625 [01]	7.21 [18]	100	175 [01]	191.88
Food	1.00	180.0	0.68 [14]	24,354	346 [01]	180.0	1.20 [11]	24,354	612 [01]	6.76 [19]	100	177 [01]	180.01
Bread and cereals	1.00	18.7	0.34 [15]	2,525	172 [07]	18.7	0.54 [15]	2,525	279 [02]	0.70 [20]	100	162 [01]	18.67
Meat and fish	1.00	91.6	1.32 [12]	12,392	675 [01]	91.6	2.20 [10]	12,392	1,128 [01]	3.44 [12]	100	167 [01]	91.60
Fruits and vegetables	1.00	26.3	0.36 [14]	3,557	186 [05]	26.3	0.74 [12]	3,557	379 [02]	0.99 [20]	100	204 [02]	26.29
Other food and non-alcoholic beverages	1.00	55.3	0.68 [14]	7,484	351 [01]	55.3	1.21 [11]	7,484	620 [01]	2.08 [18]	100	177 [01]	55.32
Alcoholic beverages, tobacco and narcotics	1.00	15.2	0.60 [13]	2,063	310 [05]	15.2	0.83 [12]	2,063	428 [04]	0.57 [21]	100	138 [05]	15.25
Clothing and footwear	1.00	90.4	1.81 [08]	12,229	927 [01]	90.4	2.43 [06]	12,229	1,245 [01]	3.39 [05]	100	134 [03]	90.40
Clothing	1.00	59.5	1.45 [10]	8,043	742 [01]	59.5	2.02 [07]	8,043	1,034 [01]	2.23 [08]	100	139 [03]	59.45
Housing, water, electricity, gas and other fuels a	1.00	294.7	1.30 [11]	39,868	665 [01]	294.7	2.74 [06]	39,868	1,406 [01]	11.07 [06]	100	211 [03]	294.69
Furnishings, household equipment and routine household maintenance	1.00	94.1	2.29 [10]	12,730	1,174 [01]	94.1	3.00 [05]	12,730	1,538 [01]	3.53 [03]	100	131 [03]	94.10
Health and education a	1.00	278.3	0.67 [12]	37,648	344 [03]	278.3	1.64 [07]	37,648	839 [01]	10.45 [07]	100	244 [01]	278.29
Health a	1.00	157.4	0.65 [11]	21,294	335 [02]	157.4	1.75 [07]	21,294	895 [01]	5.91 [04]	100	267 [01]	157.40
Education a	1.00	120.9	0.66 [12]	16,354	336 [04]	120.9	1.51 [08]	16,354	775 [01]	4.54 [15]	100	230 [01]	120.89
Transportation and communication	1.00	169.9	0.98 [11]	22,991	501 [03]	169.9	1.69 [09]	22,991	867 [02]	6.38 [14]	100	173 [02]	169.94
Transportation	1.00	125.4	0.91 [11]	16,963	466 [03]	125.4	1.62 [10]	16,963	830 [02]	4.71 [14]	100	178 [02]	125.39
Communication	1.00	44.6	1.29 [09]	6,028	661 [01]	44.6	1.94 [07]	6,028	992 [02]	1.67 [09]	100	150 [04]	44.55
Recreation and culture a	1.00	194.1	4.94 [05]	26,263	2,528 [01]	194.1	5.63 [04]	26,263	2,882 [01]	7.29 [02]	100	114 [03]	194.13
Restaurants and hotels	1.00	166.7	3.09 [07]	22,555	1,581 [01]	166.7	4.78 [06]	22,555	2,446 [01]	6.26 [01]	100	155 [01]	166.72
Miscellaneous goods and services a	1.00	391.8	2.92 [07]	53,003	1,493 [01]	391.8	3.90 [04]	53,003	2,000 [01]	14.71 [01]	100	134 [02]	391.78
Individual Consumption Expenditure by Government	1.00	101.7	0.53 [12]	13,756	273 [04]	101.7	0.90 [09]	13,756	460 [04]	3.82 [15]	100	168 [01]	101.68
Collective Consumption Expenditure by Government	1.00	159.8	1.05 [13]	21,618	540 [04]	159.8	1.64 [08]	21,618	837 [03]	6.00 [17]	100	155 [01]	159.80
Gross Fixed Capital Formation	1.00	576.0	0.77 [12]	77,924	394 [03]	576.0	1.05 [10]	77,924	537 [03]	21.63 [18]	100	136 [01]	575.99
Machinery and equipment	1.00	161.4	1.43 [09]	21,838	735 [03]	161.4	1.36 [10]	21,838	698 [03]	6.06 [18]	100	95 [10]	161.42
Construction	1.00	360.4	0.54 [12]	48,761	276 [03]	360.4	1.00 [05]	48,761	510 [02]	13.54 [13]	100	185 [01]	360.42
Other products	1.00	54.1	0.82 [10]	7,326	418 [03]	54.1	0.78 [10]	7,326	401 [03]	2.03 [14]	100	96 [09]	54.15
Changes in Inventories and Acquisitions Less Disposals of Valuables	1.00	11.0	0.24 [12]	1,485	125 [06]	11.0	0.37 [09]	1,485	191 [04]	0.41 [14]	100	153 [01]	10.97
Balance of Exports and Imports	1.00	28.9	1.23 [08]	3,910	632 [06]	28.9	1.23 [08]	3,910	632 [06]	1.09 [10]	100	100 [n.a.]	28.90
Individual Consumption Expenditure by Households b	1.00	1,785.5	1.52 [11]	241,555	781 [01]	1,785.5	2.64 [07]	241,555	1,354 [01]	67.05 [07]	100	173 [01]	1,785.50
Individual Consumption Expenditure by Households without Housing b	1.00	1,538.1	1.53 [11]	208,079	782 [01]	1,538.1	2.55 [08]	208,079	1,305 [01]	57.76 [07]	100	167 [01]	1,538.06
Government Final Consumption Expenditure	1.00	261.5	0.78 [14]	35,374	397 [04]	261.5	1.24 [10]	35,374	635 [03]	9.82 [18]	100	160 [01]	261.47
Domestic Absorption	1.00	2,633.9	1.14 [11]	356,337	586 [02]	2,633.9	1.80 [08]	356,337	921 [01]	98.91 [13]	100	157 [01]	2,633.94

Reference Data

Exchange rate (LCU/HK$)	1.00
Total population (in million)	7.39
Population share to AP (%) [ranking]	0.20 [15]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

b Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

For ICP items not covered in the retail price survey, additional data were collected through the same survey—and same outlets, as much as possible—to make use of the experience and product knowledge of staff engaged in the regular price survey.

For items covered in the non-household components —such as machinery and equipment, construction, dwelling, and government compensation—the team conducted special data collection and data extraction from existing survey returns and administrative records. These activities optimized the use of resources and minimized respondents' reporting burden.

Survey Framework

The 2017 ICP price survey for household products covered the entire territory of Hong Kong, China. For the survey of household consumption, the team selected 1,880 outlets of different types, including market stalls, groceries, small shops, supermarkets, and departmental stores. In general, the outlets selected should be operating in a fixed location on the main streets in busy and accessible areas frequently patronized by households for the purchase of goods and services. Price collection of household consumption items was carried out monthly, except for fresh food items, which were collected weekly or biweekly; some health and miscellaneous items were collected quarterly; and some education items were collected annually.

Similar to the household component, price data for the non-household components were also collected throughout the whole territory of Hong Kong, China. For machinery and equipment, data were specifically collected from dealers and distributors.

For dwelling items, data collection was integrated into the existing survey vehicle with suitable enhancements to meet the ICP data requirements. For instance, housing rental data were collected from private rented households enumerated in a regular rent survey, which is conducted as a special topic enquiry in the General Household Survey on a monthly basis.

For construction items, a multipronged approach collected the required price information from different data sources. For instance, the material prices and labor rates were anchored to the existing survey vehicles, and the approximate project prices were collated from the relevant works departments and quantity surveying companies in the private sector, among others.

Compensation data for government occupations and other related indicators were collected from administrative sources.

Gross Domestic Product Expenditure Values

Gross domestic product (GDP) expenditure values were readily available for most of the basic headings. A few expenditure items were relatively less significant in Hong Kong, China, and detailed breakdowns were not available in its GDP compilation system. The estimates for these items were produced by referring to comprehensive data collected in the 2014–2015 round of the Household Expenditure Survey, as well as imports and re-exports statistics with detailed commodity breakdowns. GDP expenditure values were estimated for most of the 155 basic headings according to the 2017 ICP classification. Individual consumption expenditure by nonprofit institutions serving households is reported separately in the national accounts and the estimate for this main aggregate was submitted to the Asian Development Bank (ADB). The expenditure for net purchases abroad was subsumed in the household consumption. Detailed estimates of capital formation, imports, and exports are generally available from the GDP compilation system using external merchandise trade statistics, government accounts, visitor expenditure survey, and annual and quarterly economic surveys, along with other administrative data. Since the GDP is based on the expenditure approach, the statistical discrepancy is reflected in the GDP by production approach.

Data Validation

Data collected were thoroughly checked before submission to ADB. Particularly, the product specifications of items priced were checked to ensure they matched the ICP requirements exactly. Moreover, the price level of individual products and price relativity between comparable items were checked to identify possible outliers. In performing these validations, references were made to indicators such as the coefficient of variation and minimum-to-maximum price ratio of individual items. For some of the items which were also covered in the 2011 ICP cycle, the prices in the 2017 ICP were compared with the corresponding 2011 ICP prices for further validation. Price movements of the household consumption items collected for the ICP were also compared with price movements of similar products in the CPI to detect abnormal price changes caused by possible outliers or extraordinary events.

ICP Price Collection Tools

Hong Kong, China used the price analysis module to generate summary statistics but not the data entry module of the ICP Asia Pacific Software Suite (ICP APSS), because most data were directly collected using the computer assisted personal interviewing system of the regular CPI compilation. In general, the price collection tools (PCTs) of the ICP APSS were generally easy to use and provided useful data diagnostics to alert users on possible outliers. The PCTs could be further enhanced by providing summary reports such as the count of items with large price variations by major group or basic heading to facilitate data quality control.

Challenges in Implementation

The validation included temporal comparison of ICP and CPI price trends between 2011 and 2017. Certain incongruities of the ICP and CPI price trends for some of the household consumption items were noted. Further studies indicated that the differences in price trends between the simulated price changes based on ICP data and the official CPI were attributable to (i) different item coverage of the ICP and CPI, (ii) different weights for aggregation (i.e., the ICP used GDP weights whereas the CPI used the weights derived from the household expenditure survey), (iii) CPI inflation affected by government's one-off relief measures, and (iv) some quality change elements embedded between 2011 and 2017 ICP. With some additional efforts, the studies further affirmed the quality of the ICP and CPI data. In light of this experience, temporal analysis will be applied as an added diagnostic tool in future rounds of ICP.

In preparing for the data collection for machinery and equipment, the team found that some items, especially those under the basic heading "special purpose machinery," were not available in Hong Kong, China. Meanwhile, the models specified for certain items were not easily found but, alternatively, more popular and up-to-date models were available for pricing. Because the ICP requires exactly matched models for price comparison, it would be more desirable if future rounds of the ICP could include a wider range of comparable models for equipment items.

Lessons Learned and Future Directions

Participation in the ICP was a valuable experience. It provided the forum for statisticians to exchange experiences and views on price statistics, and to increase understanding of pricing surveys in other economies.

From the 2017 ICP experience, further effort will be made to synchronize the items in the ICP product list and items in the CPI basket, in order to enhance the comparability between ICP prices and CPI data and minimize extra resources required.

While the popularity of brands or outlets may change rapidly for some items, attention will be paid to selecting suitable brands or outlets in order to strike a balance between representativeness of brands or outlets and the data comparability across different cycles of the ICP.

Regarding the surveys of machinery and equipment and construction, further development in product knowledge among project team members is considered necessary in order to facilitate identifying and pricing suitable products in the future.

To allow sufficient time for identifying suitable outlets for pricing the correct product items (in particular the newly introduced items), it is always helpful if the regional implementing agency will provide the product catalogues for all components earlier, say, at least 2 months in advance of the start of pricing period for preparatory work.

India

Economy Results

As Table 7.8 shows, India is the second most populous economy in the region, home to 1.31 billion people, making up about a third or 34.58% of the region's population in 2017. India also has the second highest nominal GDP of HK$19,893 billion (column 7), equivalent to 13.36% of the region's total nominal GDP (column 8). Adjusting for spatial price differences across the 22 participating economies in the region, India posted a higher real GDP figure of HK$48,395 billion with a higher share of 20.83% of the region's total real GDP—maintaining its rank at second place in the region. Compared with the largest economy in the region, India's real GDP is only about two-fifths (41%) of the People's Republic of China's real GDP. However, unlike the People's Republic of China, India's share in the region's total real GDP is higher

than its share in the region's total nominal GDP, indicating that the overall price level in India is lower than the regional average. India's share of ICEH in nominal GDP is 58.84% and share of GFCF in nominal GDP is 28.40% (column 11); both are 10th largest in the region. India's real ICEH of HK$31,360 billion (column 3) is the second largest in the region, comprising more than a quarter (26.78%) of the region's total real ICEH (column 4). India also has second largest share of real investments in the region: its real GFCF of HK$12,227 billion (column 3) constitutes 16.32% of the total real GFCF of the region (column 4).

Factoring in India's large population, the per capita real GDP is estimated at HK$36,965 (column 5), which is 60% of (or 40% lower than) the regional per capita real GDP (column 6), ranking 17th in the region (column 6) in per capita measure. Though India has the second largest real GFCF (column 4), its per capita real GFCF of HK$9,339 (column 5) ranks much lower at 16th in the region and is only 47% of (or 53% lower than) the regional average (column 6).

With the local currency of Indian rupees (₹), the PPP at GDP level of ₹3.43 = HK$1 (column 2) is only 41% of exchange rate of ₹8.36 = HK$1, implying an overall PLI of 41 (with Hong Kong, China = 100) or 64 (with Asia and the Pacific = 100). This means that the general price level in India is 41% of (or 59% lower than) the price level in Hong Kong, China (column 12) and is 64% of (or 36% lower than) the regional average price level (column 13). India has the fourth lowest PLI in the region. The PLI for ICEH is 65 (third lowest) and for GFCF is 63 (second lowest) (column 13). Among the components in Table 7.8, India has the lowest PLIs for the following: food and non-alcoholic beverages (PLI of 69); food (69); bread and cereals (68); fruits and vegetables (65); other food and non-alcoholic beverages (75); clothing and footwear (50); clothing (51); transportation and communication (78); and transportation (84) (column 13).

Table 7.8: Summary Results for India, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure		Per Capita Real Expenditure		Nominal Expenditure		Per Capita Nominal Expenditure		Nominal Expenditure Shares, (%) [ranking]	PLIs		Expenditure (billion LCU)
		(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]	(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]		(HKG = 100)	(AP = 100) [ranking]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	3.43	48,395.2	20.83 [02]	36,965	60 [17]	19,892.6	13.36 [02]	15,194	39 [17]	100.00 [n.a.]	41	64 [19]	166,225.64
Actual Individual Consumption by Households[a]	3.15	32,884.4	24.49 [02]	25,118	71 [17]	12,382.2	15.70 [02]	9,458	45 [18]	62.25 [10]	38	64 [19]	103,467.73
Food and non-alcoholic beverages	3.30	8,316.2	30.27 [02]	6,352	88 [21]	3,283.2	20.90 [02]	2,508	60 [22]	16.50 [14]	39	69 [22]	27,435.01
Food	3.24	8,343.5	31.31 [02]	6,373	91 [21]	3,233.6	21.47 [02]	2,470	62 [22]	16.26 [12]	39	69 [22]	27,020.05
Bread and cereals	3.51	1,762.2	31.70 [01]	1,346	92 [18]	739.8	21.59 [02]	565	62 [22]	3.72 [13]	42	68 [22]	6,181.69
Meat and fish	3.64	706.3	10.16 [03]	539	29 [22]	307.9	7.40 [03]	235	21 [22]	1.55 [20]	44	73 [16]	2,573.07
Fruits and vegetables	2.65	2,972.0	41.09 [01]	2,270	119 [08]	943.1	26.54 [02]	720	77 [14]	4.74 [07]	32	65 [22]	7,880.75
Other food and non-alcoholic beverages	3.57	3,027.6	37.46 [01]	2,313	108 [15]	1,292.4	28.26 [02]	987	82 [19]	6.50 [12]	43	75 [22]	10,799.50
Alcoholic beverages, tobacco and narcotics	6.88	296.6	11.76 [03]	227	34 [22]	244.3	13.38 [03]	187	39 [19]	1.23 [14]	82	114 [08]	2,041.51
Clothing and footwear	3.13	2,235.6	44.78 [01]	1,708	129 [08]	838.0	22.53 [02]	640	65 [13]	4.21 [04]	37	50 [22]	7,002.37
Clothing	3.04	1,829.1	44.57 [01]	1,397	129 [09]	665.3	22.58 [02]	508	65 [14]	3.34 [03]	36	51 [22]	5,559.21
Housing, water, electricity, gas and other fuels[a]	2.56	5,408.0	23.83 [02]	4,131	69 [18]	1,657.2	15.44 [02]	1,266	45 [20]	8.33 [11]	31	65 [16]	13,848.15
Furnishings, household equipment and routine household maintenance	3.83	814.7	19.84 [02]	622	57 [17]	373.6	11.92 [02]	285	34 [19]	1.88 [15]	46	60 [20]	3,122.25
Health and education[a]	1.69	8,246.1	19.89 [02]	6,299	58 [19]	1,666.8	9.81 [02]	1,273	28 [17]	8.38 [12]	20	49 [14]	13,928.31
Health[a]	1.49	4,124.1	17.12 [02]	3,150	50 [16]	735.2	8.16 [02]	562	24 [18]	3.70 [11]	18	48 [17]	6,143.82
Education[a]	1.91	4,075.1	22.14 [02]	3,113	64 [19]	931.6	11.66 [02]	712	34 [16]	4.68 [11]	23	53 [13]	7,784.50
Transportation and communication	3.76	4,679.7	26.93 [02]	3,574	78 [15]	2,108.0	21.00 [02]	1,610	61 [15]	10.60 [03]	45	78 [22]	17,614.92
Transportation	3.95	3,983.6	28.88 [02]	3,043	84 [14]	1,884.2	24.36 [02]	1,439	70 [16]	9.47 [02]	47	84 [22]	15,744.71
Communication	2.90	644.8	18.69 [02]	493	54 [15]	223.8	9.73 [02]	171	28 [17]	1.13 [13]	35	52 [21]	1,870.21
Recreation and culture[a]	4.56	199.1	5.06 [04]	152	15 [21]	108.7	3.15 [06]	83	9 [21]	0.55 [22]	55	62 [20]	908.00
Restaurants and hotels	3.98	490.7	9.08 [03]	375	26 [21]	233.9	6.70 [03]	179	19 [21]	1.18 [21]	48	74 [12]	1,954.68
Miscellaneous goods and services[a]	4.14	3,915.8	29.14 [02]	2,991	84 [12]	1,939.5	19.33 [02]	1,481	56 [12]	9.75 [03]	50	66 [16]	16,206.90
Individual Consumption Expenditure by Government	3.71	1,523.1	7.99 [02]	1,163	23 [20]	676.7	5.98 [02]	517	17 [17]	3.40 [18]	44	75 [06]	5,654.50
Collective Consumption Expenditure by Government	4.54	2,701.3	17.83 [02]	2,063	52 [18]	1,466.8	15.01 [02]	1,120	43 [18]	7.37 [09]	54	84 [05]	12,256.97
Gross Fixed Capital Formation	3.86	12,226.6	16.32 [02]	9,339	47 [16]	5,649.1	10.28 [02]	4,315	30 [17]	28.40 [10]	46	63 [21]	47,204.96
Machinery and equipment	6.69	2,130.3	18.94 [02]	1,627	55 [16]	1,706.0	14.41 [02]	1,303	42 [16]	8.58 [11]	80	76 [21]	14,255.86
Construction	2.53	9,602.9	14.36 [02]	7,335	42 [16]	2,908.7	8.04 [02]	2,222	23 [18]	14.62 [11]	30	56 [20]	24,305.56
Other products	6.43	1,344.0	20.28 [02]	1,027	59 [09]	1,034.4	14.96 [02]	790	43 [13]	5.20 [05]	77	74 [21]	8,643.55
Changes in Inventories and Acquisitions Less Disposals of Valuables	3.93	2,058.0	45.74 [01]	1,572	132 [05]	967.8	32.84 [02]	739	95 [08]	4.87 [04]	47	72 [19]	8,087.05
Balance of Exports and Imports	8.36	-573.4	-24.46 [22]	-438	-71 [13]	-573.4	-24.46 [22]	-438	-71 [13]	-2.88 [14]	100	100 [n.a.]	-4,791.06
Individual Consumption Expenditure by Households[b]	3.12	31,360.2	26.78 [02]	23,954	77 [17]	11,705.5	17.33 [02]	8,941	50 [18]	58.84 [10]	37	65 [20]	97,813.23
Individual Consumption Expenditure by Households without Housing[b]	3.27	26,981.6	26.80 [02]	20,609	77 [17]	10,570.2	17.51 [02]	8,074	51 [19]	53.14 [11]	39	65 [20]	88,326.44
Government Final Consumption Expenditure	4.15	4,312.2	12.79 [02]	3,294	37 [19]	2,143.5	10.17 [02]	1,637	29 [18]	10.78 [16]	50	79 [05]	17,911.46
Domestic Absorption	3.43	49,892.8	21.66 [02]	38,109	63 [17]	20,466.0	13.97 [02]	15,632	40 [17]	102.88 [09]	41	64 [19]	171,016.70

Reference Data

Exchange rate (LCU/HK$)	8.36
Total population (in million)	1309.20
Population share to AP (%) [ranking]	34.58 [02]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Economy Experience in Program Implementation

Administrative Setup

The Price Statistics Division in the National Statistical Office of the Ministry of Statistics and Programme Implementation (MOSPI) had overall responsibility for collection, validation, analysis, and coordination with various agencies for the International Comparison Program (ICP) activities. The additional director general, as head of the Price Statistics Division, was nominated national coordinator for ICP, while the deputy director general was nominated deputy national coordinator.

Various agencies and divisions were involved in the ICP. The Field Operations Division of the National Statistical Office was responsible for carrying out price collection for all household consumption surveys. Price data were collected and compiled with the cooperation of the Central Public Works Department of the Ministry of Urban Development for construction and the Department for Promotion of Industry and Internal Trade of the Ministry of Commerce and Industry for machinery and equipment. The Price Statistics Division conducted the training, operation of ICP, and data entry.

In view of the importance of the ICP program, the MOSPI constituted an expert committee on ICP to provide technical advice for ICP activities.

Use of Existing Infrastructure in Collecting Data

The consumer price index (CPI) infrastructure (including human resources, markets, and outlets) was utilized for price data collection of household products. As the specifications of the ICP products were quite different from those of the CPI items, separate questionnaires were canvassed. None of the CPI household items were used for the ICP. However, for the ICP housing rental survey, the team used house rent data collected for the CPI.

For non-household price surveys data collection, the Central Public Works Department compiled the prices of items for construction from their administrative records. The Department for Promotion of Industry and Internal Trade carried out a separate survey to collect prices of machinery and equipment items. These prices were supplemented by the prices collected by staff of the Price Statistics Division and verified on internet markets. Government compensation data were gathered from administrative documents such as the Report of the Seventh Central Pay Commission, Department of Expenditure, Ministry of Finance.

Survey Framework

Categories of food (including beverages), clothing and footwear, and education. Prices were collected from 577 urban and 320 rural markets in 33 out of 36 states and the union territories covering 99.79% of the total population. The identified urban and rural markets for the ICP are subsets of markets for the CPI: 1,114 urban markets (located in 310 towns) and 1,181 rural markets. To make the sample more representative, all income segments in urban areas—affluent, middle, and poor—were considered.

The first meeting of the expert committee on ICP decided to include one-third of the poor markets to limit the upward bias in estimated prices coming from higher income classes. Hence, the 2017 ICP round included 100 poor markets, but reduced the number of middle income markets from 414 to 314, and retained all 163 affluent markets. The selected middle income and poor markets were included in the ICP based on having large coverage of ICP items.

For rural areas, the committee recommended including in the ICP, 300 out of 1,181 villages identified in the CPI (rural portion). An additional 20 villages were included after proportionately allocating the villages to different National Sample Survey Regions based on population.

Items not under the categories of food, clothing and footwear, and education. Prices were collected only from 108 urban markets located in 36 towns. The selection of towns was based on the following broad criteria: (i) capitals in 33 union territories or states; (ii) all towns with a population more than 1,000,000 as per the Population Census 2011, which are covered under the CPI (urban); and (iii) a maximum of two towns from any state or union territory, including the capital.

For these towns, a total of 108 markets were surveyed. The selected towns were divided into a number of strata based on population size for allocation of price quotations (Table 7.9). For example, Delhi, with an allocation of eight price quotations, was divided into eight strata, and one price quotation was collected from each stratum.

Table 7.9: Number of Quotations by Population in the Selected Towns, India

Town Population	Number of Quotations
>5,000,000	8
>2,000,000 and <5,000,000	4
>1,000,000 and < 2,000,000	2
Remaining state capitals	2

Source: Ministry of Statistics and Programme Implementation, India.

Shops were selected to be representative of the area, with the most popular shop in each location selected first. While doing so, the respective structured product descriptions (SPDs) were not compromised. For instance, if most popular grocery shop in a market did not keep a type of rice with a fixed SPD, then the next most popular shop was selected where that particular SPD was available. In case of non-availability of shops within a stratum, a shop for that item was selected from the adjoining stratum.

The collected housing rental data covered urban areas only. For machinery and equipment, prices were collected with the cooperation of the Department for Promotion of Industry and Internal Trade of the Ministry of Commerce and Industry. For construction, prices representative at the national level were collected with the cooperation of the Central Public Works Department of the Ministry of Urban Development.

Data on compensation for government occupations and other related indicators were collected from administrative sources such as the Report of the Seventh Central Pay Commission, Department of Expenditure, Ministry of Finance.

Gross Domestic Product Expenditure Weights

Household consumption expenditure estimates were derived for 101 basic headings of household consumption using available estimates of individual consumption expenditure by households for 157 items or groups. Certain basic headings—such as package holidays, prostitution, games of chance, veterinary and other services for pets—do not have disaggregated gross domestic product (GDP) expenditure as these items are not covered under the Household Consumer Expenditure Survey. The estimates were prepared for the national accounts statistics based on detailed concordance between individual consumption expenditure by households items and ICP basic headings. Data from the Consumer Expenditure Survey, 2011–2012 and Annual Survey of Industries in 2016/2017 were used to estimate weights of some of the basic headings.

Similar to the 2011 ICP cycle, fiscal year estimates were converted to calendar year estimates for 2017. Calendar year control totals for GDP and its main aggregates used the sum of the four quarters pertaining to 2017. That is, the sum of quarterly fiscal estimates from Q4 2016/2017, Q1 2017/2018, Q2 2017/2018, and Q3 2017/2018, since the fiscal year of India starts on April 1 and ends on March 31. Basic heading estimates followed the structure of 2017/2018 detailed estimates.

In total, GDP expenditure values were estimated for most of the 155 basic headings according to the 2017 ICP classification. Individual consumption expenditure by nonprofit institutions serving households is part of household expenditure and was not estimated separately in the official national accounts. The GDP expenditure value estimate for net purchases abroad was estimated separately.

Government final consumption expenditure were estimated from budget documents and finance accounts of the central government, union, and states, using the cost of production approach following the classification of the functions of government to the extent possible. GDP expenditure values for basic headings under construction and under machinery and equipment were estimated using the Annual Survey of Industries, All India Debt and Investment Survey (2012–2013), Export and Import Data Bank, and others. Exports and imports data are sourced from the Directorate General of Commercial Intelligence and Statistics and the Reserve Bank of India. Statistical discrepancy is adjusted into various basic headings on pro rata basis.

Data Validation

Detailed training workshops were conducted for the ICP price surveys. Price collection for the ICP was conducted by experienced CPI price collectors, closely supervised by equally experienced supervisors to ensure the quality of data. Intra-economy validations using the minimum-to-maximum ratio and coefficient of variation were used to check individual price quotations. Errors arising from data entry mistakes and incorrect units of measurement were checked during field visits and follow-ups.

Issues raised during inter-economy regional technical and data validation workshops conducted by the Asian Development Bank were also communicated to the field for appropriate action.

Challenges in Implementation

Similar to the experience in the 2011 ICP cycle, the specifications of machinery and equipment items were eurocentric. Prices quoted were for the specifications as close as possible to the prescribed SPDs. Data pertaining to stocks and rentals of dwellings were not easy to collect unless the required data were available from a dedicated survey or census. Existing available data were used as much as possible.

Though not required in purchasing power parity (PPP) calculations for Asia and the Pacific, the ICP items were classified as important or less important to satisfy the requirement for global calculation of PPPs. The difficulty in categorization stemmed from poor overlap between the ICP and CPI items. Alternatively, the categorization was made following subjective criteria and consistency in the price movement of ICP and CPI items at basic heading levels.

Lessons Learned and Future Directions

The MOSPI is in the process of integrating the ICP into the regular CPI program by synchronizing the ICP data collection and validation with the CPI. The process also includes adoption of ICP-type SPDs for CPI items to the extent feasible, as well as training and data validation workshops for field personnel. The ministry will also strengthen coordination with relevant government agencies for collection of prices of machinery and equipment and of construction products in line with ICP requirements. The goal is to ensure high quality, regular flow, and simultaneous validation of price data in the succeeding ICP rounds, considering the endorsement of ICP as a permanent element of global statistical work program, with plans to conduct the rounds more frequently.

Indonesia

Economy Results

With 262 million people or 6.92% of the region's population, Indonesia is the third most populous of the 22 participating economies in the region. Indonesia also has the third highest nominal GDP of HK$7,913 billion, as Table 7.10 (column 7) shows, equivalent to 5.32% of the region's total nominal GDP (column 8). In real terms, Indonesia posted a real GDP figure of HK$17,394 billion (column 3) and a share of 7.49% of the region's total real GDP (column 4)—maintaining its rank of third in the region. Indonesia's larger expenditure level and share in real terms than in nominal terms implies that the economy has a lower overall price level than Hong Kong, China and the regional average. In terms of the structure of economy, Indonesia's share of nominal ICEH in its GDP (57.32%) is 11th largest in the region, while the share of nominal GFCF in GDP (32.17%) is sixth largest in the region (column 11). Indonesia's real ICEH of HK$9,551 billion (column 3) is the third largest in the region, constituting 8.16% of the region's total real ICEH (column 4). Indonesia also has third largest share of real investments in the region: its real GFCF of HK$5,264 billion (column 3) constitutes 7.02% of the total real GFCF of the region (column 4).

Factoring in its population, Indonesia's per capita real GDP is estimated at HK$66,419 (column 5), which is 8% higher than the regional per capita real GDP, ranking 13th in the region (column 6). The economy's per capita real GFCF of HK$20,099 (column 5) is 2% higher than the regional level (column 6) and per capita real ICEH of HK$36,471 is 18% higher than the regional level (column 6). Both in terms of per capita real GFCF and per capita real ICEH, Indonesia ranks at 10th in the region.

With the local currency of rupiah (Rp), Indonesia's PPP at GDP level of Rp781.12 = HK$1 (column 2) is only 45% of its exchange rate of

Rp1,716.98 = HK$1, implying that the overall PLI is 45 (with Hong Kong, China = 100) (column 12) or 71 (with Asia and the Pacific = 100) (column 13). This means that the general price level in Indonesia is 45% of (or 55% lower than) the price level in Hong Kong, China (column 12), and is 71% of (or 29% lower than) the regional average price level (column 13), ranking 13th in the region. The PLI for ICEH is 82 (ranking 11th) and for GFCF is 66 (ranking 20th) (column 13). Among the components in Table 7.10, Indonesia registers low PLIs for the following: housing, water, electricity, gas and other fuels (ranking 20th with a PLI of 56); gross fixed capital formation (ranking 20th with a PLI of 66); and construction (ranking 21st with a PLI of 54).

Economy Experience in Program Implementation

Administrative Setup

Indonesia's Implementing Agency for the 2017 International Comparison Program (ICP) round was Badan Pusat Statistik (BPS), or Statistics Indonesia, headed by the chief statistician. The director of the Directorate of Price Statistics served as the national coordinator in charge of implementing the ICP activities, while the chief of Consumer Price Statistics Subdirectorate served as the deputy national coordinator. Other members of the BPS ICP team were the head of wholesale price statistics subdirectorate and the head of the expenditure account consolidation subdirectorate.

Use of Existing Infrastructure in Collecting Data

Efforts were made to link the ICP and consumer price index (CPI) surveys, although they are somewhat different in scope and objectives. CPI items are selected to be representative of household consumption products in the economy; meanwhile, the ICP may include some items which are less representative of products consumed by households.

Table 7.10: Summary Results for Indonesia, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure — Economy Shares to AP (%) [ranking]	Per Capita Real Expenditure (HK$)	Per Capita Real Expenditure — Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure — Economy Shares to AP (%) [ranking]	Per Capita Nominal Expenditure (HK$)	Per Capita Nominal Expenditure — Index (AP = 100) [ranking]	Nominal Expenditure Shares (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	781.12	17,394.5	7.49 [03]	66,419	108 [13]	7,913.4	5.32 [03]	30,217	77 [11]	100.00 [n.a.]	45	71 [13]	13,587,212.60
Actual Individual Consumption by Households[a]	780.92	10,578.0	7.88 [03]	40,391	114 [13]	4,811.1	6.10 [03]	18,371	88 [12]	60.80 [12]	45	77 [11]	8,260,567.38
Food and non-alcoholic beverages	1,029.47	2,335.1	8.50 [03]	8,916	123 [12]	1,400.1	8.91 [03]	5,346	129 [10]	17.69 [12]	60	105 [08]	2,403,877.11
Food	1,021.42	2,100.0	7.88 [03]	8,019	114 [13]	1,249.3	8.29 [03]	4,770	120 [11]	15.79 [13]	59	105 [08]	2,145,012.46
Bread and cereals	1,209.55	468.9	8.44 [04]	1,791	122 [15]	330.4	9.64 [03]	1,261	139 [12]	4.17 [12]	70	114 [05]	567,208.37
Meat and fish	882.61	726.3	10.45 [02]	2,773	151 [13]	373.3	8.98 [02]	1,426	130 [12]	4.72 [09]	51	86 [10]	641,016.54
Fruits and vegetables	1,110.52	327.7	4.53 [03]	1,251	65 [16]	212.0	5.96 [03]	809	86 [12]	2.68 [13]	65	132 [08]	363,924.98
Other food and non-alcoholic beverages	998.10	833.3	10.31 [03]	3,182	149 [13]	484.4	10.59 [03]	1,850	153 [12]	6.12 [13]	58	103 [09]	831,727.22
Alcoholic beverages, tobacco and narcotics	959.33	602.1	23.87 [02]	2,299	345 [04]	336.4	18.42 [02]	1,285	266 [05]	4.25 [04]	56	77 [14]	577,637.00
Clothing and footwear	1,070.50	255.1	5.11 [04]	974	74 [15]	159.1	4.28 [04]	607	62 [14]	2.01 [14]	62	84 [09]	273,097.91
Clothing	1,091.62	214.7	5.23 [04]	820	76 [16]	136.5	4.63 [03]	521	67 [13]	1.72 [13]	64	89 [09]	234,338.04
Housing, water, electricity, gas and other fuels[a]	451.72	1,545.4	6.81 [03]	5,901	98 [14]	406.6	3.79 [05]	1,553	55 [16]	5.14 [19]	26	56 [20]	698,108.62
Furnishings, household equipment and routine household maintenance	1,000.08	333.1	8.11 [03]	1,272	117 [11]	194.0	6.19 [03]	741	89 [10]	2.45 [09]	58	76 [09]	333,094.87
Health[a]	417.68	2,521.0	6.08 [03]	9,626	88 [14]	613.3	3.61 [03]	2,342	52 [11]	7.75 [15]	24	59 [12]	1,052,956.83
Education[a]	423.42	858.9	3.57 [03]	3,280	52 [15]	211.8	2.35 [04]	809	34 [15]	2.68 [19]	25	66 [11]	363,688.33
Transportation and communication	403.71	1,707.3	9.28 [03]	6,519	134 [12]	401.4	5.03 [03]	1,533	73 [11]	5.07 [09]	24	54 [12]	689,268.50
Transportation	934.30	1,516.1	8.72 [03]	5,789	126 [09]	825.0	8.22 [03]	3,150	119 [11]	10.43 [04]	54	94 [14]	1,416,471.05
Communication	906.71	1,222.3	8.86 [03]	4,667	128 [09]	645.5	8.34 [03]	2,465	121 [10]	8.16 [04]	53	94 [15]	1,108,299.62
Recreation and culture[a]	1,074.36	286.8	8.31 [03]	1,095	120 [09]	179.5	7.80 [03]	685	113 [09]	2.27 [04]	63	94 [13]	308,171.43
Restaurants and hotels	1,284.49	280.2	7.13 [02]	1,070	103 [10]	209.6	6.08 [03]	801	88 [10]	2.65 [09]	75	85 [09]	359,960.53
Miscellaneous goods and services[a]	787.72	960.7	17.79 [02]	3,668	257 [08]	440.8	12.63 [02]	1,683	183 [08]	5.57 [04]	46	71 [16]	756,765.63
Individual Consumption Expenditure by Government	925.59	419.8	3.12 [06]	1,603	45 [17]	226.3	2.26 [07]	864	33 [17]	2.86 [16]	54	72 [11]	388,597.83
Collective Consumption Expenditure by Government	491.78	960.6	5.04 [03]	3,668	73 [14]	275.1	2.43 [05]	1,051	35 [14]	3.48 [17]	29	48 [14]	472,399.00
Gross Fixed Capital Formation	598.80	1,272.8	8.40 [03]	4,860	121 [15]	443.9	4.54 [03]	1,695	66 [13]	5.61 [19]	35	54 [16]	762,155.34
Machinery and equipment	830.33	5,263.7	7.02 [03]	20,099	102 [10]	2,545.5	4.63 [03]	9,720	67 [10]	32.17 [06]	48	66 [20]	4,370,574.77
Construction	1,652.77	434.0	3.86 [04]	1,657	56 [15]	417.8	3.53 [04]	1,595	51 [15]	5.28 [20]	96	91 [14]	717,377.04
Other products	498.40	6,588.0	9.85 [03]	25,156	142 [08]	1,912.3	5.28 [03]	7,302	76 [09]	24.17 [05]	29	54 [21]	3,283,435.90
Changes in Inventories and Acquisitions Less Disposals of Valuables	1,657.84	223.0	3.36 [03]	852	49 [13]	215.4	3.11 [05]	822	45 [12]	2.72 [13]	97	93 [13]	369,761.83
Balance of Exports and Imports	920.21	61.0	1.35 [06]	233	20 [14]	32.7	1.11 [07]	125	16 [13]	0.41 [13]	54	82 [15]	56,090.09
Individual Consumption Expenditure by Households[b]	1,716.98	80.3	3.43 [06]	307	50 [11]	80.3	3.43 [06]	307	50 [11]	1.01 [11]	100	100 [n.a.]	137,825.02
Individual Consumption Expenditure by Households without Housing[b]	815.39	9,551.5	8.16 [03]	36,471	118 [10]	4,536.0	6.71 [03]	17,320	97 [11]	57.32 [11]	47	82 [11]	7,788,168.38
Government Final Consumption Expenditure	890.67	8,202.4	8.15 [03]	31,320	118 [11]	4,254.9	7.05 [03]	16,247	102 [11]	53.77 [09]	52	87 [10]	7,305,594.75
Domestic Absorption	550.85	2,241.2	6.65 [03]	8,558	96 [14]	719.0	3.41 [03]	2,746	49 [13]	9.09 [19]	32	51 [16]	1,234,554.34
	775.40	17,345.1	7.53 [03]	66,230	109 [13]	7,833.2	5.35 [03]	29,910	77 [12]	98.99 [12]	45	71 [13]	13,449,387.58

Reference Data

Exchange rate (LCU/HK$)	1716.98
Total population (in million)	261.89
Population share to AP (%) [ranking]	6.92 [03]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

For both the CPI and ICP, the outlets and areas were selected based on purposive sampling; however, the regular CPI covers only urban areas while the ICP covered both urban and rural areas. The types of outlets selected in the urban and rural areas were the same. Because of their differences, ICP prices were collected by different data collectors from the CPI. Out of 488 items in CPI, prices for 134 items were used for the ICP.

The BPS ICP team conducted the survey on construction in Jakarta and selected some contractors as respondents. The dwelling survey was conducted in 28 cities (urban only), while some data were taken from the 2010 Population Census and Housing Survey, 2017 National Social Economic Survey, and 2017 Survey of Residential. Compensation data were gathered from existing administrative data from Ministry of Finance.

The BPS ICP team conducted the machinery and equipment price survey quarterly in 34 capital cities of Indonesia. The commodities covered in this survey were included in the ICP product catalogue. This survey was conducted in anticipation of ICP data requests from the general users as well as ministries and institutions. Each quarter involved around 760 respondents with a total of 2,000 price quotations for various specifications.

To fulfill ICP requirements, the prices for machinery and equipment were first collected in Jakarta, the capital city of Indonesia. When the brands required for the ICP were not available in Jakarta, they were replaced with equivalent or generic specifications. Moreover, the BPS ICP team also collected data from other cities while accounting for the price difference between each city and Jakarta. Some prices were also obtained from National Procurement Board.

The existing Quarterly Construction Establishment Survey covers materials, heavy equipment rental cost, and labor in 514 regions in Indonesia. The main purpose of this survey is to calculate the regional construction cost index. The items covered in this survey were determined by the bill of quantity, based on detailed specifications commonly used in most regions. To fulfill ICP requirements, prices collected in Jakarta for products, whose specifications exactly matched ICP's structured product descriptions, were used to fill in the ICP price collection tool (PCT) form, while the rest of the ICP items were gathered from marketplaces. The data from the Constructions Cost Survey and from the marketplace met 96% of the required items for the ICP construction list.

The resource mix of construction was calculated from average proportion cost from the bill of quantity document taken from the Constructions Cost Survey. The scope of construction activities included residential buildings (houses), nonresidential buildings (educational buildings and health buildings), and civil engineering works (roads and bridges).

Survey Framework

Samples for the 2017 ICP survey were selected based on purposive sampling because of budget limitations. In collecting prices for household items for the 2017 ICP cycle, the allocation of samples covered both urban and rural areas. For the 2017 ICP price survey, 1,156 outlets were selected for price collection; 1,128 were urban and 28 were rural.

Government compensation data and prices for construction and machinery and equipment items were collected in Jakarta City. The BPS ICP team conducted the housing rental survey in urban locations of Jakarta, other main cities, and metropolitan areas in Indonesia.

Gross Domestic Product Expenditure Values

Gross domestic product (GDP) expenditure values were estimated for most of the ICP's 155 basic headings. There was a need for in-depth studies or special surveys for the remaining basic headings without GDP expenditure estimates.

The basic headings were disaggregated using the published GDP expenditure described below:

(i)   Household consumption is organized by classification of individual consumption according to purpose (COICOP). Household consumption expenditure was split into 110 basic headings (34 food and 76 nonfood). Household consumption expenditure is based on the National Socio-Economic Survey (Susenas) and annual total population. Household consumption was corrected by using supply or retail indicators and other administrative data. Corrections were made on the outputs of food industry, restaurant, electricity, sales of car, motorcycle, and household equipment, among others. Net purchases abroad was embedded in the household consumption and cannot be estimated separately since local and imported consumption products cannot be split in Susenas.

(ii) Nonprofit institutions serving households (NPISH) consumption expenditure was obtained from a specific survey of NPISH and directories. Only the total consumption of NPISH can be estimated.

(iii) Government final consumption expenditure was disaggregated into individual and collective consumption expenditure based on classification of the functions of government. Individual consumption expenditure by government was obtained by identifying expenditure items from the budget realization of each function (health, recreation, culture, and education). The same procedure was applied for collective consumption expenditure by government.

(iv) Gross fixed capital formation was derived from GDP expenditure based on commodity flow approach, by calculating the value of the supply of goods produced by various industries (supply), with some of them then allocated to capital goods. Data was obtained from output of construction, the value of import capital goods from customs, large and medium industries

statistics, financial reports, and an investment survey.

(v)   Changes in inventories was derived from GDP based on inventory position at the end of the year. Data was obtained from medium-large manufacture, live stocks statistics, and financial reports.

(vi) Export and import of goods were compiled based on international merchandise trade statistics. In the meantime, balance of payment statistics and tourism statistics were used to compile export and import of services.

(vii) The statistical discrepancy between GDP by industry and by expenditure was caused by differences in the methodology and data sources. In practice, the statistical discrepancy is placed in the expenditure side. In the case of GDP data submitted for the ICP, the statistical discrepancy was included in the changes in inventories.

Data Validation

To ensure adherence to ICP specification, outlets were revisited after data collection verification when required. Most of the problems arose from pricing of different from the reference quantity of ICP quantity and data entry errors. If the difference arose from the deviation from the preferred unit of measurement, the quantity was adjusted accordingly. The BPS ICP team also evaluated the ICP data using CPI data for selected commodities, especially by comparing the pattern for the same period. In addition, the BPS ICP team checked the coefficient of variation and minimum-to-maximum ratio and revisited flagged items and outlets to make sure the product specification and price quoted for selected commodities were justified if not corrected.

Price Collection Tools

The PCT for machinery and equipment and for construction were developed by the Asian Development Bank (ADB) for collecting individual price data. Using a Microsoft Excel-based macro,

offline data entry was easy and guaranteed safely stored in a local drive. Data validation was provided in detail; because it was directly visible, it made the system more effective. On the downside, Microsoft Excel files became large and the viewing became slow.

The ICP Asia Pacific Software Suite used in ICP 2017 cycle was well developed. The option of uploading large data from Microsoft Excel files was very useful, user-friendly, and efficient. Other than that, the option of in-system one-at-a-time data entry was time consuming.

Challenges in Implementation

Similar to the 2011 ICP, the 2017 ICP cycle was implemented in a short period of time involving very detailed comparison of prices and expenditure data according to agreed regional standards. The ICP requirements and data collection were different from the regular CPI system, with certain specific sizes or packaging unavailable in Indonesia. The ICP product list was based on COICOP, which has not yet been adopted for the CPI in Indonesia, because of the strong need for the continuity in CPI data across time. Adoption of new COICOP may lead to many missing values for many regions in Indonesia because of regional differences in the availability and specification of products required for COICOP. Therefore, the ICP and CPI may not be compared directly.

Lessons Learned and Future Directions

ICP activities provided BPS a perspective on the global economy. Especially in relation to comparing household items across economies, BPS was made more aware of the general economy of Asia and the Pacific.

BPS experienced difficulties in integrating ICP activities with the CPI enumeration because of the limited budget for CPI, which currently covers only the urban areas. The small overlap between ICP and CPI items entailed additional work in the enumeration on top of the concurrent BPS activities such as the Household Expenditure Survey for 2017–2018. For the next ICP cycle, BPS is making efforts to integrate ICP items into the CPI. Moreover, BPS has already allocated budget for price collection of ICP items which were not covered in the CPI.

As for machinery and equipment, BPS found it difficult to match specifications of some items, while some of the premium items could not be found in the market. The data validation workshops and training for machinery and equipment and for construction were important and very useful. Throughout the activities, BPS was able to clearly understand the items and commodities. During these events, the results of inter-economy price data validations were also directly provided. Aside from the regional workshops and training, BPS hopes that ADB will conduct in-country data validation workshops and training for Indonesia to better equip the staff involved in data collection and validation.

Lao People's Democratic Republic

Economy Results

The Lao People's Democratic Republic is the 16th most populous economy, home to 6.90 million people or 0.18% of the region's total population. In contrast, the Lao People's Democratic Republic's economy is 17th largest, as Table 7.11 shows, with nominal GDP of HK$131.3 billion (column 7), which is only 0.09% of the region's total nominal GDP (column 8). However, after accounting for spatial price differences across the 22 economies, the Lao People's Democratic Republic's real GDP is estimated higher at HK$303.2 billion (column 3), equivalent to a larger share at 0.13% of the region's total real GDP (column 4) and maintaining its 17th place in the region.

A higher expenditure level and larger share of the region in real than in nominal terms imply that the general price level in the Lao People's Democratic Republic is lower than that of the reference economy—Hong Kong, China—and is also lower than the region's average price level. The Lao People's Democratic Republic also ranks 17th in both real ICEH (HK$152.3 billion) and nominal ICEH (HK$71.3 billion) (columns 3 and 7), and ranks 16th in both real GFCF (HK$83.1 billion) and nominal GFCF (HK$43.9 billion) (columns 3 and 7).

For almost all of components in Table 7.11, the Lao People's Democratic Republic's per capita real expenditures are higher than per capita nominal expenditures. The Lao People's Democratic Republic ranks 15th in both per capita real GDP of HK$43,944 (column 5) and per capita nominal GDP of HK$19,026 (column 9). The economy's per capita real ICEH (HK$22,065) (column 5) is only 71% of the regional level, ranking only 18th in the region (column 6), while its per capita real GFCF (HK$12,042) (column 5) is only 61% of the regional level, ranking 14th in the region (column 6).

With the local currency of kip (KN), the Lao People's Democratic Republic's PPP at GDP level of KN463.97 = HK$1 is only 43% of the exchange rate of KN1,071.64 = HK$1, resulting in PLIs of 43 (Hong Kong, China = 100) (column 12) and 68 (Asia and the Pacific = 100), (column 13) the 14th highest PLI in the region. The PLI for ICEH is 81 (ranking 12th) and for GFCF is 72 (ranking 15th) (column 13). The Lao People's Democratic Republic registered the second lowest PLI of 23 for the education category after Sri Lanka.

Economy Experience in Program Implementation

Administrative Setup

The Department of Economic Statistics, under the Lao Statistics Bureau (LSB), Ministry of Planning and Investment, implemented the 2017 International Comparison Program (ICP) activities. The director general of the department chaired the ICP national team, which comprised national coordinators and the technical staff from the Sector and Price Statistics Division, National Accounts Division, and Statistics Information Communication Technology Division, which is under the Department of Data Service.

Similar to the 2011 ICP cycle, the national coordinator led the team and was responsible for the overall implementation and coordination between the Asian Development Bank (ADB) and the LSB in conducting the household price collection. The deputy national coordinator was responsible for compiling gross domestic product (GDP) by expenditure. The team from the statistics methodology and information communication technology divisions were involved in non-household price collection and served as administrator of the software for data entry. In summary, the LSB ICP team was responsible for the entire national ICP process, which included data validation and quality control. The team also included consumer price index (CPI) price collectors from 17 provincial offices. Throughout the implementation of the 2017 ICP round, the LSB also involved other related agencies, which actively extended their commitments and efforts through data support and sharing of sector expertise.

Use of Existing Infrastructure in Collecting Data

Data collection was based on the existing CPI data collection mechanism and infrastructure in the Lao People's Democratic Republic, particularly for the household consumption items. About 43% or 210 out of 485 products in the CPI were used for the ICP. The team conducted additional price collection for the ICP product list from the existing CPI outlets, where possible. For items that were not available in the existing outlets, new outlets were covered by a special survey. For non-household sectors, such as construction, machinery and equipment, and housing rental data collection was conducted only in the capital city of Vientiane, where products are available satisfying the required structured product descriptions (SPDs).

Table 7.11: Summary Results for the Lao People's Democratic Republic, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Real Expenditure HK$	Per Capita Real Expenditure Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Nominal Expenditure HK$	Per Capita Nominal Expenditure Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	463.97	303.2	0.13 [17]	43,944	72 [15]	131.3	0.09 [17]	19,026	48 [15]	100.00 [n.a.]	43	68 [14]	140,697.75
Actual Individual Consumption by Households[a]	462.27	172.9	0.13 [17]	25,055	71 [18]	74.6	0.09 [17]	10,808	52 [16]	56.81 [17]	43	73 [14]	79,927.00
Food and non-alcoholic beverages	594.80	56.4	0.21 [17]	8,180	113 [15]	31.3	0.20 [17]	4,540	109 [16]	23.86 [07]	56	97 [10]	33,576.19
Food	581.49	48.2	0.18 [17]	6,990	99 [18]	26.2	0.17 [17]	3,793	95 [17]	19.94 [08]	54	96 [10]	28,050.71
Bread and cereals	629.01	12.3	0.22 [16]	1,786	122 [16]	7.2	0.21 [17]	1,049	116 [15]	5.51 [08]	59	95 [11]	7,754.46
Meat and fish	577.90	20.3	0.29 [17]	2,944	160 [11]	11.0	0.26 [17]	1,588	145 [09]	8.35 [04]	54	90 [09]	11,742.19
Fruits and vegetables	549.54	8.1	0.11 [17]	1,172	61 [18]	4.1	0.12 [17]	601	64 [18]	3.16 [11]	51	104 [15]	4,443.39
Other food and non-alcoholic beverages	613.14	15.7	0.19 [17]	2,277	107 [16]	9.0	0.20 [17]	1,303	108 [15]	6.85 [11]	57	101 [10]	9,636.15
Alcoholic beverages, tobacco and narcotics	496.78	13.3	0.53 [14]	1,934	290 [06]	6.2	0.34 [15]	897	186 [08]	4.71 [02]	46	64 [15]	6,631.55
Clothing and footwear	519.63	3.2	0.06 [18]	461	35 [19]	1.5	0.04 [18]	223	23 [18]	1.17 [18]	48	65 [17]	1,652.06
Clothing	503.79	2.6	0.06 [17]	379	35 [19]	1.2	0.04 [18]	178	23 [19]	0.94 [17]	47	65 [15]	1,317.61
Housing, water, electricity, gas and other fuels[a]	360.00	26.4	0.12 [17]	3,826	64 [20]	8.9	0.08 [17]	1,285	45 [19]	6.76 [16]	34	71 [13]	9,505.55
Furnishings, household equipment and routine household maintenance	573.66	7.5	0.18 [15]	1,091	101 [13]	4.0	0.13 [15]	584	71 [13]	3.07 [05]	54	70 [15]	4,320.36
Health[a]	132.09	50.5	0.12 [18]	7,319	67 [16]	6.2	0.04 [19]	902	20 [19]	4.74 [22]	12	30 [21]	6,671.03
Education[a]	173.04	14.8	0.06 [18]	2,145	34 [18]	2.4	0.03 [18]	346	15 [19]	1.82 [21]	16	43 [18]	2,561.63
Education[a]	107.48	38.2	0.21 [17]	5,541	114 [15]	3.8	0.05 [19]	556	26 [19]	2.92 [20]	10	23 [21]	4,109.41
Transportation and communication	705.03	9.0	0.05 [18]	1,308	28 [18]	5.9	0.06 [18]	860	32 [17]	4.52 [19]	66	114 [05]	6,363.17
Transportation	710.98	6.9	0.05 [18]	997	27 [19]	4.6	0.06 [18]	662	32 [18]	3.48 [18]	66	118 [05]	4,892.27
Communication	713.24	2.1	0.06 [18]	299	33 [17]	1.4	0.06 [17]	199	33 [16]	1.05 [15]	67	100 [11]	1,470.90
Recreation and culture[a]	740.90	1.9	0.05 [18]	269	26 [19]	1.3	0.04 [19]	186	20 [18]	0.98 [20]	69	79 [12]	1,377.23
Restaurants and hotels	703.55	11.8	0.22 [16]	1,710	120 [09]	7.7	0.22 [15]	1,123	122 [10]	5.90 [02]	66	102 [05]	8,304.46
Miscellaneous goods and services[a]	554.46	11.9	0.09 [15]	1,731	49 [15]	6.2	0.06 [15]	896	34 [15]	4.71 [12]	52	69 [14]	6,622.75
Individual Consumption Expenditure by Government	173.85	20.0	0.11 [17]	2,900	228 [10]	3.2	0.03 [19]	471	16 [19]	2.47 [20]	16	27 [20]	3,479.53
Collective Consumption Expenditure by Government	277.70	62.9	0.41 [15]	9,112	61 [14]	16.3	0.17 [17]	2,361	91 [11]	12.41 [03]	26	40 [19]	17,461.65
Gross Fixed Capital Formation	565.52	83.1	0.11 [16]	12,042	61 [14]	43.9	0.08 [16]	6,355	44 [14]	33.40 [05]	53	72 [15]	46,996.27
Machinery and equipment	1,090.28	12.2	0.11 [16]	1,763	59 [14]	12.4	0.10 [17]	1,793	57 [14]	9.43 [08]	102	97 [08]	13,261.65
Construction	330.38	63.0	0.09 [16]	9,128	52 [13]	19.4	0.05 [17]	2,814	29 [15]	14.79 [10]	31	57 [19]	20,811.37
Other products	1,076.06	12.0	0.18 [14]	1,740	99 [07]	12.1	0.17 [13]	1,748	96 [07]	9.19 [01]	100	96 [08]	12,923.25
Changes in Inventories and Acquisitions Less Disposals of Valuables	576.43	0.0	0.00 [18]	0	0 [18]	0.0	0.00 [18]	0	0 [18]	0.00 [18]	54	82 [14]	0.10
Balance of Exports and Imports	1,071.64	-3.4	-0.15 [14]	-499	-81 [14]	-3.4	-0.15 [14]	-499	-81 [14]	-2.62 [13]	100	100 [n.a.]	-3,687.27
Individual Consumption Expenditure by Households[b]	502.05	152.3	0.13 [17]	22,065	71 [18]	71.3	0.11 [17]	10,337	58 [16]	54.33 [14]	47	81 [12]	76,447.47
Individual Consumption Expenditure by Households without Housing[b]	529.33	131.1	0.13 [17]	18,994	71 [18]	64.7	0.11 [17]	9,382	59 [16]	49.31 [14]	49	82 [12]	69,381.08
Government Final Consumption Expenditure	236.96	88.4	0.26 [15]	12,806	144 [13]	19.5	0.09 [17]	2,832	51 [12]	14.88 [08]	22	35 [19]	20,941.18
Domestic Absorption	462.39	312.3	0.14 [17]	45,250	74 [15]	134.7	0.09 [17]	19,524	50 [15]	102.62 [10]	43	68 [14]	144,385.02

Reference Data

Exchange rate (LCU/HK$)	1071.64
Total population (in million)	6.90
Population share to AP (%) [ranking]	0.18 [16]

0 or 0.0 or 0.00 = magnitude is less than half of the unit employed; AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Compensation data for government occupations were collected from existing administrative records from the Ministry of Finance.

Survey Framework

The household price survey covered 22 markets in 17 provinces, of which 10 markets represented urban areas and 7 markets in rural areas. The prices of important items were collected monthly as part of the regular CPI price collection, while the collection of less important items was done in the third and fourth quarters of 2017 and conducted at least twice in each market. Household consumption items were priced from 1,254 outlets.

Price data collection for housing rental, machinery and equipment, and construction was conducted in the capital city only as recommended and agreed in the Lao People's Democratic Republic context. Compensation data for government occupations and other related indicators were collected from administrative documents from the Ministry of Finance.

Gross Domestic Product Expenditure Values

The GDP by expenditure at current prices was estimated for years 2011–2017, which were compiled for the ICP. For ICP purposes, GDP expenditure values were estimated for most of the 155 basic headings according to the 2017 ICP classification. A few basic headings, such as narcotics and prostitution, are not applicable in the Lao People's Democratic Republic. The GDP expenditure breakdown was estimated using supply and use table base year 2012.

The main data sources used to compile GDP by expenditure approach were

(i) **Individual consumption expenditure by households.** Household final consumption expenditure was measured from the Lao Expenditure and Consumption Survey 2012–2013 by the classification of individual consumption according to purpose, and then transformed into Lao Classification of Products by Activity in a four-digit level, using the base year of 2012.

(ii) **Government final consumption expenditure (individual and collective).** The government gazette (government account) identified products the government purchased.

(iii) **Nonprofit institutions serving households.** Expenditure for nonprofit institutions serving households was not estimated due to unavailability of data sources at the time of compilation.

(iv) **Net purchases abroad.** Net purchases abroad was estimated separately and submitted to ADB.

(v) **Gross fixed capital formation.** Since there was no information related to this indicator, it was estimated as a residual in the expenditure side. Meanwhile, residential building by household was estimated by Lao Expenditure and Consumption Survey.

(vi) **Changes in inventories.** Due to data constraint, this was assumed to be small in the Lao People's Democratic Republic, and therefore, this was assumed to be zero.

(vii) **Exports and imports of goods and services.** The exports and imports estimation were mainly based on customs data from the Ministry of Finance. Additionally, this was compared and adjusted by comparing with the mirror trade data.[26] Other main industries, such as mining and electricity, were based on direct reports from the enterprises and Ministry of Energy and Mining. The exports and imports of services were based on balance of payment data from the Bank of the Lao People's Democratic Republic.

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[26]   Mirror trade is the data from a trade partner's record in the UN COMTRADE website: www.uncomtrade.org.

Data Validation

In order to ensure data quality, the LSB ICP team implemented the following process, similar to the 2011 ICP round. Before data collection, the CPI price collectors in the districts and provinces offices were trained. The supervisors and data collectors were trained to be familiar with the SPDs and data validation techniques. During the fieldwork in each province, the LSB ICP team visited the field to supervise and to follow up with the enumerators. After data collection in the field, the prices were manually verified by the price collectors and supervisors before submission to the LSB. Then the LSB ICP team implemented data cleaning and editing, and when needed, reverted the data issues to enumerators for further verification or proper conversion of units. The LSB ICP team used the ICP Asia Pacific Software Suite (ICP APSS) for data validation and analysis as discussed during the regional workshop. The cleaned data was then submitted to ADB for inter-economy validation.

Price Collection Tools

There were some difficulties encountered with the installation of the ICP APSS, including data entry errors, but these were resolved immediately through "patches" sent to the LSB. The LSB's ICP team acquired good experience in using the ICP APSS, specifically the price analysis tool that was easy to use. Data was conveniently exported to Microsoft Excel for checking and validation and imported back to ICP APSS to update the database. The system allowed database updating by uploading multiple Microsoft Excel files.

For further refinement of the software, the LSB suggests accommodating data entry by multiple users connected via network. Also, it would be best if the ICP APSS could be downloaded onto tablets for more mobile data collection with easy access to the SPDs translated into a local language.

Challenges in Implementation

The ICP project has been an opportunity to strengthen the capacity of national statisticians and improve CPI data quality in a more systematic manner. However, the implementation has remarkable challenges:

(i)   A third of the ICP products were not available in many provinces. Most of the items were available only in the capital city. In most cases, the items were not available, and when items were available, they did not exactly match the SPDs and required appropriate quality adjustment.

(ii)   The ICP further required extensive understanding of the SPDs to assess the availability of products. The data collection required extensive resources, leading to additional workload for staff who also had to conduct their regular work.

(iii) The LSB collected data using paper-form questionnaires, so it was very difficult to verify the SPDs of items priced. Data entry from paper questionnaires required a significant amount of time.

(iv)   The generation of GDP expenditure values for 155 basic headings was a challenge due to the insufficiency of data sources.

(v)   Compensation of employees by occupation and by level of experience was not available. Alternatively, only average salary was submitted.

(vi)   Because of varied cultural and traditional practices, there was difficulty in collecting the type and specification of rental and dwelling.

(vii) Lastly, staff knowledge about the use of purchasing power parity data at the economy level was very limited. For more effective dissemination of the results at national level, extensive technical knowledge on these areas is required.

Lessons Learned and Future Directions

ICP project implementation improved the knowledge of the staff in the headquarters, provincial, and district offices, particularly the national coordinators and the LSB ICP team. Throughout the program, they attended many regional, country, and online workshops on variety of topics. These workshops allowed them to improve their skills, techniques, and methods on data validation. In addition, these platforms provided opportunity to learn and exchange experiences with other participating economies. Furthermore, the price collection tools were also very useful and effective in validating the collected data from across provinces, analyzing results, and comparing with other economies. An appropriate technical team should be established to handle the volume of ICP work. The regional trainings, especially for machinery and equipment and for construction, and the new techniques provided by the experts were useful in helping the team better understand the product specifications and validate the prices.

With the ICP now a permanent element of global statistical work to be conducted more frequently, the LSB will integrate the ICP in its 5-year work plan (2021–2025) and will make sure to align it with the CPI development plan. With the lessons learned from the ICP, the LSB specifically plans to undertake the following improvements in price statistics:

(i)   improve CPI compilation by updating the CPI basket, based on the results of Lao Expenditure and Consumption Survey 6, ICP price items, and SPDs, while the CPI weights will be rebased to 2020;

(ii) improve the CPI data collection process by using computer-assisted personal interviewing base, in order to improve data quality and timeliness;

(iii) publish GDP by expenditure approach and disseminate ICP results to government and other users in the country to respond to user's needs; and

(iv) for the future ICP rounds, consider covering markets and retailers and, moreover, consider the computer-assisted personal interviewing or web-based method in data collection in order to improve data quality and timeliness.

Malaysia

Economy Results

As Table 7.12 shows, Malaysia is the seventh largest economy with real GDP of HK$4,916 billion (column 3), equivalent to 2.12% of the region's total real GDP (column 4), while accounting only for 0.85%, or 32.02 million, of the region's total population. Without factoring in spatial price differences across the 22 economies in the region, Malaysia ranks lower at ninth place with nominal GDP of HK$2,453 billion (column 7), which is equivalent to a smaller share (1.65%) of the region's total nominal GDP (column 8). The lower GDP level and share of region in nominal than in real terms imply that the general price level in Malaysia is lower than in Hong Kong, China and also lower than the region's average price level. Malaysia's real ICEH of HK$2,707 billion (column 3) ranks ninth and is equivalent to 2.31% of the region's total real ICEH (column 4). Malaysia also has the sixth largest real GFCF of HK$1,186 billion (column 3), which constitutes 1.58% of the region's total real GFCF (column 4).

For many of the GDP components in Table 7.12, Malaysia's per capita expenditures and rankings are much better in real terms than in nominal terms. Malaysia has a per capita real GDP of HK$153,532 (column 5), or 150% higher than the regional level, ranking fifth in the region (column 6). By contrast, Malaysia's per capita nominal GDP is HK$76,589 (column 9), or 95% higher than the regional level, ranking sixth in the region (column 10).

Table 7.12: Summary Results for Malaysia, 2017

Expenditure Category (1)	Purchasing Power Parities (HK\$ = 1.00) (2)	Real Expenditure		Per Capita Real Expenditure		Nominal Expenditure		Per Capita Nominal Expenditure		Nominal Expenditure Shares, (%) [ranking] (11)	PLIs		Expenditure (billion LCU) (14)
		(HK\$ billion) (3)	Economy Shares to AP, (%) [ranking] (4)	HK\$ (5)	Index (AP = 100) [ranking] (6)	(HK\$ billion) (7)	Economy Shares to AP, (%) [ranking] (8)	HK\$ (9)	Index (AP = 100) [ranking] (10)		(HKG = 100) (12)	(AP = 100) [ranking] (13)	
Gross Domestic Product	0.28	4,916.5	2.12 [07]	153,532	250 [05]	2,452.6	1.65 [09]	76,589	195 [06]	100.00 [n.a.]	50	78 [08]	1,353.38
Actual Individual Consumption by Households[a]	0.27	3,069.6	2.29 [09]	95,858	270 [05]	1,505.5	1.91 [09]	47,013	226 [05]	61.38 [11]	49	83 [08]	830.74
Food and non-alcoholic beverages	0.28	606.2	2.21 [09]	18,930	261 [02]	309.1	1.97 [10]	9,654	233 [05]	12.60 [16]	51	89 [15]	170.59
Food	0.28	587.4	2.20 [09]	18,342	261 [02]	297.6	1.98 [10]	9,294	234 [05]	12.13 [15]	51	90 [15]	164.22
Bread and cereals	0.30	78.2	1.41 [10]	2,443	166 [08]	42.1	1.23 [10]	1,315	145 [10]	1.72 [16]	54	87 [16]	23.24
Meat and fish	0.27	190.6	2.74 [08]	5,952	324 [02]	93.7	2.25 [09]	2,925	266 [04]	3.82 [11]	49	82 [13]	51.69
Fruits and vegetables	0.30	127.9	1.77 [08]	3,994	209 [03]	69.6	1.96 [09]	2,174	232 [05]	2.84 [12]	54	111 [13]	38.41
Other food and non-alcoholic beverages	0.27	215.5	2.67 [08]	6,729	315 [02]	103.8	2.27 [08]	3,240	268 [04]	4.23 [14]	48	85 [18]	57.25
Alcoholic beverages, tobacco and narcotics	0.59	23.4	0.93 [10]	730	110 [14]	25.2	1.38 [08]	786	163 [09]	1.03 [15]	108	149 [03]	13.88
Clothing and footwear	0.33	71.2	1.43 [09]	2,224	169 [05]	42.6	1.14 [09]	1,329	135 [07]	1.74 [15]	60	80 [10]	23.48
Clothing	0.31	65.1	1.59 [08]	2,032	187 [05]	36.5	1.24 [09]	1,139	146 [07]	1.49 [15]	56	78 [10]	20.13
Housing, water, electricity, gas and other fuels[a]	0.19	614.2	2.71 [07]	19,182	320 [05]	211.7	1.97 [10]	6,611	233 [06]	8.63 [10]	34	73 [11]	116.82
Furnishings, household equipment and routine household maintenance	0.27	144.1	3.51 [05]	4,501	415 [04]	71.5	2.28 [08]	2,232	270 [06]	2.91 [06]	50	65 [17]	39.44
Health and education[a]	0.21	539.8	1.30 [09]	16,858	154 [07]	203.4	1.20 [10]	6,350	141 [07]	8.29 [13]	38	92 [08]	112.21
Health[a]	0.21	220.3	0.91 [08]	6,878	108 [10]	82.3	0.91 [10]	2,570	108 [08]	3.36 [14]	37	100 [05]	45.42
Education[a]	0.21	325.3	1.77 [09]	10,159	209 [07]	121.0	1.52 [07]	3,780	179 [06]	4.94 [10]	37	86 [07]	66.79
Transportation and communication	0.32	518.0	2.98 [05]	16,178	352 [04]	297.7	2.97 [05]	9,296	351 [05]	12.14 [02]	57	99 [11]	164.27
Transportation	0.28	361.0	2.62 [07]	11,273	309 [04]	186.2	2.41 [07]	5,815	285 [05]	7.59 [07]	52	92 [16]	102.76
Communication	0.42	147.6	4.28 [04]	4,608	506 [04]	111.5	4.84 [04]	3,481	573 [03]	4.55 [01]	76	113 [07]	61.51
Recreation and culture[a]	0.40	127.2	3.23 [09]	3,972	382 [04]	92.5	2.68 [08]	2,887	317 [05]	3.77 [05]	73	83 [10]	51.02
Restaurants and hotels	0.24	325.1	6.02 [05]	10,152	711 [04]	144.2	4.13 [07]	4,502	488 [04]	5.88 [03]	44	69 [18]	79.56
Miscellaneous goods and services[a]	0.31	296.1	2.20 [09]	9,245	261 [04]	168.0	1.67 [10]	5,247	198 [04]	6.85 [08]	57	76 [08]	92.72
Individual Consumption Expenditure by Government	0.22	377.8	1.98 [07]	11,798	234 [06]	148.4	1.31 [06]	4,634	155 [07]	6.05 [06]	39	66 [10]	81.89
Collective Consumption Expenditure by Government	0.24	341.4	2.25 [08]	10,660	266 [08]	150.0	1.54 [09]	4,685	181 [07]	6.12 [16]	44	68 [12]	82.78
Gross Fixed Capital Formation	0.29	1,186.0	1.58 [06]	37,035	187 [06]	619.0	1.13 [08]	19,329	133 [07]	25.24 [13]	52	71 [18]	341.55
Machinery and equipment	0.50	202.7	1.80 [07]	6,329	213 [07]	182.0	1.54 [09]	5,683	182 [07]	7.42 [16]	90	85 [19]	100.43
Construction	0.19	1,045.1	1.56 [05]	32,637	185 [05]	357.8	0.99 [06]	11,173	117 [07]	14.59 [12]	34	63 [12]	197.44
Other products	0.49	89.2	1.35 [08]	2,786	159 [06]	79.2	1.14 [08]	2,472	135 [06]	3.23 [10]	89	85 [20]	43.68
Changes in Inventories and Acquisitions Less Disposals of Valuables	0.30	14.5	0.32 [10]	451	38 [11]	7.9	0.27 [10]	246	32 [11]	0.32 [15]	55	83 [13]	4.35
Balance of Exports and Imports	0.55	170.3	7.26 [05]	5,317	859 [05]	170.3	7.26 [05]	5,317	859 [05]	6.94 [05]	100	100 [n.a.]	93.95
Individual Consumption Expenditure by Households[b]	0.28	2,706.7	2.31 [09]	84,526	273 [04]	1,357.1	2.01 [10]	42,379	237 [05]	55.33 [13]	50	87 [08]	748.86
Individual Consumption Expenditure by Households without Housing[b]	0.29	2,330.6	2.31 [09]	72,779	274 [04]	1,244.2	2.06 [10]	38,852	244 [05]	50.73 [13]	53	89 [08]	686.54
Government Final Consumption Expenditure	0.23	712.1	2.11 [08]	22,237	250 [07]	298.4	1.42 [06]	9,319	167 [07]	12.17 [11]	42	67 [09]	164.67
Domestic Absorption	0.27	4,622.9	2.01 [08]	144,364	237 [05]	2,282.3	1.56 [09]	71,273	184 [06]	93.06 [18]	49	78 [09]	1,259.43

Reference Data

Exchange rate (LCU/HK\$)	0.55
Total population (in million)	32.02
Population share to AP (%) [ranking]	0.85 [10]

AP = Asia and the Pacific; HK\$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Notable among the components in Table 7.12, Malaysia ranked fourth in per capita real ICEH of HK$84,526 (columns 6 and 5) compared with its fifth place in per capita nominal ICEH of HK$42,379 (columns 10 and 9); and sixth in per capita real GFCF of HK$37,035 (columns 6 and 5) compared to seventh in per capita nominal GFCF of HK$19,329 (columns 10 and 9).

Almost all of the 34 components in Table 7.12 have higher real expenditures than nominal expenditures—attributable to Malaysia's lower price levels relative to that of Hong Kong, China. This is a result of Malaysia's PPP at GDP level of RM0.28 = HK$1 (column 2) being only 50% of the exchange rate of RM0.55 = HK$1, implying that the overall price level in Malaysia is only half of the overall price level in Hong Kong, China, and only 78% of (or 22% lower than) the region's average price level (column 12 and 13). Though both PLIs of 50 (Hong Kong, China = 100) and 78 (Asia and the Pacific = 100) are lower than 100 (columns 12 and 13), these PLIs are eighth highest in the region. The PLI for ICEH of 87 ranks eighth while the PLI for GFCF of 71 (column 13) ranks 18th in the region—meaning that real investments are relatively cheaper in Malaysia than in more than three-quarters of the 22 economies in the region. The lowest ranking PLIs among the components in Table 7.12 are other food and non-alcoholic beverages, ranking 18th with PLI 85 (column 13); restaurants and hotels, ranking 18th with PLI 69 (column 13); gross fixed capital formation, ranking 18th with PLI 71 (column 13); and machinery and equipment, ranking 19th with PLI 85 (column 13).

Economy Experience in Program Implementation

Administrative Setup

The 2017 International Comparison Program (ICP) activities were implemented by the Prices, Income and Expenditure Statistics Division, in particular the Prices Unit with the assistance of the National Accounts Statistics Division. These offices are under the Department of Statistics Malaysia (DOSM).

The senior deputy director from the Prices, Income and Expenditure Division was appointed national coordinator and was assisted by three permanent members from the Prices Unit.

Use of Existing Infrastructure in Collecting Data

The interviewers in the states were responsible for the price collection. The items in the ICP basket were divided into three categories: consumer price index (CPI) items, purely ICP items, and conversion items (already in the CPI basket with different units). From the 492 household consumption items in the CPI basket, 215 items or about 44% were used for the ICP. The interviewers collected prices for overlapping items in the ICP and CPI concurrently. As in the 2011 cycle, prices for purely ICP items were collected using a separate questionnaire from the existing or new outlets. These prices were then captured using the ICP Asia Pacific Software Suite (ICP APSS) and the compiled data were transmitted to the central office via e-mail.

For construction items, an expert from the Construction Industry Development Board collected the data. Some items were priced by officers of DOSM from selected outlets in Peninsular Malaysia, Sabah and Sarawak. Two meetings were held, the first in the initial stage to introduce the items and the second to discuss the prices and availability of items with the right unit or specification in the market.

For machinery and equipment items, the Public Works Department provided the necessary information, focusing on the following groups: fabricated metal products except machinery and equipment; general purpose machinery; special purpose machinery; and road transport equipment.

The DOSM was responsible for pricing the rest of the following groups: electrical and optical equipment; and other products.

Existing data were used for the required housing rental information. The team used data from the rent

survey, conducted quarterly for the CPI, and selected types and floor space areas to suit ICP specification requirements. The rental data covered both urban and rural areas and represented actual rental data. The team also obtained additional information on air conditioning, number of rooms, and floor space area.

Government compensation data was obtained from the Public Service Department. The dataset contained the number of employees in different levels of years of experience and the salary scales for all levels of promotion. The data submitted for the ICP was weighted by the number of employees and level of promotion.

Survey Framework

A one-stage stratified sampling was adopted for this survey, with the outlet as the sampling unit and the price quotation as the statistical unit. The input data used the following as sources for the sampling design:

(i) lists of average prices by price collection center, state, and geographical coverage (urban and rural); and

(ii) average prices for the period January–December 2016 (CPI lists) for the identified proxy items.

The covered outlets were from both urban and rural areas in Peninsular Malaysia, Sabah, and Sarawak. Analysis was confined to the zone level with the respective stratum, with six zones:

(i) east (states of Kelantan, Pahang, and Terengganu);

(ii) middle (states of Kuala Lumpur and Selangor);

(iii) north (states of Kedah, Penang, Perak, and Perlis);

(iv) south (states of Johor, Melaka, and Negeri Sembilan);

(v) Sabah; and

(vi) Sarawak.

Determination of sample size for each item was based on the variable of selection and precision level. The variable of selection was based on the average monthly price for the items collected. For this study, the average price for the months of January–December 2016 was used to calculate the variance for each item across states.

The precision level was based on the importance of items (weights). An item with higher weight had 5% relative standard error with 95% confidence level, and an item with lower weight had 10% relative standard error with 90% confidence level.

All household items were priced on a monthly basis. Rental data, collected quarterly, covered the entire economy. The items for machinery and equipment and construction were collected monthly from urban locations. Annual average compensation data for government occupations required for the ICP and other related indicators were collected from the Public Service Department.

Gross Domestic Product Expenditure Values

Gross domestic product (GDP) expenditure values were estimated for most of the 155 basic headings according to the 2017 ICP classification.

Individual consumption expenditure by households was estimated as follows:

(i) GDP expenditure values for most of the 110 basic headings of individual consumption expenditure by households for 2017 were estimated. The four basic headings without GDP estimates were not applicable in Malaysia: narcotics, animal drawn vehicles, combined passenger transport, and prostitution.

(ii) The official individual consumption expenditure by households was published annually with 2-digit classification of individual consumption according to purpose (COICOP) in 12 groups.

(iii) Data was compiled at the 4-digit level of COICOP to estimate household consumption expenditure in the domestic market, including nonresidents' expenditure in Malaysia. Data available on an aggregated level from balance of payments statistics are used for residents' expenditure abroad and nonresidents' expenditure in the domestic market.

(iv) Individual consumption expenditure by nonprofit institutions serving households was reported separately at aggregated level without further breakdown.

(v) Compilation of data was based on Household Expenditure Survey 2016, Economic Census 2015, Distributive Trade Census 2013 and quarterly surveys, manufacturing annual and quarterly surveys, balance of payments and external trade statistics from Bank Negara Malaysia.

(vi) The methodology of compilation used extrapolation, commodity flow method, and direct estimates.

Gross fixed capital formation was estimated as follows:

(i) Expenditures on gross fixed capital formation (GFCF) at the basic headings levels for 2017 were readily available because GFCF by type of assets was compiled at 5-digit central product classification.

(ii) The data sources are from Economic Census 2016 for all sectors; the Distributive Trade Census 2013 and quarterly surveys; imports; manufacturing census and annual and quarterly surveys; data from Bank Negara Malaysia such as balance of payments statistics and external trade statistics; quarterly construction surveys; and annual financial accounts of federal government, states, local authorities, and statutory bodies.

(iii) The methodology of compilation used extrapolation, commodity flow method, and direct estimates.

Government final consumption expenditures was estimated as follows:

(i) Expenditures on government final consumption at the basic headings levels for 2017 were readily available with details, except for health services (health benefits and reimbursements).

(ii) Data were sourced from annual financial accounts of federal government; and the financial statement and budgets for state governments, local authorities, and statutory bodies.

(iii) The methodology of compilation used direct estimates.

Changes in inventories and acquisitions less disposals of valuables were estimated as follows:

(i) Data on changes in inventories and acquisitions less disposals of valuables for 2017 were readily available.

(ii) Data were sourced from monthly manufacturing surveys, monthly rubber statistics, Malaysia Palm Oil Board, Quarterly Survey of Distributive Trade, Department of Veterinary Services, and annual financial accounts of federal government.

(iii) The methodology of compilation used direct estimates.

Exports and imports were estimated as follows:

(i) Data were sourced from Bank Negara Malaysia's Balance of Payments statistics and external trade statistics.

(ii) The methodology of compilation used direct estimates.

Data Validation

As in the 2011 ICP round, several training courses were conducted, involving representatives from all states and ensuring that the correct items with the right specifications were identified and discussed. Prices from all states were submitted to the central office and comparisons were made either within states or inter-state. With intra-economy validation techniques, prices found to be outliers were reverted

to the respective states. In many cases, these outlying prices were caused by pricing either wrong items or the wrong unit or specification. The team in the central office compared these prices against the master list of prices which were made available either through observation from outlets or from all brochures obtained from several outlets in Kuala Lumpur and Selangor. As an additional step, price movements for the same or similar items within the same basic headings were also checked against that of the CPI movements.

Regional validation workshops were very useful for the participating economies in comparing their prices with those of the other economies and provided a platform for seeing whether the price differences were due to actual price differences between economies or caused by the wrong item, unit, or specification priced. While comparing prices, the economies were also able to indicate the availability of the unit or specification and changes, or the splitting of items to suit this purpose.

Price Collection Tools

Since the 2011 cycle, the ICP APSS has been a very useful system both for household and non-household items. It would be best to consider a module for uploading the readily available data captured in the consumer price index system into the ICP APSS system to avoid double data entry and to reconcile the data. The DOSM had to find a way to upload the CPI data captured in the existing CPI system to the ICP APSS.

Challenges in Implementation

Similar challenges from 2011 cycle were experienced in 2017. Prices were collected over a 12-month period covering a total of 707 household items; these numbers were adjusted to suit the requirements on either the specification or the unit of measurement. Though splitting of items was necessary to make them comparable across economies, this was found to be operationally challenging. New clear instruction or additional forms had to be sent to the

states for price collection. A major constraint was ensuring that the enumerators knew which item had to be priced as indicated in the new questionnaire and that they followed all new structured product descriptions.

Another challenge was in the data entry system. Malaysia started using the ICP APSS only in the second quarter, since the batch-upload module was not available before that time. Only the purely ICP items and conversion items (those in the CPI basket with different unit) were captured in the ICP APSS. For the CPI items, the prices were not captured but were uploaded in the system using the Microsoft Excel's vertical lookup function. A suggestion for the Asian Development Bank (ADB) is to tackle this problem and develop a way to integrate and upload the readily available CPI prices captured in the CPI system into the ICP APSS. Most economies had their own CPI system to generate CPI data.

Lessons Learned and Future Directions

The staff of the prices section in the central office and the rest of the prices staff in the states gained new experiences from their involvement in the ICP. These experiences, especially from the exchanges among the participating economies during the regional workshops arranged by ADB, strengthened statistical capacity for price statistics compilation. One of the most important sources was the technical assistance from the international experts and consultants. For example, the regional training with international experts for machinery and equipment and construction was useful in gaining a better understanding of product specifications and was helpful in validating the prices. Consequently, the application of the learned lessons improved the quality of price data for these non-household components.

The DOSM agrees with the establishment of the ICP as a permanent element of the global statistical work that is to be conducted more frequently and the DOSM will accommodate this accordingly.

The DOSM also expects the continuous technical assistance and funding, especially from the ICP regional implementing agency, in ensuring the smooth conduct of future ICP rounds. The adoption of ICP concepts for purchasing power parity (PPP) compilation and computation provided new ways for Malaysia to calculate comparative indexes between states. The ICP 2017 cycle helped Malaysia to improve the survey framework for 2020 ICP. The specific survey form for ICP collection was useful in making sure that field enumerators collected price data correctly.

Maldives

Economy Results

Maldives has the second smallest population, with less than half a million people or only 0.01% of the region's population. As Table 7.13 shows, it also has the second smallest economy in both real and nominal GDP, with a real GDP of HK$55.1 billion (column 3) making up 0.02% of the region's total real GDP (column 4) and nominal GDP of HK$37.9 billion (column 7) forming 0.03% of the region's total nominal GDP (column 8). With a nominal ICEH-to-GDP ratio of 39.86% (column 11), this is the fourth lowest in the region, behind the People's Republic of China, Singapore, and Brunei Darussalam, in that order. Meanwhile, Maldives's nominal GFCF-to-GDP ratio is 41.83% (column 11), the third highest in the region, behind the People's Republic of China. Maldives's real ICEH of HK$19 billion (column 3) is only 0.02% of the region's total real ICEH (column 4), the smallest real ICEH share in the region. Maldives's real GFCF of HK$24.8 billion (column 3) is only 0.03% of the region's total real GFCF (column 4), ranking third smallest in the region. Notable among the other main aggregates, Maldives has the smallest real GFCE of HK$11.9 billion (column 3), which is 0.04% of the region's total real GFCE (column 4).

Factoring in its population size, Maldives ranked fifth in per capita nominal GDP of HK$77,137 (column 9) in the region, which is 96% higher than the regional per capita nominal GDP (column 10). Further adjusting for spatial price differences among the 22 economies, Maldives ranks lower at sixth place in per capita real GDP while registering a higher per capita real GDP of HK$112,187 (column 5), which is 83% higher than the regional per capita real GDP (column 6). Despite nominal ICEH being two-fifths (39.86%) of economy's nominal GDP (column 11), Maldives's per capita real ICEH of HK$38,688 (column 5) is the ninth highest in the region which is 25% higher than the regional per capita real ICEH (column 6).

With the local currency of rufiyaa (Rf), Maldives's PPP at GDP level of Rf1.36 = HK$1 (column 2) is 69% of exchange rate of Rf1.97 = HK$1, implying that the overall price level in Maldives is 69% of (or 31% lower than) that in Hong Kong, China (column 12) and 107% of (or 7% higher than) the region's average price level (column 13)—the fourth most expensive in the region. The PLIs (with Asia and the Pacific = 100) for three-fifths of the 34 components in Table 7.13 are well above the regional average 100 (column 13). Among them, the following components have the highest PLIs in the region: fruits and vegetables (208); and recreation and culture (133) (column 13). Meanwhile, Maldives has the second lowest PLI of 64 (column 13) for meat and fish.

Economy Experience in Program Implementation

Administrative Setup

The National Accounts and Economics Statistics section of the National Bureau of Statistics (NBS) was in charge of the 2017 International Comparison Program (ICP) activities in Maldives. Currently, the NBS is under the Ministry of National Planning and Infrastructure.

Table 7.13: Summary Results for Maldives, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Real Expenditure HK$	Per Capita Real Expenditure Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Nominal Expenditure HK$	Per Capita Nominal Expenditure Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	1.36	55.1	0.02 [21]	112,187	183 [06]	37.9	0.03 [21]	77,137	196 [05]	100.00 [n.a.]	69	107 [04]	74.87
Actual Individual Consumption by Households[a]	1.48	23.6	0.02 [22]	47,964	135 [09]	17.7	0.02 [21]	36,053	173 [06]	46.74 [20]	75	128 [04]	34.99
Food and non-alcoholic beverages	1.22	4.3	0.02 [22]	8,650	119 [14]	2.6	0.02 [22]	5,343	129 [11]	6.93 [20]	62	108 [07]	5.19
Food	1.19	3.7	0.01 [22]	7,589	108 [14]	2.2	0.01 [22]	4,569	115 [13]	5.92 [20]	60	107 [07]	4.43
Bread and cereals	1.26	0.6	0.01 [22]	1,312	89 [19]	0.4	0.01 [22]	837	92 [17]	1.08 [19]	64	103 [08]	0.81
Meat and fish	0.76	1.7	0.02 [20]	3,529	192 [08]	0.7	0.02 [21]	1,361	124 [13]	1.76 [19]	39	64 [21]	1.32
Fruits and vegetables	2.02	0.5	0.01 [22]	1,116	58 [20]	0.6	0.02 [21]	1,141	122 [10]	1.48 [18]	102	208 [01]	1.11
Other food and non-alcoholic beverages	1.26	1.5	0.02 [22]	3,130	147 [14]	1.0	0.02 [22]	2,005	166 [10]	2.60 [17]	64	113 [07]	1.95
Alcoholic beverages, tobacco and narcotics	1.83	0.4	0.01 [21]	739	111 [13]	0.3	0.02 [20]	687	142 [10]	0.89 [18]	93	128 [06]	0.67
Clothing and footwear	1.40	0.7	0.01 [21]	1,507	114 [12]	0.5	0.01 [22]	1,068	109 [09]	1.38 [17]	71	95 [07]	1.04
Clothing	1.32	0.6	0.01 [22]	1,168	108 [12]	0.4	0.01 [22]	782	101 [09]	1.01 [16]	67	93 [06]	0.76
Housing, water, electricity, gas and other fuels[a]	2.15	4.0	0.02 [22]	8,083	135 [06]	4.3	0.04 [19]	8,814	311 [04]	11.43 [05]	109	230 [02]	8.56
Furnishings, household equipment and routine household maintenance	1.68	1.1	0.03 [21]	2,194	202 [07]	0.9	0.03 [21]	1,866	225 [07]	2.42 [10]	85	111 [04]	1.81
Health and education[a]	0.80	9.2	0.02 [22]	18,690	171 [06]	3.7	0.02 [21]	7,610	170 [06]	9.87 [09]	41	99 [05]	7.39
Health[a]	0.70	5.7	0.02 [20]	11,501	181 [04]	2.0	0.02 [19]	4,104	172 [05]	5.32 [07]	36	95 [06]	3.98
Education[a]	0.89	3.8	0.02 [22]	7,803	161 [10]	1.7	0.02 [21]	3,506	166 [08]	4.54 [14]	45	104 [05]	3.40
Transportation and communication	1.97	2.1	0.01 [22]	4,350	95 [12]	2.1	0.02 [21]	4,335	163 [08]	5.62 [16]	100	173 [03]	4.21
Transportation	1.82	1.2	0.01 [22]	2,426	67 [16]	1.1	0.01 [22]	2,232	109 [11]	2.89 [20]	92	164 [03]	2.17
Communication	2.36	0.9	0.03 [19]	1,756	193 [06]	1.0	0.04 [19]	2,103	346 [06]	2.73 [03]	120	180 [02]	2.04
Recreation and culture[a]	2.30	0.6	0.01 [21]	1,179	113 [09]	0.7	0.02 [20]	1,373	151 [09]	1.78 [14]	116	133 [01]	1.33
Restaurants and hotels	1.13	2.2	0.04 [19]	4,447	312 [07]	1.2	0.04 [19]	2,538	275 [06]	3.29 [09]	57	88 [08]	2.46
Miscellaneous goods and services[a]	1.33	1.8	0.01 [21]	3,587	101 [11]	1.2	0.01 [21]	2,420	91 [11]	3.14 [15]	67	90 [06]	2.35
Individual Consumption Expenditure by Government	0.89	5.8	0.03 [21]	11,761	234 [07]	2.6	0.02 [20]	5,310	178 [06]	6.88 [04]	45	76 [05]	5.15
Collective Consumption Expenditure by Government	1.03	6.1	0.04 [22]	12,499	312 [06]	3.2	0.03 [21]	6,515	252 [05]	8.45 [07]	52	81 [06]	6.32
Gross Fixed Capital Formation	1.26	24.8	0.03 [20]	50,477	255 [05]	15.9	0.03 [20]	32,266	222 [05]	41.83 [03]	64	87 [06]	31.32
Machinery and equipment	2.16	5.4	0.05 [20]	10,950	368 [05]	5.9	0.05 [20]	11,982	383 [05]	15.53 [01]	109	104 [07]	11.63
Construction	0.83	22.6	0.03 [20]	46,048	261 [04]	9.5	0.03 [20]	19,290	202 [05]	25.01 [03]	42	77 [07]	18.72
Other products	2.17	0.4	0.01 [20]	905	52 [11]	0.5	0.01 [20]	994	54 [09]	1.29 [19]	110	105 [06]	0.96
Changes in Inventories and Acquisitions Less Disposals of Valuables	1.44	0.7	0.02 [17]	1,383	116 [08]	0.5	0.02 [16]	1,010	130 [06]	1.31 [10]	73	111 [05]	0.98
Balance of Exports and Imports	1.97	0.6	0.03 [11]	1,293	209 [07]	0.6	0.03 [11]	1,293	209 [07]	1.68 [09]	100	100 [n.a.]	1.25
Individual Consumption Expenditure by Households[b]	1.57	19.0	0.02 [22]	38,688	125 [09]	15.1	0.02 [21]	30,743	172 [07]	39.86 [19]	79	138 [03]	29.84
Individual Consumption Expenditure by Households without Housing[b]	1.52	16.3	0.02 [22]	33,154	125 [09]	12.5	0.02 [21]	25,449	160 [07]	32.99 [20]	77	128 [04]	24.70
Government Final Consumption Expenditure	0.96	11.9	0.04 [22]	24,196	272 [05]	5.8	0.03 [21]	11,825	212 [05]	15.33 [07]	49	78 [06]	11.48
Domestic Absorption	1.35	54.4	0.02 [22]	110,671	182 [06]	37.3	0.03 [21]	75,844	196 [05]	98.32 [14]	69	108 [04]	73.61

Reference Data

Exchange rate (LCU/HK$)	1.97
Total population (in million)	0.49
Population share to AP (%) [ranking]	0.01 [21]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

The 2017 ICP team initially consisted of five members, with the head of National Accounts and Economic Statistics as the national coordinator, a senior statistical officer as the deputy national coordinator, two staff in the islands who were collecting prices for both ICP and consumer price index (CPI) (one in the north, one in the south), and one contract staff in Malé who was hired solely for ICP price collection. However, from 2018 onward, NBS ICP team had six members, including the deputy statistician, the head of the price section.

Use of Existing Infrastructure in Collecting Data

With very small overlap between the CPI and ICP baskets, only three out of 256 CPI item prices were used for the ICP. In order to minimize the costs, the NBS selected major food outlets for ICP from the CPI outlet list; these outlets represent a wider variety of products and have a larger market. All the CPI food outlets were selected for the ICP from the islands, while only the major outlets were selected for Malé because there was only one price collector for the ICP in Malé. This reduced transportation cost. With the use of the questionnaire generated by the ICP Asia Pacific Software Suite (ICP APSS), enumerators were able to record prices separately for the CPI and ICP. For nonfood items, only few outlets overlapped between the CPI and ICP as it is difficult to find the items which met the structured product descriptions (SPDs).

With insufficient information collected in the CPI, the NBS conducted a separate survey for the housing rent component of ICP 2017. The NBS hired a temporary price collector for this special survey for a period of 3 months.

NBS staff collected data for construction and machinery and equipment from major outlets representing the market.

The compensation information was mainly taken from the government system of compensation data, while some information was separately collected from the respective government ministries, such as the Maldives Police Service, Ministry of National Defense, and others.

Survey Framework

The CPI price collection covered major markets in the island's capital and four other islands (one is located in Haa Dhaal atoll in the north, and the other three islands from the three atolls located in southern end). Out of them, the NBS collected prices from three islands for the ICP (i.e., the island from north, the capital island, and the island from southernmost atoll). For the household items price survey, 241 outlets were selected; 166 were in urban and 75 in were in rural. The prices of food items and miscellaneous goods and services were collected monthly, while other categories were priced quarterly.

Prices of items for machinery and equipment and construction were collected only once for two price points (based on recall method) and only from Malé.

The rental prices for selected dwelling types were also collected once for the entire year—while asking the household about any change(s) in the rent during the year—and only for the Malé region. For the housing rental survey, blocks were randomly selected from the Malé region based on the proportion of households in the given ward. Due to nonresponse in the field survey, rental prices were also collected from the web and through acquaintances so that the sample size would be more representative.

Compensation data for relevant government occupations for Maldives and other related indicators were collected from the government administrative system of compensation data and government ministries.

Gross Domestic Product Expenditure Values

The supply and use table (SUT) 2017 was used to estimate gross domestic product (GDP) expenditure values by detailed components. Although Maldives compiled the SUT for 2017, data for some of the

industries were not yet final at the time of compilation due to a three-year lag in release. As Maldives does not publish GDP by the expenditure approach, it is not possible to compare GDP expenditure approach from the SUT with any other independent estimates. The ICP requires GDP expenditure values at the level of the 155 basic headings. The 2017 SUT has 51 products and 40 industries. The input and output structure used to derive 2017 is from the 2016 SUT. The GDP expenditure values were estimated for 119 out of the 155 basic headings according to the 2017 ICP classification. Some of the ICP's basic headings were not applicable in Maldives, such as pork, alcoholic beverages, games of chance, and prostitution.

For the estimation of individual consumption expenditure by households, the Household Income Expenditure Survey 2016 was used. This data was adjusted for the price and change in population to derive the 2017 estimate. The estimate was further adjusted to balance the supply and use of the products. As the SUT for 2017 does not provide the product level data, 2011 ICP ratios were used to apportion the aggregate value into preferred analytical level. No separate estimate for final consumption expenditure of nonprofit institutions serving households was available. The GDP expenditure value estimate for net purchases abroad was also not estimated separately.

For gross capital formation, due to lack of independent estimates, the supply side data (imports and domestic production of capital goods) were used. The category "changes in inventories" absorbs the statistical discrepancy.

Data on individual and collective consumption expenditure by government were taken from the national budget of the Ministry of Finance and coded using the classification of the functions of government.

The imports and exports of goods and services were taken from the SUT 2017 which used both the balance of payments prepared by Maldives Monetary Authority and trade statistics available from the Maldives Customs Service. The SUT for 2017 reports a number higher than the balance of payments estimates. It is assumed that the balance of payments is underestimated.

Data Validation

Considering the geography of Maldives, it was feasible for the NBS to send one person to visit all the ICP price collection islands to finalize the outlets and products which were to be selected from the islands. This ensured that our prices from all regions represented the same quality of products.

As soon as the NBS received prices from all the islands, the NBS used the validation tool of the ICP APSS to identify items that needed further attention and verification. The NBS also followed the instructions given in the workshops for improving the quality of price data.

The regional technical and data validation workshops organized by ADB were a very useful platform to discuss product lists and issues related to specific price collection. The workshops gave an opportunity for participating economies to learn from each other and to suggest ideas which further improve the representativity of items in the participating economies. The workshops certainly helped in achieving our common goal of producing reliable prices for the ICP exercise.

Price Collection Tools

Asia Pacific Software Suite. With the introduction of the web version of the ICP APSS, Maldives found it more convenient compared with its previous version. However, much has to be improved in the following areas: product page, product mapping, data entry, survey questionnaire, data validation, data filters under validation, custom report, summary statistics, data export, data import, importance levels, reset option, and editing product codes in the exported data file. The NBS informed the ADB ICP team via e-mail about details of these challenges.

Asia Pacific Software Suite: Old version compared with the web version. In 2017, some countries were using the old version, while a few countries such as Maldives were using the improved web version. However, the web version did not receive all the updates in the later stages of the ICP round. Hence, the NBS found it challenging to migrate data from the web version to the improved old version. The product list in the web version was therefore different from the full product list after the introduction of the split items in the pharmaceutical section. This necessitated an extra effort to manually input the pharmaceutical prices in the Microsoft Excel sheets. Therefore, it is important for all countries to use the same version of ICP APSS in the 2020 round with an immediately updated product list reflecting the item addition or removal based on conclusions reached in the ICP evaluation workshops. Should these challenges be addressed in the 2020 round, much effort and time will be saved.

Construction and Machinery and Equipment Price Collection Tools. The price collection tools (PCTs) were useful for data entry and summary statistics. However, it would be more convenient if these PCTs were integrated in the intended sections of the ICP APSS for the data collection stages in the 2020 round, especially with the planned web version of the ICP APSS. The housing rental PCT was fine. The compensation PCT could be improved.

Challenges in Implementation

With regard to the implementation of the household survey, the NBS was unable to start the survey in all islands in the first quarter of the 2017 round due to the late finalization of product list and the ICP APSS. There was not enough time to train the island staff in deciding on the outlets and products for the survey. The survey implementation was also challenging due to the staff shortage, with only one staff in each island.

The implementation of price collection for machinery and equipment was challenging without expert guidance. Though efforts were made to seek help from technical government staff, there were difficulties in finding an available expert. Hence, prices were collected with the help of the outlets' sales assistants. Aside from the lack of items required in the SPDs, most of the heavy machines, if available, were secondhand but for ICP secondhand machinery cannot be priced.

For the housing rental survey, there were difficulties due to nonresponse and respondents' lack of awareness about the specific details, like floor area, of their apartments. Alternatively, prices were taken from online advertisements in which more of the necessary details were available.

Overall, implementation would be easier if there is sufficient time for data collection, especially in the non-household components.

Lessons Learned and Future Directions

The staff gained knowledge on the importance of product specifications and on effective data validation in improving the price statistics. The concepts behind these new tools were also used in rebasing the CPI and conducting other surveys.

With a very small overlap of ICP and CPI products, ICP activities were carried out as a separate activity from CPI. With limited staff and budget, the NBS is not yet able to fully integrate ICP work in the regular statistical work plan. However, price statistics resources were very much utilized in conducting ICP work. Considering the budget constraints experienced in 2017 cycle, an early release of seed funds will help smoothen the implementation of ICP activities in the future rounds.

NBS believes that ICP advocacy activities were essential at the policy level, and assistance for such a workshop is very much needed in the near future. In addition, hands-on training on calculations as well as interpretation of the results will help in capacity building.

Mongolia

Economy Results

Among the 22 participating economies in the region, Mongolia has the fifth lowest real GDP of HK$211.7 billion as Table 7.14 (column 3) shows—almost 2.4 times of its nominal GDP at HK$89 billion (column 7), indicating that Mongolia's exchange rate is also almost 2.4 times of its PPP at GDP level. The economy contributes only a small fraction at 0.09% to the region's total real GDP (column 4), though this is larger than in nominal terms at 0.06% (column 8) share of the region's total nominal GDP. Mongolia's nominal ICEH-to-GDP ratio of 53.53% and nominal GFCF-to-GDP ratio of 24.64% (column 11) both rank 15th in the region. Mongolia's real ICEH share of the region is 0.09%, about the same as the economy's real GDP share of the region, but larger than the share of real GFCF at 0.05% of the region's total real GFCF (column 4).

Accounting for Mongolia's population size of 3.15 million (the fifth smallest population, constituting only 0.08% of the region's population), the economy's per capita real GDP of HK$67,241 (column 5) is ranked 12th in the region and is 10% above the regional per capita real GDP (column 6). Mongolia also posts per capita real expenditures that are higher than the regional per capita real levels (column 5) for more than half (19) of the 34 expenditure components shown in Table 7.14. Notable among them (with corresponding per capita real index relative to regional average of 100 in parentheses as drawn from column 6) is ranking third in alcoholic beverages, tobacco and narcotics (483). Meanwhile, Mongolia also registers the lowest per capita levels in fruits and vegetables (21).

With the local currency of togrog (MNT), Mongolia's PPP at GDP level of MNT131.66 = HK$1 (column 2) is only 42% of its exchange rate of MNT313.06 = HK$1, resulting in a low PLI at GDP level of 42 (with Hong Kong, China = 100) (column 12),

or 66 (with Asia and the Pacific = 100) (column 13). This makes Mongolia's overall price level the seventh least expensive in the region. The PLI for ICEH is 77, ranking 16th (column 13), while the PLI for GFCF is 73, ranking 13th (column 13). The lowest ranking PLI among the household consumption components is for meat and fish (with a PLI of 58, ranking 22nd) (column 13). Mongolia has also one of the lowest PLIs for government final consumption expenditure (with a PLI of 31, ranking 20th) (column 13).

Economy Experience in Program Implementation

Administrative Setup

The International Comparison Program (ICP) activities in Mongolia were conducted by the price statistics and national accounts teams of the National Statistics Office (NSO) of Mongolia. The price collectors were located throughout the provinces (*aimags*) and districts of Mongolia. The director of the economic statistics department was appointed national coordinator for the ICP activities and a senior statistician from the same department was appointed as deputy national coordinator.

Use of Existing Infrastructure in Collecting Data

About 45 price collectors for the consumer price index (CPI), who were located in the capital city and 21 *aimags* (administrative units), were responsible for ICP price collection. Out of 237 items in the CPI basket, 120 were also in the ICP.

The housing rental survey was specially designed for the ICP. The team extrapolated housing volume measures from the 2016 and 2017 Household Socio-Economic Survey and supplemented them with housing stock data from the 2015 population and housing census. The surveys for machinery and equipment and construction items used the statistical infrastructure of NSO and the statistics department of the municipality.

Table 7.14: Summary Results for Mongolia, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Real Expenditure HK$	Per Capita Real Expenditure Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Nominal Expenditure HK$	Per Capita Nominal Expenditure Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	131.66	211.7	0.09 [18]	67,241	110 [12]	89.0	0.06 [19]	28,278	72 [12]	100.00 [n.a.]	42	66 [16]	27,876.30
Actual Individual Consumption by Households[a]	125.77	130.6	0.10 [18]	41,482	117 [12]	52.5	0.07 [18]	16,664	80 [13]	58.93 [15]	40	68 [17]	16,427.69
Food and non-alcoholic beverages	147.76	31.2	0.11 [18]	9,899	136 [11]	14.7	0.09 [18]	4,672	113 [14]	16.52 [13]	47	83 [17]	4,605.77
Food	144.20	28.9	0.11 [18]	9,169	130 [11]	13.3	0.09 [18]	4,223	106 [15]	14.94 [14]	46	81 [18]	4,163.44
Bread and cereals	177.53	3.8	0.07 [18]	1,207	82 [21]	2.2	0.06 [18]	685	76 [20]	2.42 [15]	57	92 [13]	674.94
Meat and fish	109.06	13.4	0.19 [18]	4,258	232 [05]	4.7	0.11 [18]	1,483	135 [10]	5.25 [08]	35	58 [22]	1,462.21
Fruits and vegetables	232.70	1.2	0.02 [20]	394	21 [22]	0.9	0.03 [20]	293	31 [22]	1.04 [19]	74	151 [06]	288.63
Other food and non-alcoholic beverages	158.03	13.8	0.17 [18]	4,381	205 [06]	7.0	0.15 [18]	2,211	183 [08]	7.82 [05]	50	89 [14]	2,179.99
Alcoholic beverages, tobacco and narcotics	123.14	10.1	0.40 [15]	3,218	483 [03]	4.0	0.22 [19]	1,266	262 [06]	4.48 [03]	39	54 [17]	1,247.98
Clothing and footwear	183.41	4.8	0.10 [17]	1,537	117 [11]	2.8	0.08 [16]	900	92 [10]	3.18 [08]	59	79 [11]	887.62
Clothing	170.43	4.1	0.10 [16]	1,288	119 [11]	2.2	0.07 [16]	701	90 [11]	2.48 [07]	54	76 [12]	691.02
Housing, water, electricity, gas and other fuels[a]	124.18	18.0	0.08 [18]	5,717	95 [15]	7.1	0.07 [18]	2,268	80 [11]	8.02 [13]	40	84 [08]	2,235.56
Furnishings, household equipment and routine household maintenance	200.31	1.8	0.04 [19]	568	52 [18]	1.1	0.04 [19]	364	44 [17]	1.29 [20]	64	84 [07]	358.53
Health and education[a]	51.50	51.7	0.12 [17]	16,427	150 [09]	8.5	0.05 [17]	2,703	60 [10]	9.56 [10]	16	40 [17]	2,664.23
Health[a]	56.57	17.8	0.07 [17]	5,666	89 [11]	3.2	0.04 [17]	1,024	43 [12]	3.62 [12]	18	48 [16]	1,009.29
Education[a]	46.25	35.8	0.19 [18]	11,362	234 [06]	5.3	0.07 [17]	1,679	80 [10]	5.94 [04]	15	34 [18]	1,654.94
Transportation and communication	162.25	13.0	0.07 [16]	4,139	90 [14]	6.8	0.07 [16]	2,145	81 [14]	7.59 [11]	52	90 [17]	2,114.58
Transportation	150.30	10.3	0.07 [16]	3,282	90 [13]	5.0	0.06 [16]	1,576	77 [14]	5.57 [12]	48	86 [19]	1,553.58
Communication	216.55	2.6	0.08 [16]	823	90 [11]	1.8	0.08 [16]	569	94 [11]	2.01 [06]	69	104 [09]	561.00
Recreation and culture[a]	201.62	3.1	0.08 [17]	973	94 [11]	2.0	0.06 [17]	627	69 [11]	2.22 [13]	64	73 [14]	617.82
Restaurants and hotels	163.06	2.4	0.04 [18]	766	54 [16]	1.3	0.04 [18]	399	43 [16]	1.41 [17]	52	81 [11]	393.31
Miscellaneous goods and services[a]	141.93	7.4	0.06 [18]	2,365	67 [13]	3.4	0.03 [18]	1,072	40 [13]	3.79 [13]	45	61 [18]	1,056.92
Individual Consumption Expenditure by Government	46.91	32.1	0.17 [15]	10,191	202 [09]	4.8	0.04 [17]	1,527	51 [10]	5.40 [09]	15	25 [21]	1,505.51
Collective Consumption Expenditure by Government	75.18	27.2	0.18 [18]	8,637	216 [11]	6.5	0.07 [18]	2,074	80 [12]	7.33 [10]	24	37 [20]	2,044.68
Gross Fixed Capital Formation	166.96	41.1	0.05 [18]	13,066	66 [13]	21.9	0.04 [18]	6,968	48 [13]	24.64 [15]	53	73 [13]	6,869.35
Machinery and equipment	292.38	8.1	0.07 [19]	2,566	86 [12]	7.5	0.06 [19]	2,397	77 [12]	8.48 [12]	93	89 [16]	2,362.83
Construction	107.12	27.9	0.04 [19]	8,850	50 [14]	9.5	0.03 [19]	3,028	32 [13]	10.71 [16]	34	63 [13]	2,985.22
Other products	289.04	5.3	0.08 [16]	1,671	95 [08]	4.9	0.07 [16]	1,543	84 [08]	5.46 [04]	92	89 [16]	1,521.30
Changes in Inventories and Acquisitions Less Disposals of Valuables	158.07	11.9	0.26 [11]	3,767	317 [03]	6.0	0.20 [12]	1,902	244 [03]	6.73 [03]	50	77 [17]	1,875.03
Balance of Exports and Imports	313.06	2.1	0.09 [10]	669	108 [09]	2.1	0.09 [10]	669	108 [09]	2.37 [07]	100	100 [n.a.]	659.55
Individual Consumption Expenditure by Households[b]	139.95	106.6	0.09 [18]	33,862	109 [13]	47.7	0.07 [18]	15,137	85 [13]	53.53 [15]	45	77 [16]	14,922.18
Individual Consumption Expenditure by Households without Housing[b]	143.83	91.5	0.09 [18]	29,051	109 [13]	42.0	0.07 [18]	13,347	84 [13]	47.20 [16]	46	77 [16]	13,157.75
Government Final Consumption Expenditure	61.22	58.0	0.17 [18]	18,416	207 [09]	11.3	0.05 [19]	3,601	65 [11]	12.74 [10]	20	31 [20]	3,550.19
Domestic Absorption	130.30	208.9	0.09 [18]	66,331	109 [12]	86.9	0.06 [18]	27,609	71 [13]	97.63 [16]	42	65 [17]	27,216.75

Reference Data

Exchange rate (LCU/HK$)	313.06
Total population (in million)	3.15
Population share to AP (%) [ranking]	0.08 [18]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Survey Framework

The NSO translated the ICP product catalogue to Mongolian and distributed printed copies to all price collectors. The NSO trained 45 price collectors in the ICP's structured product descriptions (SPDs) and created a separate survey questionnaire for the ICP items indicating all the ICP items to be priced from CPI existing or other outlets. Each quarter, the team entered price data into the ICP Asia Pacific Software Suite (ICP APSS) and transmitted the collected data to the NSO headquarters via e-mail.

For household consumption survey, the team selected outlets in both urban and rural areas using target sampling to cover the entire economy of Mongolia. A one-stage stratified sampling was adopted in the 2017 ICP price survey, in which the outlet was the sampling unit and the price quotation was the statistical unit. Compared to the 2011 ICP round, the total number of sampled outlets increased by 577 (55%) in rural area and by 473 (77%) in urban area. In total, 2,714 outlets were selected for price collection; 1,086 urban and 1,628 rural. Prices for items under the categories "food and non-alcoholic beverages" and "alcoholic beverages, tobacco and narcotics" were collected monthly, while the prices for the rest of nonfood categories were collected quarterly.

Officers of the NSO and municipality statistics department conducted surveys for construction and machinery and equipment in the main districts of the capital city. The NSO organized training for officers to familiarize them with the correct items to determine their availability based on SPDs.

Officers responsible for housing rental prices in the municipality statistics department collected prices for the housing rental survey in the districts, while officers responsible for ICP collected prices for housing rental survey in *aimags*. To supplement this, data for housing rental survey were also collected from real estate agencies and online sources.

Data on compensation indicating the number of employees in different levels of working years were obtained from the Civil Service Council of Mongolia. The NSO has used the position classification of public administration, public service, and public special service, which was determined by the Government of Mongolia in 2018. This classification includes the list of all positions, definitions, and their corresponding grades. Five-year seniority is used to determine the annual salary in each occupation. Data on compensation for government occupations and other related indicators were also collected from the Ministry of Finance and Ministry of Labor and Social Protection of Mongolia.

Gross Domestic Product Expenditure Values

For the 2017 ICP round, gross domestic product (GDP) expenditure values were estimated for most of the 155 basic headings according to the 2017 ICP classification. These estimates were based on the results of the 2017 supply and use table; hence, statistical discrepancy is no longer observed and becomes part of the balancing. The data sources and methodologies for the compilation of GDP expenditures are shown in Table 7.15.

Data Validation

The NSO conducted two trainings for the price collectors to ensure that same items with correct specifications were surveyed in the price collection. The prices collected in *aimags* and the capital city were submitted to the NSO for further validation. Statistical methods, such as minimum-to-maximum ratio and coefficient of variation were used to check or validate individual price quotations and to improve the national average prices. Although there was no significant deviation in the prices, findings during the regional data validation workshops organized by the Asian Development Bank (ADB) indicated that for some items, price fluctuations were higher compared to other participating economies.

Table 7.15: Classification, Sources, and Methods for Estimating Gross Domestic Product Expenditures, Mongolia

GDP Expenditure items	Classification	Data Sources	Methodology
Household consumption Net expenditures abroad (residents abroad and Nonresidents in the country)	COICOP Balanced supply and use table	Household socio-economic survey, foreign trade statistics, Industry statistics, other statistics	Direct estimation, with some expenditures updated based on other statistical sources using and commodity flow methods
Nonprofit institutions serving households	COPNI	Annual data for nonprofit institutions serving households	

Government consumption
  Individual
    Health
    Education
  Collective
	COFOG	General government budget statistics	Direct estimation, with the consumption of fixed capital reflected in the value added of the government, according to results from the supply and use tables

Gross capital formation
  Machinery and equipment
  Construction
  Other Products
	CPC	Annual surveys of enterprises, financial reports of enterprises	Direct estimation, with estimation of changes in inventories revaluated by the holding gain or loss method

Exports of goods and services Imports of goods and services	HS	Balance of payments data, foreign trade statistics	Direct estimation

COFOG = classification of the functions of government, COICOP = classification of individual consumption according to purpose, COPNI = classification of the purposes of nonprofit institutions serving households, CPC = central product classification, GDP = gross domestic product, HS = harmonized commodity description and coding systems.
Source: National Statistics Office of Mongolia.

Regional validation workshops were very useful in comparing prices across countries. The platform was used to validate the price differences as the result of actual price difference between economies, or incorrect item specification. By comparing prices with others, economies were also able to indicate the availability of the specification or to change or split items if needed.

Price Collection Tools

ICP APSS was a good system for the household items. The price collection tools for machinery and equipment, construction, and housing rental were easy to use.

Challenges in Implementation

Prices were collected for the 12-month period. Ensuring a good match between the ICP product descriptions and the available products in stores entailed heavy effort from the price collectors. Another challenge was price collection for non-household items, which very few traders carry in a small economy like Mongolia.

Lessons Learned and Future Directions

The ICP 2017 round gave many fruitful experiences to the price statistics section for Economic Statistics Department of the NSO, Mongolia as well as to other participating economies. Moreover, the ICP strengthened the statistical capacity for compiling price statistics from the exchange of useful knowledge among the participants during the international workshops organized by ADB. As an example, the regional training with the international experts for construction and for machinery and equipment was useful in understanding the product specifications and validating the prices. After gaining practical information and new techniques, the NSO Mongolia was able to improve the quality of price data for these non-household components, which are often difficult to price.

As of this writing, the NSO has been developing the national program for the development of statistics of Mongolia for 2021–2025, which now reflects ICP activities. As part of the preparations, the NSO has been integrating some of the ICP items in the regular CPI. With the ICP now a permanent global statistical program, there is a need to provide recommendations

to the government on strengthening and maintaining the human resources dedicated for the program in the implementing agencies. In support for these steps, there is a need for in-country data validation workshops and trainings in order to achieve accurate national average price estimates.

Myanmar

Economy Results

Home to 53.15 million people, or 1.40% of the region's total population, Myanmar is the ninth most populous in the region. In comparison, Myanmar's real GDP of HK$1,409 billion, as shown in Table 7.16 (column 3), ranks lower at 14th place, and is only equivalent to 0.61% of the region's total real GDP (column 4). Without factoring in spatial price differences across the 22 economies in the region, Myanmar maintains its rank at 14th place with a significantly lower nominal GDP of HK$493 billion (column 7), which constitutes a smaller share of 0.33% of the region's total nominal GDP (column 8). Lower expenditure levels and a smaller share of the region in nominal than in real terms imply that the general price level in Myanmar is lower than in Hong Kong, China and also lower than the region's average price level. Myanmar's real ICEH of HK$784 billion (0.67% of the region's total real ICEH) and nominal ICEH of HK$281 billion (0.42% of the region's total nominal ICEH) both rank 14th in the region (columns 3, 4, 7, and 8). Myanmar's real GFCF of HK$373 billion (column 3), equivalent to 0.50% of the region's total real GFCF (column 4), ranks 13th in the region while ranking 14th in nominal terms (HK$152 billion, or 0.28% of the region's total nominal GFCF) (columns 7 and 8).

For almost all of the expenditure components in Table 7.16, Myanmar's per capita real expenditures are higher than its per capita nominal expenditures. Myanmar's per capita real GDP of HK$26,519 (column 5) is only 43% of the regional per capita

real GDP, ranking fourth lowest in the region (column 6). Myanmar's ranking is even lower by two notches in nominal terms with a per capita nominal GDP of HK$9,268, which is only 24% of the regional level (columns 9 and 10). Myanmar has the second lowest per capita real ICEH of HK$14,750, which is only 48% of the regional level (columns 5 and 6). The economy's per capita real GFCF of HK$7,026, equivalent to 35% of the regional per capita real GFCF, ranks 18th in the region (columns 5 and 6).

Almost all of the 34 components in Table 7.16 have higher real expenditures than nominal ones, mainly attributable to Myanmar's lower price levels relative to that of Hong Kong, China. With the local currency of kyats (MK), Myanmar's PPP at GDP level of MK61.00 = HK$1 (column 2) is only 35% of the exchange rate of MK174.56 = HK$1, implying that the overall price level in Myanmar is only 35% of (or 65% lower than) that in Hong Kong, China (column 12), and only 55% of (or 45% lower than) the region's average price level (column 13). With a GDP-level PLI of 55 (column 13), Myanmar has the lowest overall price level in the region. The PLI for GFCF is 56 and for ICEH is 62 (column 13)—both are the lowest in the region.

Economy Experience in Program Implementation

Administrative Setup

The Planning Department conducted the 2011 International Comparison Program (ICP) round as the implementing agency for Myanmar with the support of Central Statistical Organization (CSO). By 2016, the CSO took over the lead role in implementing ICP activities in Myanmar and since then has served as the implementing agency for 2017 ICP cycle with its director general designated as the national coordinator, while the director of the Planning Department served as the deputy national coordinator.

Table 7.16: Summary Results for Myanmar, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure		Per Capita Real Expenditure		Nominal Expenditure		Per Capita Nominal Expenditure		Nominal Expenditure Shares, (%) [ranking]	PLIs		Expenditure (billion LCU)
		(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]	(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]		(HKG = 100)	(AP = 100) [ranking]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	61.00	1,409.5	0.61 [14]	26,519	43 [19]	492.6	0.33 [14]	9,268	24 [21]	100.00 [n.a.]	35	55 [22]	85,980.80
Actual Individual Consumption by Households[a]	59.20	864.6	0.64 [14]	16,267	46 [21]	293.2	0.37 [14]	5,517	26 [21]	59.53 [14]	34	58 [22]	51,180.50
Food and non-alcoholic beverages	77.44	351.5	1.28 [11]	6,614	91 [20]	155.9	0.99 [12]	2,934	71 [21]	31.66 [04]	44	78 [20]	27,221.86
Food	76.57	346.0	1.30 [11]	6,509	92 [20]	151.7	1.01 [12]	2,855	72 [21]	30.81 [04]	44	78 [20]	26,488.46
Bread and cereals	89.63	65.5	1.18 [13]	1,232	84 [20]	33.6	0.98 [12]	633	70 [21]	6.83 [05]	51	83 [19]	5,870.26
Meat and fish	73.77	117.2	1.69 [11]	2,204	120 [15]	49.5	1.19 [12]	932	85 [16]	10.05 [02]	42	71 [20]	8,642.90
Fruits and vegetables	70.00	93.0	1.29 [11]	1,750	92 [10]	37.3	1.05 [11]	702	75 [15]	7.57 [02]	40	82 [19]	6,512.60
Other food and non-alcoholic beverages	78.05	79.4	0.98 [12]	1,494	70 [20]	35.5	0.78 [13]	668	55 [21]	7.21 [09]	45	79 [21]	6,196.10
Alcoholic beverages, tobacco and narcotics	58.12	19.0	0.76 [16]	358	54 [16]	6.3	0.35 [14]	119	25 [21]	1.29 [11]	33	46 [21]	1,106.90
Clothing and footwear	77.71	25.5	0.51 [14]	479	36 [18]	11.3	0.30 [14]	213	22 [19]	2.30 [11]	45	60 [20]	1,979.20
Clothing	75.07	22.6	0.55 [13]	425	39 [18]	9.7	0.33 [14]	183	24 [18]	1.97 [11]	43	60 [19]	1,696.90
Housing, water, electricity, gas and other fuels[a]	34.45	205.4	0.91 [12]	3,865	64 [19]	40.5	0.38 [14]	763	27 [21]	8.23 [12]	20	42 [22]	7,076.73
Furnishings, household equipment and routine household maintenance	72.91	10.3	0.25 [14]	193	18 [22]	4.3	0.14 [14]	81	10 [22]	0.87 [22]	42	55 [21]	749.70
Health[a]	25.97	208.1	0.50 [14]	3,916	36 [20]	31.0	0.18 [14]	583	13 [21]	6.29 [20]	15	36 [19]	5,406.30
Education[a]	28.03	103.5	0.43 [13]	1,947	31 [20]	16.6	0.18 [14]	313	13 [21]	3.37 [13]	16	43 [19]	2,901.50
Transportation and communication	89.23	31.3	0.18 [14]	588	13 [21]	16.0	0.16 [14]	301	11 [21]	3.25 [22]	51	89 [19]	2,790.20
Transportation	83.40	23.3	0.17 [14]	438	12 [21]	11.1	0.14 [14]	209	10 [21]	2.26 [22]	48	85 [20]	1,942.50
Communication	111.91	7.6	0.22 [14]	143	16 [20]	4.9	0.21 [13]	91	15 [18]	0.99 [17]	64	96 [12]	847.70
Recreation and culture[a]	93.98	6.8	0.17 [15]	127	12 [22]	3.6	0.11 [16]	68	8 [22]	0.74 [21]	54	61 [21]	635.50
Restaurants and hotels	72.50	34.4	0.64 [13]	646	45 [17]	14.3	0.41 [14]	268	29 [19]	2.90 [11]	42	64 [19]	2,491.00
Miscellaneous goods and services[a]	72.30	23.8	0.18 [14]	448	13 [21]	9.9	0.10 [14]	186	7 [21]	2.00 [21]	41	55 [20]	1,723.11
Individual Consumption Expenditure by Government	32.26	68.7	0.36 [14]	1,293	26 [19]	12.7	0.11 [14]	239	8 [20]	2.58 [19]	18	31 [18]	2,217.19
Collective Consumption Expenditure by Government	49.33	277.7	1.83 [10]	5,225	131 [14]	78.5	0.80 [13]	1,477	57 [14]	15.93 [02]	28	44 [18]	13,701.04
Gross Fixed Capital Formation	71.07	373.4	0.50 [13]	7,026	35 [18]	152.0	0.28 [14]	2,861	20 [19]	30.87 [09]	41	56 [22]	26,540.16
Machinery and equipment	136.32	82.7	0.74 [14]	1,556	52 [17]	64.6	0.55 [14]	1,215	39 [17]	13.11 [06]	78	74 [22]	11,274.00
Construction	42.15	305.8	0.46 [13]	5,754	33 [19]	73.9	0.20 [14]	1,390	15 [19]	14.99 [09]	24	45 [22]	12,891.60
Other products	130.09	18.3	0.28 [12]	343	20 [19]	13.6	0.20 [12]	256	14 [19]	2.76 [11]	75	71 [22]	2,374.56
Changes in Inventories and Acquisitions Less Disposals of Valuables	73.52	15.5	0.34 [09]	292	25 [13]	6.5	0.22 [11]	123	16 [14]	1.33 [09]	42	64 [22]	1,139.70
Balance of Exports and Imports	174.56	-37.7	-1.61 [16]	-709	-115 [15]	-37.7	-1.61 [16]	-709	-115 [15]	-7.65 [18]	100	100 [n.a.]	-6,580.60
Individual Consumption Expenditure by Households[b]	62.45	784.0	0.67 [14]	14,750	48 [21]	280.5	0.42 [14]	5,278	30 [21]	56.95 [12]	36	62 [22]	48,963.31
Individual Consumption Expenditure by Households without Housing[b]	67.75	675.8	0.67 [14]	12,714	48 [21]	262.3	0.43 [14]	4,935	31 [21]	53.25 [10]	39	65 [21]	45,784.01
Government Final Consumption Expenditure	42.51	374.5	1.11 [10]	7,046	79 [16]	91.2	0.43 [13]	1,716	31 [17]	18.51 [02]	24	39 [18]	15,918.23
Domestic Absorption	61.36	1,508.6	0.65 [14]	28,383	47 [19]	530.3	0.36 [14]	9,977	26 [21]	107.65 [05]	35	55 [22]	92,561.40

Reference Data

Exchange rate (LCU/HK$)	174.56
Total population (in million)	53.15
Population share to AP (%) [ranking]	1.40 [09]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

b Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Use of Existing Infrastructure in Collecting Data

As for the 2017 ICP round, the CSO initially selected a sample of one third (110 out of 330) townships identified in the Myanmar Living Conditions Survey, which was conducted from December 2016 to November 2017 to survey prices of household consumption items. The ICP sample frame of 110 townships includes all districts, capital cities, populated cities, and large cities for the sample design. However, because of limited budget, the sampling frame was reduced to 69 townships to be nationally representative, based on the recommendations of the ADB experts and CSO ICP team. ICP price collection activities for household price survey were conducted separately from those of the consumer price index (CPI), and none of the CPI items were used for the ICP.

To implement the 2017 ICP round survey, the CSO formed specific groups with the staff of 15 states, regional staff, and one ICP team at the CSO headquarters for overall implementation of economy-level activities and for coordinating with Asian Development Bank (ADB). Each specific group consisted of a supervisor, data entry person, helper, and a price collector. The price collectors and helpers collected prices of ICP items in line with structured product descriptions (SPD) from selected outlets per region. The data entry officer used the ICP Asia Pacific Software Suite (ICP APSS) for outlet mapping, entering data, and analyzing data. One supervisor was assigned to each region to check the processing of regional ICP data. Regional teams sent ICP data to the CSO ICP team monthly and quarterly. The CSO ICP team conducted data quality checks and intra-economy data validation meetings with the regional supervisors to confirm ICP price data, which was then sent to the ADB ICP team quarterly.

The CSO undertook technical consultations with the Myanmar Engineering Council on conducting price collection surveys for machinery and equipment,

and construction, and the CSO's regional staff collected the prices from selected industrial zones and construction sites in three major regions of Myanmar.

In consultation with the regional real estate agencies, the CSO ICP team undertook a separate housing rental survey for ICP requirements based on guidelines of ADB. The indicators required for the housing volume survey were taken from the pre-existing 2017 Myanmar Living Condition Survey and 2014 Myanmar Population and Housing Census to supplement the 2017 survey.

Compensation data for government occupations were sourced from the concerned ministries.

Survey Framework

For the household consumption price survey, each CSO regional team compiled a list of outlets from municipal markets in urban and rural areas of the nationally representative 69 sample townships. The sample frame included districts, capital cities, populated cities, large cities, and border areas of the sample design. For this, 3,568 outlets were selected for price collection; 3,428 were in urban areas and 140 in were in rural areas. The CSO collected ICP data monthly for food and quarterly for nonfood items.

Housing rental data was collected from urban and rural areas of Yangon Region, Mandalay Region, and Nay Pyi Taw Council, representing the major housing rental markets in Myanmar.

The prices of items for machinery and equipment, and construction were collected from Yangon Region, Mandalay Region, and Nay Pyi Taw Council, covering national prices. Government compensation data for government occupations and other related indicators were collected from Project Appraisal and Progress Reporting Department under the Ministry of Planning, Finance and Industry.

Gross Domestic Product Expenditure Values

Although the annual gross domestic product (GDP) of Myanmar is compiled in fiscal year from April of the previous year to March of the current year, quarterly estimates at the main aggregates are also available. Thus, only quarters relevant to calendar year 2017 were taken as control total estimates for ICP. Basic heading values were estimated from various available data sources.

Individual consumption expenditure by household was estimated from the 2015 Myanmar Poverty and Living Conditions Survey and the 2017 Myanmar Living Conditions Survey, 2014 population and housing census, 2014 labor force survey, and 2017 business survey, adjusted by population and inflation. Some items, such as recording media, and other recreational items and equipment, were taken from trade data. Data on games of chance, such as service charges for the lottery, were obtained from the Internal Revenue Department. Individual consumption expenditure by nonprofit institutions serving households was assumed to be included in the household expenditure.

Individual consumption expenditure by the government was taken from the Budget Department, which included the expenditures from the Ministry of Education, Ministry of Health, and Department of Human Settlement and Housing Development. Total consumption expenditure by government was based on total government budget data. The collective consumption expenditure of government was derived as the residual difference between total government expenditure and individual government expenditure.

Gross fixed capital formation was estimated from the Department of Investment and Company Administration, and the special economic zones data on actual inflow with counterpart checking of imports data and government budget data. Changes in inventories and acquisitions less disposals of valuables were taken from the Planning Department. The balance of exports and imports were from trade data and the Balance of Payment statistics from the Central Bank of Myanmar.

Data Validation

The ADB ICP team trained the price section staff of headquarters, states and regions from the CSO and planning department staff in a workshop and through field visits at the beginning of the 2017 ICP activities. This training focused on identification and price collection of the household and non-household products based on the SPDs. This training included pilot price surveys in Yangon and Mandalay.

The CSO ICP team trained 40 staff from southern Myanmar such as Kayin State, Tanitharyi State, Bago Region, Magway Region, Mon State, Rakhine State, Yangon Region, and Ayeyarwaddy Region on price collection on 1–5 May 2017. Training continued with 39 staff from northern Myanmar, including Kachin State, Kayah State, Chin State, Sagaing Region, Mandalay, Shan State, and Nay Pyi Taw on 8–12 May 2017. Subsequently, the CSO ICP team and price collectors conducted a pilot price survey at Yangon and Mandalay.

The price supervisors and collectors were encouraged to take photos of the priced items from the sample outlets. The CSO ICP team sent special instructions based on the ICP manual and guide for the price collectors and data entry officers through the regional offices. Price collectors submitted the price data to their respective data entry person. The supervisors and data entry person carried out data validation and checked the price data before sending them to the ICP team.

Price collectors collected prices for food items on a monthly basis and nonfood items on quarterly basis from the outlets located in the urban and rural areas of 69 townships. The data was sent to the CSO ICP team in the headquarters to conduct

outlets mapping, data entry, and data analysis. The CSO ICP team consolidated, reviewed, and revised the data in consultation with the international and national consultants before sending the data to ADB quarterly. The CSO ICP team reviewed the comments from ADB during the discussions in the regional data validation workshops which were attended by all participating economies. Regional data validation workshops were useful in discussing data issues, such as prices that are relatively high or low compared with the subgroup averages and in relation with other economies of the region.

The CSO ICP team collected prices of electronic and software items from computer outlets and electrical outlets at Nay Pyi Taw in November 2017 for the first time. After addressing ADB comments, the CSO ICP team submitted the revised data in April 2018.

The CSO ICP team consulted with the Myanmar Engineering Society on conducting price collection for machinery and equipment, and construction materials. Then, a pilot survey was conducted at industrial zones and construction sites in Yangon, Mandalay, and Nay Pyi Taw. Data collection was regularly monitored through visits to solve technical and other problems. Data entry used price collection tools. When unreasonable prices were found, the CSO ICP team examined and checked the photos using the SPDs. If the item was not in accordance with the SPDs and if necessary, the CSO ICP team conducted price collection again within the price collection period. The regional staff collected prices for machinery and equipment, and construction from Yangon Region, Mandalay Region, and Nay Pyi Taw Council. Despite the difficulty in understanding the definition of the items during data collection, the CSO staff continually collected and revised the data based on the data validations before submitting to ADB.

The CSO ICP team conducted a housing rental survey from Yangon Region, Mandalay Region, and Nay Pyi Taw Council with the regional real estate agencies, as suggested by the ADB guidelines.

The CSO ICP team collected compensation data from government ministries in August, September, and October. Other information on allowances, social security contribution, housing, transportation, and regular and actual work hours per week were confirmed with the concerned departments. As this was the first time, the team faced difficulty in collecting data aggregated at the union level. The price collection tool and data entry software were difficult to understand. Even without training, the CSO ICP team tried to undertake the data entry through the system; although it took time, the team was able to work through the system. The CSO ICP team submitted the compensation data to ADB.

The CSO ICP team collected housing volume data from related survey reports of Myanmar and submitted the housing volume data to ADB.

Based on the experience of the CSO on calculating the CPI and inflation, the CSO ICP team responded to the ICP-CPI country questionnaire. Meanwhile, the Planning Department responded to the GDP section for national accounts.

The CSO ICP team checked the received data from states and regions based on the consistency in branded items and prices for data. Some data underwent intra-economy data validation with the supervisor of states and regions for national ICP prices. The team submitted revised data along with comments to ADB quarterly.

Price Collection Tools

State and regional staff collected prices of food items on a monthly basis and nonfood items on a quarterly basis. Using the ICP APSS software, the CSO conducted the outlets mapping, data entry, and data analysis. The ADB ICP team trained the CSO ICP team on how to use the software via videoconferencing through ADB's Myanmar Resident Mission.

During ADB's development of a web-based version of the ICP APSS for households, the CSO tested the web-based tool and provided feedback in using the ICP APSS; the ADB ICP team addressed these issues in finalizing the second version of the web-based application and trained the ICP CSO team in its use via videoconference. To be more effective for data operators, CSO suggests an in-person session on the application of these tools to be included back-to-back in ADB workshops.

Challenges in Implementation

The ICP 2017 round price collection was the first time for the CSO to be involved in this regional initiative of the full ICP round. As expected, many price collectors faced some difficulties arising from their unfamiliarity with the international units of measurement; to address this, the supervision team distributed the conversion rates for their reference. In most cases in the field, shopkeepers did not allow the price collectors to take a photo of the product, so they approached the administrative officers of the outlets to help secure photos of the products, which helped during data validation.

The CSO did not have enough human resources when 2017 ICP round started and engaged municipal staff for temporary assistance in collecting price during the first quarter of 2017. After that, the CSO recruited regional staff who participated in the needed areas and were trained for price collection. At that time, the CSO ICP team faced significant changes while processing the national prices and had difficulty handling the ICP budget process, with some clarifications needed in ADB's reimbursement guidelines.

Lessons Learned and Future Directions

The CSO staff involved in the ICP gained knowledge and experience from the ICP activities, especially on the difference between prices for ICP and CPI. In the 2017 cycle experience, incorporating ICP products in the CPI was difficult in practice because the item

selection criteria and price determination factors in the CPI and ICP were not the same. To solve this, some of the ICP items will be integrated into the CPI in view of the plan for CPI base revision in Myanmar.

The CSO staff gained knowledge of extremely useful techniques and new methodologies from the in-country and video conference-based workshops and trainings on data validation and analysis in the ICP APSS, sample size determination, outlet selection, and familiarization in the international measurements used in SPDs, especially with the assistance of international experts for machinery and equipment and construction. These contributed to the improvement of data quality and were made possible by the close coordination and cooperation between ADB and implementing agencies. Having undertaken the data collection, the CSO staff realized the importance of collecting prices in line with the SPDs.

After obtaining results from the ICP, a survey relating to household and non-household products is planned and awareness activities will follow. The CSO plans to integrate the ICP in its regular work as part of the development of statistics sector of Myanmar. With this, the CSO will integrate price collection surveys of the CPI and ICP. The CSO will also introduce similar techniques learned from the ICP on CPI. Moreover, the CSO has considered undertaking subnational PPP computation in the near future, although preparatory works have not yet been done.

Nepal

Economy Results

Among the 22 participating economies, Nepal has the 15th largest real GDP of HK$503 billion, as Table 7.17 (column 3) shows, or about 2.6 times of its nominal GDP at HK$195 billion (column 7), indicating that the exchange rate is also about 2.6 times of the PPP at the GDP level. With a population share of 0.76% of the region, it contributes only 0.22% to the region's

total real GDP (column 4), though this is much larger than its nominal share of 0.13% (column 8). Household consumption drives Nepal's economy with a very high share of 76.70% of its total nominal GDP, the third highest nominal ICEH-to-GDP ratio in the region (column 11). With such a household consumption-based economy, Nepal's real ICEH share of the region is 0.35%, which is larger than its real GDP share of 0.22% and also larger than the share of real GFCF at 0.16% (column 4).

Factoring in the population size of 28.83 million (11th most populous in the region), Nepal's per capita real GDP is estimated at HK$17,431 (column 5), which is the lowest in the region and is only 28% of the regional per capita real GDP (column 6). In almost all components shown in column 6 of Table 7.17, Nepal's per capita real expenditures are lower than the regional level average, except for food (with an index of 103) and bread and cereals (with an index of 164).

With the local currency of Nepalese rupees (NRs), Nepal's PPP at GDP level of NRs5.20 = HK$1 (column 1) is only 39% of the exchange rate of NRs13.41 = HK$1, resulting in a low PLI for GDP level at 39 (with Hong Kong, China = 100) (column 12) or 60 (with Asia and the Pacific = 100) (column 13). This makes Nepal's average price level the third least expensive in the region, after Bhutan and Myanmar. Nepal posts the lowest PLIs for the following components: furnishings, household equipment and routine household maintenance (55); communication (44); recreation and culture (46); restaurants and hotels (52); and individual consumption expenditure by households without housing (64) (column 13). Meanwhile, Nepal registers the seventh highest PLI of 111 for transportation, and the ninth highest PLI of 67 in construction. These relatively high PLIs may stem from Nepal's landlocked and mostly mountainous geography.

Economy Experience in Program Implementation

Administrative Setup

Since the 2005 International Comparison Program (ICP) round, the Price Statistics Section, which is under the Economic Statistics Division of the Central Bureau of Statistics (CBS), has been mandated to implement the ICP. The section comprises eight staff: two directors, four statistics officers, and two statistics assistants. The senior director was assigned the position of ICP national coordinator while the second director became the deputy national coordinator. Though the administrative setup for the Price Statistics Section in 2017 ICP round was same as in the 2011 ICP round, the staff members differed in the two rounds of ICP due to internal employee rotation. All staff working in this section were members of the ICP core team and were engaged in the price surveys for different types of activities. In addition to this section, the staff in the national accounts section contributed significantly in disaggregating the gross domestic product (GDP) expenditure into the 155 basic headings of 2017 ICP classification.

Use of Existing Infrastructure in Collecting Data

The Central Bank of Nepal, a separate and independent entity from the CBS, regularly produces the consumer price index (CPI). Hence, there is currently no effective mechanism to coordinate the CPI and ICP activities. Hence, no CPI item prices were used for the ICP, which was implemented as an independent survey. Though the ICP is a regular activity of the CBS, there is no dedicated ICP team or unit for ICP activities. In this regard, ICP activities are an additional workload for the Price Statistics Section, which has its own regular quarterly surveys.

Table 7.17: Summary Results for Nepal, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Real Expenditure HK$	Per Capita Real Expenditure Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Nominal Expenditure HK$	Per Capita Nominal Expenditure Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	5.20	502.5	0.22 [15]	17,431	28 [22]	194.7	0.13 [15]	6,754	17 [22]	100.00 [n.a.]	39	60 [20]	2,611.20
Actual Individual Consumption by Households[a]	4.74	433.6	0.32 [15]	15,041	42 [22]	153.4	0.19 [15]	5,319	26 [22]	78.76 [04]	35	60 [21]	2,056.52
Food and non-alcoholic beverages	5.79	207.7	0.76 [13]	7,206	99 [18]	89.6	0.57 [14]	3,109	75 [20]	46.03 [01]	43	75 [21]	1,201.84
Food	5.68	208.4	0.78 [13]	7,230	103 [16]	88.3	0.59 [14]	3,064	77 [20]	45.36 [01]	42	75 [21]	1,184.56
Bread and cereals	6.06	69.5	1.25 [11]	2,412	164 [09]	31.4	0.92 [13]	1,089	120 [14]	16.13 [01]	45	73 [21]	421.16
Meat and fish	6.74	29.2	0.42 [15]	1,011	55 [20]	14.7	0.35 [16]	508	46 [20]	7.53 [05]	50	84 [12]	196.54
Fruits and vegetables	4.36	54.1	0.75 [12]	1,876	98 [09]	17.6	0.49 [14]	610	65 [17]	9.03 [01]	33	66 [21]	235.90
Other food and non-alcoholic beverages	6.03	57.7	0.71 [13]	2,003	94 [17]	26.0	0.57 [14]	901	75 [20]	13.34 [02]	45	79 [20]	348.23
Alcoholic beverages, tobacco and narcotics	8.79	9.0	0.36 [17]	314	47 [19]	5.9	0.32 [16]	206	43 [18]	3.04 [06]	66	91 [12]	79.49
Clothing and footwear	5.73	10.5	0.21 [15]	365	28 [20]	4.5	0.12 [15]	156	16 [22]	2.31 [10]	43	57 [21]	60.37
Clothing	5.63	9.1	0.22 [15]	314	29 [20]	3.8	0.13 [15]	132	17 [21]	1.95 [12]	42	58 [20]	50.96
Housing, water, electricity, gas and other fuels[a]	3.56	71.3	0.31 [15]	2,474	41 [22]	18.9	0.18 [16]	656	23 [22]	9.71 [07]	27	56 [19]	253.62
Furnishings, household equipment and routine household maintenance	5.60	6.8	0.17 [16]	237	22 [21]	2.9	0.09 [16]	99	12 [21]	1.47 [18]	42	55 [22]	38.32
Health and education[a]	1.90	91.7	0.22 [16]	3,179	29 [22]	13.0	0.08 [16]	451	10 [22]	6.68 [18]	14	35 [20]	174.37
Health[a]	2.14	39.0	0.16 [16]	1,353	21 [21]	6.2	0.07 [16]	216	9 [22]	3.20 [15]	16	43 [20]	83.58
Education[a]	1.74	52.3	0.28 [16]	1,812	37 [22]	6.8	0.08 [16]	235	11 [22]	3.48 [17]	13	30 [20]	90.79
Transportation and communication	6.88	12.7	0.07 [17]	439	10 [22]	6.5	0.06 [17]	225	8 [22]	3.33 [20]	51	89 [18]	87.05
Transportation	8.38	7.4	0.05 [17]	256	7 [22]	4.6	0.06 [17]	160	8 [22]	2.37 [21]	63	111 [07]	61.86
Communication	3.98	6.3	0.18 [15]	220	24 [19]	1.9	0.08 [15]	65	11 [20]	0.96 [18]	30	44 [22]	25.19
Recreation and culture[a]	5.39	12.7	0.32 [14]	441	42 [17]	5.1	0.15 [14]	177	19 [19]	2.63 [10]	40	46 [22]	68.56
Restaurants and hotels	4.50	8.1	0.15 [17]	280	20 [22]	2.7	0.08 [17]	94	10 [22]	1.39 [18]	34	52 [22]	36.42
Miscellaneous goods and services[a]	6.46	9.8	0.07 [16]	340	10 [22]	4.7	0.05 [16]	164	6 [22]	2.42 [19]	48	64 [17]	63.29
Individual Consumption Expenditure by Government	3.60	14.9	0.08 [19]	516	10 [21]	4.0	0.04 [18]	139	5 [22]	2.05 [21]	27	45 [16]	53.61
Collective Consumption Expenditure by Government	5.99	40.5	0.27 [17]	1,405	35 [20]	18.1	0.19 [16]	628	24 [20]	9.29 [06]	45	69 [10]	242.68
Gross Fixed Capital Formation	7.14	116.3	0.16 [15]	4,033	20 [20]	61.9	0.11 [15]	2,149	15 [20]	31.81 [07]	53	73 [14]	830.70
Machinery and equipment	11.54	15.2	0.14 [15]	529	18 [22]	13.1	0.11 [15]	455	15 [22]	6.74 [17]	86	82 [20]	175.91
Construction	4.86	102.1	0.15 [15]	3,541	20 [20]	37.0	0.10 [15]	1,284	13 [20]	19.01 [07]	36	67 [09]	496.26
Other products	11.93	13.3	0.20 [13]	461	26 [15]	11.8	0.17 [14]	410	22 [18]	6.07 [03]	89	85 [19]	158.54
Changes in Inventories and Acquisitions Less Disposals of Valuables	6.44	56.4	1.25 [07]	1,957	165 [04]	27.1	0.92 [08]	940	121 [07]	13.92 [01]	48	73 [18]	363.61
Balance of Exports and Imports	13.41	-65.8	-2.81 [18]	-2,282	-369 [19]	-65.8	-2.81 [18]	-2,282	-369 [19]	-33.79 [22]	100	100 [n.a.]	-882.32
Individual Consumption Expenditure by Households[b]	4.89	409.7	0.35 [15]	14,212	46 [22]	149.4	0.22 [15]	5,180	29 [22]	76.70 [03]	36	63 [21]	2,002.91
Individual Consumption Expenditure by Households without Housing[b]	5.12	352.6	0.35 [15]	12,230	46 [22]	134.5	0.22 [15]	4,665	29 [22]	69.08 [03]	38	64 [22]	1,803.80
Government Final Consumption Expenditure	5.05	58.7	0.17 [17]	2,035	23 [21]	22.1	0.10 [16]	766	14 [22]	11.35 [14]	38	60 [14]	296.29
Domestic Absorption	5.39	648.6	0.28 [15]	22,497	37 [22]	260.5	0.18 [15]	9,036	23 [22]	133.79 [01]	40	63 [20]	3,493.51

Reference Data

Exchange rate (LCU/HK$)	13.41
Total population (in million)	28.83
Population share to AP (%) [ranking]	0.76 [11]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

The CBS conducts its field activity through its 33 statistics offices, which cover all 77 districts. For the 2017 ICP round, the ICP CBS team selected 30 market centers, covering 28 statistics offices in districts, as locations for collecting prices of household products. Accordingly, the staff of 28 statistics offices were involved in collecting prices from the selected market centers. In the data collection phase, heads of the statistics offices in the districts were given supervisory responsibility. The central core team members were involved both in price collection mainly in and around the capital city and in supervision of the overall price collection activities. The central core team checked and validated the data sent by the field offices before submitting the data to the Asian Development Bank (ADB).

The price collection for specialized surveys of machinery and equipment and construction items was undertaken by CBS staff in consultation with industry experts to identify the products correctly in accordance with the structured product description (SPD). The housing rental survey was conducted in selected urban locations by CBS staff to meet ICP data requirements. The CBS used relevant housing indicators from existing surveys such as 2010–2011 Nepal Living Standards Survey, 2011 National Population and Housing Census, 2014 and 2016 Annual Household Surveys, and 2014 Multiple Indicator Cluster Survey. Government compensation data for select occupations were obtained from Financial Comptroller General Office (FCGO).

The CBS largely used its own infrastructure in the 2017 ICP round. The 28 statistics offices used available computers, laptops, and printers in printing questionnaires and encoding the data. Data entry for the 2017 ICP was affected in some quarters by other ongoing regular data entry activities in the districts. The central office used both its own and ADB-supported computers, laptops, and printers for checking and validating 2017 ICP data.

Survey Framework

For the household consumption survey, the ICP CBS team adopted two-stage purposive sampling. In the first stage, 30 market centers (28 urban and 2 rural) were selected. The number of rural market centers in the 2017 round declined from the 2011 round because the change in the administrative definition and boundaries of urban and rural areas increased the number of urban areas. The basis for selecting the market centers were (i) CPI market centers; (ii) size of the population; (iii) geographical condition; (iv) administrative division; (v) market centers in the 2011 round; and (vi) coverage and responsibility of statistics offices in districts. All 30 market centers were common to the ICP and CPI.

In the second stage, the ICP CBS team selected outlets purposively from the selected market centers. The selection procedure was based on the types of outlets, availability of items, and location. The number of outlets selected depended on the availability of the items in the market center. Prices were collected from 4,016 outlets: 3,882 of them were in urban areas and 134 outlets were in rural areas. Three quotations for each item were collected as far as possible from each market center. Nepal was able to price more than half of the total ICP items in 2017.

The frequency of data collection was determined based on the nature of items, price volatility, use of the items, and frequency of data collection in the CPI. Prices of goods and services were collected monthly for items under food and non-alcoholic beverages, annually for education, semiannually for transport, and quarterly for the rest of categories.

Prices of items for machinery and equipment were collected only from the capital city, on the assumption that most of the transactions for this component took place in the capital city and the prices of goods did not vary significantly in other market centers.

The outlets were selected purposively. During the survey, suppliers and experts on machinery and equipment were consulted in identifying the items' specifications and collect their prices.

The ICP CBS team selected 14 market centers for the survey of construction inputs from seven provinces in the country. The selection procedure was purposive, based on the volume of construction activities, transaction of the construction materials, and geographical condition. The selected market centers comprised four from Kathmandu, two from Lalitpur, two from Bhaktapur, and one from each market centers in Biratanagar, Birgunj, Pokhara, Butwal, Kanchanpur, and Jumla.

For the housing rental survey, a sample of 16 urban areas was selected from seven provinces of the country for collection of rent paid for various types of accommodation. The selection procedure was purposive. The rental data was collected from five dwellings for each type of dwelling, as far as possible.

For government compensation, data on government occupations and other related indicators were collected from the FCGO.

Gross Domestic Product Expenditure Values

The disaggregated GDP expenditure values were available for most of the basic headings. Some of the basic headings, such as passenger transport by railways and passenger transport by sea and inland waterway, were not relevant for the economy, while a few others have negligible GDP value estimates. The basic source of data for household consumption expenditure were the 2016–2017 Annual Household Survey, and 2014–2015 Household Budget Survey. The GDP expenditure value estimate for net purchases abroad was not estimated separately. For disaggregation of individual consumption expenditure by nonprofit institutions serving households (NPISH), weights from the NPISH survey 2008–2009 were used.

For individual consumption expenditure by government, the expenditure sheet followed classification of the functions of government (COFOG) from the FCGO. The 2016/2017 FCGO Report were used to directly estimate most of the basic headings. However, some basic headings within health benefits and reimbursements group were split using the respective shares from the annual household survey. Machinery and equipment estimates were derived from the imports data from the Department of Custom. Construction expenditure was derived using COFOG-wise expenditure data from the FCGO Report, published gross value added of construction component, and national accounts published table with supply and use table (SUT) ratios. Changes in inventories and acquisitions less disposals of valuables was taken directly from the GDP sheet and the values disaggregated using the shares from the published SUT. Since inventories were derived residually during annual estimates, statistical discrepancies and other errors are also included in this item. Balance of exports and imports were estimated using custom data and the balance of payment statistics from the Central Bank of Nepal.

These estimates were, however, based on the fiscal year, beginning July 16 of previous year and ending July 15 of the current year, and needed to be converted to calendar year estimates for 2017, as in the 2011 round, to meet ICP data requirements. Using the fiscal year estimates at the basic heading level, portion of estimates from the previous year and the current year were summed using the number of days as weights. These were then aggregated to achieve higher level estimates until the GDP for calendar year 2017 is derived.

Data Validation

Similar to the 2011 cycle, data validations were implemented at the local and central levels. At the local level, statistical officers or directors (officers-in-charge) of the statistics offices reviewed the quoted prices. At the central level, the data submitted

by the district offices were verified by reviewing the prices of each item in different market centers and prices of subsequent months or quarters in the same market center. The directors and statistics officers of price statistics section closely monitored the price collection activities to ensure adherence to SPDs of ICP items.

The intra-economy validation workshops involved data quality checks in accordance with the coefficient of variation and minimum-to-maximum ratio of each item. The CBS carefully took feedback from the regional validation workshops into consideration and found it very useful in improving the quality of price data. The issues and adopted solutions shared in regional workshops by various economies were very helpful in resolving data issues.

In addition to the intra-economy validation workshops, ADB periodically organized regional workshops for inter-economy validation of prices. These workshops enormously helped the participating economies in reviewing the data and sharing valuable experiences.

Price Collection Tools

The ICP Asia Pacific Software Suite (ICP APSS) was very useful for data entry and analysis. The price collection tools for the non-household components such as machinery and equipment and construction were very simple and easy to use for data entry and analysis of recorded prices.

Challenges in the ICP Implementation

The CBS Nepal experienced the following challenges during 2017 cycle:

(i)   The tracking of exactly the same goods and services as mentioned in the SPD is a great challenge for some goods and services, resulting in fewer items priced.

(ii) Pricing items was difficult, especially for those without specific brands, such as rice and garments.

(iii) Harmonization between the CPI and ICP was challenging as two different organizations are involved in the implementation of the programs. It was difficult to integrate the two datasets and other field-level management. The experiences of the CPI could not be used in the ICP.

(iv) It was difficult to understand the specifications provided by ADB and find appropriate respondents, especially in machinery and equipment as the specifications provided by ADB did not match exactly with the available items in the outlet.

(v)   As the staff in Price Statistics Section have ongoing duties for the regular programs and the ICP is additional work, the timely submission of data with the existing human resources was very challenging.

(vi) As the completion of ICP activities depended on the seed fund provided by ADB, the delay in releasing the fund affected the work schedule.

Lessons Learned and Future Directions

The major benefit from the 2017 ICP for the CBS is that this program provided learning and confidence to the ICP team in identifying the goods and services in line with the SPDs that are available in the Nepalese market. This program honed the skills of new enumerators on locating the appropriate outlets and identifying products in the markets in accordance with the SPD. This program also enhanced the data analysis skills of the ICP CBS team as well as that of the data entry operator to enter and analyze the data in ICP APSS. This program has thus increased the confidence and build capacity of the staff involved in ICP activities, which will be beneficial for the future ICP program. At the individual level, the ICP was very useful in understanding purchasing power parities (PPPs) and their importance, and the impact of the quality of price data in the compilation of PPPs.

The ICP was considered a good platform for participating economies to share experiences for the improvement of the quality of price data. There are benefits to the same organization carrying out both the CPI and ICP. To utilize the same infrastructure for price statistics, integration of the ICP and CPI activities is essential. The regional validation workshops are indispensable in improving data quality, particularly those related to GDP, machinery and equipment, and construction. Sessions by various international experts were very useful in understanding the issues, addressing them, and identifying data sources and items.

The implementing agencies need to follow the financial regulations of their governments as well as the disbursement requirements of ADB for the expenses in carrying out the ICP activities. The lengthy procedures, along with issues in the seed fund liquidations, sometimes delayed the execution of the program. Considering the limited number of staff, there is a need for simplified financial procedures for the smooth operation of the ICP program in the future.

From ICP experiences, the CBS has agreed in principle that the ICP activities need to be integrated in the annual work plan. As the country is restructured in federal system, the computation of subnational PPP will be more fruitful for the nation.

Pakistan

Economy Results

Home to 199.11 million people or 5.26% of the region's population, Pakistan is the fourth most populous economy and has the sixth largest economy in real terms in the region, with a real GDP of HK$5,954 billion, as shown in column 3 of Table 7.18, comprising 2.56% of the region's total real GDP (column 4).

In comparison, without adjusting for spatial price differences across 22 participating economies in the region, Pakistan's nominal GDP is lower at HK$2,459 billion (column 7), with smaller share of 1.65% of the region's total nominal GDP (column 8)—ranking lower at eighth place. A significantly lower figure, share, and ranking in nominal terms than in real terms indicate that Pakistan has lower overall price level relative to Hong Kong, China's and the region's price levels. The same trends can be observed for ICEH and GFCF. Pakistan has the highest nominal ICEH-to-GDP ratio in the region with its nominal ICEH of HK$2,022 billion (column 7) constituting as large as 82.22% of its nominal GDP (column 11). Pakistan's ICEH is even larger in real terms at HK$5,135 billion (column 3), comprising 4.39% of the region's total (column 4) and ranking fourth in the region. The large household consumption expenditure crowds out other components, such as the GFCF, whose nominal expenditure of HK$365 billion (column 7) is only 14.86% of Pakistan's nominal GDP (column 11), the second smallest nominal GFCF-to-GDP ratio in the region following Cambodia. Despite this, its nominal GFCF is 12th largest in the region (column 8), comprising 0.66% of the region's total nominal GFCF (column 8). The GFCF is even larger in real terms at HK$698 billion (column 3), contributing 0.93% to the region's total real GFCF (column 4).

Accounting for its population, Pakistan's per capita real GDP is estimated at HK$29,905 (column 5), which is only 49% of (or 51% lower than) the regional per capita real GDP (column 6), ranking 18th in the region. Pakistan has a per capita real GFCF of HK$3,505 (column 5), which is only 18% of the regional level (column 6), ranking 21st in the region. Despite having the fourth largest real ICEH, Pakistan's per capita real ICEH of HK$25,791 (column 5) is 83% of (or 17% lower than) the regional level (column 6) and ranks only 15th in the region.

Table 7.18: Summary Results for Pakistan, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure		Per Capita Real Expenditure		Nominal Expenditure		Per Capita Nominal Expenditure		Nominal Expenditure Shares, (%) [ranking]	PLIs		Expenditure (billion LCU)
		(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]	(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]		(HKG = 100)	(AP = 100) [ranking]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	5.59	5,954.4	2.56 [06]	29,905	49 [18]	2,458.7	1.65 [08]	12,349	31 [19]	100.00 [n.a.]	41	64 [18]	33,270.44
Actual Individual Consumption by Households[a]	5.25	5,495.3	4.09 [04]	27,599	78 [16]	2,131.3	2.70 [05]	10,704	51 [17]	86.68 [01]	39	66 [18]	28,839.99
Food and non-alcoholic beverages	6.35	1,457.9	5.31 [05]	7,322	101 [17]	684.6	4.36 [06]	3,438	83 [18]	27.84 [06]	47	82 [18]	9,263.30
Food	6.26	1,406.9	5.28 [05]	7,066	100 [17]	651.3	4.32 [06]	3,271	82 [18]	26.49 [06]	46	82 [17]	8,813.71
Bread and cereals	6.61	326.6	5.88 [06]	1,641	112 [17]	159.6	4.66 [06]	801	89 [19]	6.49 [06]	49	79 [20]	2,159.12
Meat and fish	5.85	158.5	2.28 [09]	796	43 [21]	68.5	1.65 [11]	344	31 [21]	2.79 [13]	43	72 [17]	927.29
Fruits and vegetables	5.52	248.8	3.44 [06]	1,249	65 [17]	101.5	2.86 [05]	510	54 [20]	4.13 [09]	41	83 [18]	1,373.59
Other food and non-alcoholic beverages	6.77	709.9	8.78 [04]	3,565	167 [11]	355.0	7.76 [04]	1,783	148 [13]	14.44 [01]	50	88 [17]	4,803.29
Alcoholic beverages, tobacco and narcotics	3.91	71.2	2.82 [07]	357	54 [17]	20.6	1.13 [10]	103	21 [22]	0.84 [19]	29	40 [22]	278.09
Clothing and footwear	7.10	318.8	6.39 [03]	1,601	121 [10]	167.3	4.50 [03]	840	86 [11]	6.80 [01]	52	70 [14]	2,263.38
Clothing	6.86	265.8	6.48 [03]	1,335	123 [10]	134.7	4.57 [04]	676	87 [12]	5.48 [01]	51	71 [14]	1,822.40
Housing, water, electricity, gas and other fuels[a]	3.93	1,468.6	6.47 [04]	7,376	123 [10]	426.1	3.97 [03]	2,140	75 [13]	17.33 [01]	29	61 [18]	5,765.88
Furnishings, household equipment and routine household maintenance	6.63	159.1	3.87 [04]	799	74 [16]	77.9	2.49 [06]	391	47 [16]	3.17 [04]	49	64 [18]	1,054.54
Health and education[a]	2.76	1,387.2	3.35 [04]	6,967	64 [18]	282.5	1.66 [06]	1,419	32 [16]	11.49 [04]	20	50 [13]	3,823.33
Health[a]	3.11	738.5	3.07 [05]	3,709	58 [14]	169.6	1.88 [06]	852	36 [14]	6.90 [02]	23	61 [13]	2,294.67
Education[a]	2.42	630.4	3.43 [06]	3,166	65 [18]	113.0	1.41 [09]	567	27 [18]	4.59 [13]	18	41 [14]	1,528.65
Transportation and communication	6.11	336.3	1.94 [08]	1,689	37 [17]	151.9	1.51 [10]	763	29 [18]	6.18 [15]	45	78 [21]	2,055.47
Transportation	6.46	232.1	1.68 [09]	1,166	32 [17]	110.8	1.43 [11]	557	27 [19]	4.51 [15]	48	85 [21]	1,499.37
Communication	5.27	105.4	3.06 [06]	530	58 [14]	41.1	1.79 [08]	206	34 [15]	1.67 [10]	39	58 [19]	556.10
Recreation and culture[a]	8.00	147.4	3.75 [06]	740	71 [14]	87.1	2.52 [09]	437	48 [15]	3.54 [06]	59	67 [18]	1,178.26
Restaurants and hotels	6.38	122.9	2.28 [10]	617	43 [18]	57.9	1.66 [10]	291	32 [18]	2.36 [14]	47	73 [13]	783.74
Miscellaneous goods and services[a]	6.97	340.6	2.54 [08]	1,711	48 [16]	175.4	1.75 [08]	881	33 [16]	7.14 [06]	52	69 [15]	2,374.01
Individual Consumption Expenditure by Government	4.77	311.5	1.63 [09]	1,565	31 [18]	109.7	0.97 [08]	551	18 [16]	4.46 [13]	35	59 [11]	1,484.71
Collective Consumption Expenditure by Government	5.72	409.3	2.70 [06]	2,056	51 [19]	173.1	1.77 [07]	869	34 [19]	7.04 [11]	42	66 [14]	2,342.20
Gross Fixed Capital Formation	7.08	697.9	0.93 [11]	3,505	18 [21]	365.3	0.66 [12]	1,835	13 [21]	14.86 [21]	52	71 [17]	4,942.91
Machinery and equipment	12.43	138.3	1.23 [11]	695	23 [20]	127.1	1.07 [11]	638	20 [20]	5.17 [21]	92	87 [18]	1,719.33
Construction	4.51	468.6	0.70 [10]	2,354	13 [21]	156.2	0.43 [12]	784	8 [21]	6.35 [20]	33	62 [16]	2,113.52
Other products	12.38	89.7	1.35 [06]	450	26 [17]	82.0	1.19 [07]	412	23 [17]	3.34 [09]	91	88 [18]	1,110.05
Changes in Inventories and Acquisitions Less Disposals of Valuables	6.21	85.8	1.91 [05]	431	36 [12]	39.3	1.33 [06]	198	25 [12]	1.60 [08]	46	70 [21]	532.33
Balance of Exports and Imports	13.53	-250.3	-10.68 [21]	-1,257	-203 [17]	-250.3	-10.68 [21]	-1,257	-203 [17]	-10.18 [20]	100	100 [n.a.]	-3,386.98
Individual Consumption Expenditure by Households[b]	5.33	5,135.3	4.39 [04]	25,791	83 [15]	2,021.6	2.99 [05]	10,153	57 [17]	82.22 [01]	39	68 [18]	27,355.27
Individual Consumption Expenditure by Households without Housing[b]	5.41	4,410.7	4.38 [04]	22,152	83 [15]	1,763.6	2.92 [05]	8,858	56 [17]	71.73 [01]	40	67 [19]	23,864.67
Government Final Consumption Expenditure	5.27	726.6	2.16 [07]	3,649	41 [18]	282.8	1.34 [07]	1,420	26 [19]	11.50 [13]	39	62 [12]	3,826.91
Domestic Absorption	5.62	6,518.0	2.83 [04]	32,736	54 [18]	2,709.0	1.85 [06]	13,606	35 [18]	110.18 [03]	42	65 [18]	36,657.42

Reference Data

Exchange rate (LCU/HK$)	13.53
Total population (in million)	199.11
Population share to AP (%) [ranking]	5.26 [04]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.
[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

With the local currency of Pakistan rupees (PRs), Pakistan's PPP at GDP level of PRs5.59 = HK$1 (column 2) is only 41% of its exchange rate of PRs13.53 = HK$1, implying that the general price level in Pakistan is 41% of (or 59% lower than) the price level in Hong Kong, China (column 12), and is 64% of (or 36% lower than) the regional average price level (column 13), ranking 18th in the region. The PLI for ICEH is 68 (ranking 18th) and for GFCF is 71 (ranking 17th).

Economy Experience in Program Implementation

Administrative Setup

The National Accounts Wing of the Pakistan Bureau of Statistics (PBS) took a lead role in conducting the International Comparison Program (ICP) in the country. For the 2017 ICP round, the director of national accounts was nominated national coordinator and the chief statistical officer of the Price Statistics Section was nominated deputy national coordinator. The ICP section comprised two officers from the Price Section and two officers from the National Accounts Wing. A dedicated drawing and disbursement officer was also deputed to the team so that all expenditures could be carried out in line with the financial instructions issued by the Asian Development Bank (ADB) and the financial rules applicable in the country. The experience of a dedicated section for ICP activities was very successful despite posting and transfers of officers. The core team of four officers along with the national coordinator and deputy national coordinator remained through the tenure of the project.

Use of Existing Infrastructure in Collecting Data

The PBS ICP team collected ICP data using all available reliable data sources. The consumer price index (CPI) infrastructure was used to collect data for ICP household products. Prices for 186 out of the 487 items in the CPI basket were used for the ICP. The prices of the remaining ICP items were collected through a survey conducted by price collectors who were properly trained for the task. For items in machinery and equipment and in construction, a dedicated survey was conducted in four capital cities of the country. For compensation of government employees, the PBS ICP team used the Accountant General Pakistan Revenues. For housing rental data, the PBS ICP team consulted the Rent Survey 2014/2015 and the administrative record from the Ministry of Housing and Works. For volume indicators of housing rentals, the PBS ICP team used the Pakistan Social and Living Standards Measurement Survey 2014/2015 and Population Census 2017, both conducted by PBS. To calculate gross domestic product (GDP) weights, the PBS ICP team used data from the Household Integrated Income and Consumption Survey 2015/2016, along with the annual national accounts data.

Survey Framework

ICP price collection for household products covered 24 urban areas and 6 rural areas. The PBS ICP team surveyed 4 markets in each area for a total of 120 markets, each may be comprised of various types of outlets. The 2017 ICP household items have a 38% overlap with the CPI basket. Prices were collected on monthly basis for household items. Rental data covered urban areas only. Prices for machinery and equipment and for construction were collected only once from four provincial capital cities of the country through a dedicated survey conducted by the CPI staff. Government compensation data for occupations in the ICP survey and other related indicators were collected from the Accountant General Pakistan Revenues.

Gross Domestic Product Expenditure Values

To be consistent with the ICP's national account estimates, Pakistan converted its national accounts estimates from the basis of the fiscal year (1 July to 30 June) to the calendar year (1 January to 31 December) by taking the average of corresponding financial years. For example, the expenditure on

GDP for the calendar year 2017 was obtained by taking the average of 2016/2017 and 2017/2018. GDP expenditure values at the basic heading level were estimated to the extent feasible for basic headings, according to the 2017 ICP classification, from various surveys and administrative data sources.

The individual consumption expenditure by households is derived residually in the national accounts estimates. Hence, any statistical discrepancy is captured under this aggregate. This was further disaggregated into basic headings using information from Household Integrated Economic Survey 2015/2016. First, weights obtained from the survey were applied to each GDP aggregate, then these estimates were converted into calendar years by taking the averages. Each basic heading's weight was estimated directly using the proportion from the survey in 2010/2011 for the calendar years 2011 to 2015, and from the survey in 2015/2016 for the calendar years 2016 and 2017. Net purchases abroad were not estimated separately. Some of the basic headings, such as pork, alcoholic beverages, and prostitution, are not applicable to Pakistan.

Individual consumption expenditure by nonprofit institutions serving households (NPISH) was not separately compiled and published in the national accounts estimates. To derive GDP weights for the ICP, NPISH was estimated using gross value added of membership organizations and nongovernment organizations. NPISH consumption expenditure was disaggregated into health, education, and social protection based on available records in the national accounts.

The expenditure on basic headings relating to individual and collective consumption expenditure by government (based on budget documents of federal, provincial, district and local government), gross fixed capital formation (based on an annual survey of establishments), changes in inventories (derived as a fixed proportion) and exports and imports of goods (from trade data compiled by the External Trade Section of PBS) and services (obtained from the State Bank of Pakistan) were estimated directly using information from records of the national accounts.

The expenditure on acquisitions less disposals of valuables cannot be reported under relevant basic headings because the information is not available.

Data Validation

As with the 2011 ICP round, price collectors underwent training before the price collection activities. CPI data collectors were engaged for the ICP price collection. Before prices were reported to the central office, the chief statistical officer and statistical officer vetted the prices. The prices were entered into the ICP Asia Pacific Software Suite (ICP APSS) and checked by comparing the prices within cities. The identified outliers were reverted to the regional or field offices for verification. Some prices were also verified through telephone and the regional or field offices.

The regional workshops arranged by ADB were very helpful and fruitful in helping the PBS ICP team understand ICP concepts. These workshops enabled ICP staff of PBS to overcome inconsistencies in the data when compared with regional countries. These workshops also provided an opportunity to discuss and share experiences on the CPI mechanism with other participating economies along with ICP activities.

Price Collection Tools

The PBS experienced some difficulties in the data entry module of ICP APSS designed for the household products survey. An ADB ICP team in the ADB's Pakistan Resident Mission provided dedicated training which clarified the technical shortcomings. However, even with proper use, the PBS still faced difficulties using the ICP APSS software. However, price collection tools regarding machinery and equipment and construction worked well.

Challenges in Implementation

The PBS ICP team experienced difficulties in pricing non-household items, especially for construction and for machinery and equipment, because of the tight specification of branded items. To resolve this challenge, regional workshops on the collection of non-household items were arranged at the provincial headquarters.

The harmonious relationship between the PBS ICP team and ADB ICP team contributed to the success of project implementation in Pakistan. For future improvements and awareness creation, it would be useful to have purchasing power parity advocacy activities for policy makers.

Lessons Learned and Future Directions

The experience of establishing a dedicated section comprising staff of the price statistics section and national accounts was fruitful. It enabled the staff to remain focused on their assigned responsibilities and address shortcomings that arose during data collection and data analysis. The staff gained significant insights due to constant interaction with the ADB ICP team. One major weakness was the lack of utilization of the ICP APSS, although the ADB technical team provided dedicated online training at the ADB's Pakistan Resident Mission. It is recommended for future rounds that a final version of the software be provided to economies for timely, regular, and valid responses to ADB.

The PBS ICP team gained substantial knowledge and learned from the experiences from the other participating economies. ICP activity was integrated into the PBS framework as an additional activity. The recent CPI series with new base period of 2015/2016 is fully synchronized with the classification of individual consumption according to purpose (COICOP). However, the integration of ICP activities in the statistical system is not presently being considered. Recognizing the usefulness of

in-country and regional workshops for price surveys and validation, these should be continued in the future ICP rounds.

Philippines

Economy Results

The Philippines is the eighth largest economy in real terms in the region, with a real GDP of HK$4,902 billion, as Table 7.19 (column 3) shows, equivalent to 2.11% of the region's total real GDP (column 4). In comparison, it constitutes 2.77%, or 104.92 million, of the region's total population. Without factoring spatial price differences across the 22 economies in the region, the Philippines's nominal GDP of HK$2,444 billion (column 7) is only half of its real GDP and is only 1.64% of the region's total nominal GDP (column 8). The Philippines ranks fifth in terms of real ICEH (HK$3,738 billion) (column 3), a notch higher than its sixth place in nominal terms (HK$1,796 billion) (column 7), and has the eighth highest real GFCF (HK$1,028 billion) (column 3), a notch better than its ninth place in terms of nominal GFCF (HK$611 billion) (column 7).

Almost all of the 34 expenditure components of GDP in Table 7.19 have per capita real expenditures (column 5) that are much higher than per capita nominal expenditures (column 9). The Philippines ranks 14th in both per capita real GDP (HK$46,721) (column 5), or 76% of the regional level (column 6), and in per capita nominal GDP (HK$23,295) (column 9), or 59% of the regional level (column 10). The Philippines ranks 12th in both per capita real ICEH (HK$35,630) and per capita nominal ICEH (HK$17,115) (columns 5 and 9); and 15th in both per capita real GFCF (HK$9,799) and per capita nominal GFCF (HK$5,826) (columns 5 and 9). The Philippines has the highest per capita real expenditure in the region for bread and cereals, with a value of HK$4,027, or 274% of the region's level (columns 5 and 6).

Table 7.19: Summary Results for the Philippines, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Real Expenditure HK$	Per Capita Real Expenditure Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Nominal Expenditure HK$	Per Capita Nominal Expenditure Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	3.22	4,902.0	2.11 [08]	46,721	76 [14]	2,444.1	1.64 [10]	23,295	59 [14]	100.00 [n.a.]	50	78 [09]	15,807.60
Actual Individual Consumption by Households[a]	3.06	4,083.1	3.04 [07]	38,916	110 [14]	1,928.8	2.45 [07]	18,383	88 [11]	78.91 [03]	47	80 [09]	12,474.55
Food and non-alcoholic beverages	3.35	1,460.3	5.32 [04]	13,918	192 [05]	755.5	4.81 [04]	7,201	173 [07]	30.91 [05]	52	90 [14]	4,886.29
Food	3.37	1,327.9	4.98 [06]	12,656	180 [05]	692.8	4.60 [05]	6,603	166 [07]	28.34 [05]	52	92 [12]	4,480.51
Bread and cereals	4.01	422.5	7.60 [05]	4,027	274 [01]	261.9	7.64 [05]	2,496	276 [03]	10.72 [04]	62	101 [09]	1,693.99
Meat and fish	2.78	541.6	7.79 [04]	5,162	281 [04]	232.7	5.59 [04]	2,218	202 [06]	9.52 [03]	43	72 [18]	1,504.78
Fruits and vegetables	3.65	142.5	1.97 [07]	1,358	71 [14]	80.5	2.27 [08]	767	82 [13]	3.29 [10]	57	115 [10]	520.75
Other food and non-alcoholic beverages	3.25	359.2	4.44 [05]	3,423	160 [12]	180.4	3.95 [05]	1,719	142 [14]	7.38 [07]	50	89 [15]	1,166.77
Alcoholic beverages, tobacco and narcotics	2.53	62.5	2.48 [08]	595	89 [15]	24.4	1.34 [09]	233	48 [16]	1.00 [16]	39	54 [18]	157.81
Clothing and footwear	4.88	27.1	0.54 [13]	258	20 [22]	20.4	0.55 [12]	195	20 [20]	0.84 [21]	75	101 [05]	132.01
Clothing	4.30	20.8	0.51 [14]	198	18 [21]	13.8	0.47 [13]	132	17 [20]	0.57 [22]	67	93 [07]	89.57
Housing, water, electricity, gas and other fuels[a]	2.43	571.2	2.52 [09]	5,444	91 [16]	214.2	1.99 [09]	2,041	72 [14]	8.76 [09]	37	79 [09]	1,385.20
Furnishings, household equipment and routine household maintenance	3.33	125.4	3.05 [07]	1,195	110 [12]	64.5	2.06 [10]	615	74 [12]	2.64 [07]	51	67 [16]	417.02
Health and education[a]	1.84	784.5	1.89 [08]	7,477	68 [15]	222.7	1.31 [08]	2,122	47 [14]	9.11 [11]	28	69 [09]	1,440.02
Health[a]	2.20	211.9	0.88 [10]	2,019	32 [19]	72.2	0.80 [11]	688	29 [16]	2.95 [17]	34	91 [08]	467.10
Education[a]	1.59	613.7	3.33 [07]	5,850	120 [14]	150.4	1.88 [06]	1,434	68 [12]	6.15 [02]	25	56 [11]	972.92
Transportation and communication	3.79	434.7	2.50 [07]	4,143	90 [13]	254.8	2.54 [07]	2,428	92 [13]	10.42 [05]	59	101 [09]	1,647.70
Transportation	3.55	373.0	2.70 [06]	3,555	98 [12]	204.9	2.65 [06]	1,953	96 [13]	8.39 [03]	55	98 [14]	1,325.54
Communication	5.00	64.4	1.87 [07]	614	67 [13]	49.8	2.16 [06]	475	78 [12]	2.04 [05]	77	116 [06]	322.17
Recreation and culture[a]	4.11	51.2	1.30 [12]	488	47 [16]	32.5	0.94 [12]	310	34 [16]	1.33 [17]	63	72 [15]	210.14
Restaurants and hotels	3.54	135.2	2.50 [08]	1,288	90 [13]	74.0	2.12 [09]	705	76 [12]	3.03 [10]	55	85 [10]	478.59
Miscellaneous goods and services[a]	3.58	479.8	3.57 [04]	4,573	129 [08]	265.9	2.65 [05]	2,534	96 [10]	10.88 [02]	55	74 [09]	1,719.78
Individual Consumption Expenditure by Government	2.72	316.2	1.66 [08]	3,014	60 [15]	133.0	1.18 [07]	1,268	42 [13]	5.44 [07]	42	71 [08]	860.40
Collective Consumption Expenditure by Government	3.00	305.2	2.01 [09]	2,909	73 [17]	141.7	1.45 [10]	1,351	52 [16]	5.80 [18]	46	72 [08]	916.50
Gross Fixed Capital Formation	3.85	1,028.1	1.37 [08]	9,799	50 [15]	611.3	1.11 [09]	5,826	40 [15]	25.01 [14]	59	81 [08]	3,953.63
Machinery and equipment	6.45	224.2	1.99 [06]	2,137	72 [13]	223.6	1.89 [06]	2,131	68 [13]	9.15 [09]	100	95 [11]	1,446.35
Construction	2.59	749.8	1.12 [08]	7,146	40 [17]	299.8	0.83 [08]	2,857	30 [14]	12.27 [14]	40	74 [08]	1,938.94
Other products	6.34	89.6	1.35 [07]	854	49 [12]	87.9	1.27 [06]	838	46 [11]	3.60 [08]	98	94 [10]	568.33
Changes in Inventories and Acquisitions Less Disposals of Valuables	3.77	5.3	0.12 [14]	50	4 [16]	3.1	0.10 [14]	29	4 [16]	0.13 [17]	58	89 [08]	19.86
Balance of Exports and Imports	6.47	-240.7	-10.27 [20]	-2,294	-371 [21]	-240.7	-10.27 [20]	-2,294	-371 [21]	-9.85 [19]	100	100 [n.a.]	-1,556.94
Individual Consumption Expenditure by Households[b]	3.11	3,738.3	3.19 [05]	35,630	115 [12]	1,795.7	2.66 [06]	17,115	96 [12]	73.47 [04]	48	83 [10]	11,614.14
Individual Consumption Expenditure by Households without Housing[b]	3.35	3,221.7	3.20 [05]	30,706	115 [12]	1,666.9	2.76 [06]	15,887	100 [12]	68.20 [04]	52	86 [11]	10,780.81
Government Final Consumption Expenditure	2.88	617.2	1.83 [09]	5,882	66 [17]	274.7	1.30 [09]	2,619	47 [15]	11.24 [15]	45	71 [08]	1,776.91
Domestic Absorption	3.22	5,399.2	2.34 [07]	51,459	85 [14]	2,684.8	1.83 [07]	25,589	66 [14]	109.85 [04]	50	78 [08]	17,364.54

Reference Data

Exchange rate (LCU/HK$)   6.47
Total population (in million)   104.92
Population share to AP (%) [ranking]   2.77 [06]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Lower expenditure level and smaller share of the region in nominal than in real terms imply that the general price level in the Philippines is lower than in Hong Kong, China and also lower than the region's average price level. With the local currency of pesos (₱), the Philippines's PPP at GDP level of ₱3.22 = HK$1 is about half of the exchange rate of ₱6.47 = HK$1, implying that the overall price level in the Philippines is only half of that in Hong Kong, China and only 78% of (or 22% lower than) the region's average price level. Though the PLIs at GDP level are lower than 100 relative to both the reference economy and the region, the Philippines has the ninth highest overall price level. The PLI for ICEH (Asia and the Pacific = 100) is 83 (ranking 10th) and for GFCF is 81 (ranking eighth) (column 13).

Economy Experience in Program Implementation

Administrative Setup

The Philippine Statistics Authority (PSA) is the implementing agency of the International Comparison Program (ICP) in the Philippines. Similar to previous ICP cycles, the PSA ICP team for the 2017 ICP comprised

(i)   a national coordinator;
(ii) a deputy national coordinator;
(iii) technical staff of the Price Statistics Division (PSD) who are involved in compiling the consumer price index (CPI); and
(iv) selected field staff from regional and provincial statistical offices who served as supervisors, price collectors, and data encoders.

In addition, the technical staff of the Macroeconomic Accounts Service of the PSA also assisted the PSA ICP team, particularly in estimating detailed items for the gross domestic product (GDP) of the country.

The assistant national statistician of the Economic Sector Statistics Service served as the ICP national coordinator. The Economic Sector Statistics Service of the PSA is responsible for producing primary data on agriculture, industry, trade, services, prices and other related economic activities. Meanwhile, the assistant national statistician of the Macroeconomic Accounts Service served as the deputy national coordinator.

Use of Existing Infrastructure in Collecting Data

Similar to the CPI, prices for the ICP were collected from retail sample outlets. The PSA ICP team used the same CPI sample municipalities and outlets in the urban areas for the ICP surveys. However, the PSA ICP team also covered additional municipalities to satisfy the requirement for rural representativity of collected prices. The ICP household consumption survey was conducted separately from CPI; hence, none of the CPI items prices was used in the ICP. Because of the heavy workload of regular staff at the provincial statistical offices, the PSA hired price collectors for the household consumption items.

For the more difficult components of construction and of machinery and equipment, the PSA hired a private price collection specialist. A housing rental survey was conducted for the ICP and additional housing volume indicators were taken from 2017 Annual Poverty Indicators Survey and 2015 Census of Population. Compensation data on select government occupations were taken from administrative documents from the Department of Budget and Management.

Validation of price reports for the 2017 ICP was done by PSD staff who were also involved in the price validation of CPI.

Survey Framework

The PSA conducted a separate survey, the 2017–2018 Survey of Retail Prices for Household Shop Items, to collect prices for household consumption products and services for the 2017 ICP. This survey used a purposive stratified sampling design to estimate

average prices at the national level for items included in the ICP. Sample areas covered the National Capital Region and selected provinces, particularly those considered as regional centers, during the price surveys from June 2017 to May 2018.

Table 7.20: Sample Areas in the National Capital Region, Philippines	
Districts	**Sample Areas**
NCR 1	Quiapo, Sampaloc, Paco, Divisoria, Mandaluyong
NCR 2	Cubao, Commonwealth, Novaliches, Muñoz, Marikina
NCR 3	Makati Districts 1 and 2, Pasig Districts 1 and 2, Taguig
NCR 4	Caloocan North and South, Malabon, Navotas, Valenzuela
NCR 5	Parañaque, Las Piñas, Muntinlupa, and Pasay

NCR = National Capital Region.
Source: Philippine Statistics Authority.

Table 7.21: Sample Provinces Outside the National Capital Region, Philippines	
Region	**Province**
Rest of Luzon	
CAR	Benguet
Region 3	Pampanga
Visayas	
Region 7	Cebu
Region 8	Leyte
Mindanao	
Region 9	Zamboanga del Sur
Region 10	Misamis Oriental

CAR = Cordillera Administrative Region.
Source: Philippine Statistics Authority.

For selected provinces, each sample province was subdivided into the provincial capital and four sample municipalities. Each sample municipality was stratified further into urban and rural barangay—the smallest administrative unit in the Philippines. Prices for food and non-alcoholic beverages were collected monthly, while prices for other household items and services (except private education) were collected quarterly. The PSA ICP team conducted a survey for private education items semiannually.

The PSA ICP team conducted a special survey on housing rentals in selected provinces that are considered regional centers and are also covered by the survey for household consumption items. For construction and for machinery and equipment, the PSA hired a private price collection specialist. The construction price survey was conducted in the national capital region, region 1 (Ilocos Region), region 6 (Western Visayas), and region 10 (Northern Mindanao). Meanwhile, machinery and equipment price data were collected in the national capital region, because the required commodities are very distinct and only available there.

Gross Domestic Product Expenditure Values

The PSA ICP team used data from 2015 Family Income and Expenditure Survey, which were the latest available results at the time of estimation, to generate the ratios or shares of the basic headings of individual consumption expenditure by households (ICEH). ICEH estimates from National Accounts of the Philippines was used as the control total of the household expenditure.

The official national accounts do not separately report individual consumption expenditure by nonprofit institutions serving households, so a separate estimate for this main aggregate was not submitted to the Asian Development Bank (ADB). There was also no separate estimate for GDP expenditure value for net purchases abroad. Balancing the estimates of the production and expenditure sides of GDP using the supply and use table produced a zero statistical discrepancy.

For the individual and collective consumption expenditure of the government, the PSA ICP team used the expenditure of various departments (Department of Education, Department of Health, and Department of Social Work) from the annual financial report of the Commission on Audit.

The PSA ICP team also used data from the budget of expenditures and sources of financing from the Department of Budget and Management because they provide information on the classification of the functions of the government of national government agencies.

The other items (gross capital formation, machinery and equipment, construction, other products, and imports and exports of goods and services) were directly taken from the published estimates of the National Accounts of the Philippines, using the 2012 Census of Philippine Business and Industry information on capital expenditures, building permits, balance of payment statistics, and foreign trade statistics.

Data Validation and Analysis

To ensure uniformity and consistency of the concepts used in the ICP survey, the PSA conducted two levels of training: task force training and second level training. The training prepared price collectors for data collection, processing, and validation. The task force training was conducted and attended by the PSD staff who served as trainers for the next level of training. Meanwhile, officials, regular staff, and hired price collectors of provincial statistical offices of selected sample provinces participated in the second level training.

Similar to the previous ICP cycles, the PSA prepared its own manual and product catalogue for price collection to ensure that the same products based on ADB's regional product list were priced. The PSD staff determined a national brand for some of the products (especially clothing) for uniformity and comparability among sample areas.

The PSA used the ICP Asia Pacific Software Suite in encoding and validating price data. Detailed discussions of the manual and hands-on exercises were held during the ICP training for field operation activities, manual editing of price data, and machine processing of survey results. The PSD sent

verifications to the concerned provincial statistical office when the price of commodity from a particular sample store was relatively high or low compared to prices from other sample stores.

Price trends across the regions within a quarter, as well as across quarters, were reviewed to check for outliers and revalidated if the price variations were not within reasonable ranges.

Participation in the regional data validation workshops also helped the PSA to further improve the quality of price data collected.

Price Collection Tools

Prices were collected either through personal interviews or personal observation, involving personal visits to stores to check and record prices of the items based on their price tags. Other ways of obtaining prices were through test purchase or buying an item for the purpose of checking the price, quality, weight and/or volume for its contents; direct inquiry from buyers of the commodity; and inquiry from storekeepers.

For comparability and uniformity of products to be priced, all price collectors were instructed to refer to the ICP product catalogue, which was presented and discussed thoroughly during the training.

The ICP price surveys used a survey form to write the prices collected from the sample outlets. It was generally the same format of price collection used in CPI price survey, except that the ICP forms specified the type of outlet. The price collection form also required the specific city or municipality and barangay where the outlet is located, including the classification of urban or rural.

Challenges in Implementation

The PSA ICP team encountered problems while gathering data for the volume indicators on

dwellings because some of the indicators were not yet available in the latest published census results. The PSA used the latest available data from the 2015 Family Income and Expenditure Survey to estimate selected housing indicators.

Rentals for dwelling units were also difficult to collect because the size and specifications of the housing units were not common across sample areas.

Many of the items under machinery and equipment were likewise difficult to find, because their specifications were based on developed economies, especially in European economies.

During the implementation of the 2017 ICP, the PSA also faced challenges in the limitations in budget and human resources at the central office and provincial statistical offices for undertaking price collection, data processing and validation.

Lessons Learned and Future Directions

Participation in the ICP provided the PSA ICP team members better understanding on how economies in the region conduct ICP price surveys. Through participation in the ICP, the PSA ICP team gained greater understanding and appreciation of the importance of establishing quality purchasing power parity estimates. The PSA also learned from the product descriptions of the ICP and applied this knowledge in updating the commodity specifications of the CPI market basket.

However, integrating the commodities in the ICP into CPI price surveys needs to be studied by the PSA to ensure that collection of prices for additional commodities will not delay the monthly release of the results of the CPI. Currently, many of the commodities required for the ICP are not included in the price surveys for CPI because the ICP specifications were not common or representative in the economy or differed from the CPI.

Integration of ICP with the regular work programs of the PSA, specifically price surveys for the generation of CPI, is not currently feasible as it would require additional costs and human resources on the part of the PSA. Detailed assessment of workload and required financial and human resources should be done first.

Singapore

Economy Results

Singapore's real GDP figure of HK$3,171 billion, as shown in Table 7.22 (column 3), constitutes 1.36% of the region's total real GDP—the 11th largest in the region (column 4). Without adjusting for spatial price differences, Singapore registers a lower nominal GDP of HK$2,637 billion (column 7) but constitutes a higher fraction (1.77%) of the region's total nominal GDP. More than a third, or 35.90%, of Singapore's nominal GDP comes from its nominal ICEH (column 11)—the second lowest in the region following Brunei Darussalam. Singapore's real ICEH is estimated at HK$969 billion (column 3), forming 0.83% of the region's total real ICEH, placing it 12th in the region (column 4). Singapore also has the ninth biggest investments measured in real GFCF at HK$850 billion (column 3), which is 1.13% of the region's total (column 4).

Factoring in its population of 5.61 million, Singapore has the highest per capita nominal GDP of HK$469,907 (column 9) among the 22 participating economies of the region, which is nearly 12 times of the regional per capita nominal GDP (column 10). Even after adjusting for spatial price differences, Singapore maintains the highest per capita real GDP of HK$564,960 (column 5), more than nine times of the regional per capita real GDP (column 6). Despite having one of the lowest household consumption share of the economy's GDP, Singapore's per capita real ICEH of HK$172,694 (column 5) is the second highest in the region, behind Hong Kong, China.

Table 7.22: Summary Results for Singapore, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure		Per Capita Real Expenditure		Nominal Expenditure		Per Capita Nominal Expenditure		Nominal Expenditure Shares, (%) [ranking]	PLIs		Expenditure (billion LCU)
		(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]	(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]		(HKG = 100)	(AP = 100) [ranking]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	0.15	3,170.7	1.36 [11]	564,960	921 [01]	2,637.2	1.77 [07]	469,907	1,195 [01]	100.00 [n.a.]	83	130 [02]	467.31
Actual Individual Consumption by Households[a]	0.17	1,081.0	0.81 [13]	192,614	543 [02]	1,042.6	1.32 [12]	185,763	892 [02]	39.53 [21]	96	164 [02]	184.73
Food and non-alcoholic beverages	0.15	76.6	0.28 [16]	13,644	188 [06]	63.2	0.40 [16]	11,264	271 [03]	2.40 [22]	83	144 [02]	11.20
Food	0.15	67.0	0.25 [16]	11,938	170 [06]	56.3	0.37 [16]	10,024	252 [03]	2.13 [22]	84	149 [02]	9.97
Bread and cereals	0.16	10.8	0.19 [17]	1,922	131 [13]	9.9	0.29 [16]	1,764	195 [07]	0.38 [22]	92	149 [03]	1.75
Meat and fish	0.16	22.2	0.32 [16]	3,959	216 [06]	20.2	0.49 [13]	3,599	328 [03]	0.77 [22]	91	152 [02]	3.58
Fruits and vegetables	0.15	14.3	0.20 [16]	2,542	133 [07]	12.1	0.34 [15]	2,147	229 [06]	0.46 [22]	84	172 [05]	2.14
Other food and non-alcoholic beverages	0.12	30.6	0.38 [16]	5,459	256 [03]	21.1	0.46 [15]	3,754	311 [02]	0.80 [22]	69	122 [04]	3.73
Alcoholic beverages, tobacco and narcotics	0.32	9.4	0.37 [16]	1,675	251 [07]	17.0	0.93 [11]	3,022	626 [02]	0.64 [20]	180	249 [01]	3.01
Clothing and footwear	0.17	28.7	0.57 [12]	5,114	388 [03]	27.9	0.75 [11]	4,975	506 [02]	1.06 [19]	97	131 [04]	4.95
Clothing	0.16	25.9	0.63 [12]	4,621	426 [03]	23.5	0.80 [11]	4,190	538 [02]	0.89 [18]	91	126 [04]	4.17
Housing, water, electricity, gas and other fuels[a]	0.19	141.5	0.62 [14]	25,209	421 [03]	154.5	1.44 [12]	27,532	971 [02]	5.86 [18]	109	231 [01]	27.38
Furnishings, household equipment and routine household maintenance	0.18	40.4	0.98 [12]	7,200	664 [02]	41.9	1.34 [12]	7,460	901 [02]	1.59 [16]	104	136 [01]	7.42
Health and education[a]	0.15	217.3	0.52 [13]	38,718	353 [02]	186.5	1.10 [11]	33,228	740 [02]	7.07 [16]	86	209 [02]	33.04
Health[a]	0.18	99.2	0.41 [14]	17,683	278 [03]	98.1	1.09 [09]	17,488	735 [02]	3.72 [10]	99	264 [02]	17.39
Education[a]	0.13	118.1	0.64 [13]	21,049	433 [02]	88.3	1.11 [11]	15,740	746 [02]	3.35 [19]	75	172 [02]	15.65
Transportation and communication	0.21	146.1	0.84 [12]	26,027	567 [01]	176.3	1.76 [08]	31,420	1,185 [01]	6.69 [12]	121	209 [01]	31.25
Transportation	0.22	112.3	0.81 [13]	20,003	549 [01]	137.7	1.78 [09]	24,531	1,200 [01]	5.22 [13]	123	219 [01]	24.40
Communication	0.21	33.3	0.96 [10]	5,930	651 [02]	38.7	1.68 [10]	6,889	1,133 [01]	1.47 [12]	116	174 [03]	6.85
Recreation and culture[a]	0.15	128.5	3.27 [07]	22,894	2,204 [02]	109.2	3.16 [05]	19,451	2,135 [02]	4.14 [04]	85	97 [05]	19.34
Restaurants and hotels	0.14	122.0	2.26 [11]	21,731	1,523 [02]	96.8	2.77 [08]	17,256	1,872 [02]	3.67 [08]	79	123 [03]	17.16
Miscellaneous goods and services[a]	0.18	171.0	1.27 [10]	30,468	858 [02]	172.9	1.72 [09]	30,801	1,162 [02]	6.55 [09]	101	135 [01]	30.63
Individual Consumption Expenditure by Government	0.15	112.9	0.59 [11]	20,109	399 [03]	95.8	0.85 [10]	17,062	571 [01]	3.63 [16]	85	143 [02]	16.97
Collective Consumption Expenditure by Government	0.12	257.5	1.70 [11]	45,883	1,146 [02]	181.4	1.86 [06]	32,322	1,252 [02]	6.88 [12]	70	109 [03]	32.14
Gross Fixed Capital Formation	0.15	850.3	1.13 [09]	151,506	765 [01]	696.3	1.27 [06]	124,067	855 [01]	26.40 [11]	82	112 [03]	123.38
Machinery and equipment	0.21	174.7	1.55 [08]	31,125	1,047 [01]	206.5	1.74 [07]	36,788	1,177 [01]	7.83 [15]	118	112 [02]	36.58
Construction	0.12	399.4	0.60 [11]	71,169	403 [02]	270.8	0.75 [11]	48,255	505 [03]	10.27 [17]	68	125 [02]	47.99
Other products	0.20	198.8	3.00 [05]	35,425	2,023 [01]	219.0	3.17 [04]	39,024	2,137 [01]	8.30 [02]	110	106 [05]	38.81
Changes in Inventories and Acquisitions Less Disposals of Valuables	0.17	56.1	1.25 [08]	9,994	841 [01]	52.3	1.77 [04]	9,313	1,196 [01]	1.98 [06]	93	142 [02]	9.26
Balance of Exports and Imports	0.18	664.7	28.36 [02]	118,442	19,132 [01]	664.7	28.36 [02]	118,442	19,132 [01]	25.21 [01]	100	100 [n.a.]	117.79
Individual Consumption Expenditure by Households[b]	0.17	969.2	0.83 [12]	172,694	558 [02]	946.8	1.40 [12]	168,702	945 [02]	35.90 [21]	98	169 [02]	167.77
Individual Consumption Expenditure by Households without Housing[b]	0.17	833.1	0.83 [12]	148,442	558 [02]	814.6	1.35 [12]	145,143	910 [02]	30.89 [21]	98	163 [02]	144.34
Government Final Consumption Expenditure	0.13	371.7	1.10 [11]	66,233	744 [02]	277.2	1.31 [08]	49,384	887 [02]	10.51 [17]	75	119 [03]	49.11
Domestic Absorption	0.16	2,228.8	0.97 [12]	397,138	653 [01]	1,972.5	1.35 [11]	351,465	908 [02]	74.79 [22]	88	139 [02]	349.52

Reference Data

Exchange rate (LCU/HK$)	0.18
Total population (in million)	5.61
Population share to AP (%) [ranking]	0.15 [17]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Singapore has the highest per capita real expenditures for the following components (with the corresponding per capita real index relative to regional average of 100 in parentheses, as drawn from column 6): transportation and communication (567); transportation (549); gross fixed capital formation (765); and machinery and equipment (1,047).

With the local currency of Singapore dollars (S$), Singapore's PPP at GDP level of S$0.15 = HK$1 is 83% of the exchange rate of S$0.18 = HK$1, implying that the overall price level is 83% of Hong Kong, China's (column 12) and 130% of region's average price level (column 13). This makes Singapore the second highest overall price level in the region behind Hong Kong, China. The PLIs for almost all expenditure components in Table 7.22 are well above the regional average of 100 (column 13). Among them, the following household consumption components register the highest PLIs in the region: alcoholic beverages, tobacco and narcotics (PLI of 249); housing, water, electricity, gas and other fuels (231); furnishings, household equipment and routine household maintenance (136); transportation and communication (209); transportation (219); and miscellaneous goods and services (135) (column 13).

Economy Experience in Program Implementation

Administrative Setup

The Department of Statistics (DOS) had the overall responsibility as the implementing agency for collecting, validating, and coordinating with various agencies to submit the required data for the 2017 International Comparison Program (ICP). Similar to the 2011 ICP round and 2016 Purchasing Power Parity (PPP) Update, the national and deputy national coordinators, as well as officers from the Consumer Price Indices Section and National Accounts Section were involved in the 2017 ICP. For construction, the

Building and Construction Agency (BCA) assisted in compiling and validating the required data.

Use of Existing Infrastructure in Collecting Data

For items in the 2017 household consumption list, close to half of the price data for the ICP survey were obtained from the consumer price index (CPI) regular price surveys. For each of these items, significant effort was exerted to compare the specifications to ensure consistency with the 2017 ICP product list and data comparability with other economies. For items not included in the CPI regular price surveys, additional resources were deployed by the consumer and producer price sections to collect detailed specifications and relevant price data.

The 2017 ICP used housing rental data from relevant government agencies. Some of the housing volume measures were also obtained from administrative data from the Housing and Development Board and Urban Redevelopment Authority, as well as the Comprehensive Labor Force Survey conducted by the Ministry of Manpower. Majority of the items and products required for construction and machinery and equipment were not included in the DOS and BCA regular surveys. Special surveys had to be conducted and significant resources were expended to collect the price data for these items. For government compensation, data were collated from the Public Services Division and other agencies from the education and healthcare sectors.

Survey Framework

The price surveys for both household and non-household components covered the whole economy of Singapore, which is a city-state with no rural population. For household consumption, machinery and equipment, and construction components, the same survey frameworks were adopted as the existing infrastructure of the CPI, Producer Price Index, and BCA, respectively.

As for government compensation and housing rental, administrative data were obtained, where possible, from the relevant agencies.

Gross Domestic Product Expenditure Values

Most of the gross domestic product (GDP) expenditure by basic headings were available from the national accounts. Data on individual consumption expenditure by households and gross fixed capital formation were mainly compiled based on the supply and use balancing, with the key data sources from external trade statistics, Census of Manufacturing Activities, Survey of Services, and administrative data.

Individual consumption expenditure by nonprofit institutions serving households is not reported separately in the national accounts; however, for the purpose of the ICP, the DOS made separate estimates of the GDP expenditures for the main aggregates and their components. The GDP expenditure value estimate for net purchases abroad was also estimated separately.

Estimates on government final consumption expenditure were compiled by the cost of production approach, using data from government financial statements. Data on exports and imports of goods and services were obtained from the balance of payments statistics. Statistical discrepancy was distributed across all basic headings.

Data Validation

For all sectors, product specifications of the priced items were thoroughly examined to ensure that they fulfilled the requirements of the ICP. All prices obtained were checked and verified with respondents before submission to ADB. Where possible, the price trends were also compared with those of similar items selected in the CPI basket to ensure data consistency. Intra-economy data validation based on ADB's guidelines, such as minimum-to-maximum

price ratio and coefficient of variation were also conducted to ensure plausibility of prices and to identify possible outliers. References were also made to similar price data previously submitted in the 2011 ICP round and 2016 PPP Update.

The regional data workshops were beneficial in addressing data issues and concerns faced by the participating economies. The workshops provided a good platform for in-depth discussion among the economies. The data validation guidelines provided by Asian Development Bank (ADB) were used as reference to further check the submitted price data to ensure that the intra-economy and inter-economy variabilities were within acceptable limits.

For household consumption items, the price ratios of 2017–2016 and/or 2017–2011 (where available and appropriate) were compared; the majority of items have comparable price movement from 2017 over 2016 and/or 2011 between the CPI and PPP. Differences in the directions observed were due mainly to different specifications for products priced in the ICP 2017 round versus previous rounds, such as different brands and varieties, or different establishments where prices were collected. This was also a result of the phasing out of old products as well as the change in the CPI basket over time.

For machinery and equipment items, where possible, prices were obtained from official distributors and dealers to ensure that they were representative. If the specific model of the required machinery and equipment item was unavailable, the price for a comparable replacement model was collected. Any deviations in specifications between the replacement model and the required model were documented in detail and included in the submission to ADB for further data evaluation. All prices obtained were scrutinized and clarifications made with respondents before submission to ADB. During the regional data validation workshops, clear guidelines on machinery and equipment data collection and

validation were established. These workshops were also useful for clarifying and resolving common issues faced by the participating economies during machinery and equipment price collection.

As for the construction data, to ensure data reliability, prices of each item were obtained from 30 large and active main construction firms, and based on assessments, Singapore's data were representative of the industry. References were also made to similar price data submitted for the 2011 ICP and 2016 PPP Update. The construction survey does not differentiate geographical areas, as Singapore is a city-state where location is not a factor in price variations.

Price Collection Tools

The DOS used the price collection tools (PCTs) for machinery and equipment, construction, housing, and compensation. In 2011, ADB's PCTs required frequent software patches to resolve the technical bugs. For 2017, ADB has converted the PCT to macro Microsoft Excel format which is more user-friendly. However, as macro formatted Microsoft Excel sheets are blocked by our e-mail firewall, DOS ICP team suggested to use existing built-in Microsoft Excel formulas instead.

Challenges in Implementation

For household consumption items for the ICP 2017 round, prices of about 50% of the items are not available from the CPI regular price surveys, though special efforts were rendered during CPI rebasing to include as many ICP items where possible and appropriate. These items are mainly those which are not commonly purchased by households in Singapore. Significant efforts were required to check the specifications and obtain the prices required, especially for those which were not available from the CPI. Specifically, the product specifications for the household consumption items were very detailed and required further verification with respondents to ensure that the specifications of the

items priced were consistent and the prices provided were correct.

During the regional data validation workshops, many economies highlighted that the specifications provided for some of the items differ from those commonly available in their economies. It would be efficient if ADB could further review the items under the household consumption product list for future rounds of the ICP and select only those items with product specifications that are commonly available, representative, and comparable across the region.

Most of the items and products required for machinery and equipment were not included in the regular DOS surveys because they were uncommon. To increase data comparability for cross-economy comparison, special surveys had to be conducted.

For construction, similar to household items, there were ICP items which were unavailable in Singapore for 2011, 2015–2016, and 2017 as the BCA had difficulties pricing them based on the strict specifications, as required by the ICP. These items are highly likely to continue to be unavailable. Additional resources had to be deployed by the BCA to collect prices for items required via special price surveys. The best alternative items that suit ICP specifications and discussed with ADB during submission and workshops if items priced are comparable to other countries. In addition, the ICP method of comparing construction prices based on a single specification (i.e., using the same list of items) across economies may be subject to data limitations and distortions. Bearing in mind that building specifications could vary significantly across economies, this leads to a question about the usefulness of such price comparison. Construction data quality could be further enhanced if the item descriptions could be more detailed and specific in future rounds of the ICP.

As for government compensation data, additional resources are to be deployed by the Singapore Public Service Division to compile data required, and by the DOS to collate data from various agencies.

Lessons Learned and Future Directions

Participation in the rounds of ICP helped enhance the staff's understanding of PPP methodology and estimates. Various regional workshops were useful in raising awareness and understanding of issues and challenges encountered by different statistical offices of the participating economies in the areas of price collection and national accounts compilation.

For household price survey, the DOS has developed a module in the CPI computerized system to process prices and compile relevant statistics required for the ICP. In addition, during the recent CPI rebasing exercise, the DOS has made special effort to include ICP items into the CPI basket where appropriate. Non-household surveys, such as machinery and equipment, have already been integrated in the relevant agencies' work plan.

The current global pandemic situation has affected Singapore's retail, food and beverage, and construction sectors severely. The coordinating agency for construction will assess the integration of ICP construction price surveys in their work plan when the industry situation is more normalized.

Sri Lanka

Economy Results

As Table 7.23 shows, Sri Lanka has the 13th largest real GDP in the region with HK$1,621 billion (column 3), which is 2.38 times of the size of its nominal GDP of HK$681 billion (column 7). This indicates that the Sri Lanka's exchange rate is also 2.38 times of the PPP at GDP level. The economy contributes 0.70% to the region's total real GDP (column 4), which is larger than its nominal share of 0.46% (column 8). Sri Lanka's nominal ICEH-to-GDP ratio of 62.05% (column 11) is the eighth highest in the region while its nominal GFCF-to-GDP ratio of 26.30% is the 12th highest in the region. Relative to the region's totals, Sri Lanka's real ICEH share of the region is

0.79%, ranking lower at 13th, whereas Sri Lanka's real GFCF share of the region is 0.44%, also ranking lower at 14th (column 4).

Accounting for Sri Lanka's population of 21.44 million (13th most populous in the region), the economy's per capita real GDP of HK$75,587 (column 5) ranks 10th highest in the region and is 23% above the regional per capita real GDP (column 6). Sri Lanka also posts per capita real expenditures that are higher than the regional per capita real levels in more than three-fifths of the components in Table 7.23 (column 6). Notable among them is breads and cereals with a per capita real expenditure of HK$3,219 (column 5) which is 119% higher than the regional per capita level, ranking fourth in the region (column 6).

With the local currency of Sri Lanka rupees (SLRs), Sri Lanka's PPP at GDP level of SLRs8.22 = HK$1 (column 2) is only 42% of the exchange rate of SLRs19.56 = HK$1, implying that the general price level in Sri Lanka is 42% of (or 58% lower than) in Hong Kong, China (column 11), or 66% of (or 34% lower than) the region's average price level (column 13). This makes Sri Lanka's average price level the sixth lowest in the region. The PLI for ICEH is 79 (ranking 15th) and for GFCF is 75 (ranking 10th) (column 13). Sri Lanka registered the lowest PLIs in the following expenditure components in the region: health and education (26); education (19); miscellaneous goods and services (54); and government final consumption expenditure (27) (column 13).

Economy Experience in Program Implementation

Administrative Setup

As in the 2011 cycle, the prices and wages and the national accounts divisions of the Department of Census and Statistics (DCS) implemented the 2017 International Comparison Program (ICP) activities. The director of the Prices and Wages Division was the national coordinator for ICP activities and a statistician in the same division was the deputy national coordinator.

Table 7.23: Summary Results for Sri Lanka, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Real Expenditure HK$	Per Capita Real Expenditure Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Nominal Expenditure HK$	Per Capita Nominal Expenditure Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	8.22	1,620.9	0.70 [13]	75,587	123 [10]	680.8	0.46 [13]	31,748	81 [10]	100.00 [n.a.]	42	66 [17]	13,317.29
Actual Individual Consumption by Households[a]	7.91	1,114.3	0.83 [12]	51,965	146 [08]	450.6	0.57 [13]	21,011	101 [10]	66.18 [08]	40	69 [16]	8,813.70
Food and non-alcoholic beverages	11.10	216.0	0.79 [12]	10,075	139 [10]	122.6	0.78 [13]	5,718	138 [09]	18.01 [11]	57	99 [09]	2,398.41
Food	10.98	214.6	0.81 [12]	10,006	142 [09]	120.5	0.80 [13]	5,617	141 [09]	17.69 [10]	56	99 [09]	2,356.19
Bread and cereals	10.74	69.0	1.24 [12]	3,219	219 [04]	37.9	1.11 [11]	1,768	195 [06]	5.57 [07]	55	89 [14]	741.48
Meat and fish	10.05	32.1	0.46 [14]	1,497	82 [18]	16.5	0.40 [15]	769	70 [18]	2.42 [16]	51	86 [11]	322.52
Fruits and vegetables	10.78	32.7	0.45 [13]	1,525	80 [13]	18.0	0.51 [13]	840	89 [11]	2.65 [14]	55	112 [12]	352.37
Other food and non-alcoholic beverages	11.96	82.1	1.02 [11]	3,828	179 [08]	50.2	1.10 [12]	2,341	194 [07]	7.37 [08]	61	108 [08]	982.05
Alcoholic beverages, tobacco and narcotics	27.47	6.1	0.24 [18]	286	43 [21]	8.6	0.47 [13]	402	83 [13]	1.27 [12]	140	194 [02]	168.56
Clothing and footwear	8.86	36.9	0.74 [11]	1,721	131 [07]	16.7	0.45 [13]	780	79 [12]	2.46 [09]	45	61 [19]	327.15
Clothing	8.53	34.7	0.85 [11]	1,620	149 [07]	15.1	0.51 [12]	706	91 [10]	2.22 [09]	44	61 [18]	296.23
Housing, water, electricity, gas and other fuels[a]	5.72	162.5	0.72 [13]	7,577	126 [09]	47.5	0.44 [13]	2,214	78 [12]	6.97 [14]	29	62 [17]	928.82
Furnishings, household equipment and routine household maintenance	9.21	20.3	0.49 [13]	945	87 [15]	9.5	0.30 [13]	445	54 [15]	1.40 [19]	47	62 [19]	186.54
Health and education[a]	2.11	357.3	0.86 [11]	16,662	152 [08]	38.6	0.23 [13]	1,799	40 [15]	5.67 [21]	11	26 [22]	754.62
Health[a]	2.78	148.8	0.62 [12]	6,937	109 [09]	21.2	0.24 [13]	987	41 [13]	3.11 [16]	14	38 [21]	414.19
Education[a]	1.57	216.4	1.18 [11]	10,092	208 [08]	17.4	0.22 [13]	812	38 [15]	2.56 [22]	8	19 [22]	340.44
Transportation and communication	10.91	171.9	0.99 [10]	8,017	175 [07]	95.9	0.96 [12]	4,470	169 [07]	14.08 [01]	56	97 [13]	1,875.26
Transportation	11.32	157.9	1.14 [10]	7,362	202 [06]	91.3	1.18 [12]	4,259	208 [06]	13.42 [01]	58	103 [11]	1,786.64
Communication	8.76	10.1	0.29 [13]	472	52 [16]	4.5	0.20 [14]	211	35 [14]	0.67 [19]	45	67 [18]	88.62
Recreation and culture[a]	13.60	75.9	1.93 [11]	3,538	341 [05]	52.7	1.53 [10]	2,459	270 [06]	7.74 [01]	70	79 [11]	1,031.40
Restaurants and hotels	10.93	29.9	0.55 [14]	1,393	98 [11]	16.7	0.48 [13]	779	84 [11]	2.45 [13]	56	86 [09]	326.57
Miscellaneous goods and services[a]	7.90	147.5	1.10 [11]	6,878	194 [05]	59.6	0.59 [11]	2,778	105 [08]	8.75 [05]	40	54 [22]	1,165.46
Individual Consumption Expenditure by Government	2.51	219.9	1.15 [10]	10,255	204 [08]	28.2	0.25 [12]	1,313	44 [12]	4.14 [14]	13	22 [22]	550.98
Collective Consumption Expenditure by Government	3.99	145.3	0.96 [14]	6,778	169 [12]	29.6	0.30 [14]	1,382	54 [15]	4.35 [21]	20	32 [22]	579.80
Gross Fixed Capital Formation	10.70	327.4	0.44 [14]	15,270	77 [11]	179.0	0.33 [13]	8,349	58 [12]	26.30 [12]	55	75 [10]	3,502.12
Machinery and equipment	19.00	94.7	0.84 [13]	4,416	149 [10]	92.0	0.78 [13]	4,290	137 [10]	13.51 [04]	97	92 [13]	1,799.42
Construction	6.77	225.6	0.34 [14]	10,519	60 [11]	78.1	0.22 [13]	3,642	38 [11]	11.47 [15]	35	64 [11]	1,527.68
Other products	18.63	9.4	0.14 [15]	438	25 [18]	8.9	0.13 [15]	417	23 [16]	1.31 [18]	95	91 [14]	175.02
Changes in Inventories and Acquisitions Less Disposals of Valuables	11.30	122.1	2.71 [03]	5,693	479 [02]	70.5	2.39 [03]	3,288	422 [02]	10.36 [02]	58	88 [09]	1,379.02
Balance of Exports and Imports	19.56	-48.9	-2.09 [17]	-2,282	-369 [20]	-48.9	-2.09 [17]	-2,282	-369 [20]	-7.19 [17]	100	100 [n.a.]	-957.34
Individual Consumption Expenditure by Households[b]	8.89	929.3	0.79 [13]	43,335	140 [08]	422.4	0.63 [13]	19,698	110 [10]	62.05 [08]	45	79 [15]	8,262.72
Individual Consumption Expenditure by Households without Housing[b]	9.44	800.8	0.80 [13]	37,342	140 [08]	386.3	0.64 [13]	18,015	113 [10]	56.74 [08]	48	80 [14]	7,556.78
Government Final Consumption Expenditure	3.26	346.9	1.03 [12]	16,177	182 [11]	57.8	0.27 [14]	2,696	48 [14]	8.49 [20]	17	27 [22]	1,130.77
Domestic Absorption	8.23	1,733.4	0.75 [13]	80,834	133 [11]	729.7	0.50 [13]	34,030	88 [10]	107.19 [06]	42	66 [16]	14,274.63

Reference Data

Exchange rate (LCU/HK$)	19.56
Total population (in million)	21.44
Population share to AP (%) [ranking]	0.57 [13]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

b Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

The ICP unit in the Prices and Wages Division, and its entire staff, assisted the national coordinator. Statistical officers of the Prices and Wages Division and 42 district officers of the DCS were involved in the data collection for ICP price surveys under the supervision of the senior statistician and other statisticians.

Use of Existing Infrastructure in Collecting Data

For consumer price index (CPI) compilation, open market retail prices of food and nonfood items are collected weekly, monthly, and quarterly from 14 selected price collection centers within the Colombo City and its suburbs and the main cities of 25 districts for the price collection program in their areas. For the ICP household consumption price surveys, four markets within Colombo City limits (Grandpass, Narahenpita Special Economic Center, Pettah, and Wellawatta) and 38 other cities were covered from May 2017 to April 2018. Out of the 464 CPI items, prices for 146 items (exact match) were used for the ICP.

The DCS staff also implemented a special survey for housing rental prices designed for meeting the ICP data requirements. The team extrapolated housing volume indicators from the 2012 Census of Population and Housing and some other actual housing rental information from the 2016 Household Income and Expenditure Survey using a backward calculated midyear population series based on the 2012 census. Compensation data for government occupations were obtained mainly from administrative documents on salary revision circulars and guidelines, which covered all government occupations. Further clarifications were made during visitations to the relevant institutions.

Survey Framework

For the household consumption survey, the outlets were purposively selected within the 42 price collection centers (23 urban and 19 rural). The survey covered supermarkets, open markets, covered markets, mobile shops, street vendors, pharmacies, private doctors' clinics, private hospitals, private outlets for therapeutic appliances and equipment, and other service providers. Prices for perishable food items were collected weekly while prices for other food items were collected monthly. Prices for household appliances, durable goods and other equipment, health, education, package holidays, catering services, accommodation services, and insurance and financial services basic headings were collected semiannually. All other nonfood items were collected quarterly.

Special surveys for machinery and equipment and construction were conducted in carefully selected purposive samples of institutions and outlets within Colombo city limits only. Price surveys were carried out in the second quarter of 2017 and first quarter of 2018. For housing rental prices, a special survey was conducted for the ICP in 2017. Samples were included from the main city of each district and locations within 10 kilometers from the main city.

Gross Domestic Produce Expenditure Values

The National Accounts Division of the DCS releases the gross domestic product (GDP) by three approaches on an annual basis. For expenditure and income approach estimates, the compiled GDP figure from the production approach is treated as the control figure.

(i) Individual consumption expenditure by households is disseminated following the classification of individual consumption according to purpose. For the base year, main data sources for household final consumption expenditure were Household Income and Expenditure Survey information and the use side of the supply and use tables. When compiling expenditure values for the following years, changes in the availability (domestic output + imports – exports) are used to extrapolate the previous year figures.

Details from the 2016 Household Income and Expenditure Survey were used to disaggregate basic heading estimates. The main aggregate and the components of individual consumption expenditure by nonprofit institutions serving households is not reported separately in the official national accounts. A separate estimate for net purchases abroad was provided.

(ii) Government final consumption expenditure (GFCE) is disseminated following the classification of the functions of government. The data for the GFCE were based on the information from state accounts annual budget estimates.

(iii) Gross fixed capital formation is disseminated following the asset classification. The annual survey of industries, capital expenditure data from administrative reports, import statistics, and annual survey of construction industries were used to disaggregate the estimates into the required basic headings.

(iv) Balance of payments statistics from the Central Bank reports, along with imports and exports of goods data from Sri Lanka Customs, were used to derive estimates for the balance of exports and imports.

(v) The change in inventories was the balancing item in the expenditure approach.

For the ICP, DCS constructed a concordance among ICP components (basic headings) with central product classification and Household Income and Expenditure Survey items.

Data Validation

Raw prices with coefficient of variation greater than 30%, between 20% and 30%, and less than 20%, and minimum-to-maximum ratio, were reviewed at the provincial level through the price capture tools, and validated according to instructions given during data review workshops. The team communicated to ADB justifiable reasons for some products with high coefficients of variation.

The trends of the collected prices for the ICP were compared with similar products or subgroups in the CPI price collection program. The ICP DCS team checked prices that were outside a specific range for data entry errors or other possible errors, such as deviation in product specifications or packaging size, and took corrective measures to improve the data quality.

Price Collection Tools

The ICP DCS team encountered some data entry issues in the 2017 version of the ICP Asia Pacific Software Suite (ICP APSS). Because of this, the team used the 2011 version of ICP APSS in some district offices.

Challenges in the Implementation

Using the 2011 version of ICP APSS was time-consuming because the transferred data in Microsoft Excel was reformatted to newer version, which necessitated manually changing the recorded date before importing to the 2017 version.

Lessons Learned and Future Directions

The housing volume survey required data on the number of rooms and on inside water availability, among other indicators. These indicators were not available from any survey or census exercises implemented by the DCS. The available indicators were number of bedrooms, water piped into the dwelling, and water piped into the yard or plot, which were provided to ADB. Learning from this experience, and to meet the ICP data requirements for housing volume in the next ICP round, the DCS included two questions in the 2021 Census of Population and Housing: the number of rooms and the availability of water inside the housing unit. Also, the DCS noticed the inconsistency of average annual rent among some housing categories because of issues in the selected sample. The DCS plans to have a representative sample frame for rented housing units after the 2021 census to resolve this issue.

To further improve data quality in the next ICP rounds, the DCS plans to arrange two data validation workshops semiannually for feedback from district offices. The DCS also plans to integrate into CPI activities similar methods to the ICP for calculating provincial (subnational) level purchasing power parities, with ADB assistance.

Taipei,China

Economy Results

As Table 7.24 shows, Taipei,China is the 12th most populous economy, home to 23.56 million or 0.62% of the region's population. In contrast, Taipei,China's GDP in PPP terms or the real GDP of HK$6,688 billion (column 3) comprises 2.88% of the region's total real GDP, ranking fifth largest in the region (column 4). Taipei,China's nominal GDP of HK$4,480 billion (column 7) comprises 3.01% of the region's total nominal GDP (column 8), ranking a notch higher in the region. A higher real GDP than nominal GDP indicates that the general price level in Taipei,China is lower than in Hong Kong, China, whereas a lower share in region's real GDP than in region's nominal GDP shows that general price level in Taipei,China is higher than the region's average price levels. More than half or 52.94% of Taipei,China's nominal GDP comes from nominal ICEH (column 11), ranking at 16th place. The economy's real ICEH of HK$3,484 billion (column 3) comprises 2.98% of the region's total real ICEH, placing it sixth in the region (column 4). Taipei,China has the fifth highest real GFCF of HK$1,225 billion, forming 1.63% of the region's total GFCF.

Factoring in its population, Taipei,China has the fourth highest per capita real GDP of HK$283,878 (column 5) which is almost five times of the region's per capita real GDP (column 6). Taipei,China maintains its fourth place despite a lower per capita nominal GDP of HK$190,165 (column 9), which is still nearly five times of the region's per capita

nominal GDP (column 10). Taipei,China's per capita real ICEH of HK$147,894 (column 5) is the third highest in the region (column 6), after Singapore and Hong Kong, China. Taipei,China has the highest per capita real expenditure for health and education amounting to HK$49,759 (column 5), or 454% of the regional per capita real expenditure for the same component (column 6).

With the local currency of NT dollars (NT$), the economy's PPP at GDP level of NT$2.62 = HK$1 is 67% of the exchange rate of NT$3.91 = HK$1, implying that the overall price level in Taipei,China is 67% of (or 33% lower than) in Hong Kong, China (column 12) and 105% of (or 5% higher than) the region's average price level (column 13)—the fifth highest in the region. The PLIs for various expenditure components in Table 7.24, though none registers as highest in the region, are mostly above the regional average (column 13) with the following exceptions: clothing and footwear (PLI of 89); clothing (89); health and education (99); health (90); communication (85); recreation and culture (96); restaurants and hotels (98); miscellaneous goods and services (96); and government final consumption expenditure (85) (column 13).

Economy Experience in Program Implementation

Administrative Setup

The Department of Statistics, Directorate General of Budget, Accounting and Statistics (DGBAS), Executive Yuan, is responsible for statistics related to the economy of Taipei,China such as the consumer price index (CPI), social indicators, and national accounts, and the implementation of the 2017 International Comparison Program (ICP) round. The senior executive officer from Department of Statistics was assigned as the coordinator from DGBAS for 2017 ICP, and the chief of Price Statistics Section as the deputy coordinator.

Table 7.24: Summary Results for Taipei,China; 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure		Per Capita Real Expenditure		Nominal Expenditure		Per Capita Nominal Expenditure		Nominal Expenditure Shares, (%) [ranking]	PLIs		Expenditure (billion LCU)
		(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]	(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]		(HKG = 100)	(AP = 100) [ranking]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	2.62	6,688.2	2.88 [05]	283,878	463 [04]	4,480.3	3.01 [04]	190,165	484 [04]	100.00 [n.a.]	67	105 [05]	17,501.18
Actual Individual Consumption by Households[a]	2.58	4,097.5	3.05 [06]	173,917	490 [03]	2,707.4	3.43 [04]	114,917	552 [03]	60.43 [13]	66	112 [05]	10,575.94
Food and non-alcoholic beverages	3.20	417.3	1.52 [10]	17,712	244 [03]	341.7	2.17 [08]	14,504	349 [02]	7.63 [17]	82	143 [03]	1,334.79
Food	3.20	388.8	1.46 [10]	16,504	234 [03]	318.4	2.11 [08]	13,516	340 [02]	7.11 [17]	82	145 [03]	1,243.86
Bread and cereals	3.68	80.8	1.45 [09]	3,430	234 [02]	76.1	2.22 [09]	3,229	357 [01]	1.70 [17]	94	153 [02]	297.15
Meat and fish	3.08	126.0	1.81 [10]	5,349	291 [03]	99.5	2.39 [07]	4,224	385 [02]	2.22 [17]	79	132 [03]	388.73
Fruits and vegetables	3.42	108.8	1.50 [09]	4,616	242 [02]	95.1	2.68 [07]	4,038	430 [01]	2.12 [16]	87	178 [04]	371.60
Other food and non-alcoholic beverages	2.74	101.2	1.25 [10]	4,294	201 [07]	71.0	1.55 [09]	3,013	249 [05]	1.58 [20]	70	124 [03]	277.31
Alcoholic beverages, tobacco and narcotics	2.86	76.0	3.01 [06]	3,224	484 [02]	55.5	3.04 [05]	2,357	488 [03]	1.24 [13]	73	101 [10]	216.89
Clothing and footwear	2.59	155.4	3.11 [06]	6,594	500 [02]	102.9	2.77 [05]	4,366	444 [03]	2.30 [12]	66	89 [08]	401.78
Clothing	2.49	140.7	3.43 [06]	5,971	551 [02]	89.6	3.04 [05]	3,802	489 [03]	2.00 [10]	64	89 [08]	349.93
Housing, water, electricity, gas and other fuels[a]	2.59	627.4	2.76 [06]	26,629	444 [02]	415.8	3.87 [04]	17,647	622 [03]	9.28 [08]	66	140 [04]	1,624.09
Furnishings, household equipment and routine household maintenance	3.23	135.3	3.29 [06]	5,741	529 [03]	111.8	3.57 [04]	4,745	573 [03]	2.50 [08]	83	108 [05]	436.66
Health and education[a]	1.58	1,172.3	2.83 [06]	49,759	454 [01]	474.2	2.79 [04]	20,129	448 [03]	10.58 [05]	40	99 [06]	1,852.47
Health[a]	1.32	794.6	3.30 [04]	33,725	530 [01]	268.1	2.98 [03]	11,382	478 [03]	5.99 [03]	34	90 [09]	1,047.46
Education[a]	1.94	414.8	2.25 [08]	17,606	362 [03]	206.1	2.58 [04]	8,747	415 [04]	4.60 [12]	50	114 [04]	805.01
Transportation and communication	2.49	567.1	3.26 [04]	24,070	524 [02]	361.5	3.60 [04]	15,345	579 [03]	8.07 [09]	64	110 [07]	1,412.19
Transportation	2.58	432.0	3.13 [04]	18,335	503 [02]	285.4	3.69 [04]	12,115	593 [03]	6.37 [10]	66	118 [06]	1,114.93
Communication	2.21	134.8	3.91 [05]	5,721	628 [03]	76.1	3.31 [05]	3,230	531 [04]	1.70 [08]	56	85 [14]	297.26
Recreation and culture[a]	3.28	277.1	7.05 [03]	11,760	1,132 [03]	233.0	6.75 [02]	9,888	1,085 [03]	5.20 [03]	84	96 [06]	910.00
Restaurants and hotels	2.47	310.2	5.74 [06]	13,164	923 [03]	196.1	5.62 [04]	8,322	903 [03]	4.38 [06]	63	98 [06]	765.85
Miscellaneous goods and services[a]	2.80	578.3	4.30 [03]	24,545	692 [03]	415.0	4.14 [03]	17,616	665 [03]	9.26 [04]	72	96 [04]	1,621.22
Individual Consumption Expenditure by Government	1.89	693.1	3.64 [05]	29,420	584 [02]	335.6	2.97 [03]	14,244	477 [02]	7.49 [03]	48	82 [04]	1,310.87
Collective Consumption Expenditure by Government	2.25	511.6	3.38 [05]	21,714	543 [03]	294.6	3.01 [04]	12,503	484 [04]	6.57 [14]	58	89 [04]	1,150.70
Gross Fixed Capital Formation	2.93	1,224.9	1.63 [05]	51,992	263 [04]	917.6	1.67 [04]	38,947	268 [04]	20.48 [04]	75	102 [04]	3,584.36
Machinery and equipment	4.30	326.6	2.90 [05]	13,862	466 [04]	359.1	3.03 [05]	15,244	488 [04]	8.02 [13]	110	105 [06]	1,402.90
Construction	2.35	547.8	0.82 [09]	23,251	132 [09]	329.2	0.91 [07]	13,974	146 [06]	7.35 [19]	60	111 [04]	1,286.09
Other products	4.19	213.7	3.22 [04]	9,072	518 [02]	229.2	3.32 [03]	9,729	533 [02]	5.12 [06]	107	103 [07]	895.37
Changes in Inventories and Acquisitions Less Disposals of Valuables	2.91	−14.1	−0.31 [21]	−600	−50 [21]	−10.5	−0.36 [21]	−447	−57 [21]	−0.24 [20]	75	114 [04]	−41.18
Balance of Exports and Imports	3.91	571.2	24.37 [03]	24,246	3,916 [03]	571.2	24.37 [03]	24,246	3,916 [03]	12.75 [04]	100	100 [n.a.]	2,231.37
Individual Consumption Expenditure by Households[b]	2.66	3,484.4	2.98 [06]	147,894	478 [03]	2,371.9	3.51 [04]	100,673	564 [03]	52.94 [16]	68	118 [05]	9,265.07
Individual Consumption Expenditure by Households without Housing[b]	2.64	2,985.8	2.97 [07]	126,730	476 [03]	2,021.0	3.35 [04]	85,782	538 [03]	45.11 [17]	68	113 [05]	7,894.60
Government Final Consumption Expenditure	2.07	1,191.1	3.53 [05]	50,555	568 [03]	630.2	2.99 [04]	26,747	480 [04]	14.07 [09]	53	85 [04]	2,461.57
Domestic Absorption	2.64	5,788.3	2.51 [06]	245,684	404 [04]	3,909.1	2.67 [04]	165,920	429 [04]	87.25 [19]	68	106 [05]	15,269.82

Reference Data

Exchange rate (LCU/HK$)	3.91
Total population (in million)	23.56
Population share to AP (%) [ranking]	0.62 [12]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

The staff members of Price Statistics Section and National Accounts Section undertook most of the core ICP activities. The ICP DGBAS team sought professional assistance and advice from external experts as well as other department members to fulfill other data requirements of the ICP. Data collection for machinery and equipment was assisted by the Industrial Technology Research Institute to ensure the quality of data for the ICP price surveys.

Use of Existing Infrastructure in Collecting Data

For items in the existing CPI, Construction Cost Index, and rental surveys that satisfied the ICP specification requirements, their price data were directly used for the ICP. For the household consumption, 451 out of 600 items in the CPI basket were used for the ICP. Housing volume indicators were extrapolated from the 2010 Population and Housing Census and 2017 Family Income and Expenditure Survey as well as DGBAS Social Indicators and other information from the Water Resources Agency, Ministry of Economic Affairs. Machinery and equipment data were provided by the sampling manufacturers from wholesale price index. Data for compensation of government employees were obtained from the Directorate-General of Personnel Administration, Ministry of National Defense and Ministry of Education.

For the ICP items that were not in any of the existing surveys, additional item surveys were conducted.

Survey Framework

In 2017, the CPI survey covered nine cities and eight counties. The same CPI structure was used to obtain the ICP prices. Five specifications for each item were priced in each quarter. Food, beverages, and public services such as water and electricity, were priced on a monthly basis with 15 quotations in a quarter. Prices of out-of-season products, such as fresh mangoes with no transactions in winter, were not collected in that specific period. About online

shopping, for the simplicity of the operation as well as good transportation network to allow minimal shipping costs, outlets falling under the category "other kinds of trades and outlets" were surveyed solely in the north area.

There was no separate survey on actual rentals conducted for the ICP. The housing rental data were directly sourced from the existing CPI, which covered the entire economy of Taipei,China. Regional weights for different locations in large and small urban and rural areas were applied.

In 2017, the Construction Cost Index survey covered six cities and one county. The same structure was used to obtain the ICP construction prices, whereas machinery and equipment data were provided by representative manufacturers from the wholesale price index on a one-time basis.

Gross Domestic Product Expenditure Values

Gross domestic product (GDP) expenditure values for most basic headings were readily available, except for few basic headings such as narcotics, prostitution, other fuels, pharmaceutical products, and other medical products. The estimate for main aggregate individual consumption expenditure by nonprofit institutions serving households was reported separately in the official national accounts. However, further breakdown for this aggregate was not available. The GDP expenditure value estimate for net purchases abroad was not estimated separately. Since GDP is based on the expenditure approach, the statistical discrepancy that serves as balancing item is shown separately on the production and income sides of GDP.

The main sources used to compute the expenditure value for the 155 basic headings required by the ICP were the following: the sales of trade and food services, the household survey on income and expenditure, and survey on relevant indicators on domestic and foreign tourism were used to

split estimates of the household expenditures. For government consumption, the central and local government's final accounts broken down into categories following classification of the functions of government were used to split available basic headings of the ICP. Industrial production statistics and trade statistics were mainly used to derive the capital formation components, while balance of payments statistics were directly used to estimate exports and imports.

Data Validation

Similar data validation procedures from the 2011 cycle were implemented in 2017 ICP cycle. The ICP DGBAS team

(i) reviewed the specifications of the items priced to ensure that those products to be surveyed conform with the structured product descriptions (SPDs) as specified;

(ii) performed validations with reference to indicators such as coefficient of variation and minimum-to-maximum price ratios;

(iii) checked the price level for each product and price relativity with the same item priced in the 2011 ICP round, and compared with the elementary aggregation level of the CPI;

(iv) checked that the specifications of the products matched with the descriptions specified in the SPD, and whether the specifications and quality of the products surveyed were different from those of other economies;

(v) rechecked the price and market information on the product, and modified the price surveyed when an error occurred or changed the quotation when the price discrepancy resulted from a quality issue;

(vi) sought assistance from experts to verify the rationality of the prices for machinery and equipment and construction.

(vii) used observations from Asian Development Bank (ADB) workshops on regional validation

and inter-economy comparison to examine the reasonableness of the price data submitted.

Price Collection Tools

Most ICP price data were mainly collected through the regular CPI reporting system. The generation of the report and analysis of prices were conducted using the ICP price collection tools, which were also found helpful in data validation. The ADB ICP team responded effectively to the demands and problems; thus, operations and functions were well-managed in general.

Challenges in Implementation

The 2017 ICP coincided with the rebasing of price statistics, thus the workload was overwhelming for DGBAS. Moreover, given considerations of data quality as well as the comparability for inter-economy comparison, the DGBAS ICP team had to price more unspecified items for machinery and equipment due to its professional nature, with only a handful of items at the end. Another issue is that with motorcars and motorcycles, there were difficulties in finding appropriate items for the ICP, due to strict environmental regulation as well as the consumers' preferences of certain brands. The DGBAS ICP team would like to suggest expanding the pricing list or allowing more lenient specifications for the pricing items to solve this problem.

Lessons Learned and Future Directions

As mentioned, DGBAS experienced difficulties in finding items for machinery and equipment that matched with the SPD. Since machines are rather professional subjects, DGBAS ICP team had to consult with both experts and the private sector when exploring the potential pricing items. DGBAS ICP team had the opportunity to view and understand more about machinery and equipment, thus preparing for the upcoming 2020 ICP round.

Drawing from the 2017 ICP experiences, the DGBAS ICP team reviewed and has been gradually integrating items deemed important (mostly for household consumption) into the CPI since 2018, thus allowing a better harmonization between the ICP and CPI. The integration systematized and routinized the pricing for both ICP and CPI items, allowing more frequent pricing and outlet locations. Starting with the next ICP round in 2020, price collection will be done for all items on a monthly basis, allowing one step further to reflect the price level.

Thailand

Economy Results

As Table 7.25 shows, Thailand has the fourth largest economy in the region with real GDP of HK$7,232 billion (column 3), or 3.11% of the region's total real GDP (column 4), while accounting only for 1.79% or 67.65 million of the region's total population. Without factoring in spatial price differences across the 22 economies in the region, Thailand ranks lower at fifth place with a nominal GDP of HK$3,548 billion (column 7) comprising a smaller fraction (2.38%) of the region's total nominal GDP (column 8). The economy's ranking improves by one notch for ICEH and GFCF in real terms than in nominal terms: seventh in terms of real ICEH (HK$3,466 billion) (column 3) compared to eighth in nominal terms (HK$1,694 billion) (column 7); and fourth in real GFCF (HK$1,500 billion) (column 3) compared to fifth in nominal GFCF (HK$805 billion) (column 7).

For many of the GDP components in Table 7.25, Thailand's per capita expenditures and rankings are higher in real terms than in nominal terms. The economy has the seventh largest per capita real GDP (HK$106,892) (column 5), a notch better than its ranking of eighth place in per capita nominal GDP of (HK$52,444) (column 9), and ranks seventh in per capita real ICEH (HK$51,232) (column 5) but ranks lower at ninth place in per capita nominal

ICEH (HK$25,042) (column 9). Meanwhile, the economy ranks ninth in both per capita real GFCF (HK$22,173) (column 5) and per capita nominal GFCF (HK$11,906) (column 9).

Expenditure levels and shares larger in real terms than in nominal terms imply that Thailand has a lower overall price level than Hong Kong, China and the regional average. With the local currency of baht (B), the economy's PPP at GDP level of B2.14 = HK$1 (column 2) is 49% of the exchange rate of B4.36 = HK$1, implying that the average price level in the economy is 49% of (or 51% lower than) that of Hong Kong, China, or 77% of (or 23% lower than) the region's average price level. Thailand's overall price level ranks 10th in the region. The PLI for ICEH is 85, ranking ninth (column 13) while the PLI for GFCF is 73, ranking 12th (column 13). Thailand's lowest ranking components in terms of PLIs are clothing (with PLI of 65) and restaurants and hotels (with PLI of 71), both ranking 17th in the region (column 13).

Economy Experience in Program Implementation

Administrative Setup

The Division of Trade Information and Economic Indices (DTIEI), Trade Policy and Strategy Office, Ministry of Commerce, Thailand was in charge of implementing the International Comparison Program (ICP) activities. The 2017 DTIEI ICP team comprised of 14 officers from DTIEI and 25 price collectors regularly involved in compiling the consumer price index (CPI), producer price index, construction material index, and export–import price index. Additionally, DTIEI cooperated with several departments that specialize in specific sectors to collect data, such as private consultants for machinery and equipment data, the Department of Public Works and Town and Country Planning for construction data, and the Comptroller General's Department for government compensation data.

Table 7.25: Summary Results for Thailand, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure		Per Capita Real Expenditure		Nominal Expenditure		Per Capita Nominal Expenditure			PLIs		Expenditure (billion LCU)
		(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]	(HK$ billion)	Economy Shares to AP, (%) [ranking]	HK$	Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	(HKG = 100)	(AP = 100) [ranking]	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	2.14	7,231.6	3.11 [04]	106,892	174 [07]	3,548.1	2.38 [05]	52,444	133 [08]	100.00 [n.a.]	49	77 [10]	15,451.96
Actual Individual Consumption by Households[a]	2.05	4,201.7	3.13 [05]	62,106	175 [06]	1,977.3	2.51 [06]	29,226	140 [09]	55.73 [18]	47	80 [10]	8,611.02
Food and non-alcoholic beverages	2.31	881.1	3.21 [07]	13,023	179 [07]	466.6	2.97 [07]	6,896	166 [08]	13.15 [15]	53	93 [11]	2,031.91
Food	2.28	774.7	2.91 [07]	11,450	163 [07]	405.7	2.69 [07]	5,997	151 [08]	11.44 [16]	52	93 [11]	1,767.00
Bread and cereals	2.52	150.1	2.70 [08]	2,219	151 [12]	86.7	2.53 [08]	1,282	142 [11]	2.44 [14]	58	94 [12]	377.72
Meat and fish	2.06	207.8	2.99 [07]	3,072	167 [10]	98.5	2.37 [08]	1,455	132 [11]	2.77 [14]	47	79 [14]	428.78
Fruits and vegetables	2.42	268.6	3.71 [04]	3,971	208 [04]	149.5	4.21 [04]	2,209	235 [04]	4.21 [08]	56	113 [11]	650.90
Other food and non-alcoholic beverages	2.28	252.4	3.12 [07]	3,730	175 [09]	131.9	2.88 [07]	1,950	161 [11]	3.72 [15]	52	92 [12]	574.51
Alcoholic beverages, tobacco and narcotics	3.25	86.4	3.43 [05]	1,278	192 [08]	64.6	3.54 [04]	954	198 [07]	1.82 [08]	75	103 [09]	281.21
Clothing and footwear	2.13	64.3	1.29 [10]	951	72 [17]	31.5	0.85 [10]	465	47 [17]	0.89 [20]	49	66 [15]	137.00
Clothing	2.02	65.0	1.58 [09]	961	89 [14]	30.1	1.02 [10]	445	57 [17]	0.85 [19]	46	65 [17]	131.07
Housing, water, electricity, gas and other fuels[a]	1.41	533.5	2.35 [10]	7,885	132 [07]	172.9	1.61 [11]	2,555	90 [09]	4.87 [21]	32	68 [14]	752.83
Furnishings, household equipment and routine household maintenance	2.66	122.4	2.98 [09]	1,809	167 [08]	74.7	2.39 [07]	1,105	133 [09]	2.11 [12]	61	80 [08]	325.51
Health and education[a]	1.21	1,348.2	3.25 [05]	19,927	182 [05]	373.3	2.20 [05]	5,518	123 [08]	10.52 [06]	28	68 [10]	1,625.75
Health[a]	1.37	574.2	2.38 [06]	8,487	133 [07]	180.0	2.00 [05]	2,661	112 [07]	5.07 [08]	31	84 [10]	783.99
Education[a]	1.07	787.3	4.28 [04]	11,637	239 [05]	193.3	2.42 [05]	2,857	135 [09]	5.45 [07]	25	57 [10]	841.76
Transportation and communication	2.53	472.4	2.72 [06]	6,982	152 [08]	274.4	2.73 [06]	4,056	153 [09]	7.73 [10]	58	101 [10]	1,194.94
Transportation	2.46	415.8	3.01 [05]	6,146	169 [07]	235.0	3.04 [05]	3,473	170 [07]	6.62 [09]	57	101 [13]	1,023.32
Communication	2.96	58.0	1.68 [08]	857	94 [10]	39.4	1.71 [09]	583	96 [10]	1.11 [14]	68	102 [10]	171.63
Recreation and culture[a]	3.27	127.3	3.24 [08]	1,882	181 [07]	95.7	2.77 [07]	1,414	155 [08]	2.70 [08]	75	86 [08]	416.70
Restaurants and hotels	1.99	375.9	6.96 [04]	5,556	389 [05]	171.4	4.91 [05]	2,533	275 [07]	4.83 [05]	46	71 [17]	746.31
Miscellaneous goods and services[a]	2.40	457.8	3.41 [05]	6,767	191 [06]	252.3	2.51 [06]	3,730	141 [06]	7.11 [07]	55	74 [10]	1,098.86
Individual Consumption Expenditure by Government	1.40	883.4	4.64 [04]	13,057	259 [05]	283.1	2.50 [04]	4,184	140 [08]	7.98 [02]	32	54 [13]	1,232.89
Collective Consumption Expenditure by Government	1.91	652.2	4.30 [04]	9,640	241 [09]	286.2	2.93 [05]	4,230	164 [09]	8.07 [08]	44	68 [13]	1,246.23
Gross Fixed Capital Formation	2.34	1,500.1	2.00 [04]	22,173	112 [09]	805.5	1.47 [05]	11,906	82 [09]	22.70 [17]	54	73 [12]	3,507.91
Machinery and equipment	4.16	489.4	4.35 [03]	7,234	243 [06]	467.6	3.95 [03]	6,912	221 [06]	13.18 [05]	96	91 [15]	2,036.62
Construction	1.46	811.6	1.21 [07]	11,997	68 [10]	272.7	0.75 [10]	4,030	42 [10]	7.68 [18]	34	62 [14]	1,187.47
Other products	4.10	69.2	1.04 [09]	1,022	58 [10]	65.2	0.94 [09]	963	53 [10]	1.84 [16]	94	90 [15]	283.82
Changes in Inventories and Acquisitions Less Disposals of Valuables	2.47	−20.3	−0.45 [22]	−300	−25 [20]	−11.5	−0.39 [22]	−170	−22 [20]	−0.32 [21]	57	87 [10]	−50.18
Balance of Exports and Imports	4.36	490.7	20.94 [04]	7,253	1,172 [04]	490.7	20.94 [04]	7,253	1,172 [04]	13.83 [03]	100	100 [n.a.]	2,136.97
Individual Consumption Expenditure by Households[b]	2.13	3,466.0	2.96 [07]	51,232	166 [07]	1,694.2	2.51 [08]	25,042	140 [09]	47.75 [18]	49	85 [09]	7,378.12
Individual Consumption Expenditure by Households without Housing[b]	2.31	2,991.4	2.97 [06]	44,216	166 [07]	1,583.8	2.62 [07]	23,410	147 [08]	44.64 [18]	53	88 [09]	6,897.31
Government Final Consumption Expenditure	1.67	1,486.9	4.41 [04]	21,978	247 [08]	569.3	2.70 [05]	8,414	151 [08]	16.04 [05]	38	61 [13]	2,479.13
Domestic Absorption	2.11	6,308.6	2.74 [05]	93,248	153 [07]	3,057.4	2.09 [05]	45,191	117 [09]	86.17 [20]	48	76 [10]	13,314.99

Reference Data

Exchange rate (LCU/HK$)	4.36
Total population (in million)	67.65
Population share to AP (%) [ranking]	1.79 [08]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

In order to manage issues on ICP matters, DTIEI was involved in coordination with price collectors, data entry, prices validation, and implementation of project-related activities. The National Economic and Social Development Board was also involved in the 2017 DTIEI ICP team, responsible for compilation of gross domestic product (GDP) expenditure weights estimation.

Use of Existing Infrastructure in Collecting Data

DTIEI used existing surveys such as the CPI, construction, machinery and equipment, and rental survey to collect overlapping or closely related ICP items. Out of the 422 household consumption items in CPI, prices for 216 items were used for ICP. For some ICP items which were not in any of the mentioned surveys, additional surveys were conducted by price collectors at similar outlets, if possible. In terms of household consumption and housing rentals, the selected provinces were based on the CPI to represent the buying habits of the residents of urban and rural areas in five geographic regions of Thailand. The housing volume measures were obtained from the 2017 Household Socio-Economic Survey and the Provincial Electricity Authority's 2017 Annual Report, as well as extrapolations from the 2010 Population and Housing Census and Department of Provincial Administration data.

Survey Framework

For household consumption items, surveys covered a total of 25 geographic locations, including both urban and rural areas in all five regions: the Bangkok metropolitan area and central, northern, northeastern, and southern regions. For the Bangkok metropolitan area, the ICP covered four districts in Bangkok and one boundary province; all were counted as urban areas. For other regions, the ICP covered four urban areas and one rural area in each region.

Outlets were analyzed and selected based on the volume of sales, location, and cooperation of price informant or volunteer, in order to select outlets with the highest market share within each area. Prices were collected weekly, monthly, and quarterly, depending on the behavior of price movement. For non-household components, machinery and equipment items were collected annually while some of the construction items were collected monthly from the Bureau of Trade and Economic Indices database, then converted to annual prices.

The same CPI samples were used for the housing rental survey covering the entire economy of Thailand. The DTIEI ICP team ensured the samples were applicable for ICP purposes. The types and size of dwelling were confirmed in accordance with the ICP catalogue.

Gross Domestic Product Expenditure Values

GDP expenditures consist of household and government consumption, gross fixed capital formation (GFCF), and net exports. Out of the 155 basic headings required in the ICP, GDP expenditure values were available for 143 basic headings: 105 basic headings of individual consumption expenditure by households for which the 2017 Household Socio-Economic Survey was mainly used as a source; 3 basic headings for the individual consumption expenditure by nonprofit institutions serving households using the 2013 Nonprofit Organization Survey; 18 basic headings of individual consumption expenditure by government and four basic headings of collective consumption expenditure by government by allocating expenditures from the Government Fiscal Management Information System's disbursement data to the classification of the functions of government; 10 basic headings of GFCF (in line with the statistical classification of products by activity); the basic heading of change in inventories which used value-added tax, and relevant details from the Individual/Household Consumption Expenditure Survey and imports–exports data to split capital

formation; and 2 basic headings of exports and imports which used data from Bank of Thailand and Thai Customs. Statistical discrepancy was distributed to estimates of household, government, and capital formation.

The GDP expenditure values for the remaining 12 basic headings were not estimated because:

(i) Thailand does not follow the classification of individual consumption according to purpose for the individual consumption expenditure. Although total estimates of net purchases abroad may be available, this cannot be separated from the households estimates.

(ii) Some items and informal economic activities were not included in GDP of Thailand.

(iii) Government final consumption expenditure was not classified by basic heading under housing item.

(iv) In terms of GFCF, net acquisitions of valuables were not calculated. Change in inventories was recorded as flows without beginning and ending stocks.

Data Validation

Prices and data were carefully checked by comparing them across geographical areas for the product specifications. Prices with large variations were identified and price collectors were asked to provide explanations for unusual movements. Incorrect price data were revised accordingly. Some data validation issues identified by the ICP regional implementing agency through inter-economy and regional validation workshops were also addressed. Intra-economy workshop at Trade Policy and Strategy Office with the Asian Development Bank team were conducted to validate some issues. The prices of household products were further validated by comparing CPI items and data from the previous ICP round.

Price Collection Tools

The ICP Asia Pacific Software Suite, along with Microsoft Excel, was used to summarize data, analyze the results, validate the prices based on their movements, and identify errors in the data. The price collection tools used for machinery and equipment, construction, housing, and compensation, enhanced the convenience for users.

Challenges in Implementation

Similar to the experience in the 2011 ICP cycle, the most significant challenge in the household consumption component was the wide variation of product specifications, especially the unit of measure, quality, brand, and size across regions in Thailand. This considerably contributed to high variation in national average prices. To resolve this concern, the staff identified these unusual prices, requested an explanation from the price collectors, and conducted field surveys in specific areas when necessary.

For machinery and equipment, the difficulty was similar because the specifications for technological equipment tend to change rapidly, hence it was difficult to identify the exact specification (or closely similar ones) as indicated in the product catalogue. The unit of measurement was an obstacle for machinery and equipment as well as construction.

For compensation, available data sources in 2017 did not satisfy the ICP requirements. Hence, the 2017 compensation was extrapolated from the 2011 data.

Lessons Learned and Future Directions

There is a need to harmonize the CPI and ICP items to increase their overlap. DTIEI may consider including some ICP products and initiate the structured product description system in CPI. DTIEI will hold more intensive training for price collectors to further familiarize them with the ICP specifications, especially the units of measurement.

There is also a need for greater effort to translate the product list and product catalogue to the local language. DTIEI will consider conducting subnational purchasing power parity following ICP regional implementation and guidelines, so support from ICP regional implementing agency will be advantageous. Regarding the surveys of machinery and equipment and construction, training from international experts will be useful to help the DTIEI ICP team better understand the product specifications and validate the prices, thus improving the quality of price data for machinery and equipment and construction.

Viet Nam

Economy Results

As Table 7.26 shows, Viet Nam is the seventh most populous economy, home to 94.24 million, or 2.49% of the region's total population. In comparison, its real GDP of HK$4,069 billion (column 3) comprises 1.75% of the region's total real GDP, the 10th highest in the region (column 4). Without adjusting for spatial price differences across the 22 economies in the region, Viet Nam ranks lower at 12th place with a nominal GDP of HK$1,744 billion (column 7), which is less than half of its real GDP and is equivalent to 1.17% of the region's total nominal GDP (column 8). This implies that the general price level in Viet Nam is lower than in Hong Kong, China and lower than the region's average price level. Viet Nam ranks 10th in both real ICEH (HK$2,364 billion) and real GFCF (HK$795 billion) (column 3), a notch higher than its ranking of 11th in both nominal ICEH (HK$1,030 billion) and nominal GFCF (HK$415 billion) (column 7).

Factoring in its population, Viet Nam ranks 16th in both per capita real GDP (HK$43,179 or 70% of the regional level) (columns 5 and 6), and per capita nominal GDP (HK$18,506 or 47% of the regional levels) (columns 9 and 10). Although Viet Nam's per capita real ICEH (HK$25,088 or 81% of regional level) (columns 5 and 6) is more than double the per capita nominal ICEH (HK$10,932 or 61% of regional level) (columns 9 and 10), the economy ranks 16th in per capita real ICEH, a notch lower than its 15th place in per capita nominal ICEH. The same can be seen in GFCF—the per capita real GFCF of HK$8,435 ranks 17th (column 4) while per capita nominal GFCF of HK$4,401 ranks higher at 16th (column 9).

With the local currency of dong (D), Viet Nam's PPP at GDP level of D1,230.21 = HK$1 (column 2) is only 43% of the exchange rate of D2,870.44 = HK$1, implying that the overall price level in Viet Nam is only 43% of (57% lower than) in Hong Kong, China (column 12), and only 67% of (or 33% lower than) the region's average price level (column 13), ranking 15th in the region. The PLI for ICEH is 76 (ranking 17th) and for GFCF is 71 (ranking 19th) (column 13). Among the notable expenditure components with relatively low PLIs in the region in Table 7.26, ranking at 20th place are alcoholic beverages, tobacco and narcotics (PLIs of 49); communication (55); and restaurants and hotels (61) (column 13).

Economy Experience in Program Implementation

Administrative Setup

In July 2016, the director general of the General Statistics Office (GSO) of Viet Nam signed a decision establishing the GSO ICP working group to implement the 2017 International Comparison Program (ICP) round. The working group had eight members, headed by the director of the Price Statistics Department as the national coordinator with the deputy director of the System of National Accounts Department as the deputy national coordinator. Members of the team came from the Price Statistics Department, System of National Accounts Department, Foreign Statistics and International Cooperation Department, and Statistical Methodology and Information Technology Department.

Table 7.26: Summary Results for Viet Nam, 2017

Expenditure Category	Purchasing Power Parities (HK$ = 1.00)	Real Expenditure (HK$ billion)	Real Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Real Expenditure HK$	Per Capita Real Expenditure Index (AP = 100) [ranking]	Nominal Expenditure (HK$ billion)	Nominal Expenditure Economy Shares to AP, (%) [ranking]	Per Capita Nominal Expenditure HK$	Per Capita Nominal Expenditure Index (AP = 100) [ranking]	Nominal Expenditure Shares, (%) [ranking]	PLIs (HKG = 100)	PLIs (AP = 100) [ranking]	Expenditure (billion LCU)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Gross Domestic Product	1,230.21	4,069.2	1.75 [10]	43,179	70 [16]	1,744.0	1.17 [12]	18,506	47 [16]	100.00 [n.a.]	43	67 [15]	5,005,975.49
Actual Individual Consumption by Households[a]	1,174.31	2,728.7	2.03 [10]	28,955	82 [15]	1,116.3	1.42 [11]	11,845	57 [15]	64.01 [09]	41	70 [15]	3,204,308.69
Food and non-alcoholic beverages	1,399.93	656.5	2.39 [08]	6,966	96 [19]	320.2	2.04 [09]	3,397	82 [19]	18.36 [10]	49	85 [16]	919,033.30
Food	1,387.67	636.9	2.39 [08]	6,758	96 [19]	307.9	2.04 [09]	3,267	82 [19]	17.65 [11]	48	86 [16]	883,745.15
Bread and cereals	1,512.19	174.3	3.14 [07]	1,850	126 [14]	91.8	2.68 [07]	974	108 [16]	5.27 [09]	53	85 [18]	263,601.27
Meat and fish	1,348.70	271.5	3.91 [05]	2,881	157 [12]	127.6	3.07 [06]	1,354	123 [14]	7.32 [06]	47	79 [15]	366,216.13
Fruits and vegetables	1,339.90	96.1	1.33 [10]	1,020	53 [21]	44.9	1.26 [10]	476	51 [21]	2.57 [15]	47	95 [17]	128,831.11
Other food and non-alcoholic beverages	1,440.01	111.4	1.38 [09]	1,182	55 [22]	55.9	1.22 [10]	593	49 [22]	3.20 [16]	50	89 [16]	160,384.80
Alcoholic beverages, tobacco and narcotics	1,011.00	113.7	4.51 [04]	1,206	181 [09]	40.0	2.19 [06]	425	88 [12]	2.30 [07]	35	49 [20]	114,901.23
Clothing and footwear	1,398.93	114.1	2.29 [07]	1,211	92 [13]	55.6	1.50 [08]	590	60 [15]	3.19 [07]	49	65 [16]	159,672.16
Clothing	1,339.04	99.6	2.43 [07]	1,057	98 [13]	46.5	1.58 [08]	493	63 [15]	2.66 [05]	47	65 [16]	133,404.73
Housing, water, electricity, gas and other fuels[a]	1,204.73	587.2	2.59 [08]	6,230	104 [13]	246.4	2.30 [07]	2,615	92 [08]	14.13 [02]	42	89 [07]	707,365.41
Furnishings, household equipment and routine household maintenance	1,560.32	125.3	3.05 [08]	1,329	123 [10]	68.1	2.17 [09]	723	87 [11]	3.90 [02]	54	71 [13]	195,458.96
Health[a]	542.92	1,079.8	2.60 [07]	11,458	105 [13]	204.2	1.20 [09]	2,167	48 [12]	11.71 [02]	19	46 [15]	586,235.78
Education[a]	653.21	435.6	1.81 [07]	4,622	73 [12]	99.1	1.10 [08]	1,052	44 [11]	5.68 [06]	23	61 [14]	284,529.15
Transportation and communication	456.55	660.8	3.59 [05]	7,012	144 [11]	105.1	1.32 [10]	1,115	53 [13]	6.03 [03]	16	37 [16]	301,706.64
Transportation	1,535.26	276.9	1.59 [09]	2,938	64 [16]	148.1	1.48 [11]	1,572	59 [16]	8.49 [08]	53	93 [15]	425,112.50
Communication	1,624.48	247.9	1.80 [08]	2,630	72 [15]	140.3	1.81 [08]	1,488	73 [15]	8.04 [05]	57	101 [12]	402,630.51
Recreation and culture[a]	1,046.39	21.5	0.62 [11]	228	25 [18]	7.8	0.34 [11]	83	14 [19]	0.45 [20]	36	55 [20]	22,481.98
Restaurants and hotels	1,657.38	84.8	2.16 [10]	899	87 [12]	48.9	1.42 [11]	519	57 [13]	2.81 [07]	58	66 [19]	140,464.97
Miscellaneous goods and services[a]	1,133.87	124.6	2.31 [09]	1,322	93 [12]	49.2	1.41 [11]	522	57 [13]	2.82 [12]	40	61 [20]	141,304.28
Individual Consumption Expenditure by Government	1,251.26	99.1	0.74 [13]	1,052	30 [18]	43.2	0.43 [11]	458	17 [18]	2.48 [18]	44	58 [19]	123,995.30
Collective Consumption Expenditure by Government	609.30	405.4	2.13 [06]	4,302	85 [13]	86.1	0.76 [11]	913	31 [15]	4.93 [11]	21	36 [17]	247,028.93
Gross Fixed Capital Formation	839.84	393.8	2.60 [07]	4,178	104 [16]	115.2	1.18 [11]	1,222	47 [17]	6.61 [13]	29	45 [17]	330,690.42
Machinery and equipment	1,497.52	795.0	1.06 [10]	8,435	43 [17]	414.7	0.75 [11]	4,401	30 [16]	23.78 [16]	52	71 [19]	1,190,474.00
Construction	2,656.58	104.5	0.93 [12]	1,109	37 [18]	96.7	0.82 [12]	1,026	33 [19]	5.54 [19]	93	88 [17]	277,553.37
Other products	963.83	878.8	1.31 [06]	9,326	53 [12]	295.1	0.82 [09]	3,131	33 [12]	16.92 [08]	34	62 [15]	847,051.87
Changes in Inventories and Acquisitions Less Disposals of Valuables	2,632.64	25.0	0.38 [11]	265	15 [20]	22.9	0.33 [11]	243	13 [20]	1.32 [17]	92	88 [17]	65,868.75
Balance of Exports and Imports	1,470.82	95.3	2.12 [04]	1,012	85 [09]	48.8	1.66 [05]	518	67 [10]	2.80 [05]	51	78 [16]	140,220.00
Domestic Absorption	2,870.44	48.9	2.09 [07]	519	84 [10]	48.9	2.09 [07]	519	84 [10]	2.80 [06]	100	100 [n.a.]	140,282.38
Individual Consumption Expenditure by Households[b]	1,250.81	2,364.3	2.02 [10]	25,088	81 [16]	1,030.3	1.52 [11]	10,932	61 [15]	59.07 [09]	44	76 [17]	2,957,279.76
Individual Consumption Expenditure by Households without Housing[b]	1,270.00	2,033.3	2.02 [10]	21,575	81 [16]	899.6	1.49 [11]	9,546	60 [15]	51.58 [12]	44	74 [17]	2,582,258.68
Government Final Consumption Expenditure	733.48	787.6	2.34 [06]	8,358	94 [15]	201.3	0.95 [11]	2,136	38 [16]	11.54 [12]	26	41 [17]	577,719.35
Domestic Absorption	1,218.57	3,993.0	1.73 [10]	42,370	70 [16]	1,695.1	1.16 [12]	17,987	46 [16]	97.20 [17]	42	67 [15]	4,865,693.11

Reference Data

Exchange rate (LCU/HK$)	2870.44
Total population (in million)	94.24
Population share to AP (%) [ranking]	2.49 [07]

AP = Asia and the Pacific; HK$ = Hong Kong dollar; HKG = Hong Kong, China; LCU = local currency units; n.a. = not applicable; n.e.c. = not elsewhere classified; PLI = price level index.

Notes: Figures enclosed in brackets in columns 4, 6, 8, 10, 11, and 13 indicate rankings of the economy among 22 participating economies for the indicators under reference. Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy. Nominal expenditure aggregates are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

b Includes expenditure by nonprofit institutions serving households.

Sources: Asian Development Bank estimates. Data for expenditure at local currency units and mid-year population estimates were supplied by the participating economies for the International Comparison Program. For exchange rates: International Monetary Fund. International Financial Statistics. http://data.imf.org/ (accessed 17 September 2019).

Members of the Price Statistics Department were in charge of directly implementing the ICP activities. The director of the Price Statistics Department had been the national coordinator since the 2005 ICP round, but some of its members were replaced, mostly due to retirement.

The main tasks of the 2017 GSO-ICP team included designing the questionnaire and building related documents, organizing training, implementing the collection of ICP prices in provinces and estimating gross domestic product (GDP) in 2017 for 155 basic headings.

Use of Existing Infrastructure in Collecting Data

The GSO-ICP team reviewed and built the list of Viet Nam's ICP items for price surveys comprising household consumption, machinery and equipment, construction, and housing rental, among others. Based on that list, the provincial statistical offices built their own local lists by reviewing the products commonly sold in each province. After the product list was completed, the provincial statistical offices reviewed the items for price collection.

Though the ICP price survey network was different from the consumer price index (CPI) price survey network, prices for 213 out of 652 items in the CPI were used for the ICP. Moreover, CPI price collectors were also deployed to collect ICP prices. The 2017 ICP survey was an additional activity because its scope and objectives differed from the regular price surveys of the GSO.

Some of the existing housing rental and volume data were obtained from 2016 Household Living Standards Survey and 2014 Viet Nam Intercensal Population and Housing.

Government compensation data were obtained from administrative sources such as the Ministry of Planning and Investment, Ministry of Finance, and Ministry of Health.

Survey Framework

The 2017 ICP prices were collected in both urban and rural areas of eight major cities and provinces representing the economic regions. The ICP items were mostly available in these provinces.

Price collection was conducted monthly for household items: food and foodstuff were priced on the 11th and 21st of each month and nonfood items were priced on the 21st of each month. The team collected prices quarterly for medicine and healthcare services, government consumption, education, and construction.

Machinery and equipment items were surveyed quarterly in the two major cities of Ha Noi and Ho Chi Minh. A survey on housing rental was conducted for the ICP in the second quarter of 2018, covering Ho Chi Minh and Ha Noi.

Gross Domestic Product Expenditure Values

The following sources of data were used to disaggregate GDP into 155 basic headings:

(i) supply and use tables from 2007 (138x138) and 2012 and 2016 (164x164);
(ii) published GDP by expenditure;
(iii) published government expenditure;
(iv) export and import data from State Bank of Vietnam and Vietnam Customs;
(v) the 2016 Viet Nam Household Living Standard Survey;
(vi) the 2014 Viet Nam intercensal Population and Housing Survey;
(vii) 2017 quarterly GDP by expenditure;
(viii) enterprise survey; and
(ix) other sources.

In splitting GDP by expenditure, the following steps were taken, and data sources were used.

Individual consumption expenditure by households. For the household consumption components, results of the Viet Nam Household Living Standard Survey were used to split further into group and class estimates, and then ratios from the supply and use tables were used to further break up into basic heading estimates. The final consumption of households is mainly based on the supply and use tables and, in addition, on reference sources such the Viet Nam Household Living Standard Survey and total retail sales and service revenue. The survey to compile the supply and use tables gathered information for the final consumption of households information by province, city, and urban and rural areas, covering final consumption of goods and services purchased in the market, final consumption of self-sufficiency products, depreciation of self-owned and residential houses by type of house, and final consumer financial intermediation service. The household final consumption is then calculated by 164 products and aggregated to 12 categories: (i) food and non-alcoholic beverages; (ii) alcoholic beverages, tobacco, and narcotics; (iii) clothing and footwear; (iv) housing, water, electricity, gas and other fuels; (v) furnishings, household equipment, and routine household maintenance; (vi) health; (vii) transport; (viii) communication; (ix) recreation and culture; (x) education; (xi) restaurants and hotels; and (xii) miscellaneous goods and services.

Individual consumption expenditure by nonprofit institutions serving households. This main aggregate was not published in the official national accounts. However, for the purpose of the ICP, the 2012 Input-Output Survey conducted in 2013 was able to provide some information on housing, health, recreation and culture, education, social protection, and other services.

Government final consumption expenditure. The team used data from government expenditure to calculate the main aggregates (individual and collective consumption expenditure by government) and used the supply and use tables to further split by cost components: compensation of employees, intermediate consumption, and gross operating surplus.

Gross capital formation. The team used investment data to calculate total gross capital formation to further break down the expenditure value.

Data Validation

Data entry was done through the ICP Asia Pacific Software Suite (ICP APSS), a computer program provided by the Asian Development Bank (ADB). Provincial statistical offices sent data to the GSO on the 25th of each month, who then carefully checked for outliers and other data issues using the coefficient of variation and minimum-to-maximum ratio. The final data were aggregated to national average and were sent to ADB for inter-economy validations.

After the inter-economy validations by ADB, some data issues were not easily resolved due to lack of information, as noted by the coordinator who re-checked the raw data. Necessary findings or revisions were sent to ADB.

Price Collection Tools

The ICP APSS met most of the users' needs for data entry, validation, and data analysis. Survey questionnaires were translated into Vietnamese. For the next ICP, it would be better if the software is compatible with many different computer specifications for easier installation.

The team used the price collection tools (PCTs) for machinery and equipment and for construction. Price collectors were able to collect prices directly from the outlet or company using the PCTs.

Challenges in Implementation

As the list of ICP items was very long, many price collectors experienced difficulty in finding suitable products. Some product items specified by ICP were not easily found in Viet Nam, although their structured product descriptions (SPDs) were basic and general.

For machinery and equipment, the team encountered some difficulties in finding suitable products. Some products specified by the ICP required unique models not readily found in Viet Nam. Apart from items which are model-specific, economies were required to price items with similar specifications as "unspecified" items. It was not possible to price many unspecified items. Vehicles may have very similar specifications but different model numbers in Viet Nam.

Lessons Learned and Future Directions

With the new ICP tools and methods, GSO was able to improve its capacity to conduct price surveys in Viet Nam. All of these were especially helpful in laying the framework for estimating subnational purchasing power parities (PPPs). With seed funds from ADB, the GSO acquired computer equipment along with the software necessary for ICP activities. The GSO also learned from the experiences of other participating economies through the regular regional workshops arranged by ADB. The ICP also provided a platform for closer cooperation of Price Statistics Department with the System of National Accounts Department. GSO has integrated the ICP activities into the CPI price survey. For product

groups whose product specifications are the same as those in the ICP list, GSO plans to directly obtain the prices from the CPI without the need for a separate survey for the ICP.

The assistance from international experts during the training on machinery and equipment was well received. The detailed guidelines helped GSO staff to determine and collect prices for the most suitable goods according to the ICP's commodity specifications; determine what kind of prices are best suited to collect; and handle changes in the quality and design of items. With the information gained, the quality of price data was improved.

The ICP has been a permanent element in Viet Nam's regular statistical system. For the future ICP rounds, GSO's plan for ICP includes the following:

(i) developing a list of representative items according to ICP guidelines;
(ii) training provinces on where to obtain prices, either from the existing CPI or a special survey for the ICP, according to items' SPDs; and
(iii) training price collectors on how to identify items, collect their prices, and record the date of price collection.

For the next ICP rounds, GSO looks forward to attending intensive trainings on price data validations, as well as learning more deeply about PPP calculation methods at the regional level, especially about how to handle special cases. The team also hopes to better align Viet Nam's ICP implementation plan with the plans for Asia and the Pacific.

8. A History of Global and Regional Comparisons of Prices and Real Expenditures

In 2018, the International Comparison Program (ICP) reached an important milestone, celebrating 50 years since the program began in 1968. The ICP's main objective is to compile reliable measures of relative price levels in different currencies through estimates of purchasing power parities (PPPs) of currencies. PPPs are crucial to converting gross domestic product (GDP) and other aggregates, usually expressed in local currency units, in order to compare real incomes and standards of living in different economies. Although exchange rates are useful for currency conversions, they are less appropriate for comparisons of real incomes and standards of living because they are subject to volatility and do not capture the differences in relative price levels and purchasing power of currencies between different economies. The notion of PPP, its relationship to exchange rates, and its compilation have antecedents that predate the ICP, and stretch back to the early decades of the twentieth century.

Purchasing Power Parities and International Real Income Comparisons: Early Developments

The origin of the term purchasing power parity is attributed to the contributions of Gustav Cassel in 1916 and 1918, when he conceptualized the PPP of currency of a country and postulated the absolute and relative PPP theories.[27] Both of these theories are still relevant with significant advances in methods of compiling and analyzing PPPs since his work was published. Cassel's concept of PPP is fundamentally the same as the concept that underpins the current ICP framework. His theory is founded on the premise that the value of a currency is determined primarily by the amount of goods and services that a unit of currency of a country can buy in the country, and that the currency's buying power determines the demand for the currency. Cassel's PPP is the inverse of the general price level in a country, and Cassel's (1928) definition of the goods and services include "the whole mass of commodities marketed in the country" (quoted in Officer 1976, 33).

The absolute version of PPP theory postulates that, under conditions of free trade or when trade restrictions from both trading nations are of equal severity, the short-run equilibrium exchange rate measured by the value of one country's currency relative to another's currency equals the ratio of the internal purchasing power of currency or the ratio of general price levels. While the absolute version discusses PPPs and exchange rates at a given period, the relative theory of PPPs concerns changes in PPPs over time. Starting with a normal base period where the PPP and exchange rates are the same, the PPP in the current period is obtained by updating base period PPP with the ratio of proportionate changes in price levels in the countries concerned. The relative PPP theory provides the foundation for current procedures for updating PPPs between ICP benchmark years.

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[27] *The International Monetary Fund Staff Papers* (Officer 1976) offers a fairly comprehensive account of Cassel's concept of PPP and the absolute and relative versions of PPP theory.

While some may debate the absolute and relative versions of the PPP theory and their validity, the objective here is to underscore the importance of Gustav Cassel's work and recognize his contributions as the cornerstone for the work on ICP. Cassel himself recognized the possibility of deviations of PPPs from the exchange rates, which could arise from dissimilar trade restrictions and possible speculation in the foreign exchange market. Longer term capital movements and government interventions in exchange rate markets are another source of the discrepancy and these are precisely the reasons why exchange rates are not appropriate for converting GDP and other aggregates for comparisons of standards of living and the purchasing power of incomes in different countries.

The first systematic attempt to make international comparisons with the purpose of converting nominal expenditures appeared in Colin Clark's (1940) early work *Conditions of Economic Progress*, later revised with a more complete set of comparisons in 1957. An economist with firm roots and beliefs set in economic statistics, Clark worked on several aspects of agricultural statistics, national accounts statistics, and price comparisons. When first published in 1940, *Conditions of Economic Progress* was the only source of information on comparative real products and levels of living across countries. Clark painstakingly compiled statistics on agriculture, manufacturing, mining, and service sectors, including construction, for his price comparisons. Although his 1940 version included good estimates for 30 countries and less reliable estimates for another 23, his 1957 publication included detailed estimates of national products of 29 countries expressed in international units (US dollars) and Asian units (Indian rupees). Clark realized the importance of selection of a numeraire currency for international comparisons. In compiling results for 29 countries, he had used

simple methods based on quantity indicator data to impute missing information.

In his 1957 publication, Clark used 1929 as the benchmark year. His computation of PPPs operationalized Cassel's conceptual framework using Fisher's ideal index number—now known as a superlative index—with all comparisons using US as the base or reference economy and the US dollar as the reference currency. These comparisons were in international units, but Clark realized that price structure in the US would differ significantly from the price structure in India. He then compiled an alternative set of price comparisons with India as the reference economy and Indian rupee as the reference currency. Though Clark did not make any attempt to compare his PPPs with exchange rates, Angus Maddison (2004) in his 2004 Colin Clark lecture reported such comparisons. For the 1929 benchmark year, Clark's results show that PPP relative to exchange rates—what is now referred to as the price level index (PLI)—was high in Czechoslovakia, Greece, and Spain, and relatively low in Australia, Norway, South Africa, and Switzerland. Clark's estimates of real per capita income in 1950, in Asian units (Indian rupees), were 4,543 for the US; 3,562 for Canada; and 192 for India. Clark also produced estimates of real income per capita in 1950 in 1929 prices, a pioneering effort to make comparisons over time and space, where he reported estimates, in international units, of $1,064, $810, and $118 for the US, Canada and Colombia, respectively.

It is appropriate to end this brief recollection of Clark's contribution with a comment by an ex-World Bank employee and a famous economist, Graham Pyatt (1984, 81), "It is undeniably correct to acknowledge Colin Clark as a pioneer not only in devising methods of computing purchasing power parity, but also in applying them to the understanding of development."

International Comparison Project Phases I, II, and III: Laying the Foundation

The current approaches to international comparisons of prices and real incomes have evolved from the 1950s, in large measure due to the energetic and visionary leadership of Irving Kravis. An international trade theorist, Kravis began his work on international comparisons in collaboration with Milton Gilbert during his time at the Organisation for European Economic Co-operation (now known as the Organisation for Economic Co-operation and Development [OECD]), leading to two publications by Gilbert and Kravis (1954) and Gilbert and associates (1958). Their work explicitly recognized that exchange rates are not appropriate converters for making real income comparisons. Focusing on a small set of seven European economies and based on reliable data, the estimates of PPPs and real per capita income (gross national product per capita) were compiled at US and European prices (a weighted average of price structures in the European economies) and also based on geometric average (the Fisher index). The reported relative incomes for the year 1950, with the US = 100, were 58 for the United Kingdom, 48 for France, 38 for Germany, and 26 for Italy, whereas relative incomes of these economies in nominal or exchange rate converted terms were uniformly lower: 37 for the United Kingdom, 35 for France, 26 for Germany, and 16 for Italy (Klein 1993).

The ICP began in 1968 as a collaborative research project between the University of Pennsylvania and the United Nations Statistics Division (UNSD), after a report on international comparisons of production, income and expenditure aggregates examined the implications of using exchange rates to convert currencies and their effects on country contributions to the United Nations based on per capita GDP (ECOSOC 1968). The project was established following a recommendation of the United Nations Statistical Commission (UNSC), with funding from a diverse set of sources including the World Bank, the United States Agency for International Development, the Ford Foundation, and others. The research brief for the project was to focus on a small but diverse set of countries, under the leadership of Irving Kravis from the University of Pennsylvania and Zoltan Kenessey from UNSD.

The small step of setting up the ICP at the University of Pennsylvania led to a giant leap in international price and real income comparisons. Led by Kravis, the project in its first three phases established a framework for international comparisons that provided not only a solid foundation for the modern edifice of the ICP but became a great source for the current architecture and methods employed in compiling PPPs of currencies and real expenditures.

These first three phases of the ICP reflect the gradual development of ideas, procedures, and methods that have become the gold standard in this area. The first phase covered 10 countries with 1970 as the benchmark year, which increased to 16 countries in the 1973 benchmark in Phase II, and more than doubled to 34 countries with the 1975 benchmark in Phase III. The reports on the three phases are an essential read for anyone wishing to understand and undertake international comparisons. These reports are not just a collection of tables and results but a source of valuable insights into the way Kravis, Heston, and Summers approached the challenges of price comparisons across countries and their thought processes in identifying and finding solutions to difficult measurement problems encountered along the journey. These reports by Kravis et al. (1975), Kravis, Heston and Summers (1978a) and, especially, the third report by Kravis, Heston, and Summers (1982), *World Product and Income: International Comparisons of Real Gross Product*, are classics in this field.

A distinguishing feature of work during these three phases of ICP is that the research team led by Kravis developed a comprehensive approach to international comparisons of macroeconomic aggregates. It is not an exaggeration to state that their team considered

and allowed for every potential problem that may be encountered in these comparisons. In the process, they developed a full set of protocols that still apply in the current era of international comparisons.

Kravis et al. (1975) and Kravis, Heston, and Summers (1978a and 1982) established an explicit link between national accounts and international comparisons that is consistent with the current ICP framework, which is built around the system of national accounts statistics. Although they did not use the term "basic headings," they considered a total of 153 detailed categories—110 for consumption, 38 for capital formation, and 5 for government expenditure—whose classification strongly resembles the current ICP classification of basic headings. The notion of national average prices was central to price surveys and the authors explain in detail how they tried to accomplish price surveys in large countries like India. In preparing the items to be priced, the authors considered issues of comparability and representativeness, though they did not use precisely those terms. They designed descriptions of products to be priced, along the lines of the US Bureau of Labor Statistics checklists for compiling the consumer price index (CPI). This approach is a precursor to the well-articulated structured product description (SPD) approach used in ICP cycles in 2005, 2011, and 2017.

Kravis, Heston, and Summers also considered the problem of quality differences in health and education services across economies. They detailed their efforts to implement the output approach to education and health by considering the number of pupils in different classes and number of different medical procedures conducted during the course of the year. For government compensation, they introduced productivity adjustments based on the average level of education of government employees—slightly different from productivity adjustments

introduced in the ICP since 2005, which are based on capital–labor ratios. To adjust quality differences in automobiles and rental accommodation, they used hedonic regression methods. For comparisons of the construction component of gross fixed capital formation (GFCF), the authors considered both the bill of quantities approach currently used by Eurostat and the basket of construction components (BOCC) employed during the 2005 ICP. After carefully evaluating both approaches, the team decided to use the bill of quantities approach. In dealing with dwelling comparisons, the team once again thoroughly investigated all the options—both the rental approach and the volume or quantity approach incorporating quality differences, such as availability of water or electricity—but finally opted to use the rental approach using hedonic regressions. Summers, an accomplished econometrician, contributed significantly to the process of selecting appropriate methods.

The team comprehensively searched for an appropriate index number methodology to aggregate price data. Summers developed the country-product-dummy (CPD) method for aggregation at the basic heading level, providing a way to make use of all the price data available when not all countries priced all the products within in a detailed category (or basic heading). This method has been the Technical Advisory Group (TAG) recommended method for the ICP since 2005. The TAG considered the CPD method to be superior to the Éltető-Köves-Szulc (EKS)[28] method and its variants which are still employed in comparisons by Eurostat and the OECD. The team was also diligent about the quality of price data: all the price data collected were subject to two data editing and validation software programs, COMPARE and CLEANSER, to validate data and identify outliers. These programs may be considered forerunners of the Quaranta and Dikhanov tables used in the ICP since 2005.

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[28]   The Éltető-Köves-Szulc (EKS) method is also known as the Gini-Éltető-Köves-Szulc (GEKS) method.

To aggregate the price data above the detailed category level, the team examined properties like transitivity, base invariance, matrix consistency (additivity), and the characteristicity property proposed by Drechsler (1973). After considering a range of index number methods, the team opted to use the Geary-Khamis method (Geary 1958; Khamis 1972). Kravis, Heston, and Summers presented results based on the Geary-Khamis method along with results based on the standard Laspeyres, Paasche, Fisher, EKS, Walsh, and other methods. Results from Phase I of the ICP ranked the US highest in real per capita GDP in 1970 with $4,801, compared to Kenya at the lowest, with $275.

Moreover, in reporting empirical results, Kravis, Heston, and Summers recognized that PPPs and real per capita GDP figures are estimates that are subject to a variety of errors—including sampling, measurement, and formula errors—and attempted to provide measures of standard errors associated with these estimates (Kravis et al. 1975, 77–78). Though Kravis, Heston, and Summers (1982) mention this aspect, they did not pursue further work in this direction and did not report standard errors for the results in Phase III.

The team reported PLIs,[29] labeled price indexes, and found that India had the lowest PLI of 29 compared to a PLI of 53 for Kenya (US = 100), though Kenya had a lower real per capita GDP than India. More recent ICP exercises also exhibit this phenomenon of low PLIs for low income countries. For purposes of analysis, Kravis, Heston, and Summers used the exchange rate deviation index[30] and its relationship with real per capita GDP.

Finally, to illustrate the comprehensive nature of Kravis, Heston, and Summers's approach, the Phase I report presented a table comparing real per capita GDP indexes for France, Germany, Italy, and the United Kingdom from 1970, with extrapolated indexes from the 1950 results reported in Gilbert and Kravis (1954), and found that the deviations between the 1970 benchmark and extrapolations were under 6%—showing a fair degree of consistency between extrapolations and benchmark comparisons despite seismic shifts in methodology used in 1970 compared to the use of Fisher index in 1950. The Phase III report consolidates the work done in Phases I and II, with the exception of the notion of regionalization of the ICP. Instead of grouping countries by geographical regions, Kravis, Heston, and Summers advocated grouping countries by similarity in prices and in incomes. Using clustering methods to identify groups based on price similarity, they divided 34 participating countries into six regions, with the sixth region consisting solely of the US. Group 5 included Austria, Belgium, Denmark, France, Germany, Japan, the Netherlands, Luxembourg, and the United Kingdom, while the remaining countries were grouped into four other regions.

In the Phase III report, Kravis, Heston, and Summers identify important issues in the ICP's future work. First, they call for increasing coverage from 34 countries; the 2017 ICP cycle achieved this with 176 countries participating. Second, they acknowledge the time between benchmarks and emphasize the importance of providing extrapolations to years between benchmark comparisons; the 2017 ICP cycle addressed this, with the World Bank constructing interpolated series for 2012 to 2016 and between the 2011 and 2017 benchmark comparisons. Third, they call for the ICP to find a way to provide meaningful estimates of PPPs and real expenditures for countries not included in the ICP. Summers and Heston (1991) largely addressed this issue by compiling PPPs for a large number of countries and for a long period, leading to the regular publication of the Penn World Table.

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29   Derived by dividing the PPP by the exchange rate.
30   Derived by dividing the exchange rate by the PPP.

International Comparisons of Prices and Real Expenditures: Transitioning from a Project to a Program

After a golden era in the development of methods and procedures for international comparisons by Kravis, Heston, and Summers, the ICP consolidated and expanded country coverage during Phase IV, with 1980 as its benchmark year. With its scope widened to add countries from all the continents of the globe, the ICP shifted its operations to the Untied Nations Statistical Office (now known as UNSD) in New York, although Kravis, Heston, and Summers continued to advise on methodological aspects of the project. In line with the directions identified for the future of ICP at the conclusion of Phase III report, the ICP increased coverage from 34 to 60 countries and regionalization—foreshadowed in the Phase III report—became a reality in Phase IV with the increase in country coverage. The process of regionalization accelerated when the European Union (EU) and OECD developed a parallel international comparison program (see next section). The ICP participating regions included Asia, Africa, Latin America, and the Eurostat-OECD group of countries. With regionalization came a need to link and combine the regional results into global comparisons, so the ICP entrusted selected bridge countries with the task of collecting prices for a range of products with specifications from another region. The final published results included all 60 participating countries.

The nature and character of the project transformed during Phase IV, as the research project run from University of Pennsylvania transitioned into a project of global proportions with responsibilities shifted to the United Nations Statistical Office. The Statistical Division of the Department of Economics and Social Development, along with Eurostat, the OECD, and the Austrian Statistical Office provided the necessary administrative support, and participating countries were responsible for domestic price collection.

The ICP's Phase V, with 1985 as the benchmark year, increased coverage to 64 countries, up from 60 in Phase IV. However, the PPPs and real GDP results from Phase V were presented only for 56 countries. The richest country in the comparison was the US, with a per capita real income of $16,494, and the poorest was Ethiopia, with a per capita real income of $301.

The Phase V results were particularly significant for applying PPPs from 1985 to measure global and regional poverty. The PPPs from Phase V formed the basis for the calibration of the international poverty line. The now widely known dollar-a-day poverty line was formulated by Ravallion et al. (1991) using estimated PPPs for consumption from the Phase V of ICP for 1985. The calibrated line was close to a dollar and that was the beginning of the use of the international poverty line to measure absolute poverty. When the 1993 ICP results were compiled, the World Bank revised the international poverty line to $1.08 per day but retained the notion of $1 per day. This poverty line was at the core of the first Millennium Development Goal of halving absolute poverty by 2015. The international poverty line has been revised by the World Bank with the release of PPPs from ICP for different benchmarks. The current poverty line, after the release of the 2011 ICP cycle results, stands at $1.90 per day. The Atkinson Commission (World Bank 2017) recommended that the international poverty line of $1.90 (based on 2011 PPPs) be maintained in future, after making appropriate adjustments for price changes in different economies.

There were no major methodological innovations during the fourth and fifth phases of ICP. At the recommendation of the 25th Session of the UNSC, held in February 1989, the Statistical Division of the Department of Economic and Social Development

(1992) prepared the *Handbook of the International Comparison Programme*, which marked the transition of ICP from a project to a statistical program of the United Nations Statistics Division. The handbook reiterates the use of annual national average prices for use in the ICP (United Nations 1992, paras. 123–145). The handbook discusses the issue of comparability versus representativity under importance and identity (United Nations 1992, paras. 115–118) and emphasizes the need to achieve a balance between these two competing objectives. It discussed the problem of choice of a suitable aggregation method, in particular between the Geary-Khamis and Éltető-Köves-Szulc (EKS as it was known at that time) but did not offer a resolution, instead foreshadowing the possibility of providing results under both methods. Finally, the handbook discussed the issue of linking regional comparisons and the need to maintain fixity, which ensures that the relative levels of income and prices at the regional level are maintained in the global or world level comparisons.

Phase VI of the ICP, with 1993 as the benchmark year, greatly increased coverage with 115 participating countries. However, this ICP round encountered severe challenges, including the lack of adequate funding to support the program and the absence of effective coordination. While regional comparisons were undertaken for Africa, Asia, Eurostat-OECD countries, and Western Asia, there was no coordinated effort to collect necessary data for a proper linking of regional comparisons. Though the program compiled global comparisons using ad hoc and heroic assumptions, it did not consider these comparisons sufficiently reliable for publication and dissemination.

At the end of Phase VI, the ICP was at a crossroads, with questions about its viability as an international statistical program and about whether the outputs of the ICP were sufficiently valuable to support continuation of the program. Following its recommendation in 1997, the UNSC commissioned a review of the ICP and Jacob Ryten was assigned to conduct the review and offer recommendations. A similar review by Ian Castles on behalf of OECD preceded Ryten's review. Like Castle's report, Ryten's report—while critical of the program's general conduct and the lack of financial support for the activities—supported the ICP's continuation. His main recommendation stated that the "ICP should not be ended nor should it be allowed to languish" (ECOSOC 1999, 9). Further, he wrote that "Securing financing on a broader scale implies making a commitment to producing reliable and timely data, with well-documented methods and sound analytical commentary" (9). Addressing the issue of global coordination, he wrote that the "Programme must have a global or world coordinator" (9); and further that "Interested parties (the United Nations, IMF, the World Bank, the Asian and Inter-American Development Banks, selected NSOs) should mobilize the required resources under the guidance of the world coordinator" (10). After successful efforts by the World Bank to mobilize resources to support the ICP, the UNSC recommended implementing the next cycle of ICP with arrangements kick-started by a major workshop in 2001 supported by the World Bank and the OECD. Work for the next cycle began in 2002, resulting in a new era for the ICP, with 2005 as the benchmark year.

The Eurostat-OECD International Comparisons

The Eurostat-OECD comparison program, designed to produce PPPs and real expenditure comparisons for EU and OECD member states, significantly influenced approaches to international price and real income comparisons. Comparisons among EU member states date back to comparisons reported in Paretti, Krijnse-Locker, and Goybet (1970), with 1970 as the benchmark year, and the first official comparison involving nine EU member countries, with 1975 as the benchmark year is reported in Eurostat (1977). Results from these comparisons,

along with Phase III results from Kravis, Heston, and Summers (1982), set the scene for regionalizing the ICP. The European Comparison Program (ECP) was launched in 1979 after the 27th Plenary Session of the Conference of European Statisticians.[31] Results from the ECP assumed additional significance as the European Commission decided to use PPPs and PPP-converted GDP to allocate structural funds to EU member states. Consequently, the EU states governed the procedures and methods used in this region's international comparisons.

The ECP involved several groups of countries: Group I countries participated in the comparisons organized by Eurostat and the OECD for their joint program; Group II countries from central and eastern Europe participated in comparisons coordinated by Statistics Austria; and Group III included member countries of the Commonwealth of Independent States (except Ukraine), Mongolia, and Turkey. The Eurostat-OECD program began in 1980 and covered 18 OECD countries: 13 from Groups I and II of the ECP and five non-EU OECD countries. Initially the program ran every 5 years—1980, 1985, and 1990—and then every 3 years. Since 1990, Eurostat comparisons have been undertaken annually though the OECD program remained on a three-year cycle.

Because of the complexity of organizing the international comparison program with several groups of countries, the Eurostat-OECD program developed strict guidelines and protocols regarding timetables, survey frameworks, and methods for aggregating price data. The most important feature of these comparisons is the process of linking various groups, for example linking Group II and Group III comparisons with Group I countries, and, finally combining the Eurostat and OECD comparisons into a single set of estimated PPPs and real expenditures. The single most significant contribution from this program is the establishment

of the fixity principle, which ensured that the price level and real expenditure relativities among Eurostat countries remained fixed when they are integrated with the remaining OECD countries. The 2005, 2011, and 2017 ICP cycles strictly adhere to the fixity principle, although with slightly different methodology.

The second contribution of this joint program is to the aggregation methodology used in international comparisons. Though the country-product-dummy (CPD) and Geary-Khamis methods anchored comparisons through the first five phases of the ICP, the Eurostat had advocated and employed a different set of methods for aggregating price data at the detailed or basic heading level and for aggregation to higher levels. The Eurostat approach relied on a range of variants of what was then known as the Éltető-Köves-Szulc (EKS) for aggregating price data below basic heading level, where binary comparisons were geometric averages of price relatives of those commodities that were commonly priced. The EKS technique was used in Eurostat-OECD comparisons to make these binary comparisons transitive. Where information was available on representativity of products prices, in Eurostat-OECD comparisons an asterisk-version of EKS (Eurostat-OECD 2012) was used. For aggregation above the basic heading level, the EKS method built on binary comparisons using the Fisher index in place of the Geary-Khamis method. For several years, there were serious discussions and arguments regarding the relative merits of the Geary-Khamis and EKS methods, but through all these deliberations the EU comparisons were always based on EKS method. The OECD used the Geary-Khamis method for its 1980 comparisons, but for the 1985 comparisons shifted to the EKS method, with results based on Geary-Khamis published in a separate report. After discussing these issues at length, the ICP's Technical Advisory Group recommended the CPD method for aggregation

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[31]   Further details of the ECP and the history of Eurostat-OECD program are in "Annex I: Brief history of the program" in Eurostat-OECD's (2012) publication *Eurostat-OECD Methodological Manual on Purchasing Power Parities.*

below basic heading level and EKS for aggregation at higher levels. Thus, Eurostat's persistent adherence to the EKS method significantly influenced how international comparisons in ICP are compiled since the 2005 ICP round. Another Eurostat contribution to the ICP is the Quaranta table, used for data validation and editing, which became a standard tool for price data validation and detecting outlier prices. Most ICP regions use Quaranta tables along with Dikhanov tables and other specialist software designed to detect outliers.

The Eurostat-OECD program has always been at the forefront of tackling serious measurement problems encountered in international comparisons, especially for comparison-resistant services like education and health. Since 2008, the Eurostat-OECD program stopped using the input method for education and instead adopted an output approach incorporating quality adjustments based on Programme for International Student Assessment (PISA) scores.[32] In comparisons since the 2011 ICP cycle, Eurostat-OECD program has adopted the output approach for health as well. On other difficult areas for cross-country comparisons such as construction and housing or dwelling services, Eurostat-OECD has experimented with various alternatives and now essentially uses the bill of quantities of approach for construction and the rental approach for housing.

The Eurostat program, which has compiled PPPs every year since 1990, offers valuable lessons learned. Given the UNSC's 2016 recommendation, which called for the ICP to increase frequency in compiling PPPs and use a rolling price survey approach, the experience gained by Eurostat provides a good starting point for the ICP in its transition toward annually compiling PPPs. The recent scoping paper by David Roberts (2019) describes the processes involved and articulates a scheme for its implementation in the other regions.

Alternative Sources of Purchasing Power Parities

The Penn World Table

A major contributor to the ICP's recognition and subsequent popularity has undoubtedly been the Penn World Table, with estimates of PPPs and real incomes for a large number of economies and for a long period of time. Another factor that significantly contributed to the popularity of PPPs and real incomes is the release of Maddison's (2001) historical series of real per capita incomes using PPPs at 1990 Geary-Khamis prices. The Maddison series made PPPs an indispensable tool for economic historians interested in understanding the economic performance and relative standards of living enjoyed by people over the centuries.

In their report on the 1975 benchmark comparisons for 34 economies, Kravis, Heston, and Summers (1982) foreshadowed the need to extrapolate PPPs to economies not covered by the ICP. They began work on this problem soon after completing Phase II, which covered 16 economies. Their first set of extrapolations provided PPPs and real per capita incomes for 100 economies for 1970 (Kravis, Heston and Summers 1978b). The extrapolation method was simple and based on a log-linear relationship between per capita real incomes (using PPPs) and nominal incomes (using exchange rates), openness of the economies, and a measure of price isolation of the economy based on data from 1963 to 1970. Although their construction was basically cross-sectional, it was still valuable and received considerable attention.

In 1980, they published the first version of the now famous Penn World Table, which covered 119 economies from 1950 to 1977, and transformed

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[32]   The OECD's Programme for International Student Assessment (PISA) assesses the ability of 15-year-olds to use their knowledge and skills in reading, mathematics, and science to meet real-life challenges

their earlier work to a new level (Summers, Kravis and Heston 1980). The Penn World Table provided PPPs and per capita real expenditures at current and constant prices for major national accounts expenditure aggregates: consumption, investment, and government. They adjusted current price series for changes in terms of trade, unlike the current ICP which evaluates imports and exports at exchange rates. Summers, Kravis, and Heston used a different extrapolation method for the Penn World Table from their 1978 report: the Penn World Table used a relationship between real and nominal shares of consumption, investment, and government, and used the Geary-Khamis method to aggregate the extrapolated consumption, investment, government, exports, and imports.

The Penn World Table broke new ground with version 3 in 1984 and version 4 in 1988. In a precursor to the current practice of making data and results available online, version 3 was made available to users through machine readable diskettes at a small price and version 4 was made available as a complementary diskette to the issues of the *Review of Income and Wealth, 1988,* in which Summers and Heston's (1988) article was included. This electronic dissemination can be seen as a precursor to the current practice of making data and results available online. Version 4 used data from the 1970, 1975, and 1980 benchmark comparisons and provided extrapolated series for 121 market economies over 26 years.

The publication of version 5 of the Penn World Table (Summers and Heston 1991) marked the beginning of the immense popularity enjoyed by the Penn World Table and consequently that of PPPs and international real income comparisons. Version 5 covered 152 economies from 1950 to 1988. Extrapolated data from version 5 provided valuable information and impetus for researchers interested in growth theories and convergence of economies. Version 5 used multiple benchmarks in deriving extrapolated PPPs, using the idea of consistentization

developed in Summers and Heston (1988), although subsequent versions did not continue the practice of using multiple benchmarks. In 2013, Feenstra, Inklaar, and Timmer took on the responsibility of compiling and disseminating the Penn World Table, and the Groningen Growth and Development Center became the new home for the Penn World Table, where it continues to grow and flourish. In 2013, version 8.0 started a new generation, with several changes to the methodology, including the method of interpolating PPPs between benchmarks and the use of the Gini-Éltető-Köves-Szulc (GEKS) method to aggregate components, in addition to the Geary-Khamis method. An important feature of the Penn World Table through its successive versions is the inclusion of a large array of variables that are of interest to researchers but not always readily available. The most important is the series on capital stock in PPP terms, which gives researchers access to a panel of estimates of real GDP, capital stock, and labor force data. Estimates of labor productivity as well as total factor productivity are also available in the recent versions of the Penn World Table.

The Penn World Table became one of the most cited sources in academic research. Heston (n.d., 103) mentions that Summers and Heston (1991) on version 5 was ranked 37th in the list of most cited articles from 1970 to 2006, with 1,070 citations. The work of Feenstra et al. (2015) on the next generation of the Penn World Table has more than 3,000 Google Scholar citations. The Penn World Table's popularity continued to grow, and in 2008, its website had 4.5 million hits and 139,100 unique visitors. The current version must be enjoying a similar level of demand from researchers and general users.

Maddison's Industry of Origin Approach

In parallel to the ICP's development and the increased availability of PPPs from the expenditure side of national accounts, Maddison and his associates from the University of Groningen helped develop an alternative approach, the industry of origin approach,

which has led to the establishment of the International Comparisons of Output and Productivity project at Groningen. The work of Gilbert and Kravis (1954), Gilbert and associates (1958), and the subsequent work of Kravis, Heston, and Summers (1982) recognized that the international price comparisons of GDP can be undertaken from the expenditure side as well as from the production side of national accounts. The availability of easily accessible price data from the expenditure side made the choice of expenditure side approach to international comparisons somewhat obvious. The work of Paige and Bombach (1959) preceded international comparisons from the output side and was a source of inspiration for them. Collection of price data for industry-side comparisons is a painstaking process, but the Maddison group managed to compile and publish both bilateral and multilateral comparisons of prices, output, and productivity for the agriculture and manufacturing sectors and for particular service sector industries such as transport and wholesale and retail trade. The Maddison approach to industry-side price comparisons has eventually led to the group's involvement in the capital, labor, energy, materials, and services (KLEMS) project led by Dale Jorgensen and his associates. Given the difficulties of pursuing the industry-or-origin approach, the group has developed a methodology which makes use of ICP comparisons to construct output-side price comparisons (Inklaar and Timmer 2013a). Consequently, PPPs from the ICP have become the principal source for price comparisons on the output side.

Maddison's (1995 and 2001) contributions provided great exposure for PPPs and real incomes from the ICP to a wider audience of economic historians. In his 1995 book, *Monitoring the World Economy*, Maddison anchored his historical series of per capita real income on ICP-based comparisons for the benchmark year 1990, compiled using the Geary-Khamis method. He used estimates of per capita GDP in 1990 international dollars (a term associated with the Geary-Khamis method to refer to the use of US dollar merely as a numeraire currency) and compiled

a historical series for 1820 to 1992. Subsequently he extended these series in his 2001 book, *The World Economy: A Millennial Perspective*, and extrapolated them to the last two millennia. The Maddison series firmly placed PPPs and international dollars among economic historians. Since his death in 2010, Groningen established a project on the Maddison series, and it is receiving contributions from eminent economic historians and researchers in international comparisons. Though Maddison's work did not directly contribute to the development of ICP or its methodology, his work and legacy helped enhance the role and significance of PPPs in quantitative economic history and thereby helped renew interest in compilation and dissemination of PPP data for economic research and comparisons.

University of Queensland International Comparison Data

A relatively recent addition to sources of data on PPPs and real incomes is the University of Queensland International Comparison Data (UQICD). The UQICD serves the same purpose as the Penn World Table and provides estimates of PPPs and real expenditures at the GDP level and for the three major components: consumption, government, and investment. Currently, UQICD provides data for 181 economies from 1970 to 2012. The next version of UQICD, for release in December 2020, will extend coverage to 2018.

UQICD constructs a panel of PPPs and real incomes using econometric methods that address the problem of consistentization—methods that Summers and Heston (1988) originally considered but later replaced with simple extrapolation using growth rates. To construct the panel of PPPs, UQICD's philosophy is to use all available data from all sources, including ICP results from all the benchmarks since 1970, Eurostat-OECD results for more frequent benchmark years, national growth rates and deflators, and the knowledge and understanding of the Penn effect that describes the

relationship between price level indexes and real per capita GDP and determinants of national price levels (Kravis and Lipsey 1978; Clague 1986). The econometric methodology that makes it possible to use all this information is described in Rao, Rambaldi, and Doran (2010).

A novel feature of UQICD's extrapolated PPPs and real incomes is that standard errors or measures of reliability associated with these extrapolations are available to users. The University of Queensland posts current and constant price series of major aggregates on a website.[33] The next version of UQICD, to be released in December 2020, will add a new module on income distributions and inequality measures, which provides extrapolated information on income distributions for 150 economies from 1970 to 2015.

The 2005 International Comparison Program: A New Beginning for Regionalization

Several years lapsed between the 1993 and 1996 price comparisons and the program's revival, which can be partly attributed to the Ryten report's strong recommendation that the "ICP should not be ended nor should it be allowed to languish." The ICP's fortunes changed when the World Bank took an active interest in the ICP and demonstrated its willingness to lead by holding a major international conference on the ICP in 2001, jointly with OECD, and following up with a meeting of technical people working in this area in 2002. Adequate funding for the program was a precondition for the UNSC to begin a new phase or cycle of ICP. The World Bank and other organizations mobilized sufficient funds to get ICP off the ground with 2005 as the new benchmark.

The 2005 round of ICP was a new beginning that launched the program into a new era, with several significant developments. First, the World Bank partnered with several organizations that agreed to function as regional implementing agencies, including the African Development Bank, the Asian Development Bank (ADB), the Interstate Statistical Committee of the Commonwealth of Independent States, Eurostat, the OECD, the State Statistical Service of the Russian Federation, the United Nations Economic Commission for Latin America, and the United Nations Economic and Social Commission for Western Asia. This is the first time in the history of ICP that the program enjoyed such close cooperation and enthusiastic participation of various regional and international organizations. The World Bank housed the ICP's Global Office which coordinated and implemented the global program. Another defining feature of the 2005 ICP, which continues to date, is the role played by economy-level implementing agencies. The ICP encouraged participating economies to take ownership of the program by participating in ICP activities from beginning to end. The economy-level implementing agencies played an active role not only in collecting price data but in developing the item list, validating data and, finally, validating the results at the regional level. In many respects, the success enjoyed by ICP now owes a great deal to this bottom-up approach.

The 2005 round of ICP was preceded by the preparation of the ICP Handbook, which provided detailed instructions to participating regional and economy-level implementing agencies—one of the recommendations of Ryten's later (ECOSOC 2000) report and also a condition of the UNSC for the ICP. The ICP broke new ground by establishing the Technical Advisory Group (TAG), which comprised eminent economists and economic statisticians from academia and international organizations. The TAG

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33   uqicd.economics.uq.edu.au.

was entrusted with recommending methodology for the ICP, including the survey methodology for prices, methods for aggregating price data at the basic heading level and at higher levels; and with providing guidance on comparison-resistant areas such as education, health, construction, and housing. The TAG was also responsible for reviewing the estimated PPPs and real expenditures before the results were published and disseminated.

The TAG played a critical role in determining appropriate methods for international comparisons and its decisions marked a significant departure from the past ICP methods. The TAG recommended the country-product-dummy (CPD) method for aggregating price data up to the basic heading level (similar to the elementary level in the consumer price index compilation) and considered the method to be superior to variants of the Gini-Éltető-Köves-Szulc (GEKS) methods used by the Eurostat. The TAG also recommended the use of indicators of representativeness of items priced in different economies. For higher levels of aggregation, the TAG recommended discontinuing the Geary-Khamis method, which had been the main aggregation procedure since the ICP's inception. The use of GEKS method based on a superlative index, the Fisher binary index, was recommended for aggregation to the GDP level and its sub-aggregates. Unlike the Geary-Khamis method, the GEKS procedure is non-additive, implying that in the GEKS procedure the sum of the real expenditures of the basic headings constituting an aggregate are not equal to the real expenditures based on the PPPs for the aggregate. The additive methods have the disadvantage of giving more weight to the relative prices of high income economies, which results in the real expenditures of low income economies to become artificially larger and move closer to the real expenditures of high income economies.

The TAG also recommended a formal procedure for linking regional comparisons leading to global comparisons. Instead of relying on one or two link economies, TAG recommended using 18 ring economies, including economies from each region. The TAG also recommended a method for computing linking factors, which ensured the fixity of relative positions of economies within regions. For price and real expenditure comparisons in construction, the TAG recommended the method of basket of construction components (BOCC). For housing expenditure comparisons, the TAG endorsed both the rental and the quantity indicator approaches, but preferred the rental approach. For health and education, in the absence of reliable and adequate data on output quantities, the TAG recommended the use of input approach. The regional implementing agencies for Asia and the Pacific and for Africa introduced productivity adjustments in their comparisons of government compensation, and the ICP now implements these adjustments for all participating economies.

The 2005 ICP round was a resounding success, in large part because of all the processes put in place to ensure smooth implementation of ICP at the regional and global level. With its largest coverage yet, the 2005 round included 146 economies, with the People's Republic of China participating for the first time and India participating for the first time since 1985, and reached an important milestone by including two of the world's most populous economies. Although the People's Republic of China's participation was limited to price collection from 11 major cities and their surrounding areas, it was considered an important step forward in making ICP truly global in coverage.

Completed in 2008, the 2005 ICP final results attracted considerable attention and discussion. The results indicated that the People's Republic of China was the world's second largest economy and India was among the top 10 economies of the world, and showed an economic geography and landscape that differed significantly from extrapolations from the 1993 ICP benchmark. One headline noted that the world was 40% smaller than expected from extrapolated data and another commented that the

world was poorer than previously thought. Though the 1993 benchmark itself was not reliable and indeed was not a proper global comparison, the discrepancy between the 2005 results and 1993 extrapolations led to a thorough examination of the possible sources of the discrepancy. The international poverty line was set at $1.25 based on the PPPs from 2005 ICP results.

The 2005 round successfully placed ICP on a solid footing, by expanding the number of participating economies and establishing governing structures to deliver reliable estimates of PPPs and real expenditures. The ICP also helped build statistical capacity in many participating economies from Africa, Asia and the Pacific, and other regions, and fostered a strong cooperation among participating economies, which is central to such a complex and major international statistical endeavor.

International Comparison Program 2011: A Phase for Consolidation

The Friends of the Chair Group of the UNSC assessed the 2005 ICP and concluded that the "2005 round of ICP has obviously been a major step forward in developing a system of calculating PPPs on a global basis" (ECOSOC 2008). In particular, the group recognized the effectiveness of the governing structures in successfully executing the 2005 ICP. In its 40th session, held in February 2009, the UNSC endorsed the governance structure and the work program for the 2011 round of ICP.

The 2011 ICP round provided an opportunity to examine the success and effectiveness of some of the methods implemented in the 2005 ICP. The TAG thoroughly examined all the methodological innovations in 2005 and recommended several important changes to the methodology, especially concerning the linking procedure used in 2005, which depended on the choice of reference or numeraire economy. Further, linking of regions based

on 18 ring economies was considered problematic because it relied on the quality of data produced by ring economies in different regions. Instead, the TAG recommended a more general approach based on linking using price data collected from all the participating economies from all the regions—an approach designed to be robust against data problems with one or more participating economies. Consequently, the ICP Global Office had the task of preparing a global list of items for price surveys for use in global linking. The participating regions were encouraged by the ICP Global Office to include items from the global list into their regional lists in order to ensure coherence between comparisons based on regional and global lists. For global linking, the ICP used global core prices with the CPD method at the basic heading level and country aggregation with volume redistribution (CAR volume) procedure at higher levels of aggregation.

The methodology for construction was also reviewed by the TAG in view of the difficulties in implementing the BOCC approach. Identifying construction components, their pricing and, more importantly, their weights according to different components posed operational difficulties. The TAG assessed possible alternatives and recommended a simpler procedure involving collecting data on prices of materials used in construction; wages of labor with different skill levels; rental of machinery and equipment used in construction; indicators of relevance of construction materials used in different types of construction (residential, nonresidential and civil engineering); and finally weights for materials, labor, and equipment for different types of construction. The participating economies found the new method simpler to implement.

The TAG also introduced other innovations, streamlining the methodology for productivity adjustment and applying productivity adjustment factors to government compensation data from all the participating economies. After considering the lack of weights data at the item level, the TAG stressed

the need to identify the importance of products and recommended using the importance indicators at aggregation below the basic heading level. After much deliberation, the TAG recommended the use of a 3:1 weight in favor of items identified as important. The importance weights were used in the global linking at basic heading level, but some regions including Asia and the Pacific have opted not to use these weights in their regional comparisons.

The 2011 ICP round also successfully increased participation from 146 economies in 2005 to 177 in 2011. An additional 21 Pacific island economies participated in comparisons of household consumption only. The People's Republic of China participated fully and provided price data with national coverage. The 2011 ICP ranked the US first with 17.1% of world GDP, followed by the People's Republic of China with 14.9% and India with 6.4%. In terms of per capita real income, the US was ranked 12th, the People's Republic of China 99th, Indonesia 107th, and India 127th.

Despite the 2011 round's notable success, its results caused a certain level of controversy and comment because the users found the economies, and the world as whole, much wealthier than extrapolations from the 2005 round implied. In simple terms, PPPs from the 2011 round were lower than PPPs obtained by extrapolating 2005 parities using national accounts deflators. This observed discrepancy was the opposite of the 2005 findings that PPPs in 2005 were higher than extrapolations from 1993. Because of this apparent reversal and lower PPPs, some commentators concluded that world poverty halved and the world was far richer than anticipated. This reversal in two successive ICP rounds led researchers to examine the underlying causes. Deaton and Aten (2017) and Inklaar and Rao (2017) identified possible sources of this systematic difference. Inklaar and Rao demonstrated that a large proportion of systematic differences could be explained by the

changes to the methodology and improvements in the underlying data. Notwithstanding this research, these discrepancies of the 2005 and 2011 rounds including extrapolations with previous benchmarks were considered serious and the topic occupied the Friends of the Chair Group in their assessment of the 2011 round.

Friends of the Chair Report on the 2011 ICP and Implications for the 2017 ICP

The Friends of the Chair Group evaluated the 2011 ICP and made several recommendations. In its preliminary report to the UNSD in its 46th session in March 2015, the group recognized the discrepancies between extrapolations and the 2005 and 2011 benchmark results and noted, "A certain challenge arose from the cumulative effect of the two ICP rounds (2005 and 2011), which took the ICP from a one-time 'snapshot' created by each solitary benchmark into a kind of time series-like environment with the requirement of time consistency" (ECOSOC 2015, 8). The group concluded that the six-year interval between the successive ICP rounds is somewhat long and exacerbated the discrepancies between the extrapolated results in comparison with the actual results and that ICP should be undertaken more frequently.

Their report recognized the World Bank's (2013) publication *Measuring the Real Size of the World Economy: The Framework, Methodology, and Results of the International Comparison Program (ICP)*, often referred to as "the ICP Book," which comprehensively describes the framework that underpins the ICP and its methods. The book details the ICP's conceptual, analytical, and methodological challenges; its solutions and recommendations; and the uses of PPPs by the IMF for internal allocation and by the World Bank for measuring regional and global poverty.

The Friends of the Chair Group's final report to the 47th Session of the UNSC in March 2016 includes, among others, the following recommendations:

"66. It is recommended that the International Comparison Program be organized on a more frequent basis, with the next benchmark year occurring in 2017. Results of future ICP cycles should be available, if possible, every 3 years, with extrapolations to annual results. This would make ICP results more relevant to users.

67. It is recommended that a rolling benchmark concept be set up, which would consist of a system of rolling surveys over a three-year comparison cycle with the objective of obtaining annual benchmark results. The rolling benchmark concept requires a set of reliable indicators for detailed GDP categories in order to extrapolate and retrapolate survey data to the respective benchmark years. This enables economies and regions to spread the survey burden over 3 years and offers more flexibility in the allocation of resources.

68. It is recommended that ICP become a permanent element of the global statistical program. The objective should be to institutionalize ICP at the global, regional, and national levels by incorporating ICP work into the annual and multiannual work programs of the global and regional implementing agencies and national statistical institutions as an established business line ....

72. It is recommended that the methodology and procedures to be applied during a comparison cycle be approved by the Governing Board at the outset of the process and that, once the preliminary results are calculated, changes in methodology not be allowed. For the next cycle in 2017, no major changes in methodology should be introduced in order to ensure comparability with the 2011 results. Subsequently, if a methodology or procedure is deemed flawed, the Governing Board could consider and approve improvements in methodology to

be applied during subsequent ICP cycles" (ECOSOC 2016a,19).

In decision 47/107 in its report of the 47th Session, the UNSC endorsed the Friends of the Chair Group report and made the following recommendations, among others:

(b) Expressed its support for the recommendations of the Friends of the Chair Group, contained in section V.A of the report, that the International Comparison Programme become a permanent element of the global statistical programme and that it be conducted at more frequent intervals;

(c) Agreed with the proposal to adopt a rolling benchmark approach of surveys to be spread over a three-year cycle, starting in 2017, which would allow flexibility in conducting the surveys according to the specific conditions of the participating countries, and supported the objective of producing results with the possibility of extrapolating the rolling survey data;...

(f) Agreed that for the 2017 cycle no major changes in the methodology should be introduced and that a research agenda, to be developed and undertaken by the Technical Advisory Task Force, should focus on methodological improvements to be considered for future comparison cycles;" (ECOSOC 2016b, 16).

The Friends of the Chair Group Report and the UNSC recommendations had important implications for ICP governance of the 2017 round. The UNSC also endorsed strengthening the governance structure, which comprised the ICP Governing Board as the global strategic and policy making body for implementing the ICP; the Inter-agency Coordination Group for implementing and coordinating the program at regional and global levels; the TAG as the technical body to oversee technical soundness of the program, with task forces established by the TAG for methodological research; and the economy-level implementing agencies for implementing the program at the

economy level. Accepting and implementing the UNSC recommendations, the World Bank agreed to incorporate the ICP into its work program and set up a global ICP unit within its Development Data Group—establishing, for the first time in the history of the ICP, a permanent home for ICP activities and providing stability and continuity for the program.

Following the recommendations of the UNSC, the 2017 ICP was globally implemented successfully with the participation of 176 economies. The recommendation with most immediate consequence was that "no major changes in the methodology should be introduced" during the 2017 ICP cycle. The global ICP unit, the TAG, and all the regional implementing agencies strictly adhered to this direction while planning and implementing programs for the 2017 ICP cycle. All the methods used in 2017 ICP cycle are identical to those used in 2011, except for some minor refinements to the existing methods. The general expectation was that there will be a closer alignment between the 2017 results and extrapolations from 2011 and that any differences that may exist would not be systematic. This expectation has been fully realized, as evidenced by the degree of consistency between 2011 extrapolations and the 2017 results achieved at the regional level in Asia and the Pacific and at the global level.

Future Directions in the ICP

The 2017 ICP cycle has come to a successful conclusion through the efforts of ADB in Asia and the Pacific, other regional coordinating agencies at the regional level, and the World Bank at the global level. The World Bank has released the global results and some regions have released their regional results, which are now available to users through dedicated ICP websites. The participating economies have extended an unprecedented level of cooperation and enthusiastic participation, which contributed in large measure to the success of the 2017 ICP cycle.

Strict adherence to the general principles laid down by the UNSC by the regional coordinating agencies, the global ICP unit, and the TAG have ensured a high level of consistency between the 2017 results and extrapolations from the 2011 ICP cycle.

The ICP now has a permanent home at the World Bank, which places the program on a solid footing for future continuation. The ICP is an ongoing statistical program designed to meet the macroeconomic data needs of an increasingly globalized world. It represents a highly complex exercise in economic measurement, which requires continuous development and refinement of the conceptual framework, survey instruments and data collection and validation methods, and the methods used in compiling PPPs and real expenditure data. The ICP must deal with numerous challenges as they arise in the short term as well as in the longer term.

Most immediately, the ICP must deal with the unexpected turbulence and uncertainty created by the coronavirus disease (COVID-19) pandemic and its devastating effects on all the economies of the world. Given the global nature of the program, the COVID-19 pandemic has forced the ICP to postpone the 2020 ICP cycle, which was about to get underway early in 2020, with a decision to move the benchmark year from 2020 to 2021 under the assumption that normal statistical activities would resume in 2021. Because the 2020 cycle was to be the first in the series of benchmarks to be implemented every 3 years, an unintended consequence is the increased gap between the 2017 ICP cycle and the next ICP cycle.

In the medium and longer term, there are several areas where methodological improvements and refinements are necessary, particularly in comparison-resistant aggregates such as construction, dwellings, health, and education. In the case of health and education, the Eurostat-OECD has switched to direct output-based comparisons,

whereas the other regions continue to use an input-based approach along with productivity adjustments for compensation. Comparisons of price levels and real expenditures on housing continue to be a challenge that requires concerted effort from the participating economies to improve the coverage of rental surveys. Construction remains an agenda item for further refinement because there is a serious gap between the methodology used in the OECD-Eurostat region and the current ICP approach in other regions.

The World Bank has formulated a research agenda designed to improve and modernize the ICP in light of tremendous developments in information technology and communications. Innovative methods with appropriate use of techniques like web scraping and Application Programming Interface (API) to collect price data from online sources need to be explored to complement traditional methods of data collection. It is important to develop a strategy for concurrently developing methods for validation and editing as well as aggregation methodologies for using data from these sources to compile PPPs and real expenditures. The ICP has formidable challenges to meet as well as exciting prospects in the future.

9. Summary and Moving Forward

The main objective of this chapter is to bring together the main elements of this report and to summarize the key findings from the 2017 International Comparison Program (ICP) in Asia and the Pacific. The chapter also looks to the future as it discusses the major developments and challenges for the ICP moving to the next ICP cycle.

The 2017 Cycle in Asia and the Pacific

The Asian Development Bank (ADB) has served as the regional implementing agency (RIA) for the Asia and Pacific region since the 2005 cycle. ADB has continued its activities and initiatives to further enhance the statistical capacity of the participating economies and to strengthen the infrastructure necessary to conduct ICP in the region. ADB in its capacity as the RIA for the region has balanced (i) its role in implementing the methods and approaches provided by the ICP Global Office at the World Bank and in ensuring strict adherence to the recommended procedures, and (ii) the need to continuously refine and fine-tune methodologies to suit the needs and realities of undertaking price comparisons in a complex and diverse region such as Asia and the Pacific.

The resolutions of the 47th Session of the United Nations Statistical Commission (UNSC), stating that "no major changes in the methodology should be introduced," has guided the 2017 ICP cycle both at the regional and the global levels (ECOSOC 2016a). Working within the general parameters set by the UNSC, ADB introduced several innovations: (i) improving the quality and comparability of basic data through refined data validation methods used in compiling price and real expenditure comparisons, (ii) streamlining the procedures for productivity adjustments on the collected wage and salary data as a part of comparisons

of government compensation of employees, and (iii) developing a new methodology for comparison of housing services with a potential to be introduced from the next ICP cycle.

As a major initiative undertaken during the 2017 ICP cycle, ADB improved the scope and reliability of basic data used in comparing housing price levels and real expenditures. Significant progress was achieved in the compilation of quantity and quality indicator data for dwellings and in the collection of reliable and comparable data from housing rental price surveys. During the 2017 ICP cycle, ADB developed a new methodology that makes optimal use of the quantity and rental price data for housing and expenditure comparisons, but its implementation was deferred to the next ICP cycle, following the recommendation of the ICP Technical Advisory Group and largely in line with the UNSC recommendation not to introduce new methodologies during the 2017 ICP cycle.

In the 2017 ICP cycle, ADB implemented a refined methodology for adjusting productivity on wages and salaries of government employees to further refine the methodology used in 2011 ICP. The ADB method used in 2011 was transitive—the PPP between any two economies yielded the same result as an indirect comparison with a third economy—but it was not base-invariant, that is, results differed depending on the choice of reference currencies. ADB also recognized that the labor shares used in 2011 were in broad classes, and therefore, required further fine-tuning by using more reliable estimates of the shares.

Finally, ADB has enhanced its in-house capacity for computing and compiling ICP results. Developing independent codes provides an improved understanding of the methods and processes involved in the computation of ICP results, independently checks the results, and ensures that results are replicable.

Twenty-two economies participated in the 2017 ICP cycle for Asia and the Pacific: Bangladesh; Bhutan; Brunei Darussalam; Cambodia; Fiji; Hong Kong, China; India; Indonesia; the Lao People's Democratic Republic; Malaysia; Maldives; Mongolia; Myanmar; Nepal; Pakistan; the People's Republic of China; the Philippines; Singapore; Sri Lanka; Taipei,China; Thailand; and Viet Nam.

ADB regional members, namely, Australia, Japan, New Zealand, and the Republic of Korea, are part of the comparisons undertaken by the Organisation for Economic Co-operation and Development (OECD) and, hence, are not part of the ICP for Asia and the Pacific. Additionally, ADB regional members in Central Asia, namely, Armenia, Azerbaijan, Kazakhstan, the Kyrgyz Republic, and Tajikistan are covered under the regional ICP coordinated by the Interstate Statistical Committee of the Commonwealth of Independent States (CIS-STAT) with Georgia included as a guest participant in the Eurostat-OECD comparison (World Bank 2020).

A Summary of Results from the 2017 ICP in Asia and the Pacific

The ICP in Asia and the Pacific with—the 22 participating economies of the region exhibiting significant geographic, demographic and economic diversity—is akin to the global-level ICP in terms of diversity of participating economies. The region accounts over half of the world's population and is home to five of the world's most populous economies—the People's Republic of China, India, Indonesia, Pakistan, and Bangladesh, in order of size—and also economies with small populations like Brunei Darussalam, with the smallest population in the region, followed by Maldives, Bhutan, and Fiji. The region includes fully urbanized economies—like Hong Kong, China; and Singapore—as well as economies with large land masses like the People's Republic of China, India, and Indonesia, in order of size. The region exhibits significant economic disparities, being home to economies with high per

capita real GDP: Singapore being highest in the region, followed by Brunei Darussalam; Hong Kong, China; and Taipei,China; and with lower-middle and low income economies, such as Nepal with the lowest per capita income, followed by Cambodia, Bangladesh, and Myanmar. Detailed tables and analyses of results are available in Chapter 3 of this report.

Size and Distribution of the Economies

The size of the economy of Asia and the Pacific in 2017, obtained using purchasing power parities (PPPs) with Hong Kong dollar as the reference currency, is HK$232.3 trillion, whereas the nominal size of the Asia and Pacific economy is only HK$148.9 trillion obtained using exchange rates. The big difference between the real (or PPP-based) and nominal (or exchange rate-based) size of the economy of Asia and the Pacific is due to the fact that PPPs of currencies of the participating economies, with Hong Kong dollar as the reference currency, are lower than the exchange rates of their respective currencies for one Hong Kong dollar. In other words, the average price levels for comparable commodities are lower in many economies than in the reference economy— Hong Kong, China. The three largest economies in terms of real GDP are the People's Republic of China (HK$117.9 trillion), India (HK$48.4 trillion), and Indonesia (HK$17.4 trillion). The economy of the People's Republic of China alone accounts for more than half of the regional economy in real terms. The smallest economies are Bhutan with (real GDP of HK$52 billion) and Maldives (HK$55 billion).

The three largest economies, the People's Republic of China, India, and Indonesia, account for 79% of the real GDP of the region. In contrast, the smallest 10 economies account for only 2% of real GDP. The share of the People's Republic of China is 2.4 times that of India and 6.8 times that of Indonesia. Disparities in the size can be gauged by the fact that the People's Republic of China is 2,289 times the size of the economy of Bhutan. However, disparities in size need to be assessed against the relative population sizes of these economies.

Per Capita Real Incomes and Inequality

The per capita real GDP is a broad indicator of the standard of living because it accounts for differences in the size of population across the economies. The per capita real GDP of Asia and the Pacific is HK$61,375 whereas the per capita nominal income is HK$39,326. The four economies with the highest per capita real GDP or income are, from highest to lowest, Singapore (HK$564,960); Brunei Darussalam (HK$362,379); Hong Kong, China (HK$360,247); and Taipei,China (HK$283,878). These high income economies are also the top ranked in terms of per capita GDP in nominal terms. At the other end of the spectrum, Myanmar (HK$26,519), Bangladesh (HK$26,401), Cambodia (HK$23,853), and Nepal (HK$17,431) are the four bottom ranked economies by per capita real GDP. The two largest economies in real GDP are ranked lower in per capita real GDP because of their large populations, with the People's Republic of China ranked 8th and India ranked 17th. The real per capita income of the richest economy, Singapore, is 32.4 times the lowest real per capita income of Nepal.

As GDP includes consumption by households, general government, gross fixed capital formation (GFCF), changes in inventories, acquisitions less disposals of valuables, and balance of exports and imports, it may be useful to focus on per capita consumption expenditure of households as an indicator of material well-being. The ICP provides two measures that can be used for this purpose. The first measure is the individual consumption expenditure by households (ICEH) and the second measure is the actual individual consumption by households (AICH), which includes ICEH, individual consumption expenditure by the nonprofit institutions serving households (NPISH), and individual consumption expenditure by government (ICEG). The AICH is considered a more comprehensive measure of material well-being of the population as it includes all expenditures for the households irrespective of who pays for it. Considering AICH, the total size of AICH for the region is HK$134.3 trillion in real terms and HK$78.9 trillion in nominal terms. The real per capita AICH for the region is HK$35,472. Hong Kong, China has the highest per capita real AICH (HK$255,310), which is 7.2 times the regional average, followed by Singapore (HK$192,614) at 5.4 times the regional average and Taipei,China (HK$173,917) at 4.9 times the regional average. Brunei Darussalam, with the second highest per capita real GDP at 5.9 times the regional average, has a considerably lower per capita real AICH of only 2.7 times the size of the region. Nepal has the lowest per capita real AICH in the region, followed by Myanmar, Bangladesh, and Cambodia.

Price Level Indexes

The price level index (PLI) for a given aggregate such as GDP for a given economy is the ratio of PPP to the exchange rate. The PLIs are usually expressed relative to the regional average of 100. PLIs are a useful measure from the perspective of the participating economies as they provide an overall measure of the level of prices of comparable goods and services in the economy expressed relative to the region. At the GDP level, economies with PLIs above the regional average of 100 are Hong Kong, China (156); Singapore (130); the People's Republic of China (125); Maldives (107); and Taipei,China (105). The PLI for India is 64. The PLIs exhibit a decreasing relationship with per capita real GDP, a phenomenon referred to as the Penn effect. In general, PLIs and the ranking of economies by PLIs are very similar for GDP, ICEH, and AICH. PLIs for government expenditures in most economies are generally low with Asia and the Pacific as the base because salaries for government employees are low and government compensation in the form of wages and salaries is a major component of government expenditure. Despite adjusting for productivity levels across economies, PLIs for government expenditure remain below regional level of 100 for 19 out of 22 economies. As for the PLIs for GFCF are concerned, for half of the economies, the PLIs for GFCF are higher than PLIs for GDP. With Asia and the Pacific as the reference, PLIs for machinery and equipment

are generally around 100, ranging from a minimum of 74 to a maximum of 115. Hong Kong, China has a PLI of 95 for machinery and equipment, which is below the regional average, whereas the People's Republic of China has a PLI of 110, which is above the regional average. However, unlike machinery and equipment, construction PLIs show a much wider spread, ranging between 45 (Myanmar) and 185 (Hong Kong, China). As machinery and equipment goods are mostly traded, prices of these items are likely to be similar across the economies and, therefore, PLIs tend to be clustered around 100. However, in the case of construction, the wider spread in PLIs is due to the fact that construction is a non-traded sector.

Asia and the Pacific in 2011 and 2017: A Comparative Analysis

For the first time since the inception of the ICP in 1968, international comparison results are available for two consecutive ICP cycles, 2011 and 2017, based on identical approaches and methods for the compilation of PPPs and real expenditures. In addition, the original 2011 results released in Asia and the Pacific (ADB 2014) have been updated and recomputed, taking into account changes to population and national accounts data for 2011, updates in reference PPPs, productivity adjustments to wages and salaries, and changes in the ICP classification. Detailed results and tables are in Chapter 4 of this report.

Since the same methodology has been used, it is possible to examine whether the 2017 ICP cycle results are consistent with the 2011 ICP results. A detailed analysis of PPPs and real expenditures of 2017 ICP

results with 2017 results extrapolated from revised 2011 ICP results shows a high degree of consistency between these two benchmark comparisons. While differences between actual and extrapolated data for 2017 is expected for a variety of reasons, the observed differences are not systematic, thus providing a degree of confidence in the ICP methodology and the general approach.

The 2011 and 2017 ICP cycles provide two snapshots of the regional economy of Asia and the Pacific through the 22 participating economies. At the economy level, nine out of 22 economies have grown at an annualized growth rate of 6% or more. The lowest growth rates are posted by Brunei Darussalam, which posted a negative growth of about 1%, and by Taipei,China (a growth rate of about 2%) and Hong Kong, China (about 3%).

At the regional level, the real size of the economy in PPP terms has increased from HK$144.4 trillion in 2011 to HK$232.3 trillion in 2017. This means that the size of the economy of Asia and the Pacific in 2017 at current 2017 prices is roughly 1.6 times the size in 2011 at current 2011 prices. However, the regional economy size in 2011 is in prices observed in the 2011 benchmark year and, similarly, the size of the regional economy in 2017 is in the prices observed in 2017. The increase in the size of the regional economy, 1.6 times, therefore can be decomposed into regional inflation effect and regional growth effect during this period.

Applying a recently developed index number methodology, changes in real GDP at the regional and subregional levels have been decomposed into respective growth and inflation components. For the purpose of subregional analysis, the 22 participating economies have been grouped into four geographical subregions and into four income-based groups.[34]

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[34] The geographical groups are (i) Mekong, comprising Cambodia, the Lao People's Democratic Republic, Myanmar, Thailand, and Viet Nam; (ii) South Asia, comprising Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka; (iii) Southeast Asia and others, comprising Fiji, Indonesia, Malaysia, Mongolia, the People's Republic of China, and the Philippines; and (iv) high income, comprising Brunei Darussalam; Hong Kong, China; Singapore; and Taipei,China. The income-based groups formed on the basis of gross national income per capita Atlas method by the World Bank for 2017 are (i) high income, comprising Brunei Darussalam; Hong Kong, China; Singapore; and Taipei,China; (ii) upper-middle income, comprising Fiji, Malaysia, Maldives, the People's Republic of China, and Thailand; (iii) lower-middle income I, comprising Bhutan, Indonesia, the Lao People's Democratic Republic, Mongolia, the Philippines, Sri Lanka, and Viet Nam; and (iv) lower-middle income II, comprising Bangladesh, Cambodia, India, Myanmar, Nepal, and Pakistan.

The analysis shows that the real GDP in current 2017 and 2011 prices of the Asia and Pacific region increased by 61.26% over the six-year period. A decomposition of this increase shows that a major proportion of the change in real GDP from 2011 to 2017 stems from the regional growth of 45.61% at constant 2011 prices and regional inflation of 10.75%. This implies an annualized constant growth rate of 6.46% and inflation rate of 1.72%. The results show significant variation across different subregions. In terms of growth performance, Southeast Asia and South Asia grew at an annualized rate of 6.84% and 6.77% at constant 2011 prices, respectively. In contrast, the high income group recorded only a 2.67% annualized growth at constant 2011 prices as well as annualized growth in inflation of 2.71%. The Southeast Asia region has the lowest annualized inflation rate of 1.29%.

Analysis of growth and inflation for income-based economy groupings shows strong evidence of catch-up and convergence across economies of the region. In terms of growth performance at constant 2011 prices, the lower-middle income II group of economies grew at an annualized rate of 6.86% compared to 2.67% by the high income economies. The upper-middle income economies have also posted an impressive annualized growth rate of 6.88%, largely driven by the performance of the People's Republic of China. In terms of regional inflation, the lowest inflation rate is posted by the upper-middle income economies with a 1.32% annualized inflation rate, while the highest rate of 2.71% is posted by the high income economies.

The ICP in Asia and the Pacific: Moving Forward

Under normal circumstance, the successful implementation of the 2017 ICP cycle and the degree of consistency achieved between the 2011 and 2017 ICP cycles would be a source of immense relief and satisfaction. By now, the ICP Global Office

and regional implementing agencies would have embarked on an evaluation of the 2017 ICP cycle with the aim of identifying areas and processes requiring further improvements and to plan the tasks associated with the implementation of the 2020 ICP cycle. The outbreak of the COVID-19 pandemic has produced an unprecedented set of circumstances leading to the postponement of the benchmark year from 2020 to 2021. Notwithstanding, this section canvasses areas for consideration as ICP moves forward to the next ICP cycle and beyond.

COVID-19 and the Next ICP Cycle

The UNSC recommended an increase in the frequency of the ICP cycles and designated 2020 as the year for the next ICP cycle. At the conclusion of the 2017 ICP cycle, processes were set in motion early in the year 2020 at the global and regional levels to initiate the 2020 ICP cycle. The coronavirus disease (COVID-19) pandemic prompted a revision to the timetable for the next ICP cycle. Most economies of the region and the world have been seriously impacted by the lock-down restrictions and various measures imposed to contain the spread of the virus. These measures in turn had impacted on the survey activities of the statistical agencies in terms of their price collection and compilation of national accounts statistics. Most national statistical agencies had to prioritize their activities with a special focus on consumer price index (CPI) compilation.

In Asia and the Pacific, the price surveys were initiated in the first quarter of 2020 in many economies. However, with the onset of the COVID-19 in many economies, ADB, in its capacity as the RIA, conducted a survey of the 22 participating economies in March 2020 on the effect of COVID-19 on their preparations and implementation of the 2020 ICP cycle. Out of the 22 economies surveyed, 20 responded with most of them reporting that their data collection activities were impacted or were likely to be impacted in coming weeks due to COVID-19. The ICP household consumption price surveys and regular CPI surveys

in most economies were limited to non-field data collection, where possible.

The ICP Global Office at the World Bank with the feedback from all RIAs presented a report to the ICP Technical Advisory Group, which suggested for postponement of the ICP cycle from 2020 to 2021. The ICP Global Office subsequently approached the ICP Governing Board considering the current situation and its impact on the ongoing and future ICP activities, recommended moving the benchmark year to 2021, with the assumption that normal statistical activities would resume in 2021. It also recognized that this recommendation will result in increasing the gap between the two ICP benchmarks.

Methodology for Measuring PPPs and Real Expenditures for Housing

Since the 2005 ICP round, comparisons of rental prices and real expenditures for housing or dwelling services at the regional level have posed serious challenges and measurement problems for the RIA in Asia and the Pacific. Housing comparisons posed insurmountable problems in the 2005 and 2011 rounds of the ICP in Asia and the Pacific, finally requiring the region to adopt the sub-optimal solution of using the reference volume approach. Despite the high degree of commitment and cooperation from the participating economies and improved rental and housing quantity data during the 2017 ICP cycle, application of the recommended direct rental and direct volume approaches to housing comparisons failed to produce meaningful results.

ADB, in consultation with a specially constituted Experts Group, devised an approach which combines the best of the rental and volume approaches, after making additional adjustments for accounting for quality differences that remain unaccounted for in the current rental and direct quantity approaches. Taking a cue from the success of productivity adjustments in the 2005 ICP round, which are now

standard for global comparisons of government compensation, ADB has developed a new approach whereby adjustments to rental PPPs obtained from the rental approach and indirect PPPs obtained from the direct quantity approach are introduced. As rental and direct quantity approaches are two alternatives for the comparison of real housing expenditures, the new ADB approach canvasses an amalgam of the two approaches by selecting plausible results from both, and filling gaps through a linking process.

The new approach developed by ADB was tested on the 2017 ICP data for dwellings in the region and results were encouraging. The approach was presented to a meeting of the ICP Technical Advisory Group in 2019. While the approach was acknowledged to be superior to the existing reference volume approach, the actual implementation and use of the approach has been recommended for implementation in the next ICP cycle. Finalization and implementation of a viable alternative to the reference volume approach for housing comparisons, using the newly developed approach is a major priority for the next ICP cycle.

Increasing Frequency of ICP Cycles and the Use of Rolling Price Survey Approach

In the 47th Session of the UNSC, it was recommended that the frequency of the ICP cycles be increased and the gap between cycles be reduced from the current five or 6 years to a gap of 3 years. Based on the recommendation, the year 2020 was recommended for the ICP cycle following the completion of the 2017 ICP cycle. Conducting the ICP every 3 years imposes additional burden on the participating economies. The rolling price survey approach was devised by the Eurostat in order to distribute the burden of conducting price surveys over 3 years instead of concentrating them in a single benchmark year. This approach is currently used by the Eurostat and OECD in their regional comparisons. The steps involved in implementing

this approach are well-documented and a special task force established by the ICP Global Office has prepared a position paper on the approach. The ICP regions in the meanwhile are evaluating feasible options for ICP implementation best suited to their context and capabilities of the economies within the region.

During the next ICP cycle, Asia and the Pacific will implement the usual benchmark approach similar to the earlier benchmark exercises. The RIA will closely examine the rolling price survey approach in consultation with the economies in the region and the feasibility of its implementation along with other alternative approaches that may better suit the needs and statistical capacity of the participating economies in the region.

Sustainability of the ICP in the Region

The ICP is a resource-intensive statistical initiative with the burden of implementation of price collections surveys largely borne by the participating economies. Scarce financial and human resources need to be allocated to support the participation of the economies in the ICP. The RIA for Asia and the Pacific has been successful in establishing a framework of partnership with defined roles and responsibilities of the parties involved in the ICP and also in providing seed funds to several participating economies for implementing ICP surveys and acquiring computer equipment for ICP activities. The success of the ICP in the region is largely due to a sense of ownership shown by the participating economies. It is necessary to build on the success enjoyed thus far through initiatives to enhance the sustainability of the ICP in the region. The first and most important step in this direction is to demonstrate the use of ICP results for evidence-based policy making at the economy level. Most of the current applications of PPPs are in the international domain. The urgent need to explore the uses of PPPs and ICP results for domestic use has been recognized by the ICP Global Office in its research

agenda for the ICP. A well-established program for the compilation of subnational PPPs for price and real income comparisons among smaller geographic locations within an economy is likely to provide the participating economies with a better understanding of PPPs and their applications to assess the economic performance, standards of living, and poverty incidence across different geographical locations within the economy. ADB had in the past provided technical support and training to many economies in the region in application of the ICP concepts and methods for compiling subnational PPPs. Some economies in the region have already made progress in the direction of subnational price comparisons and their applications and this program needs to further build on the achievements and learning from these experiences. The topic of subnational PPPs is also on the global research agenda and guidelines are being developed by a task force of the ICP Technical Advisory Group to assist the economies in their efforts to compile subnational PPPs.

It has long been recognized that a closer integration of ICP related activities with the CPI program at the economy level is necessary for their continued and effective participation in the ICP and improve the CPIs as well. The ICP has helped build capacity in economies as many have been adopting best practices from ICP to improve their CPI classification (to adopt COICOP classification), methods, and data validation tools. The staff have gained knowledge on the importance of product specifications and on effective data validation in improving the price statistics. Several economies have been integrating the ICP practice of the structured product descriptions in revising CPI product baskets or have plans to introduce structured product descriptions for CPI price collection in future improvement plans. In addition, many economies are integrating ICP products into the CPI basket whenever feasible. Inclusion of ICP items in the CPI item list or use of CPI prices for matching ICP products greatly facilitates ICP price collection in some economies while bringing about a greater integration of ICP

and CPI activities. To further assist economies on the process of technical and operational integration of ICP and CPI activities, a manual with a set of practical guidelines to bring about this integration is currently under preparation by a task force established by the ICP Technical Advisory Group.

In addition to the capacity building in the price statistics, the ICP has also provided an avenue to the economies for improving the compilation of the expenditure side estimates of gross domestic product, with economies attempting to provide detailed breakdown of the GDP expenditures following ICP classification.

The region should continue to build upon the above activities to find applications of ICP methods in policy applications at the economy level, bringing about greater integration of CPI and ICP and build capacity in price and national accounts statistics for sustaining the ICP activities at the economy level. Some economies have also incorporated ICP into their regular work plans and such actions will pave the way for greater ownership and sustainability of ICP activities in the region.

Appendixes

Appendix 1: Statistical Tables: Purchasing Power Parities and Real Expenditures, 2017

The tables in this appendix present the 2017 key results for Asia and the Pacific for gross domestic product (GDP), its main aggregates, and selected expenditure aggregates at levels below the main aggregates. The main aggregates include individual consumption expenditure by households (ICEH) and nonprofit institutions serving households (NPISH), individual consumption expenditure by the government (ICEG), collective consumption expenditure by government (CCEG), government final consumption expenditure (GFCE), gross fixed capital formation (GFCF), changes in inventories, acquisitions less disposals of valuables, and balance of exports and imports.

This appendix also presents actual individual consumption by households (AICH), which is the aggregate of ICEH, NPISH, and ICEG. The five components of AICH are (i) housing, water, electricity, gas and other fuels; (ii) health; (iii) recreation and culture; (iv) education; and (v) miscellaneous goods and services. In contrast, expenditures for the other AICH components of food and non-food household consumption are incurred by households only. Results are also presented for another broad aggregate called "domestic absorption," which represents the domestic expenditures as aggregate of AICH, CCEG, GFCF, changes in inventories, and acquisitions less disposals of valuables.

These expenditure aggregates were derived using the Gini-Éltető-Köves-Szulc (GEKS) method. The real expenditure for each aggregate is derived by dividing the nominal expenditures estimated in local currency units by a purchasing power parity (PPP) that is specific to that aggregate, so real expenditure for such an aggregate may not equal the total of its components' real expenditures within an economy. Some PPPs presented are reference PPPs. For the detailed list of reference PPPs, see Appendix 5. When an economy's implementing agency is not able to provide prices for any of the items for any category corresponding to the available GDP expenditures, the regional implementing agency estimates the PPP for this category using gap filling techniques based on the country-product-dummy approach.

The results presented in these tables are produced by the International Comparison Program (ICP) regional implementing agency for Asia and the Pacific, based on data supplied by all the participating economies, and in accordance with the methodology recommended by the ICP Technical Advisory Group and approved by Asia and the Pacific Regional Advisory Board. As such, these results are not produced by participating economies as part of the economies' official statistics.

Table A1.1   Purchasing Power Parities, 2017 (Hong Kong, China as base)
Table A1.2   Price Level Indexes, 2017 (Hong Kong, China = 100)
Table A1.3   Price Level Indexes, 2017 (Asia and the Pacific = 100)
Table A1.4   Real Expenditure, 2017 (HK$ billion)
Table A1.5   Economy Shares of Real Expenditure to Asia and the Pacific, 2017 (%)
Table A1.6   Per Capita Real Expenditure, 2017 (HK$)

The above 13 indicator tables include the following 34 expenditure categories:

Gross domestic product (GDP). Actual individual consumption by households (AICH) at purchasers' prices *plus* collective consumption expenditure by government (CCEG) at purchasers' prices *plus* gross fixed capital formation (GFCF) at purchasers' prices *plus* changes in inventories and acquisitions less disposals of valuables *plus* the free on board (FOB) value of exports of goods and services *less* the FOB value of imports of goods and services.

Actual individual consumption by households (AICH). The total value of the individual consumption expenditures by households (ICEH), nonprofit institutions serving households (NPISH), and individual consumption expenditure by government (ICEG) at purchasers' prices.

Food and non-alcoholic beverages. Household expenditure on food products and non-alcoholic beverages purchased for consumption at home. It excludes expenditures on food products and non-alcoholic beverages sold for immediate consumption away from home by hotels, restaurants, cafés, bars, kiosks, street vendors, automatic vending machines, and other vendors; cooked dishes prepared by restaurants for consumption off their premises; cooked dishes prepared by catering contractors, whether collected by the customer or delivered to the customer's home; and products sold specifically as pet foods.

Food. Household expenditure on food products purchased for consumption at home. It excludes food products sold for immediate consumption away from the home by hotels, restaurants, cafés, bars, kiosks, street vendors, automatic vending machines, etc.; cooked dishes prepared by restaurants for consumption off their premises; cooked dishes prepared by catering contractors, whether collected by the customer or delivered to the customer's home; and products sold specifically as pet food.

Bread and cereals. Household expenditure on rice; other cereals, flour, and other cereal products; bread; other bakery products; and pasta products and couscous, purchased for consumption at home.

Meat and fish. Household expenditure on fresh, chilled, frozen, preserved or processed animals, poultry meat, fish and seafood purchased for consumption as food at home. It also includes animals, poultry, fish and seafood (such as crustaceans, molluscs and other shellfish, sea snails, land crabs, land snails and frogs) purchased live for consumption as food.

Fruits and vegetables. Household expenditure on fresh, chilled, frozen, preserved or processed fruit and fruit-based products, and vegetable and vegetable-based products purchased for consumption as food at home.

Other food and non-alcoholic beverages. Household expenditure on milk, cheese and eggs; oils and fats; sugar, jam, honey, chocolate and confectionery; and food products not elsewhere classified, purchased for consumption at home. It also includes expenditure on non-alcoholic beverages purchased for consumption at home, and excludes non-alcoholic beverages sold for immediate consumption away from home by hotels, restaurants, cafés, bars, kiosks, street vendors, automatic vending machines, and other vendors.

Alcoholic beverages, tobacco and narcotics. Household expenditure on alcoholic beverages purchased for consumption at home. It includes low or non-alcoholic beverages that are generally alcoholic such as non-alcoholic beer, and excludes alcoholic beverages sold for immediate consumption away from the home by hotels, restaurants, cafés, bars, kiosks, street vendors, automatic vending machines, and other vendors; and household expenditure on tobacco (which covers all purchases of tobacco, including purchases of tobacco in cafés, bars, restaurants, and service stations).

Clothing and footwear. Household expenditure on clothing materials; other articles of clothing and clothing accessories; garments for men, women, children, and infants; cleaning, repair, and hire of clothing; all footwear for men, women, children, and infants; and repair and hire of footwear.

Clothing. Household expenditure on clothing materials, other articles of clothing and clothing accessories; garments for men, women, children, and infants; and cleaning, repair, and hire of clothing.

Housing, water, electricity, gas and other fuels. Household expenditure on actual and imputed rentals for housing; maintenance and repair of the dwelling; water supply and miscellaneous services related to the dwelling; and electricity, gas, and other fuels *plus* expenditure by NPISH on housing *plus* ICEG on housing services provided to individuals.

Furnishings, household equipment, and routine household maintenance. Household expenditure on furniture and furnishings; carpets and other floor coverings; repair of furniture, furnishings and floor coverings; household textiles; household appliances; glassware, tableware, and household utensils; tools and equipment for house and garden; and goods and services for routine household maintenance.

Health and education. Household expenditure on health and education, including expenditure of NPISH and government on health and education.

Health. Household expenditure on pharmaceuticals; medical products, appliances, and equipment; outpatient services; and hospital services *plus* expenditure of NPISH on health *plus* ICEG on health benefits and reimbursements, and the production of health services.

Education. Household expenditure on pre-primary, primary, secondary, post-secondary, and tertiary education *plus* expenditure of NPISH on education *plus* ICEG on education benefits and reimbursements and the production of education services.

Transportation and communication. Household expenditure on transportation and communication.

Transportation. Household expenditure on purchase of vehicles, operation of personal transport equipment, and transport services.

Communication: Household expenditure on postal services, telephone and telefax equipment, and telephone and telefax services.

Recreation and culture. Household expenditure on audiovisual, photographic, and information processing equipment; other major durables for recreation and culture; other recreational items and equipment; gardens and pets; recreational and cultural services; newspapers, books, and stationery; and package holidays *plus* expenditure by NPISH on recreation and culture *plus* ICEG on recreation and culture.

Restaurants and hotels. Household expenditure on food products and beverages sold for immediate consumption away from the home by hotels, restaurants, cafés, bars, kiosks, street vendors, automatic vending machines, and other vendors (including cooked dishes prepared by restaurants for consumption off their premises and cooked dishes prepared by catering contractors, whether collected by the customer or delivered to the customer's home) and household expenditure on accommodation services provided by hotels and similar establishments.

Miscellaneous goods and services. Household expenditure on personal care, personal effects, social protection, insurance, and financial and other services *plus* expenditure by NPISH on social protection and other services *plus* ICEG on social protection.

Individual consumption expenditure by government (ICEG). The total value of actual and imputed final consumption expenditures incurred by government on individual goods and services. These include expenditures incurred by the government considered to be individual services such as housing, health, recreation and culture, education, and social protection.

Collective consumption expenditure by government (CCEG). The final consumption expenditure of government on collective services or the service provided by the government simultaneously to all members of the community.

Gross fixed capital formation (GFCF). The total value of acquisitions less disposals of fixed assets by resident institutional units during the accounting period *plus* the additions to the value of nonproduced assets realized by the productive activity of resident institutional units.

Machinery and equipment. Capital expenditure on fabricated metal products, electrical and optical equipment, general-purpose machinery, special-purpose machinery, and transport equipment.

Construction. Capital expenditure on the construction of new structures and renovation of existing structures. Structures include residential buildings, nonresidential buildings, and civil engineering works.

Other products. Capital expenditure on furniture and other manufactured goods; computer software that a producer expects to use in production for more than one year; plantation, orchard, and vineyard development; change in stocks including breeding stock, draught animals, dairy cattle, animals raised for wool clippings;

land improvement, including dams and dikes that are part of flood control and irrigation projects; mineral exploration; acquisition of entertainment, literary, or artistic originals; and other intangible fixed assets such as research and development, weapons and ammunition; and ownership transfer costs on nonproduced assets including ownership transfer costs relating to land.

Changes in inventories and acquisitions less disposals of valuables. The value of physical change in inventories of raw materials, supplies and finished goods held by producers; inventories of goods acquired for resale by wholesalers and retailers; inventories of all goods stored by government; work-in-progress in manufacturing, construction and service industries; work-in-progress on cultivated assets (e.g., the natural growth prior to harvest of agricultural crops, vineyards, orchards, plantations and timber tracts and the natural growth in livestock raised for slaughter); and acquisitions of valuables (produced assets, such as nonmonetary gold, precious stones, antiques, paintings, sculptures and other art objects, that are not used primarily for production or consumption but purchased and held as stores of value) *less* disposals of valuables.

Balance of exports and imports. The FOB value of exports of goods and services *less* the FOB value of imports of goods and services.

Individual consumption expenditure by households (ICEH). The total value of actual and imputed final consumption expenditures incurred by households and NPISH for goods and services consumed by the households on housing, health, recreation and culture, education, and social protection and other services. It also includes expenditures on individual goods and services sold at prices that are not economically significant.

Individual consumption expenditure by households (ICEH) without housing. ICEH and NPISH, without actual and imputed rentals for housing and excluding expenditure by NPISH on housing.

Government final consumption expenditure (GFCE). The total value of actual and imputed final consumption expenditures incurred by government on individual goods and services and final consumption expenditure of government on collective services.

Domestic absorption. AICH at purchasers' prices *plus* CCEG at purchasers' prices *plus* GFCF at purchasers' prices *plus* changes in inventories and acquisitions less disposals of valuables.

Table A1.1: Purchasing Power Parities, 2017
(Hong Kong, China as base)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE
Gross Domestic Product	4.95	3.20	0.11	237.61	0.16	1.00	3.43	781.12	463.97	0.28	1.36	131.66	61.00	5.20	5.59	3.22	0.70	0.15	8.22	2.62	2.14	1,230.21
Actual Individual Consumption by Households[a]	4.58	3.05	0.11	227.84	0.15	1.00	3.15	780.92	462.27	0.27	1.48	125.77	59.20	4.74	5.25	3.06	0.67	0.17	7.91	2.58	2.05	1,174.31
Food and non-alcoholic beverages	5.42	3.92	0.12	274.33	0.17	1.00	3.30	1,029.47	594.80	0.28	1.22	147.76	77.44	5.79	6.35	3.35	0.67	0.15	11.10	3.20	2.31	1,399.93
Food	5.38	3.83	0.12	270.90	0.17	1.00	3.24	1,021.42	581.49	0.28	1.19	144.20	76.57	5.68	6.26	3.37	0.66	0.15	10.98	3.20	2.28	1,387.67
Bread and cereals	6.17	4.50	0.12	276.89	0.18	1.00	3.51	1,209.55	629.01	0.30	1.26	177.53	89.63	6.06	6.61	4.01	0.79	0.16	10.74	3.68	2.52	1,512.19
Meat and fish	5.57	3.58	0.11	288.16	0.17	1.00	3.64	882.61	577.90	0.27	0.76	109.06	73.77	6.74	5.85	2.78	0.61	0.16	10.05	3.08	2.06	1,348.70
Fruits and vegetables	3.88	3.92	0.16	268.30	0.15	1.00	2.65	1,110.52	549.54	0.30	2.02	232.70	70.00	4.36	5.52	3.65	0.58	0.15	10.78	3.42	2.42	1,339.90
Other food and non-alcoholic beverages	5.74	3.78	0.12	270.59	0.18	1.00	3.57	998.10	613.14	0.27	1.26	158.03	78.05	6.03	6.77	3.25	0.73	0.12	11.96	2.74	2.28	1,440.01
Alcoholic beverages, tobacco and narcotics	6.07	3.69	0.12	186.32	0.27	1.00	6.88	959.33	496.78	0.59	1.83	123.14	58.12	8.79	3.91	2.53	0.76	0.32	27.47	2.86	3.25	1,011.00
Clothing and footwear	5.74	3.87	0.20	287.62	0.20	1.00	3.13	1,070.50	519.63	0.33	1.40	183.41	77.71	5.73	7.10	4.88	1.29	0.17	8.86	2.59	2.13	1,398.93
Clothing	5.55	3.46	0.18	291.31	0.19	1.00	3.04	1,091.62	503.79	0.31	1.32	170.43	75.07	5.63	6.86	4.30	1.27	0.16	8.53	2.49	2.02	1,339.04
Housing, water, electricity, gas and other fuels[a]	3.30	2.02	0.06	219.78	0.09	1.00	2.56	451.72	360.00	0.19	2.15	124.18	34.45	3.56	3.93	2.43	0.56	0.19	5.72	2.59	1.41	1,204.73
Furnishings, household equipment and routine household maintenance	5.75	4.52	0.10	283.64	0.21	1.00	3.83	1,000.08	573.66	0.27	1.68	200.31	72.91	5.60	6.63	3.33	0.87	0.18	9.21	3.23	2.66	1,560.32
Health and education[a]	2.66	1.29	0.07	94.01	0.11	1.00	1.69	417.68	132.09	0.21	0.80	51.50	25.97	1.90	2.76	1.84	0.47	0.15	2.11	1.58	1.21	542.92
Health[a]	2.47	1.13	0.09	116.49	0.09	1.00	1.49	423.42	173.04	0.21	0.70	56.57	28.03	2.14	3.11	2.20	0.39	0.18	2.78	1.32	1.37	653.21
Education[a]	2.80	1.42	0.06	77.49	0.11	1.00	1.91	403.71	107.48	0.21	0.89	46.25	24.07	1.74	2.42	1.59	0.58	0.13	1.57	1.94	1.07	456.55
Transportation and communication	5.07	4.35	0.16	306.87	0.15	1.00	3.76	934.30	705.03	0.32	1.97	162.25	89.23	6.88	6.11	3.79	0.56	0.21	10.91	2.49	2.53	1,535.26
Transportation	5.16	4.06	0.14	315.26	0.16	1.00	3.95	906.71	710.98	0.28	1.82	150.30	83.40	8.38	6.46	3.55	0.52	0.22	11.32	2.58	2.46	1,624.48
Communication	4.68	5.84	0.28	272.76	0.13	1.00	2.90	1,074.36	713.24	0.42	2.36	216.55	111.91	3.98	5.27	5.00	0.68	0.21	8.76	2.21	2.96	1,046.39
Recreation and culture[a]	6.34	5.14	0.19	354.03	0.20	1.00	4.56	1,284.49	740.90	0.40	2.30	201.62	93.98	5.39	8.00	4.11	0.86	0.15	13.60	3.28	3.27	1,657.38
Restaurants and hotels	4.76	3.18	0.10	242.71	0.19	1.00	3.98	787.72	703.55	0.24	1.13	163.06	72.50	4.50	6.38	3.54	0.74	0.14	10.93	2.47	1.99	1,133.87
Miscellaneous goods and services[a]	5.51	3.43	0.11	272.74	0.19	1.00	4.14	925.59	554.46	0.31	1.33	141.93	72.30	6.46	6.97	3.58	0.85	0.18	7.90	2.80	2.40	1,251.26
Individual Consumption Expenditure by Government	3.51	1.50	0.07	140.26	0.11	1.00	3.71	491.78	173.85	0.22	0.89	46.91	32.26	3.60	4.77	2.72	0.60	0.15	2.51	1.89	1.40	609.30
Collective Consumption Expenditure by Government	4.60	1.74	0.07	233.89	0.14	1.00	4.54	598.80	277.70	0.24	1.03	75.18	49.33	5.99	5.72	3.00	0.72	0.12	3.99	2.25	1.91	839.84
Gross Fixed Capital Formation	6.10	4.53	0.12	273.33	0.16	1.00	3.86	830.33	565.52	0.29	1.26	166.96	71.07	7.14	7.08	3.85	0.74	0.15	10.70	2.93	2.34	1,497.52
Machinery and equipment	12.49	9.51	0.20	520.78	0.26	1.00	6.69	1,652.77	1,090.28	0.50	2.16	292.38	136.32	11.54	12.43	6.45	1.00	0.21	19.00	4.30	4.16	2,656.58
Construction	3.59	2.60	0.08	164.05	0.12	1.00	2.53	498.40	330.38	0.19	0.83	107.12	42.15	4.86	4.51	2.59	0.57	0.12	6.77	2.35	1.46	963.83
Other products	12.20	9.48	0.21	507.50	0.26	1.00	6.43	1,657.84	1,076.06	0.49	2.17	289.04	130.09	11.93	12.38	6.34	0.99	0.20	18.63	4.19	4.10	2,632.64
Changes in Inventories and Acquisitions Less Disposals of Valuables	5.77	3.92	0.12	286.26	0.18	1.00	3.93	920.21	576.43	0.30	1.44	158.07	73.52	6.44	6.21	3.77	0.76	0.17	11.30	2.91	2.47	1,470.82
Balance of Exports and Imports	10.32	8.36	0.18	519.75	0.27	1.00	8.36	1,716.98	1,071.64	0.55	1.97	313.06	174.56	13.41	13.53	6.47	0.87	0.18	19.56	3.91	4.36	2,870.44
Individual Consumption Expenditure by Households[b]	4.73	3.28	0.11	238.51	0.16	1.00	3.12	815.39	502.05	0.28	1.57	139.95	62.45	4.89	5.33	3.11	0.66	0.17	8.89	2.66	2.13	1,250.81
Individual Consumption Expenditure by Households without Housing[b]	5.03	3.46	0.12	250.10	0.17	1.00	3.27	890.67	529.33	0.29	1.52	143.83	67.75	5.12	5.41	3.35	0.68	0.17	9.44	2.64	2.31	1,270.00
Government Final Consumption Expenditure	4.11	1.62	0.07	183.79	0.13	1.00	4.15	550.85	236.96	0.23	0.96	61.22	42.51	5.05	5.27	2.88	0.67	0.13	3.26	2.07	1.67	733.48
Domestic Absorption	4.94	3.27	0.11	236.24	0.15	1.00	3.43	775.40	462.39	0.27	1.35	130.30	61.36	5.39	5.62	3.22	0.70	0.16	8.23	2.64	2.11	1,218.57

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.
[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A1.2: Price Level Indexes, 2017
(Hong Kong, China = 100)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE
Gross Domestic Product	48	38	61	46	59	100	41	45	43	50	69	42	35	39	41	50	80	83	42	67	49	43
Actual Individual Consumption by Households[a]	44	36	61	44	58	100	38	45	43	49	75	40	34	35	39	47	77	96	40	66	47	41
Food and non-alcoholic beverages	53	47	69	53	64	100	39	60	56	51	62	47	44	43	47	52	77	83	57	82	53	49
Food	52	46	68	52	62	100	39	59	54	51	60	46	44	42	46	52	77	84	56	82	52	48
Bread and cereals	60	54	69	53	68	100	42	70	59	54	64	57	51	45	49	62	92	92	55	94	58	53
Meat and fish	54	43	62	55	64	100	44	51	54	49	39	35	42	50	43	43	70	91	51	79	47	47
Fruits and vegetables	38	47	91	52	58	100	32	65	51	54	102	74	40	33	41	57	67	84	55	87	56	47
Other food and non-alcoholic beverages	56	45	65	52	67	100	43	58	57	48	64	50	45	45	50	50	84	69	61	70	52	50
Alcoholic beverages, tobacco and narcotics	59	44	69	36	100	100	82	56	46	108	93	39	33	66	29	39	88	180	140	73	75	35
Clothing and footwear	56	46	113	55	75	100	37	62	48	60	71	59	45	43	52	75	148	97	45	66	49	49
Clothing	54	41	104	56	70	100	36	64	47	56	67	54	43	42	51	67	146	91	44	64	46	47
Housing, water, electricity, gas and other fuels[a]	32	24	35	42	34	100	31	26	34	34	109	40	20	27	29	37	64	109	29	66	32	42
Furnishings, household equipment and routine household maintenance	56	54	58	55	80	100	46	58	54	50	85	64	42	42	49	51	101	104	47	83	61	54
Health and education[a]	26	15	42	18	40	100	20	24	12	38	41	16	15	14	20	28	54	86	11	40	28	19
Health[a]	24	14	50	22	36	100	18	25	16	37	36	18	16	16	23	34	45	99	14	34	31	23
Education[a]	27	17	35	15	42	100	23	24	10	37	45	15	14	13	18	25	67	75	8	50	25	16
Transportation and communication	49	52	91	59	57	100	45	54	66	57	100	52	51	51	45	59	64	121	56	64	58	53
Transportation	50	49	79	61	60	100	47	53	66	52	92	48	48	63	48	55	60	123	58	66	57	57
Communication	45	70	156	52	49	100	35	63	67	76	120	69	64	30	39	77	79	116	45	56	68	36
Recreation and culture[a]	61	62	107	68	77	100	55	75	69	73	116	64	54	40	59	63	99	85	70	84	75	58
Restaurants and hotels	46	38	57	47	71	100	48	46	66	44	57	52	42	34	47	55	85	79	56	63	46	40
Miscellaneous goods and services[a]	53	41	62	52	70	100	50	54	52	57	67	45	41	48	52	55	98	101	40	72	55	44
Individual Consumption Expenditure by Government	34	18	40	27	43	100	44	29	16	39	45	15	18	27	35	42	70	85	13	48	32	21
Collective Consumption Expenditure by Government	45	21	39	45	52	100	54	35	26	44	52	24	28	45	42	46	83	70	20	58	44	29
Gross Fixed Capital Formation	59	54	68	53	62	100	46	48	53	52	64	53	41	53	52	59	86	82	55	75	54	52
Machinery and equipment	121	114	115	100	100	100	80	96	102	90	109	93	78	86	92	100	116	118	97	110	96	93
Construction	35	31	45	32	44	100	30	29	31	34	42	34	24	36	33	40	65	68	35	60	34	34
Other products	118	113	118	98	98	100	77	97	100	89	110	92	75	89	91	98	114	110	95	107	94	92
Changes in Inventories and Acquisitions Less Disposals of Valuables	56	47	69	55	69	100	47	54	54	55	73	50	42	48	46	58	88	93	58	75	57	51
Balance of Exports and Imports	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Individual Consumption Expenditure by Households[b]	46	39	63	46	60	100	37	47	47	50	79	45	36	36	39	48	77	98	45	68	49	44
Individual Consumption Expenditure by Households without Housing[b]	49	41	65	48	66	100	39	52	49	53	77	46	39	38	40	52	79	98	48	68	53	44
Government Final Consumption Expenditure	40	19	39	35	48	100	50	32	22	42	49	20	24	38	39	45	77	75	17	53	38	26
Domestic Absorption	48	39	61	45	58	100	41	45	43	49	69	42	35	40	42	50	80	88	42	68	48	42

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A1.3: Price Level Indexes, 2017
(Asia and the Pacific = 100)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE
Gross Domestic Product	75	60	95	71	92	156	64	71	68	78	107	66	55	60	64	78	125	130	66	105	77	67
Actual Individual Consumption by Households[a]	76	62	103	75	98	170	64	77	73	83	128	68	58	60	66	80	132	164	69	112	80	70
Food and non-alcoholic beverages	92	82	121	92	111	175	69	105	97	89	108	83	78	75	82	90	135	144	99	143	93	85
Food	92	81	121	92	110	177	69	105	96	90	107	81	78	75	82	92	136	149	99	145	93	86
Bread and cereals	97	87	112	86	110	162	68	114	95	87	103	92	83	73	79	101	148	149	89	153	94	85
Meat and fish	90	72	104	93	107	167	73	86	90	82	64	58	71	84	72	72	117	152	86	132	79	79
Fruits and vegetables	77	95	185	105	117	204	65	132	104	111	208	151	82	66	83	115	137	172	112	178	113	95
Other food and non-alcoholic beverages	98	80	115	92	119	177	75	103	101	85	113	89	79	79	88	89	148	122	108	124	92	89
Alcoholic beverages, tobacco and narcotics	81	61	95	50	138	138	114	77	64	149	128	54	46	91	40	54	121	249	194	101	103	49
Clothing and footwear	75	62	152	74	101	134	50	84	65	80	95	79	60	57	70	101	199	131	61	89	66	65
Clothing	75	58	145	78	98	139	51	89	65	78	93	76	60	58	71	93	203	126	61	89	65	65
Housing, water, electricity, gas and other fuels[a]	68	51	74	89	71	211	65	56	71	73	230	84	42	56	61	79	135	231	62	140	68	89
Furnishings, household equipment and routine household maintenance	73	71	76	72	105	131	60	76	70	65	111	84	55	55	64	67	132	136	62	108	80	71
Health and education[a]	63	38	102	44	98	244	49	59	30	92	99	40	36	35	50	69	133	209	26	99	68	46
Health[a]	64	36	133	60	95	267	48	66	43	100	95	48	43	43	61	91	119	264	38	90	84	61
Education[a]	63	39	80	34	96	230	53	54	23	86	104	34	32	30	41	56	154	172	19	114	57	37
Transportation and communication	85	90	157	102	98	173	78	94	114	99	173	90	89	89	78	101	111	209	97	110	101	93
Transportation	89	87	141	108	107	178	84	94	118	92	164	86	85	111	85	98	108	219	103	118	101	101
Communication	68	105	234	79	73	150	52	94	100	113	180	104	96	44	58	116	118	174	67	85	102	55
Recreation and culture[a]	70	70	122	78	88	114	62	85	79	83	133	73	61	46	67	72	113	97	79	96	86	66
Restaurants and hotels	71	59	89	72	110	155	74	71	102	69	88	81	64	52	73	85	131	123	86	98	71	61
Miscellaneous goods and services[a]	71	55	82	70	94	134	66	72	69	76	90	61	55	64	69	74	131	135	54	96	74	58
Individual Consumption Expenditure by Government	57	30	67	45	72	168	75	48	27	66	76	25	31	45	59	71	117	143	22	82	54	36
Collective Consumption Expenditure by Government	69	32	61	70	80	155	84	54	40	68	81	37	44	69	66	72	129	109	32	89	68	45
Gross Fixed Capital Formation	81	74	93	72	84	136	63	66	72	71	87	73	56	73	71	81	117	112	75	102	73	71
Machinery and equipment	115	108	110	95	95	95	76	91	97	85	104	89	74	82	87	95	110	112	92	105	91	88
Construction	64	57	84	58	81	185	56	54	57	63	77	63	45	67	62	74	121	125	64	111	62	62
Other products	113	109	113	94	94	96	74	93	96	85	105	89	71	85	88	94	110	106	91	103	90	88
Changes in Inventories and Acquisitions Less Disposals of Valuables	85	72	106	84	106	153	72	82	82	83	111	77	64	73	70	89	134	142	88	114	87	78
Balance of Exports and Imports	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Individual Consumption Expenditure by Households[b]	79	68	109	80	103	173	65	82	81	87	138	77	62	63	68	83	133	169	79	118	85	76
Individual Consumption Expenditure by Households without Housing[b]	81	69	109	80	110	167	65	87	82	89	128	77	65	64	67	86	132	163	80	113	88	74
Government Final Consumption Expenditure	64	31	62	57	76	160	79	51	35	67	78	31	39	60	62	71	123	119	27	85	61	41
Domestic Absorption	75	61	95	71	92	157	64	71	68	78	108	65	55	63	65	78	126	139	66	106	76	67

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.
[b] Includes expenditure by nonprofit institutions serving households.
Source: Asian Development Bank estimates.

Table A1.4: Real Expenditure, 2017
(HK$ billion)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	4,271.6	51.5	155.6	378.1	70.8	2,662.8	48,395.2	17,394.5	303.2	4,916.5	55.1	211.7	1,409.5	502.5	5,954.4	4,902.0	117,928.5	3,170.7	1,620.9	6,688.2	7,231.6	4,069.2	232,344.5
Actual Individual Consumption by Households[a]	3,284.7	31.4	41.7	335.4	52.7	1,887.2	32,884.4	10,578.0	172.9	3,069.6	23.6	130.6	864.6	433.6	5,495.3	4,083.1	57,691.5	1,081.0	1,114.3	4,097.5	4,201.7	2,728.7	134,283.5
Food and non-alcoholic beverages	1,412.0	8.3	4.7	123.0	14.4	191.9	8,316.2	2,335.1	56.4	606.2	4.3	31.2	351.5	207.7	1,457.9	1,460.3	8,641.1	76.6	216.0	417.3	881.1	656.5	27,469.5
Food	1,415.4	7.8	4.3	119.3	13.9	180.0	8,343.5	2,100.0	48.2	587.4	3.7	28.9	346.0	208.4	1,406.9	1,327.9	8,421.7	67.0	214.6	388.8	774.7	636.9	26,645.1
Bread and cereals	551.2	1.8	1.0	37.4	2.6	18.7	1,762.2	468.9	12.3	78.2	0.6	3.8	65.5	69.5	326.6	422.5	1,250.2	10.8	69.0	80.8	150.1	174.3	5,558.3
Meat and fish	263.2	1.0	1.7	34.6	2.8	91.6	706.3	726.3	20.3	190.6	1.7	13.4	117.2	29.2	158.5	541.6	3,391.1	22.2	32.1	126.0	207.8	271.5	6,950.8
Fruits and vegetables	265.9	2.0	0.6	18.1	4.5	26.3	2,972.0	327.7	8.1	127.9	0.5	1.2	93.0	54.1	248.8	142.5	2,419.2	14.3	32.7	108.8	268.6	96.1	7,232.8
Other food and non-alcoholic beverages	305.6	3.3	1.6	31.6	4.5	55.3	3,027.6	833.3	15.7	215.5	1.5	13.8	79.4	57.7	709.9	359.2	1,788.5	30.6	82.1	101.2	252.4	111.4	8,081.7
Alcoholic beverages, tobacco and narcotics	49.4	0.6	0.1	15.9	4.2	15.2	296.6	602.1	13.3	23.4	0.4	10.1	19.0	9.0	71.2	62.5	1,037.4	9.4	6.1	76.0	86.4	113.7	2,522.1
Clothing and footwear	156.4	1.9	0.7	5.0	1.8	90.4	2,235.6	255.1	3.2	71.2	0.7	4.8	25.5	10.5	318.8	27.1	1,383.8	28.7	36.9	155.4	64.3	114.1	4,991.8
Clothing	144.1	1.5	0.7	2.5	1.6	59.5	1,829.1	214.7	2.6	65.1	0.6	4.1	22.6	9.1	265.8	20.8	1,093.9	25.9	34.7	140.7	65.0	99.6	4,104.1
Housing, water, electricity, gas and other fuels[a]	742.7	5.6	8.3	53.9	6.3	294.7	5,408.0	1,545.4	26.4	614.2	4.0	18.0	205.4	71.3	1,468.6	571.2	9,596.3	141.5	162.5	627.4	533.5	587.2	22,692.3
Furnishings, household equipment and routine household maintenance	84.0	0.7	1.8	5.0	2.5	94.1	814.7	333.1	7.5	144.1	1.1	1.8	10.3	6.8	159.1	125.4	1,870.2	40.4	20.3	135.3	122.4	125.3	4,105.7
Health and education[a]	516.1	10.2	15.7	110.5	10.8	278.3	8,246.1	2,521.0	50.5	539.8	9.2	51.7	208.1	91.7	1,387.2	784.5	22,460.2	217.3	357.3	1,172.3	1,348.2	1,079.8	41,466.5
Health[a]	217.6	6.6	3.4	45.4	3.4	157.4	4,124.1	858.9	14.8	220.3	5.7	17.8	103.5	39.0	738.5	211.9	15,269.3	99.2	148.8	794.6	574.2	435.6	24,089.9
Education[a]	298.5	4.0	14.1	65.8	7.5	120.9	4,075.1	1,707.3	38.2	325.3	3.8	35.8	104.1	52.3	630.4	613.7	8,110.3	118.1	216.4	414.8	787.3	660.8	18,404.6
Transportation and communication	137.3	3.5	4.8	18.9	7.3	169.9	4,679.7	1,516.1	9.0	518.0	2.1	13.0	31.3	12.7	336.3	434.7	7,849.7	146.1	171.9	567.1	472.4	276.9	17,378.8
Transportation	120.9	3.1	4.3	17.8	4.7	125.4	3,983.6	1,222.3	6.9	361.0	1.2	10.3	23.3	7.4	232.1	373.0	5,930.6	112.3	157.9	432.0	415.8	247.9	13,793.6
Communication	15.4	0.5	0.6	0.7	2.6	44.6	644.8	286.8	2.1	147.6	0.9	2.6	7.6	6.3	105.4	64.4	1,859.9	33.3	10.1	134.8	58.0	21.5	3,450.4
Recreation and culture[a]	37.7	0.5	1.5	5.8	0.7	194.1	199.1	280.2	1.9	127.2	0.6	3.1	6.8	12.7	147.4	51.2	2,168.6	128.5	75.9	277.1	127.3	84.8	3,932.6
Restaurants and hotels	72.4	0.6	2.1	14.9	0.5	166.7	490.7	960.7	11.8	325.1	2.2	2.4	34.4	8.1	122.9	135.2	2,088.7	122.0	29.9	310.2	375.9	124.6	5,401.7
Miscellaneous goods and services[a]	108.0	1.7	2.1	7.6	3.3	391.8	3,915.8	419.8	11.9	296.1	1.8	7.4	23.8	9.8	340.6	479.8	5,960.6	171.0	147.5	578.3	457.8	99.1	13,435.6
Individual Consumption Expenditure by Government	81.1	5.9	14.9	30.1	5.3	101.7	1,523.1	960.6	20.0	377.8	5.8	32.1	68.7	14.9	311.5	316.2	12,874.0	112.9	219.9	693.1	883.4	405.4	19,058.3
Collective Consumption Expenditure by Government	222.3	10.5	48.6	14.2	9.5	159.8	2,701.3	1,272.8	62.9	341.4	6.1	27.2	277.7	40.5	409.3	305.2	7,282.5	257.5	145.3	511.6	652.2	393.8	15,152.2
Gross Fixed Capital Formation	1,070.4	18.7	56.7	35.5	12.0	576.0	12,226.6	5,263.7	83.1	1,186.0	24.8	41.1	373.4	116.3	697.9	1,028.1	47,427.8	850.3	327.4	1,224.9	1,500.1	795.0	74,935.9
Machinery and equipment	153.1	2.6	11.3	8.5	4.6	161.4	2,130.3	434.0	12.2	202.7	5.4	8.1	82.7	15.2	138.3	224.2	6,465.1	174.7	94.7	326.6	489.4	104.5	11,249.6
Construction	1,275.6	21.7	51.3	31.5	5.2	360.4	9,602.9	6,588.0	63.0	1,045.1	22.6	27.9	305.8	102.1	468.6	749.8	43,267.1	399.4	225.6	547.8	811.6	878.8	66,851.9
Other products	2.9	0.3	2.2	0.2	0.5	54.1	1,344.0	223.0	12.0	89.2	0.4	5.3	18.3	13.3	89.7	89.6	4,167.0	198.8	9.4	213.7	69.2	25.0	6,628.2
Changes in Inventories and Acquisitions Less Disposals of Valuables	5.7	-0.0	-2.7	1.7	0.7	11.0	2,058.0	61.0	0.0	14.5	0.7	11.9	15.5	56.4	85.8	5.3	1,935.0	56.1	122.1	-14.1	-20.3	95.3	4,499.2
Balance of Exports and Imports	-144.3	-4.0	13.2	-0.2	-1.5	28.9	-573.4	80.3	-3.4	170.3	0.6	2.1	-37.7	-65.8	-250.3	-240.7	1,643.0	664.7	-48.9	571.2	490.7	48.9	2,343.7
Individual Consumption Expenditure by Households[b]	3,119.9	26.5	30.7	302.7	47.3	1,785.5	31,360.2	9,551.5	152.3	2,706.7	19.0	106.6	784.0	409.7	5,135.3	3,738.3	46,610.8	969.2	929.3	3,484.4	3,466.0	2,364.3	117,100.2
Individual Consumption Expenditure by Households without Housing[b]	2,686.9	22.8	26.4	255.8	40.9	1,538.1	26,981.6	8,202.4	131.1	2,330.6	16.3	91.5	675.8	352.6	4,410.7	3,221.7	40,057.4	833.1	800.8	2,985.8	2,991.4	2,033.3	100,686.7
Government Final Consumption Expenditure	318.0	16.7	64.3	41.1	15.0	261.5	4,312.2	2,241.2	88.4	712.1	11.9	58.0	374.5	58.7	726.6	617.2	19,609.0	371.7	346.9	1,191.1	1,486.9	787.6	33,710.6
Domestic Absorption	4,579.8	60.7	134.1	380.7	74.0	2,633.9	49,892.8	17,345.1	312.3	4,622.9	54.4	208.9	1,508.6	648.6	6,518.0	5,399.2	115,947.8	2,228.8	1,733.4	5,788.3	6,308.6	3,993.0	230,373.8

0.0 = magnitude is less than half of unit employed; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A1.5: Economy Shares of Real Expenditure to Asia and the Pacific, 2017

(%)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	1.84	0.02	0.07	0.16	0.03	1.15	20.83	7.49	0.13	2.12	0.02	0.09	0.61	0.22	2.56	2.11	50.76	1.36	0.70	2.88	3.11	1.75	100.00
Actual Individual Consumption by Households[a]	2.45	0.02	0.03	0.25	0.04	1.41	24.49	7.88	0.13	2.29	0.02	0.10	0.64	0.32	4.09	3.04	42.96	0.81	0.83	3.05	3.13	2.03	100.00
Food and non-alcoholic beverages	5.14	0.03	0.02	0.45	0.05	0.70	30.27	8.50	0.21	2.21	0.02	0.11	1.28	0.76	5.31	5.32	31.46	0.28	0.79	1.52	3.21	2.39	100.00
Food	5.31	0.03	0.02	0.45	0.05	0.68	31.31	7.88	0.18	2.20	0.01	0.11	1.30	0.78	5.28	4.98	31.61	0.25	0.81	1.46	2.91	2.39	100.00
Bread and cereals	9.92	0.03	0.02	0.67	0.05	0.34	31.70	8.44	0.22	1.41	0.01	0.07	1.18	1.25	5.88	7.60	22.49	0.19	1.24	1.45	2.70	3.14	100.00
Meat and fish	3.79	0.01	0.02	0.50	0.04	1.32	10.16	10.45	0.29	2.74	0.02	0.19	1.69	0.42	2.28	7.79	48.79	0.32	0.46	1.81	2.99	3.91	100.00
Fruits and vegetables	3.68	0.03	0.01	0.25	0.06	0.36	41.09	4.53	0.11	1.77	0.01	0.02	1.29	0.75	3.44	1.97	33.45	0.20	0.45	1.50	3.71	1.33	100.00
Other food and non-alcoholic beverages	3.78	0.04	0.02	0.39	0.06	0.68	37.46	10.31	0.19	2.67	0.02	0.17	0.98	0.71	8.78	4.44	22.13	0.38	1.02	1.25	3.12	1.38	100.00
Alcoholic beverages, tobacco and narcotics	1.96	0.03	0.01	0.63	0.17	0.60	11.76	23.87	0.53	0.93	0.01	0.40	0.76	0.36	2.82	2.48	41.13	0.37	0.24	3.01	3.43	4.51	100.00
Clothing and footwear	3.13	0.04	0.01	0.10	0.04	1.81	44.78	5.11	0.06	1.43	0.01	0.10	0.51	0.21	6.39	0.54	27.72	0.57	0.74	3.11	1.29	2.29	100.00
Clothing	3.51	0.04	0.02	0.06	0.04	1.45	44.57	5.23	0.06	1.59	0.01	0.10	0.55	0.22	6.48	0.51	26.65	0.63	0.85	3.43	1.58	2.43	100.00
Housing, water, electricity, gas and other fuels[a]	3.27	0.02	0.04	0.24	0.03	1.30	23.83	6.81	0.12	2.71	0.02	0.08	0.91	0.31	6.47	2.52	42.29	0.62	0.72	2.76	2.35	2.59	100.00
Furnishings, household equipment and routine household maintenance	2.05	0.02	0.04	0.12	0.06	2.29	19.84	8.11	0.18	3.51	0.03	0.04	0.25	0.17	3.87	3.05	45.55	0.98	0.49	3.29	2.98	3.05	100.00
Health and education[a]	1.24	0.02	0.04	0.27	0.03	0.67	19.89	6.08	0.12	1.30	0.02	0.12	0.50	0.22	3.35	1.89	54.16	0.52	0.86	2.83	3.25	2.60	100.00
Health[a]	0.90	0.03	0.01	0.19	0.01	0.65	17.12	3.57	0.06	0.91	0.02	0.07	0.43	0.16	3.07	0.88	63.38	0.41	0.62	3.30	2.38	1.81	100.00
Education[a]	1.62	0.02	0.08	0.36	0.04	0.66	22.14	9.28	0.21	1.77	0.02	0.19	0.57	0.28	3.43	3.33	44.07	0.64	1.18	2.25	4.28	3.59	100.00
Transportation and communication	0.79	0.02	0.03	0.11	0.04	0.98	26.93	8.72	0.05	2.98	0.01	0.07	0.18	0.07	1.94	2.50	45.17	0.84	0.99	3.26	2.72	1.59	100.00
Transportation	0.88	0.02	0.03	0.13	0.03	0.91	28.88	8.86	0.05	2.62	0.01	0.07	0.17	0.05	1.68	2.70	43.00	0.81	1.14	3.13	3.01	1.80	100.00
Communication	0.45	0.01	0.02	0.02	0.07	1.29	18.69	8.31	0.06	4.28	0.03	0.08	0.22	0.18	3.06	1.87	53.90	0.96	0.29	3.91	1.68	0.62	100.00
Recreation and culture[a]	0.96	0.01	0.04	0.15	0.02	4.94	5.06	7.13	0.05	3.23	0.01	0.08	0.17	0.32	3.75	1.30	55.14	3.27	1.93	7.05	3.24	2.16	100.00
Restaurants and hotels	1.34	0.01	0.04	0.28	0.01	3.09	9.08	17.79	0.22	6.02	0.04	0.04	0.64	0.15	2.28	2.50	38.67	2.26	0.55	5.74	6.96	2.31	100.00
Miscellaneous goods and services[a]	0.80	0.01	0.02	0.06	0.02	2.92	29.14	3.12	0.09	2.20	0.01	0.06	0.18	0.07	2.54	3.57	44.36	1.27	1.10	4.30	3.41	0.74	100.00
Individual Consumption Expenditure by Government	0.43	0.03	0.08	0.16	0.03	0.53	7.99	5.04	0.11	1.98	0.03	0.17	0.36	0.08	1.63	1.66	67.55	0.59	1.15	3.64	4.64	2.13	100.00
Collective Consumption Expenditure by Government	1.47	0.07	0.32	0.09	0.06	1.05	17.83	8.40	0.41	2.25	0.04	0.18	1.83	0.27	2.70	2.01	48.06	1.70	0.96	3.38	4.30	2.60	100.00
Gross Fixed Capital Formation	1.43	0.02	0.08	0.05	0.02	0.77	16.32	7.02	0.11	1.58	0.03	0.05	0.50	0.16	0.93	1.37	63.29	1.13	0.44	1.63	2.00	1.06	100.00
Machinery and equipment	1.36	0.02	0.10	0.08	0.04	1.43	18.94	3.86	0.11	1.80	0.05	0.07	0.74	0.14	1.23	1.99	57.47	1.55	0.84	2.90	4.35	0.93	100.00
Construction	1.91	0.03	0.08	0.05	0.01	0.54	14.36	9.85	0.09	1.56	0.03	0.04	0.46	0.15	0.70	1.12	64.72	0.60	0.34	0.82	1.21	1.31	100.00
Other products	0.04	0.00	0.03	0.00	0.01	0.82	20.28	3.36	0.18	1.35	0.01	0.08	0.28	0.20	1.35	1.35	62.87	3.00	0.14	3.22	1.04	0.38	100.00
Changes in Inventories and Acquisitions Less Disposals of Valuables	0.13	-0.00	-0.06	0.04	0.02	0.24	45.74	1.35	0.00	0.32	0.02	0.26	0.34	1.25	1.91	0.12	43.01	1.25	2.71	-0.31	20.94	2.12	100.00
Balance of Exports and Imports	-6.16	-0.17	0.56	-0.01	-0.06	1.23	-24.46	3.43	-0.15	7.26	0.03	0.09	-1.61	-2.81	-10.68	-10.27	70.11	28.36	-2.09	24.37	20.94	2.09	100.00
Individual Consumption Expenditure by Households[b]	2.66	0.02	0.03	0.26	0.04	1.52	26.78	8.16	0.13	2.31	0.02	0.09	0.67	0.35	4.39	3.19	39.80	0.83	0.79	2.98	2.96	2.02	100.00
Individual Consumption Expenditure by Households without Housing[b]	2.67	0.02	0.03	0.25	0.04	1.53	26.80	8.15	0.13	2.31	0.02	0.09	0.67	0.35	4.38	3.20	39.78	0.83	0.80	2.97	2.97	2.02	100.00
Government Final Consumption Expenditure	0.94	0.05	0.19	0.12	0.04	0.78	12.79	6.65	0.26	2.11	0.04	0.17	1.11	0.17	2.16	1.83	58.17	1.10	1.03	3.53	4.41	2.34	100.00
Domestic Absorption	1.99	0.03	0.06	0.17	0.03	1.14	21.66	7.53	0.14	2.01	0.02	0.09	0.65	0.28	2.83	2.34	50.33	0.97	0.75	2.51	2.74	1.73	100.00

0.00 = magnitude is less than half of the unit employed; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real components may not sum up to the total of their real components for an economy.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A1.6: Per Capita Real Expenditure, 2017
(HK$)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	26,401	70,855	362,379	23,853	80,772	360,247	36,965	66,419	43,944	153,532	112,187	67,241	26,519	17,431	29,905	46,721	85,061	564,960	75,587	283,878	106,892	43,179	61,375
Actual Individual Consumption by Households[a]	20,301	43,196	97,121	21,161	60,057	255,310	25,118	40,391	25,055	95,858	47,964	41,482	16,267	15,041	27,599	38,916	41,613	192,614	51,965	173,917	62,106	28,955	35,472
Food and non-alcoholic beverages	8,727	11,369	10,950	7,758	16,471	25,959	6,352	8,916	8,180	18,930	8,650	9,899	6,614	7,206	7,322	13,918	6,233	13,644	10,075	17,712	13,023	6,966	7,256
Food	8,748	10,702	9,993	7,527	15,796	24,354	6,373	8,019	6,990	18,342	7,589	9,169	6,509	7,230	7,066	12,656	6,075	11,938	10,006	16,504	11,450	6,758	7,038
Bread and cereals	3,407	2,535	2,219	2,357	3,012	2,525	1,346	1,791	1,786	2,443	1,312	1,207	1,232	2,412	1,641	4,027	902	1,922	3,219	3,430	2,219	1,850	1,468
Meat and fish	1,627	1,367	3,936	2,186	3,229	12,392	539	2,773	2,944	5,952	3,529	4,258	2,204	1,011	796	5,162	2,446	3,959	1,497	5,349	3,072	2,881	1,836
Fruits and vegetables	1,643	2,791	1,349	1,141	5,122	3,557	2,270	1,251	1,172	3,994	1,116	394	1,750	1,876	1,249	1,358	1,745	2,542	1,525	4,616	3,971	1,020	1,911
Other food and non-alcoholic beverages	1,889	4,591	3,662	1,994	5,093	7,484	2,313	3,182	2,277	6,729	3,130	4,381	1,494	2,003	3,565	3,423	1,290	5,459	3,828	4,294	3,730	1,182	2,135
Alcoholic beverages, tobacco and narcotics	305	894	314	1,005	4,761	2,063	227	2,299	1,934	730	739	3,218	358	314	357	595	748	1,675	286	3,224	1,278	1,206	666
Clothing and footwear	967	2,564	1,688	313	2,021	12,229	1,708	974	461	2,224	1,507	1,537	479	365	1,601	258	748	5,114	1,721	6,594	951	1,211	1,319
Clothing	891	2,059	1,517	158	1,802	8,043	1,397	820	379	2,032	1,168	1,288	425	314	1,335	198	789	4,621	1,620	5,971	961	1,057	1,084
Housing, water, electricity, gas and other fuels[a]	4,591	7,690	19,297	3,398	7,159	39,868	4,131	5,901	3,826	19,182	8,083	5,717	3,865	2,474	7,376	5,444	6,922	25,209	7,577	26,629	7,885	6,230	5,994
Furnishings, household equipment and routine household maintenance	519	1,006	4,107	313	2,811	12,730	622	1,272	1,091	4,501	2,194	568	193	237	799	1,195	1,349	7,200	945	5,741	1,809	1,329	1,085
Health and education[a]	3,190	14,074	36,636	6,973	12,291	37,648	6,299	9,626	7,319	16,858	18,690	16,427	3,916	3,179	6,967	7,477	16,200	38,718	16,662	49,759	19,927	11,458	10,954
Health[a]	1,345	9,103	7,943	2,866	3,822	21,294	3,150	3,280	2,145	6,878	11,501	5,666	1,947	1,353	3,709	2,019	11,014	17,683	6,937	33,725	8,487	4,622	6,363
Education[a]	1,845	5,470	32,719	4,151	8,565	16,354	3,113	6,519	5,541	10,159	7,803	11,362	1,958	1,812	3,166	5,850	5,850	21,049	10,092	17,606	11,637	7,012	4,862
Transportation and communication	848	4,862	11,210	1,193	8,291	22,991	3,574	5,789	1,308	16,178	4,350	4,139	588	439	1,689	4,143	5,662	26,027	8,017	24,070	6,982	2,938	4,591
Transportation	747	4,244	9,967	1,124	5,410	16,963	3,043	4,667	997	11,273	2,426	3,282	438	256	1,166	3,555	4,278	20,003	7,362	18,335	6,146	2,630	3,644
Communication	95	670	1,449	43	2,937	6,028	493	1,095	299	4,608	1,756	823	143	220	530	614	1,342	5,930	472	5,721	857	228	911
Recreation and culture[a]	233	730	3,471	368	762	26,263	152	1,070	269	3,972	1,179	973	127	441	740	488	1,564	22,894	3,538	11,760	1,882	899	1,039
Restaurants and hotels	447	887	4,774	939	579	22,555	375	3,668	1,710	10,152	4,447	766	646	280	617	1,288	1,507	21,731	1,393	13,164	5,556	1,322	1,427
Miscellaneous goods and services[a]	668	2,309	4,926	479	3,793	53,003	2,991	1,603	1,731	9,245	3,587	2,365	448	340	1,711	4,573	4,299	30,468	6,878	24,545	6,767	1,052	3,549
Individual Consumption Expenditure by Government	502	8,087	34,673	1,899	6,002	13,756	1,163	3,668	2,900	11,798	11,761	10,191	1,293	516	1,565	3,014	9,286	20,109	10,255	29,420	13,057	4,302	5,034
Collective Consumption Expenditure by Government	1,374	14,383	113,259	898	10,782	21,618	2,063	4,860	9,112	10,660	12,499	8,637	5,225	1,405	2,056	2,909	5,253	45,883	6,778	21,714	9,640	4,178	4,003
Gross Fixed Capital Formation	6,616	25,672	132,105	2,240	13,726	77,924	9,339	20,099	12,042	37,035	50,477	13,066	7,026	4,033	3,505	9,799	34,209	151,506	15,270	51,992	22,173	8,435	19,795
Machinery and equipment	946	3,588	26,197	535	5,300	21,838	1,627	1,657	1,763	6,329	10,950	2,566	1,556	529	695	2,137	4,663	31,125	4,416	13,862	7,234	1,109	2,972
Construction	7,884	29,896	119,441	1,991	5,913	48,761	7,335	25,156	9,128	32,637	46,048	8,850	5,754	3,541	2,354	7,146	31,208	71,169	10,519	23,251	11,997	9,326	17,659
Other products	18	452	5,114	14	599	7,326	1,027	852	1,740	2,786	905	1,671	343	461	450	854	3,006	35,425	438	9,072	1,022	265	1,751
Changes in Inventories and Acquisitions Less Disposals of Valuables	35	–31	–6,342	106	778	1,485	1,572	233	0	451	1,383	3,767	292	1,957	431	50	1,396	9,994	5,693	–600	–300	1,012	1,188
Balance of Exports and Imports	–892	–5,544	30,743	–12	–1,707	3,910	–438	307	–499	5,317	1,293	669	–709	–2,282	–1,257	–2,294	1,185	118,442	–2,282	24,246	7,253	519	619
Individual Consumption Expenditure by Households[b]	19,282	36,422	71,556	19,097	53,908	241,555	23,954	36,471	22,065	84,526	38,688	33,862	14,750	14,212	25,791	35,630	33,620	172,694	43,335	147,894	51,232	25,088	30,933
Individual Consumption Expenditure by Households without Housing[b]	16,606	31,349	61,494	16,141	46,641	208,079	20,609	31,320	18,994	72,779	33,154	29,051	12,714	12,230	22,152	30,706	28,893	148,442	37,342	126,730	44,216	21,575	26,597
Government Final Consumption Expenditure	1,966	22,991	149,626	2,592	17,113	35,374	3,294	8,558	12,806	22,237	24,196	18,416	7,046	2,035	3,649	5,882	14,144	66,233	16,177	50,555	21,978	8,358	8,905
Domestic Absorption	28,305	83,514	312,153	24,017	84,339	356,337	38,109	66,230	45,250	144,364	110,671	66,331	28,383	22,497	32,736	51,459	83,633	397,138	80,834	245,684	93,248	42,370	60,855

0 = magnitude is less than half of the unit employed; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.
b Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A1.7: Per Capita Real Expenditure Index, 2017

(Asia and the Pacific = 100)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	43	115	590	39	132	587	60	108	72	250	183	110	43	28	49	76	139	921	123	463	174	70	100
Actual Individual Consumption by Households[a]	57	122	274	60	169	720	71	114	71	270	135	117	46	42	78	110	117	543	146	490	175	82	100
Food and non-alcoholic beverages	120	157	151	107	227	358	88	123	113	261	119	136	91	99	101	192	86	188	139	244	179	96	100
Food	124	152	142	107	224	346	91	114	99	261	108	130	92	103	100	180	86	170	142	234	163	96	100
Bread and cereals	232	173	151	161	205	172	92	122	122	166	89	82	84	164	112	274	61	131	219	234	151	126	100
Meat and fish	89	74	214	119	176	675	29	151	160	324	192	232	120	55	43	281	133	216	82	291	167	157	100
Fruits and vegetables	86	146	71	60	268	186	119	65	61	209	58	21	92	98	65	71	91	133	80	242	208	53	100
Other food and non-alcoholic beverages	88	215	172	93	239	351	108	149	107	315	147	205	70	94	167	160	60	256	179	201	175	55	100
Alcoholic beverages, tobacco and narcotics	46	134	47	151	715	310	34	345	290	110	111	483	54	47	54	89	112	251	43	484	192	181	100
Clothing and footwear	73	194	128	24	153	927	129	74	35	169	114	117	36	28	121	20	76	388	131	500	72	92	100
Clothing	82	190	140	15	166	742	76	76	35	187	108	119	39	29	123	18	73	426	149	551	89	98	100
Housing, water, electricity, gas and other fuels[a]	77	128	322	57	119	665	69	98	64	320	135	95	64	41	123	91	115	421	126	444	132	104	100
Furnishings, household equipment and routine household maintenance	48	93	379	29	259	1,174	57	117	101	415	202	52	18	22	74	110	124	664	87	529	167	123	100
Health and education[a]	29	128	334	64	112	344	58	88	67	154	171	150	36	29	64	68	148	353	152	454	182	105	100
Health[a]	21	143	125	45	60	335	50	52	34	108	181	89	31	21	58	32	173	278	109	530	133	73	100
Education[a]	38	113	673	85	176	336	64	134	114	209	161	234	40	37	65	120	120	433	208	362	239	144	100
Transportation and communication	18	106	244	26	181	501	78	126	28	352	95	90	13	10	37	90	123	567	175	524	152	64	100
Transportation	21	116	274	31	148	466	84	128	27	309	67	90	12	7	32	98	117	549	202	503	169	72	100
Communication	10	74	159	5	322	661	54	120	33	506	193	90	16	24	58	67	147	651	52	628	94	25	100
Recreation and culture[a]	22	70	334	35	73	2,528	15	103	26	382	113	94	12	42	71	47	151	2,204	341	1,132	181	87	100
Restaurants and hotels	31	62	335	66	41	1,581	26	257	120	711	312	54	45	20	43	90	106	1,523	98	923	389	93	100
Miscellaneous goods and services[a]	19	65	139	14	107	1,493	84	45	49	261	101	67	13	10	48	129	121	858	194	692	191	30	100
Individual Consumption Expenditure by Government	10	161	689	38	119	273	23	73	58	234	234	202	26	10	31	60	184	399	204	584	259	85	100
Collective Consumption Expenditure by Government	34	359	2,830	22	269	540	52	121	228	266	312	216	131	35	51	73	131	1,146	169	543	241	104	100
Gross Fixed Capital Formation	33	130	667	11	69	394	47	102	61	187	255	66	35	20	18	50	173	765	77	263	112	43	100
Machinery and equipment	32	121	882	18	178	735	55	56	59	213	368	86	52	18	23	72	157	1,047	149	466	243	37	100
Construction	45	169	676	11	33	276	42	142	52	185	261	50	33	20	13	40	177	403	60	132	68	53	100
Other products	1	26	292	1	34	418	59	49	99	159	52	95	20	26	26	49	172	2,023	25	518	58	15	100
Changes in Inventories and Acquisitions Less Disposals of Valuables	3	-3	-534	9	65	125	132	20	0	38	116	317	25	165	36	4	117	841	479	-50	-25	85	100
Balance of Exports and Imports	-144	-895	4,966	-2	-276	632	-71	50	-81	859	209	108	-115	-369	-203	-371	191	19,132	-369	3,916	1,172	84	100
Individual Consumption Expenditure by Households[b]	62	118	231	62	174	781	77	118	71	273	125	109	48	46	83	115	109	558	140	478	166	81	100
Individual Consumption Expenditure by Households without Housing[b]	62	118	231	61	175	782	77	118	71	274	125	109	48	46	83	115	109	558	140	476	166	81	100
Government Final Consumption Expenditure	22	258	1,680	29	192	397	37	96	144	250	272	207	79	23	41	66	159	744	182	568	247	94	100
Domestic Absorption	47	137	513	39	139	586	63	109	74	237	182	109	47	37	54	85	137	653	133	404	153	70	100

0 = magnitude is less than half of the unit employed; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A1.8: Nominal Expenditure, 2017
(HK$ billion)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	2,047.3	19.7	94.5	172.8	41.7	2,662.8	19,892.6	7,913.4	131.3	2,452.6	37.9	89.0	492.6	194.7	2,458.7	2,444.1	94,637.9	2,637.2	680.8	4,480.3	3,548.1	1,744.0	148,874.2
Actual Individual Consumption by Households[a]	1,456.8	11.5	25.3	147.0	30.4	1,887.2	12,382.2	4,811.1	74.6	1,505.5	17.7	52.5	293.2	153.4	2,131.3	1,928.8	44,670.2	1,042.6	450.6	2,707.4	1,977.3	1,116.3	78,872.8
Food and non–alcoholic beverages	741.4	3.9	3.3	64.9	9.2	191.9	3,283.2	1,400.1	31.3	309.1	2.6	14.7	155.9	89.6	684.6	755.5	6,656.3	63.2	122.6	341.7	466.6	320.2	15,711.8
Food	738.4	3.6	2.9	62.2	8.6	180.0	3,233.6	1,249.3	26.2	297.6	2.2	13.3	151.7	88.3	651.3	692.8	6,452.3	56.3	120.5	318.4	405.7	307.9	15,063.1
Bread and cereals	329.4	1.0	0.7	19.9	1.8	18.7	739.8	330.4	7.2	42.1	0.4	2.2	33.6	31.4	159.6	261.9	1,144.0	9.9	37.9	76.1	86.7	91.8	3,426.4
Meat and fish	142.0	0.4	1.0	19.2	1.8	91.6	307.9	373.3	11.0	93.7	0.7	4.7	49.5	14.7	68.5	232.7	2,383.6	20.2	16.5	99.5	98.5	127.6	4,158.5
Fruits and vegetables	100.0	1.0	0.5	9.3	2.6	26.3	943.1	212.0	4.1	69.6	0.6	0.9	37.3	17.6	101.5	80.5	1,627.7	12.1	18.0	95.1	149.5	44.9	3,554.2
Other food and non–alcoholic beverages	170.1	1.5	1.0	16.5	3.0	55.3	1,292.4	484.4	9.0	103.8	1.0	7.0	35.5	26.0	355.0	180.4	1,500.9	21.1	50.2	71.0	131.9	55.9	4,572.7
Alcoholic beverages, tobacco and narcotics	29.0	0.3	0.1	5.7	4.2	15.2	244.3	336.4	6.2	25.2	0.3	4.0	6.3	5.9	20.6	24.4	912.6	17.0	8.6	55.5	64.6	40.0	1,826.5
Clothing and footwear	87.0	0.9	0.8	2.7	1.3	90.4	838.0	159.1	1.5	42.6	0.5	2.8	11.3	4.5	167.3	20.4	2,053.1	27.9	16.7	102.9	31.5	55.6	3,718.9
Clothing	77.5	0.6	0.7	1.4	1.1	59.5	665.3	136.5	1.2	36.5	0.4	2.2	9.7	3.8	134.7	13.8	1,596.1	23.5	15.1	89.6	30.1	46.5	2,945.8
Housing, water, electricity, gas and other fuels[a]	237.7	1.4	2.9	22.8	2.1	294.7	1,657.2	406.6	8.9	211.7	4.3	7.1	40.5	18.9	426.1	214.2	6,142.5	154.5	47.5	415.8	172.9	246.4	10,736.6
Furnishings, household equipment and routine household maintenance	46.8	0.4	1.0	2.7	2.0	94.1	373.6	194.0	4.0	71.5	0.9	1.1	4.3	2.9	77.9	64.5	1,885.8	41.9	9.5	111.8	74.7	68.1	3,133.6
Health and education[a]	133.2	1.6	6.6	20.0	4.3	278.3	1,666.8	613.3	6.2	203.4	3.7	8.5	31.0	13.0	282.5	222.7	12,222.8	186.5	38.6	474.2	373.3	204.2	16,994.7
Health[a]	52.2	0.9	1.7	10.2	1.2	157.4	735.2	211.8	2.4	82.3	2.0	3.2	16.6	6.2	169.6	72.2	6,815.7	98.1	21.2	268.1	180.0	99.1	9,007.5
Education[a]	81.1	0.7	4.9	9.8	3.1	120.9	931.6	401.4	3.8	121.0	1.7	5.3	14.3	6.8	113.0	150.4	5,407.1	88.3	17.4	206.1	193.3	105.1	7,987.2
Transportation and communication	67.4	1.8	4.4	11.2	4.1	169.9	2,108.0	825.0	5.9	297.7	2.1	6.8	16.0	6.5	151.9	254.8	5,047.7	176.3	95.9	361.5	274.4	148.1	10,037.4
Transportation	60.5	1.5	3.4	10.8	2.9	125.4	1,884.2	645.5	4.6	186.2	1.1	5.0	11.1	4.6	110.8	204.9	3,584.3	137.7	91.3	285.4	235.0	140.3	7,736.4
Communication	7.0	0.3	1.0	0.4	1.3	44.6	223.8	179.5	1.4	111.5	1.0	1.8	4.9	1.9	41.1	49.8	1,463.5	38.7	4.5	76.1	39.4	7.8	2,301.1
Recreation and culture[a]	23.2	0.3	1.6	4.0	0.5	194.1	108.7	209.6	1.3	92.5	0.7	2.0	3.6	5.1	87.1	32.5	2,143.0	109.2	52.7	233.0	95.7	48.9	3,449.2
Restaurants and hotels	33.4	0.2	1.2	7.0	0.4	166.7	233.9	440.8	7.7	144.2	1.2	1.3	14.3	2.7	57.9	74.0	1,773.2	96.8	16.7	196.1	171.4	49.2	3,490.2
Miscellaneous goods and services[a]	57.7	0.7	1.3	4.0	2.3	391.8	1,939.5	226.3	6.2	168.0	1.2	3.4	9.9	4.7	175.4	265.9	5,833.2	172.9	59.6	415.0	252.3	43.2	10,034.5
Individual Consumption Expenditure by Government	27.6	1.1	5.9	8.1	2.3	101.7	676.7	275.1	3.2	148.4	2.6	4.8	12.7	4.0	109.7	133.0	8,966.8	95.8	28.2	335.6	283.1	86.1	11,312.4
Collective Consumption Expenditure by Government	99.1	2.2	19.1	6.4	4.9	159.8	1,466.8	443.9	16.3	150.0	3.2	6.5	78.5	18.1	173.1	141.7	6,075.7	181.4	29.6	294.6	286.2	115.2	9,772.2
Gross Fixed Capital Formation	632.6	10.1	38.8	18.7	7.4	576.0	5,649.1	2,545.5	43.9	619.0	15.9	21.9	152.0	61.9	365.3	611.3	40,555.8	696.3	179.0	917.6	805.5	414.7	54,938.3
Machinery and equipment	185.3	3.0	13.0	8.5	4.6	161.4	1,706.0	417.8	12.4	182.0	5.9	7.5	64.6	13.1	127.1	223.6	7,478.7	206.5	92.0	359.1	467.6	96.7	11,836.5
Construction	443.8	6.8	23.3	10.0	2.3	360.4	2,908.7	1,912.3	19.4	357.8	9.5	9.5	73.9	37.0	156.2	299.8	28,311.4	270.8	78.1	329.2	272.7	295.1	36,187.9
Other products	3.4	0.4	2.6	0.2	0.5	54.1	1,034.4	215.4	12.1	79.2	0.5	4.9	13.6	11.8	82.0	87.9	4,765.7	219.0	8.9	229.2	65.2	22.9	6,913.9
Changes in Inventories and Acquisitions Less Disposals of Valuables	3.2	-0.0	-1.9	0.9	0.5	11.0	967.8	32.7	0.0	7.9	0.5	6.0	6.5	27.1	39.3	3.1	1,693.2	52.3	70.5	-10.5	-11.5	48.8	2,947.3
Balance of Exports and Imports	-144.3	-4.0	13.2	-0.2	-1.5	28.9	-573.4	80.3	-3.4	170.3	0.6	2.1	-37.7	-65.8	-250.3	-240.7	1,643.0	664.7	-48.9	571.2	490.7	48.9	2,343.7
Individual Consumption Expenditure by Households[b]	1,429.2	10.4	19.4	138.9	28.2	1,785.5	11,705.5	4,536.0	71.3	1,357.1	15.1	47.7	280.5	149.4	2,021.6	1,795.7	35,703.4	946.8	422.4	2,371.9	1,694.2	1,030.3	67,560.3
Individual Consumption Expenditure by Households without Housing[b]	1,309.5	9.4	17.2	123.1	27.0	1,538.1	10,570.2	4,254.9	64.7	1,244.2	12.5	42.0	262.3	134.5	1,763.6	1,666.9	31,635.0	814.6	386.3	2,021.0	1,583.8	899.6	60,380.5
Government Final Consumption Expenditure	126.7	3.2	25.0	14.5	7.2	261.5	2,143.5	719.0	19.5	298.4	5.8	11.3	91.2	22.1	282.8	274.7	15,042.4	277.2	57.8	630.2	569.3	201.3	21,084.7
Domestic Absorption	2,191.6	23.7	81.3	173.0	43.2	2,633.9	20,466.0	7,833.2	134.7	2,282.3	37.3	86.9	530.3	260.5	2,709.0	2,684.8	92,994.8	1,972.5	729.7	3,909.1	3,057.4	1,695.1	146,530.5

0.0 = magnitude is less than half of unit employed; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A1.9: Economy Shares of Nominal Expenditure to Asia and the Pacific, 2017

(%)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	1.38	0.01	0.06	0.12	0.03	1.79	13.36	5.32	0.09	1.65	0.03	0.06	0.33	0.13	1.65	1.64	63.57	1.77	0.46	3.01	2.38	1.17	100.00
Actual Individual Consumption by Households[a]	1.85	0.01	0.03	0.19	0.04	2.39	15.70	6.10	0.09	1.91	0.02	0.07	0.37	0.19	2.70	2.45	56.64	1.32	0.57	3.43	2.51	1.42	100.00
Food and non-alcoholic beverages	4.72	0.02	0.02	0.41	0.06	1.22	20.90	8.91	0.20	1.97	0.02	0.09	0.99	0.57	4.36	4.81	42.36	0.40	0.78	2.17	2.97	2.04	100.00
Food	4.90	0.02	0.02	0.41	0.06	1.20	21.47	8.29	0.17	1.98	0.01	0.09	1.01	0.59	4.32	4.60	42.84	0.37	0.80	2.11	2.69	2.04	100.00
Bread and cereals	9.61	0.03	0.02	0.58	0.05	0.54	21.59	9.64	0.21	1.23	0.01	0.06	0.98	0.92	4.66	7.64	33.39	0.29	1.11	2.22	2.53	2.68	100.00
Meat and fish	3.41	0.01	0.03	0.46	0.04	2.20	7.40	8.98	0.26	2.25	0.02	0.11	1.19	0.35	1.65	5.59	57.32	0.49	0.40	2.39	2.37	3.07	100.00
Fruits and vegetables	2.81	0.03	0.01	0.26	0.07	0.74	26.54	5.96	0.12	1.96	0.02	0.03	1.05	0.49	2.86	2.27	45.80	0.34	0.51	2.68	4.21	1.26	100.00
Other food and non-alcoholic beverages	3.72	0.03	0.02	0.36	0.07	1.21	28.26	10.59	0.20	2.27	0.02	0.15	0.78	0.57	7.76	3.95	32.82	0.46	1.10	1.55	2.88	1.22	100.00
Alcoholic beverages, tobacco and narcotics	1.59	0.02	0.01	0.31	0.23	0.83	13.38	18.42	0.34	1.38	0.02	0.22	0.35	0.32	1.13	1.34	49.96	0.93	0.47	3.04	3.54	2.19	100.00
Clothing and footwear	2.34	0.02	0.02	0.07	0.04	2.43	22.53	4.28	0.04	1.14	0.01	0.08	0.30	0.12	4.50	0.55	55.21	0.75	0.45	2.77	0.85	1.50	100.00
Clothing	2.63	0.02	0.02	0.05	0.04	2.02	22.58	4.63	0.04	1.24	0.01	0.07	0.33	0.13	4.57	0.47	54.18	0.80	0.51	3.04	1.02	1.58	100.00
Housing, water, electricity, gas and other fuels[a]	2.21	0.01	0.03	0.21	0.02	2.74	15.44	3.79	0.08	1.97	0.04	0.07	0.38	0.18	3.97	1.99	57.21	1.44	0.44	3.87	1.61	2.30	100.00
Furnishings, household equipment and routine household maintenance	1.49	0.01	0.03	0.09	0.06	3.00	11.92	6.19	0.13	2.28	0.03	0.04	0.14	0.09	2.49	2.06	60.18	1.34	0.30	3.57	2.39	2.17	100.00
Health and education[a]	0.78	0.01	0.04	0.12	0.03	1.64	9.81	3.61	0.04	1.20	0.02	0.05	0.18	0.08	1.66	1.31	71.92	1.10	0.23	2.79	2.20	1.20	100.00
Health[a]	0.58	0.01	0.02	0.11	0.01	1.75	8.16	2.35	0.03	0.91	0.02	0.04	0.18	0.07	1.88	0.80	75.67	1.09	0.24	2.98	2.00	1.10	100.00
Education[a]	1.02	0.01	0.06	0.12	0.04	1.51	11.66	5.03	0.05	1.52	0.02	0.07	0.18	0.08	1.41	1.88	67.70	1.11	0.22	2.58	2.42	1.32	100.00
Transportation and communication	0.67	0.02	0.04	0.11	0.04	1.69	21.00	8.22	0.06	2.97	0.02	0.07	0.16	0.06	1.51	2.54	50.29	1.76	0.96	3.60	2.73	1.48	100.00
Transportation	0.78	0.02	0.04	0.14	0.04	1.62	24.36	8.34	0.06	2.41	0.01	0.06	0.14	0.06	1.43	2.65	46.33	1.78	1.18	3.69	3.04	1.81	100.00
Communication	0.30	0.01	0.04	0.02	0.05	1.94	9.73	7.80	0.06	4.84	0.04	0.08	0.21	0.08	1.79	2.16	63.60	1.68	0.20	3.31	1.71	0.34	100.00
Recreation and culture[a]	0.67	0.01	0.05	0.12	0.01	5.63	3.15	6.08	0.04	2.68	0.02	0.06	0.11	0.15	2.52	0.94	62.13	3.16	1.53	6.75	2.77	1.42	100.00
Restaurants and hotels	0.96	0.01	0.03	0.20	0.01	4.78	6.70	12.63	0.22	4.13	0.04	0.04	0.41	0.08	1.66	2.12	50.81	2.77	0.48	5.62	4.91	1.41	100.00
Miscellaneous goods and services[a]	0.57	0.01	0.01	0.04	0.02	3.90	19.33	2.26	0.06	1.67	0.01	0.03	0.10	0.05	1.75	2.65	58.13	1.72	0.59	4.14	2.51	0.43	100.00
Individual Consumption Expenditure by Government	0.24	0.01	0.05	0.07	0.02	0.90	5.98	2.43	0.03	1.31	0.02	0.04	0.11	0.04	0.97	1.18	79.26	0.85	0.25	2.97	2.50	0.76	100.00
Collective Consumption Expenditure by Government	1.01	0.02	0.20	0.07	0.05	1.64	15.01	4.54	0.17	1.54	0.03	0.07	0.80	0.19	1.77	1.45	62.17	1.86	0.30	3.01	2.93	1.18	100.00
Gross Fixed Capital Formation	1.15	0.02	0.07	0.03	0.01	1.05	10.28	4.63	0.08	1.13	0.03	0.04	0.28	0.11	0.66	1.11	73.82	1.27	0.33	1.67	1.47	0.75	100.00
Machinery and equipment	1.57	0.03	0.11	0.07	0.04	1.36	14.41	3.53	0.10	1.54	0.05	0.06	0.55	0.11	1.07	1.89	63.18	1.74	0.78	3.03	3.95	0.82	100.00
Construction	1.23	0.02	0.06	0.03	0.01	1.00	8.04	5.28	0.05	0.99	0.03	0.03	0.20	0.10	0.43	0.83	78.23	0.75	0.22	0.91	0.75	0.82	100.00
Other products	0.05	0.01	0.04	0.00	0.01	0.78	14.96	3.11	0.17	1.14	0.01	0.07	0.20	0.17	1.19	1.27	68.93	3.17	0.13	3.32	0.94	0.33	100.00
Changes in Inventories and Acquisitions Less Disposals of Valuables	0.11	-0.00	-0.06	0.03	0.02	0.37	32.84	1.11	0.00	0.27	0.02	0.20	0.22	0.92	1.33	0.10	57.45	1.77	2.39	-0.36	-0.39	1.66	100.00
Balance of Exports and Imports	-6.16	-0.17	0.56	-0.01	-0.06	1.23	-24.46	3.43	-0.15	7.26	0.03	0.09	-1.61	-2.81	-10.68	-10.27	70.11	28.36	-2.09	24.37	20.94	2.09	100.00
Individual Consumption Expenditure by Households[b]	2.12	0.02	0.03	0.21	0.04	2.64	17.33	6.71	0.11	2.01	0.02	0.07	0.42	0.22	2.99	2.66	52.85	1.40	0.63	3.51	2.51	1.52	100.00
Individual Consumption Expenditure by Households without Housing[b]	2.17	0.02	0.03	0.20	0.04	2.55	17.51	7.05	0.11	2.06	0.02	0.07	0.43	0.22	2.92	2.76	52.39	1.35	0.64	3.35	2.62	1.49	100.00
Government Final Consumption Expenditure	0.60	0.02	0.12	0.07	0.03	1.24	10.17	3.41	0.09	1.42	0.03	0.05	0.43	0.10	1.34	1.30	71.34	1.31	0.27	2.99	2.70	0.95	100.00
Domestic Absorption	1.50	0.02	0.06	0.12	0.03	1.80	13.97	5.35	0.09	1.56	0.03	0.06	0.36	0.18	1.85	1.83	63.46	1.35	0.50	2.67	2.09	1.16	100.00

0.00 = magnitude is less than half of the unit employed; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A1.10: Per Capita Nominal Expenditure, 2017
(HK$)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	12,654	27,094	220,065	10,904	47,572	360,247	15,194	30,217	19,026	76,589	77,137	28,278	9,268	6,754	12,349	23,295	68,262	469,907	31,748	190,165	52,444	18,506	39,326
Actual Individual Consumption by Households[a]	9,004	15,752	58,920	9,276	34,687	255,310	9,458	18,371	10,808	47,013	36,053	16,664	5,517	5,319	10,704	18,383	32,220	185,763	21,011	114,917	29,226	11,845	20,835
Food and non-alcoholic beverages	4,582	5,337	7,582	4,095	10,485	25,959	2,508	5,346	4,540	9,654	5,343	4,672	2,934	3,109	3,438	7,201	4,801	11,264	5,718	14,504	6,896	3,397	4,150
Food	4,563	4,904	6,813	3,923	9,842	24,354	2,470	4,770	3,793	9,294	4,569	4,223	2,855	3,064	3,271	6,603	4,654	10,024	5,617	13,516	5,997	3,267	3,979
Bread and cereals	2,036	1,366	1,531	1,256	2,034	2,525	565	1,261	1,049	1,315	837	685	633	1,089	801	2,496	825	1,764	1,768	3,229	1,282	974	905
Meat and fish	877	585	2,441	1,212	2,077	12,392	235	1,426	1,588	2,925	1,361	1,483	932	508	344	2,218	1,719	3,599	769	4,224	1,455	1,354	1,098
Fruits and vegetables	618	1,308	1,227	589	2,947	3,557	720	809	601	2,174	1,141	293	702	610	510	767	1,174	2,147	840	4,038	2,209	476	939
Other food and non-alcoholic beverages	1,051	2,077	2,383	1,038	3,428	7,484	987	1,850	1,303	3,240	2,005	2,211	668	901	1,783	1,719	1,083	3,754	2,341	3,013	1,950	593	1,208
Alcoholic beverages, tobacco and narcotics	179	395	217	360	4,761	1,229	187	1,285	897	786	687	1,266	119	206	103	195	658	3,022	402	2,357	954	425	482
Clothing and footwear	538	1,187	1,908	173	1,521	12,229	640	607	223	1,329	1,068	900	213	156	840	233	1,481	4,975	780	4,366	465	590	982
Clothing	479	853	1,583	89	1,262	8,043	508	521	178	1,139	782	701	183	132	676	132	1,151	4,190	706	3,802	445	493	778
Housing, water, electricity, gas and other fuels[a]	1,469	1,857	6,723	1,437	2,420	39,868	1,266	1,553	1,285	6,611	8,814	2,268	763	656	2,140	2,041	4,431	27,532	2,214	17,647	2,555	2,615	2,836
Furnishings, household equipment and routine household maintenance	289	545	2,371	171	2,247	12,730	285	741	584	2,232	1,866	364	81	99	391	615	1,360	7,460	445	4,745	1,105	723	828
Health and education[a]	823	2,166	15,377	1,261	4,913	37,648	1,273	2,342	902	6,350	7,610	2,703	583	451	1,419	2,122	8,816	33,228	1,799	20,129	5,518	2,167	4,489
Health[a]	322	1,233	3,950	642	1,357	21,294	562	809	346	2,570	4,104	1,024	313	216	852	688	4,916	17,488	987	11,382	2,661	1,052	2,379
Education[a]	501	933	11,427	619	3,556	16,354	712	1,533	556	3,780	3,506	1,679	270	235	567	1,434	3,900	15,740	812	8,747	2,857	1,115	2,110
Transportation and communication	417	2,530	10,170	704	4,690	22,991	1,610	3,150	860	9,296	4,335	2,145	301	225	763	2,428	3,641	31,420	4,470	15,345	4,056	1,572	2,651
Transportation	374	2,061	7,907	682	3,260	16,963	1,439	2,465	662	5,815	2,232	1,576	209	160	557	1,953	2,585	24,531	4,259	12,115	3,473	1,488	2,044
Communication	43	468	2,262	23	1,430	6,028	171	685	199	3,481	2,103	569	91	65	206	475	1,056	6,889	211	3,230	583	83	608
Recreation and culture[a]	143	449	3,727	251	585	26,263	83	801	186	2,887	1,373	627	68	177	437	310	1,546	19,451	2,459	9,888	1,414	519	911
Restaurants and hotels	206	337	2,740	439	413	22,555	179	1,683	1,123	4,502	2,538	399	268	94	291	705	1,279	17,256	779	8,322	2,533	522	922
Miscellaneous goods and services[a]	356	949	3,033	251	2,651	53,003	1,481	864	896	5,247	2,420	1,072	186	164	881	2,534	4,207	30,801	2,778	17,616	3,730	458	2,651
Individual Consumption Expenditure by Government	171	1,455	13,851	513	2,581	13,756	517	1,051	471	4,634	5,310	1,527	239	139	551	1,268	6,468	17,062	1,313	14,244	4,184	913	2,988
Collective Consumption Expenditure by Government	612	2,998	44,416	404	5,595	21,618	1,120	1,695	2,361	4,685	6,515	2,074	1,477	628	869	1,351	4,382	32,322	1,382	12,503	4,230	1,222	2,581
Gross Fixed Capital Formation	3,909	13,903	90,377	1,178	8,460	77,924	4,315	9,720	6,355	19,329	32,266	6,968	2,861	2,149	1,835	5,826	29,253	124,067	8,349	38,947	11,906	4,401	14,512
Machinery and equipment	1,145	4,085	30,187	536	5,285	21,838	1,303	1,595	1,793	5,683	11,982	2,397	1,215	455	638	2,131	5,394	36,788	4,290	15,244	6,912	1,026	3,127
Construction	2,743	9,305	54,172	628	2,590	48,761	2,222	7,302	2,814	11,173	19,290	3,028	1,390	1,284	784	2,857	20,421	48,255	3,642	13,974	4,030	3,131	9,559
Other products	21	513	6,019	14	585	7,326	790	822	1,748	2,472	994	1,543	256	410	412	838	3,437	39,024	417	9,729	963	243	1,826
Changes in Inventories and Acquisitions Less Disposals of Valuables	20	-15	-4,391	58	538	1,485	739	125	0	246	1,010	1,902	123	940	198	29	1,221	9,313	3,288	-447	-170	518	779
Balance of Exports and Imports	-892	-5,544	30,743	-12	-1,707	3,910	-438	307	-499	5,317	1,293	669	-709	-2,282	-1,257	-2,294	1,185	118,442	-2,282	24,246	7,253	519	619
Individual Consumption Expenditure by Households[b]	8,833	14,296	45,068	8,763	32,106	244,555	8,941	17,320	10,337	42,379	30,743	15,137	5,278	5,180	10,153	17,115	25,753	168,702	19,698	100,673	25,042	10,932	17,846
Individual Consumption Expenditure by Households without Housing[b]	8,093	12,986	40,083	7,767	30,772	208,079	8,074	16,247	9,382	38,852	25,449	13,347	4,935	4,665	8,858	15,887	22,818	145,143	18,015	85,782	23,410	9,546	15,950
Government Final Consumption Expenditure	783	4,453	58,267	917	8,176	35,374	1,637	2,746	2,832	9,319	11,825	3,601	1,716	766	1,420	2,619	10,850	49,384	2,696	26,747	8,414	2,136	5,570
Domestic Absorption	13,545	32,638	189,322	10,916	49,279	356,337	15,632	29,910	19,524	71,273	75,844	27,609	9,977	9,036	13,606	25,589	67,077	351,465	34,030	165,920	45,191	17,987	38,707

0 = magnitude is less than half of the unit employed; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A1.11: Per Capita Nominal Expenditure Index, 2017
(Asia and the Pacific = 100)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	32	69	560	28	121	916	39	77	48	195	196	72	24	17	31	59	174	1,195	81	484	133	47	100
Actual Individual Consumption by Households[a]	43	76	283	45	166	1,225	45	88	52	226	173	80	26	26	51	88	155	892	101	552	140	57	100
Food and non-alcoholic beverages	110	129	183	99	253	625	60	129	109	233	129	113	71	75	83	173	116	271	138	349	166	82	100
Food	115	123	171	99	247	612	62	120	95	234	115	106	72	77	82	166	117	252	141	340	151	82	100
Bread and cereals	225	151	169	139	225	279	62	139	116	145	92	76	70	120	89	276	91	195	195	357	142	108	100
Meat and fish	80	53	222	110	189	1,128	21	130	145	266	124	135	85	46	31	202	157	328	70	385	132	123	100
Fruits and vegetables	66	139	131	63	314	379	77	86	64	232	122	31	75	65	54	82	125	229	89	430	235	51	100
Other food and non-alcoholic beverages	87	172	197	86	284	620	82	153	108	268	166	183	55	75	148	142	90	311	194	249	161	49	100
Alcoholic beverages, tobacco and narcotics	37	82	45	75	987	428	39	266	186	163	142	262	25	43	21	48	136	626	83	488	198	88	100
Clothing and footwear	55	121	194	18	155	1,245	65	62	23	135	109	92	22	16	86	20	151	506	79	444	47	60	100
Clothing	62	110	203	11	162	1,034	65	67	23	146	101	90	24	17	87	17	148	538	91	489	57	63	100
Housing, water, electricity, gas and other fuels[a]	52	65	237	51	85	1,406	45	55	45	233	311	80	27	23	75	72	156	971	78	622	90	92	100
Furnishings, household equipment and routine household maintenance	35	66	286	21	271	1,538	34	89	71	270	225	44	10	12	47	74	164	901	54	573	133	87	100
Health and education[a]	18	48	343	28	109	839	28	52	20	141	170	60	13	10	32	47	196	740	40	448	123	48	100
Health[a]	14	52	166	27	57	895	24	34	15	108	172	43	13	9	36	29	207	735	41	478	112	44	100
Education[a]	24	44	542	29	169	775	34	73	26	179	166	80	13	11	27	68	185	746	38	415	135	53	100
Transportation and communication	16	95	384	27	177	867	61	119	32	351	163	81	11	8	29	92	137	1,185	169	579	153	59	100
Transportation	18	101	387	33	160	830	70	121	32	285	109	77	10	8	27	96	127	1,200	208	593	170	73	100
Communication	7	77	372	4	235	992	28	113	33	573	346	94	15	11	34	78	174	1,133	35	531	96	14	100
Recreation and culture[a]	16	49	409	28	64	2,882	9	88	20	317	151	69	8	19	48	34	170	2,135	270	1,085	155	57	100
Restaurants and hotels	22	37	297	48	45	2,446	19	183	122	488	275	43	29	10	32	76	139	1,872	84	903	275	57	100
Miscellaneous goods and services[a]	13	36	114	9	100	2,000	56	33	34	198	91	40	7	6	33	96	159	1,162	105	665	141	17	100
Individual Consumption Expenditure by Government	6	49	464	17	86	460	17	35	16	155	178	51	8	5	18	42	216	571	44	477	140	31	100
Collective Consumption Expenditure by Government	24	116	1,721	16	217	837	43	66	91	181	252	80	57	24	34	52	170	1,252	54	484	164	47	100
Gross Fixed Capital Formation	27	96	623	8	58	537	30	67	44	133	222	48	20	15	13	40	202	855	58	268	82	30	100
Machinery and equipment	37	131	965	17	169	698	42	51	57	182	383	77	39	15	20	68	173	1,177	137	488	221	33	100
Construction	29	97	567	7	27	510	23	76	29	117	202	32	15	13	8	30	214	505	38	146	42	33	100
Other products	1	28	330	1	32	401	43	45	96	135	54	84	14	22	23	46	188	2,137	23	533	53	13	100
Changes in Inventories and Acquisitions Less Disposals of Valuables	3	-2	-564	7	69	191	95	16	0	32	130	244	16	121	25	4	157	1,196	422	-57	-22	67	100
Balance of Exports and Imports	-144	-895	4,966	-2	-276	632	-71	50	-81	859	209	108	-115	-369	-203	-371	191	19,132	-369	3,916	1,172	84	100
Individual Consumption Expenditure by Households[b]	49	80	253	49	180	1,354	50	97	58	237	172	85	30	29	57	96	144	945	110	564	140	61	100
Individual Consumption Expenditure by Households without Housing[b]	51	81	251	49	193	1,305	51	102	59	244	160	84	31	29	56	100	143	910	113	538	147	60	100
Government Final Consumption Expenditure	14	80	1,046	16	147	635	29	49	51	167	212	65	31	14	26	47	195	887	48	480	151	38	100
Domestic Absorption	35	84	489	28	127	921	40	77	50	184	196	71	26	23	35	66	173	908	88	429	117	46	100

0 = magnitude is less than half of the unit employed; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia;
LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka;
TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A1.12: Shares of Nominal Expenditure, 2017
(%)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Actual Individual Consumption by Households[a]	71.16	58.14	26.77	85.07	72.91	70.87	62.25	60.80	56.81	61.38	46.74	58.93	59.53	78.76	86.68	78.91	47.20	39.53	66.18	60.43	55.73	64.01	52.98
Food and non-alcoholic beverages	36.21	19.70	3.45	37.55	22.04	7.21	16.50	17.69	23.86	12.60	6.93	16.52	31.66	46.03	27.84	30.91	7.03	2.40	18.01	7.63	13.15	18.36	10.55
Food	36.07	18.10	3.10	35.98	20.69	6.76	16.26	15.79	19.94	12.13	5.92	14.94	30.81	45.36	26.49	28.34	6.82	2.13	17.69	7.11	11.44	17.65	10.12
Bread and cereals	16.09	5.04	0.70	11.52	4.28	0.70	3.72	4.17	5.51	1.72	1.08	2.42	6.83	16.13	6.49	10.72	1.21	0.38	5.57	1.70	2.44	5.27	2.30
Meat and fish	6.93	2.16	1.11	11.11	4.37	3.44	1.55	4.72	8.35	3.82	1.76	5.25	10.05	7.53	2.79	9.52	2.52	0.77	2.42	2.22	2.77	7.32	2.79
Fruits and vegetables	4.88	4.83	0.56	5.40	6.19	0.99	4.74	2.68	3.16	2.84	1.48	1.04	7.57	9.03	4.13	3.29	1.72	0.46	2.65	2.12	4.21	2.57	2.39
Other food and non-alcoholic beverages	8.31	7.67	1.08	9.52	7.21	2.08	6.50	6.12	6.85	4.23	2.60	7.82	7.21	13.34	14.44	7.38	1.59	0.80	7.37	1.58	3.72	3.20	3.07
Alcoholic beverages, tobacco and narcotics	1.42	1.46	0.10	3.30	10.01	0.57	1.23	4.25	4.71	1.03	0.89	4.48	1.29	3.04	0.84	1.00	0.96	0.64	1.27	1.24	1.82	2.30	1.23
Clothing and footwear	4.25	4.38	0.87	1.59	3.20	3.39	4.21	2.01	1.17	1.74	1.38	3.18	2.30	2.31	6.80	0.84	2.17	1.06	2.46	2.30	0.89	3.19	2.50
Clothing	3.79	3.15	0.72	0.81	2.65	2.23	3.34	1.72	0.94	1.49	1.01	2.48	1.97	1.95	5.48	0.57	1.69	0.89	2.22	2.00	0.85	2.66	1.98
Housing, water, electricity, gas and other fuels[a]	11.61	6.86	3.05	13.18	5.09	11.07	8.33	5.14	6.76	8.63	11.43	8.02	8.23	9.71	17.33	8.76	6.49	5.86	6.97	9.28	4.87	14.13	7.21
Furnishings, household equipment and routine household maintenance	2.29	2.01	1.08	1.57	4.72	3.53	1.88	2.45	3.07	2.91	2.42	1.29	0.87	1.47	3.17	2.64	1.99	1.59	1.40	2.50	2.11	3.90	2.10
Health and education[a]	6.51	7.99	6.99	11.57	10.33	10.45	8.38	7.75	4.74	8.29	9.87	9.56	6.29	6.68	11.49	9.11	12.92	7.07	5.67	10.58	10.52	11.71	11.42
Health[a]	2.55	4.55	1.79	5.89	2.85	5.91	3.70	2.68	1.82	3.36	5.32	3.62	3.37	3.20	6.90	2.95	7.20	3.72	3.11	5.99	5.07	5.68	6.05
Education[a]	3.96	3.44	5.19	5.68	7.47	4.54	4.68	5.07	2.92	4.94	4.54	5.94	2.91	3.48	4.59	6.15	5.71	3.35	2.56	4.60	5.45	6.03	5.37
Transportation and communication	3.29	9.34	4.62	6.46	9.86	6.38	10.60	10.43	4.52	12.14	5.62	7.59	3.25	3.33	6.18	10.42	5.33	6.69	14.08	8.07	7.73	8.49	6.74
Transportation	2.95	7.61	3.59	6.25	6.85	4.71	9.47	8.16	3.48	7.59	2.89	5.57	2.26	2.37	4.51	8.39	3.79	5.22	13.42	6.37	6.62	8.04	5.20
Communication	0.34	1.73	1.03	0.21	3.01	1.67	1.13	2.27	1.05	4.55	2.73	2.01	0.99	0.96	1.67	2.04	1.55	1.47	0.67	1.70	1.11	0.45	1.55
Recreation and culture[a]	1.13	1.66	1.69	2.30	1.23	7.29	0.55	2.65	0.98	3.77	1.78	2.22	0.74	2.63	3.54	1.33	2.26	4.14	7.74	5.20	2.70	2.81	2.32
Restaurants and hotels	1.63	1.24	1.25	4.02	0.87	6.26	1.18	5.57	5.90	5.88	3.29	1.41	2.90	1.39	2.36	3.03	1.87	3.67	2.45	4.38	4.83	2.82	2.34
Miscellaneous goods and services[a]	2.82	3.50	1.38	2.31	5.57	14.71	9.75	2.86	4.71	6.85	3.14	3.79	2.00	2.42	7.14	10.88	6.55	6.55	8.75	9.26	7.11	2.48	6.74
Individual Consumption Expenditure by Government	1.35	5.37	6.29	4.70	5.43	3.82	3.40	3.48	2.47	6.05	6.88	5.40	2.58	2.05	4.46	5.44	9.47	3.63	4.14	7.49	7.98	4.93	7.60
Collective Consumption Expenditure by Government	4.84	11.07	20.18	3.71	11.76	6.00	7.37	5.61	12.41	6.12	8.45	7.33	15.93	9.29	7.04	5.80	6.42	6.88	4.35	6.57	8.07	6.61	6.56
Gross Fixed Capital Formation	30.90	51.31	41.07	10.80	17.78	21.63	28.40	32.17	33.40	25.24	41.83	24.64	30.87	31.81	14.86	25.01	42.85	26.40	26.30	20.48	22.70	23.78	36.90
Machinery and equipment	9.05	15.08	13.72	4.91	11.11	6.06	8.58	5.28	9.43	7.42	15.53	8.48	13.11	6.74	5.17	9.15	7.90	7.83	13.51	8.02	13.18	5.54	7.95
Construction	21.68	34.34	24.62	5.76	5.44	13.54	14.62	24.17	14.79	14.59	25.01	10.71	14.99	19.01	6.35	12.27	29.92	10.27	11.47	7.35	7.68	16.92	24.31
Other products	0.17	1.89	2.74	0.13	1.23	2.03	5.20	2.72	9.19	3.23	1.29	5.46	2.76	6.07	3.34	3.60	5.04	8.30	1.31	5.12	1.84	1.32	4.64
Changes in Inventories and Acquisitions Less Disposals of Valuables	0.15	-0.05	-2.00	0.53	1.13	0.41	4.87	0.41	0.00	0.32	1.31	6.73	1.33	13.92	1.60	0.13	1.79	1.98	10.36	-0.24	-0.32	2.80	1.98
Balance of Exports and Imports	-7.05	-20.46	13.97	-0.11	-3.59	1.09	-2.88	1.01	-2.62	6.94	1.68	2.37	-7.65	-33.79	-10.18	-9.85	1.74	25.21	-7.19	12.75	13.83	2.80	1.57
Individual Consumption Expenditure by Households[b]	69.81	52.77	20.48	80.37	67.49	67.05	58.84	57.32	54.33	55.33	39.86	53.53	56.95	76.70	82.22	73.47	37.73	35.90	62.05	52.94	47.75	59.07	45.38
Individual Consumption Expenditure by Households without Housing[b]	63.96	47.93	18.21	71.23	64.69	57.76	53.14	53.77	49.31	50.73	32.99	47.20	53.25	69.08	71.73	68.20	33.43	30.89	56.74	45.11	44.64	51.58	40.56
Government Final Consumption Expenditure	6.19	16.44	26.48	8.41	17.19	9.82	10.78	9.09	14.88	12.17	15.33	12.74	18.51	11.35	11.50	11.24	15.89	10.51	8.49	14.07	16.04	11.54	14.16
Domestic Absorption	107.05	120.46	86.03	100.11	103.59	98.91	102.88	98.99	102.62	93.06	98.32	97.63	107.65	133.79	110.18	109.85	98.26	74.79	107.19	87.25	86.17	97.20	98.43

0.00 = magnitude is less than half of the unit employed; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A1.13: Gross Domestic Product, 2017

(billion local currency units)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE
Gross Domestic Product	21,131.47	164.63	16.75	89,830.52	11.06	2,662.84	166,225.64	13,587,212.60	140,697.75	1,353.38	74.87	27,876.30	85,980.80	2,611.20	33,270.44	15,807.60	82,075.40	467.31	13,317.29	17,501.18	15,451.96	5,005,975.49
Actual Individual Consumption by Households[a]	15,036.64	95.71	4.48	76,416.27	8.07	1,887.18	103,467.73	8,260,567.38	79,927.00	830.74	34.99	16,427.69	51,180.50	2,056.52	28,839.99	12,474.55	38,740.57	184.73	8,813.70	10,575.94	8,611.02	3,204,308.69
Food and non-alcoholic beverages	7,652.67	32.43	0.58	33,732.31	2.44	191.88	27,435.01	2,403,877.11	33,576.19	170.59	5.19	4,605.77	27,221.86	1,201.84	9,263.30	4,886.29	5,772.70	11.20	2,398.41	1,334.79	2,031.91	919,033.30
Food	7,621.07	29.80	0.52	32,317.57	2.29	180.01	27,020.05	2,145,012.46	28,050.71	164.22	4.43	4,163.44	26,488.46	1,184.56	8,813.71	4,480.51	5,595.82	9.97	2,356.19	1,243.86	1,767.00	883,745.15
Bread and cereals	3,399.54	8.30	0.12	10,345.52	0.47	18.67	6,181.69	567,208.37	7,754.46	23.24	0.81	674.94	5,870.26	421.16	2,159.12	1,693.99	992.14	1.75	741.48	297.15	377.72	263,601.27
Meat and fish	1,465.27	3.56	0.19	9,982.34	0.48	91.60	2,573.07	641,016.54	11,742.19	51.69	1.32	1,462.21	8,642.90	196.54	927.29	1,504.78	2,067.21	3.58	322.52	388.73	428.78	366,216.13
Fruits and vegetables	1,032.24	7.95	0.09	4,852.75	0.69	26.29	7,880.75	363,924.98	4,443.39	38.41	1.11	288.63	6,512.60	235.90	1,373.59	520.75	1,411.65	2.14	352.37	371.60	650.90	128,831.11
Other food and non-alcoholic beverages	1,755.62	12.62	0.18	8,551.69	0.80	55.32	10,799.50	831,727.22	9,636.15	57.25	1.95	2,179.99	6,196.10	348.23	4,803.29	1,166.77	1,301.70	3.73	982.05	277.31	574.51	160,384.80
Alcoholic beverages, tobacco and narcotics	299.69	2.40	0.02	2,967.21	1.11	15.25	2,041.51	577,637.00	6,631.55	13.88	0.67	1,247.98	1,106.90	79.49	278.09	157.81	791.45	3.01	168.56	216.89	281.21	114,901.23
Clothing and footwear	897.67	7.21	0.15	1,426.04	0.35	90.40	7,002.37	273,097.91	1,652.06	23.48	1.04	887.62	1,979.20	60.37	2,263.38	132.01	1,780.59	4.95	327.15	401.78	137.00	159,672.16
Clothing	800.14	5.19	0.12	731.49	0.29	59.45	5,559.21	234,338.04	1,317.61	20.13	0.76	691.02	1,696.90	50.96	1,822.40	89.57	1,384.22	4.17	296.23	349.93	131.07	133,404.73
Housing, water, electricity, gas and other fuels[a]	2,453.24	11.29	0.51	11,836.17	0.56	294.69	13,848.15	698,108.62	9,505.55	116.82	8.56	2,235.56	7,076.73	253.62	5,765.88	1,385.20	5,327.11	27.38	928.82	1,624.09	752.83	707,365.41
Furnishings, household equipment and routine household maintenance	483.40	3.31	0.18	1,409.10	0.52	94.10	3,122.25	333,094.87	4,320.36	39.44	1.81	358.53	749.70	38.32	1,054.54	417.02	1,635.46	7.42	186.54	436.66	325.51	195,458.96
Health and education[a]	1,375.15	13.16	1.17	10,390.09	1.14	278.29	13,928.31	1,052,956.83	6,671.03	112.21	7.39	2,664.23	5,406.30	174.37	3,823.33	1,440.02	10,600.34	33.04	754.62	1,852.47	1,625.75	586,235.78
Health[a]	538.29	7.49	0.30	5,291.70	0.32	157.40	6,143.82	363,688.33	2,561.63	45.42	3.98	1,009.29	2,901.50	83.58	2,294.67	467.10	5,910.99	17.39	414.19	1,047.46	783.99	284,529.15
Education[a]	836.86	5.67	0.87	5,098.39	0.83	120.89	7,784.50	689,268.50	4,109.41	66.79	3.40	1,654.94	2,504.80	90.79	1,528.65	972.92	4,689.35	15.65	340.44	805.01	841.76	301,706.64
Transportation and communication	695.82	15.37	0.77	5,803.60	1.09	169.94	17,614.92	1,416,471.05	6,363.17	164.27	4.21	2,114.58	2,790.20	87.05	2,055.47	1,647.70	4,377.68	31.25	1,875.26	1,412.19	1,194.94	425,112.50
Transportation	624.00	12.53	0.60	5,616.00	0.76	125.39	15,744.71	1,108,299.62	4,892.27	102.76	2.17	1,553.58	1,942.50	61.86	1,499.37	1,325.54	3,108.48	24.40	1,786.64	1,114.93	1,023.32	402,630.51
Communication	71.82	2.84	0.17	187.60	0.33	44.55	1,870.21	308,171.43	1,470.90	61.51	2.04	561.00	847.70	25.19	556.10	322.17	1,269.20	6.85	88.62	297.26	171.63	22,481.98
Recreation and culture[a]	239.40	2.73	0.28	2,065.62	0.14	194.13	908.00	359,960.53	1,377.23	51.02	1.33	617.82	635.50	68.56	1,178.26	210.14	1,858.50	19.34	1,031.40	910.00	416.70	140,464.97
Restaurants and hotels	344.43	2.05	0.21	3,612.97	0.10	166.72	1,954.68	756,765.63	8,304.46	79.56	2.46	393.31	2,491.00	36.42	783.74	478.59	1,537.84	17.16	326.57	765.85	746.31	141,304.28
Miscellaneous goods and services[a]	595.17	5.77	0.23	2,071.68	0.62	391.78	16,206.90	388,597.83	6,622.75	92.72	2.35	1,056.92	1,723.11	63.29	2,374.01	1,719.78	5,058.91	30.63	1,165.46	1,621.22	1,098.86	123,995.30
Individual Consumption Expenditure by Government	284.87	8.84	1.05	4,222.44	0.60	101.68	5,654.50	472,399.00	3,479.53	81.89	5.15	1,505.51	2,217.19	53.61	1,484.71	860.40	7,776.51	16.97	550.98	1,310.87	1,232.89	247,028.93
Collective Consumption Expenditure by Government	1,022.71	18.22	3.38	3,329.22	1.30	159.80	12,256.97	762,155.34	17,461.65	82.78	6.32	2,044.68	13,701.04	242.68	2,342.20	916.50	5,269.16	32.14	579.80	1,150.70	1,246.23	330,690.42
Gross Fixed Capital Formation	6,528.86	84.47	6.88	9,703.36	1.97	575.99	47,204.96	4,370,574.77	46,996.27	341.55	31.32	6,869.35	26,540.16	830.70	4,942.91	3,953.63	35,172.31	123.38	3,502.12	3,584.36	3,507.91	1,190,474.00
Machinery and equipment	1,912.92	24.82	2.30	4,414.09	1.23	161.42	14,255.86	717,277.04	13,261.65	100.43	11.63	2,362.83	11,274.00	175.91	1,719.33	1,446.35	6,485.94	36.58	1,799.42	1,402.90	2,036.62	277,553.37
Construction	4,580.58	56.54	4.12	5,175.74	0.60	360.42	24,305.56	3,283,435.90	20,811.37	197.44	18.72	2,985.22	12,891.60	496.26	2,113.52	1,938.94	24,553.31	47.99	1,527.68	1,286.09	1,187.47	847,051.87
Other products	35.35	3.12	0.46	113.53	0.14	54.15	8,643.55	369,761.83	12,923.25	43.68	0.96	1,521.30	2,374.56	158.54	1,110.05	568.33	4,133.05	38.81	175.02	895.37	283.82	65,868.75
Changes in Inventories and Acquisitions Less Disposals of Valuables	32.62	-0.09	-0.33	479.02	0.13	10.97	8,087.05	56,090.09	0.10	4.35	0.98	1,875.03	1,139.70	363.61	532.23	19.86	1,468.43	9.26	1,379.02	-41.18	-50.18	140,220.00
Balance of Exports and Imports	-1,489.36	-33.69	2.34	-97.34	-0.40	28.90	-4,791.06	137,825.02	-3,687.27	93.95	1.25	659.55	-6,580.60	-882.32	-3,386.98	-1,556.94	1,424.94	117.79	-957.34	2,231.37	2,136.97	140,282.38
Individual Consumption Expenditure by Households[b]	14,751.77	86.87	3.43	72,193.83	7.47	1,785.50	97,813.23	7,788,168.38	76,447.47	748.86	29.84	14,922.18	48,963.31	2,002.91	27,355.27	11,614.14	30,964.06	167.77	8,262.72	9,265.07	7,378.13	2,957,279.76
Individual Consumption Expenditure by Households without Housing[b]	13,515.99	78.90	3.05	63,986.47	7.16	1,538.06	88,326.44	7,305,594.75	69,381.08	686.54	24.70	13,157.75	45,784.01	1,803.80	23,864.67	10,780.81	27,435.70	144.34	7,556.78	7,894.60	6,897.31	2,582,258.68
Government Final Consumption Expenditure	1,307.58	27.06	4.43	7,551.66	1.90	261.47	17,911.46	1,234,554.34	20,941.18	164.67	11.48	3,550.19	15,918.23	296.29	3,826.91	1,776.91	13,045.67	49.11	1,130.77	2,461.57	2,479.13	577,719.35
Domestic Absorption	22,620.83	198.31	14.41	89,927.86	11.46	2,633.94	171,016.70	13,449,387.58	144,385.02	1,259.43	73.61	27,216.75	92,561.40	3,493.51	36,657.42	17,364.54	80,650.46	349.52	14,274.63	15,269.82	13,314.99	4,865,693.11

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Economy sources.

Appendix 2: Statistical Tables: Purchasing Power Parities and Real Expenditures, 2011 Revised

The tables presented in this appendix are 2011 revised key results for Asia and the Pacific for gross domestic product (GDP), its main aggregates, and selected expenditure aggregates at levels below the main aggregates. The main aggregates include individual consumption expenditure by households (ICEH) and nonprofit institutions serving households (NPISH), individual consumption expenditure by the government (ICEG), collective consumption expenditure by government (CCEG), government final consumption expenditure (GFCE), gross fixed capital formation (GFCF), changes in inventories, acquisitions less disposals of valuables, and balance of exports and imports.

This appendix also presents actual individual consumption by households (AICH), which is the aggregate of ICEH, NPISH, and ICEG. The five components of AICH are (i) housing, water, electricity, gas and other fuels; (ii) health; (iii) recreation and culture; (iv) education; and (v) miscellaneous goods and services. In contrast, expenditures for the other AICH components of food and non-food household consumption are incurred by households only. Results are also presented for another broad aggregate called "domestic absorption," which represents the domestic expenditures as aggregate of AICH, CCEG, GFCF, changes in inventories, and acquisitions less disposals of valuables.

These expenditure aggregates were derived using the Gini-Éltető-Köves-Szulc (GEKS) method. The real expenditure for each aggregate is derived by dividing the nominal expenditures estimated in local currency units by a purchasing power parity (PPP) that is specific to that aggregate, so real expenditure for such an aggregate may not equal the total of its components' real expenditures within an economy. Some PPPs presented are reference PPPs. For the detailed list of reference PPPs, see Appendix 5. When an economy's implementing agency is not able to provide prices for any of the items for any category corresponding to the available GDP expenditures, the regional implementing agency estimates the PPP for this category using gap filling techniques based on the country-product-dummy approach.

The 2011 revised results are based on revisions in the 2011 estimates of GDP, population, refinements in the methodology for estimating productivity adjustment factors, changes in some reference PPPs, and changes in International Comparison Program (ICP) classification (see Appendix 4, Table A4.2). The results presented in these tables are produced by the ICP regional implementing agency for Asia and the Pacific, based on data supplied by all the participating economies, and in accordance with the methodology recommended by the ICP Technical Advisory Group and approved by Asia and the Pacific Regional Advisory Board. As such, these results are not produced by participating economies as part of the economies' official statistics.

Table A2.1   Purchasing Power Parities, 2011 (Revised) (Hong Kong, China as base)
Table A2.2   Price Level Indexes, 2011 (Revised) (Hong Kong, China = 100)
Table A2.3   Price Level Indexes, 2011 (Revised) (Asia and the Pacific = 100)
Table A2.4   Real Expenditure, 2011 (Revised) (HK$ billion)
Table A2.5   Economy Shares of Real Expenditure to Asia and the Pacific, 2011 (Revised) (%)
Table A2.6   Per Capita Real Expenditure, 2011 (Revised) (HK$)
Table A2.7   Per Capita Real Expenditure Index, 2011 (Revised) (Asia and the Pacific = 100)
Table A2.8   Nominal Expenditure, 2011 (Revised) (HK$ billion)
Table A2.9   Economy Shares of Nominal Expenditure to Asia and the Pacific, 2011 (Revised) (%)

The above 13 indicator tables include 34 expenditure categories for which the definitions are shown in Appendix 1.

Table A2.1: Purchasing Power Parities, 2011 (Revised)
(Hong Kong, China as base)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE
Gross Domestic Product	4.47	3.13	0.13	262.06	0.18	1.00	2.97	671.29	509.59	0.85	0.28	1.50	101.97	50.03	4.83	4.77	3.46	0.67	0.16	7.51	2.90	2.37	1,321.50
Actual Individual Consumption by Households[a]	4.22	2.88	0.14	248.72	0.18	1.00	2.66	655.87	508.52	0.91	0.27	1.50	93.22	46.70	4.44	4.39	3.27	0.65	0.19	7.01	2.83	2.21	1,250.82
Food and non-alcoholic beverages	5.22	3.25	0.14	311.28	0.19	1.00	2.81	834.78	704.97	1.03	0.30	1.52	119.37	61.71	5.11	5.55	3.71	0.69	0.18	9.51	3.23	2.66	1,580.74
Food	5.17	3.20	0.14	308.74	0.19	1.00	2.76	831.23	688.76	1.03	0.30	1.50	117.87	60.52	5.04	5.46	3.76	0.69	0.19	9.38	3.23	2.63	1,577.37
Bread and cereals	5.83	3.59	0.13	315.08	0.20	1.00	3.02	917.57	815.50	1.13	0.34	1.95	134.47	72.99	5.49	6.48	4.22	0.79	0.20	10.04	3.83	3.16	1,695.16
Meat and fish	5.71	2.91	0.15	322.51	0.21	1.00	2.93	757.68	663.63	1.01	0.27	1.06	92.10	56.20	5.42	5.56	3.22	0.65	0.20	8.56	3.23	2.31	1,674.44
Fruits and vegetables	3.25	2.78	0.17	275.95	0.16	1.00	2.35	765.55	543.66	1.00	0.31	2.16	188.59	47.99	3.86	3.58	4.12	0.59	0.18	8.45	2.83	2.49	1,294.51
Other food and non-alcoholic beverages	5.71	3.60	0.14	333.45	0.21	1.00	3.02	902.83	790.73	1.00	0.30	1.47	123.59	71.37	5.51	6.02	3.69	0.74	0.16	10.41	3.09	2.80	1,597.29
Alcoholic beverages, tobacco and narcotics	2.66	4.05	0.29	200.09	0.19	1.00	3.21	925.53	510.12	0.67	0.37	0.90	74.21	54.92	4.83	3.81	2.34	0.77	0.36	6.39	2.73	2.78	877.68
Clothing and footwear	6.13	3.53	0.23	280.48	0.23	1.00	2.79	1,157.91	564.60	1.33	0.43	1.68	166.51	55.57	5.07	6.33	5.33	1.03	0.21	8.42	3.17	2.68	1,460.10
Clothing	6.34	3.54	0.23	287.04	0.22	1.00	2.72	1,185.09	574.15	1.37	0.43	1.79	165.72	57.01	5.20	6.51	5.49	1.07	0.21	8.44	3.27	2.75	1,499.23
Housing, water, electricity, gas and other fuels[a]	2.85	2.51	0.12	228.96	0.10	1.00	2.17	332.53	375.99	0.75	0.18	2.08	90.82	32.85	3.17	2.67	2.42	0.49	0.21	4.30	2.89	1.27	1,276.10
Furnishings, household equipment and routine household maintenance	4.34	3.63	0.25	261.79	0.22	1.00	3.38	773.61	569.90	1.19	0.35	1.60	151.96	54.33	4.63	5.92	3.19	0.81	0.21	9.54	3.42	2.89	1,366.16
Health and education[a]	2.22	1.69	0.10	101.21	0.13	1.00	1.35	383.44	143.60	0.69	0.19	0.92	33.25	14.41	2.07	2.13	2.09	0.50	0.17	2.95	2.03	1.43	465.65
Health[a]	2.31	1.76	0.10	112.90	0.14	1.00	1.12	504.53	237.08	0.79	0.20	0.79	32.70	19.55	2.02	1.91	2.64	0.43	0.18	3.37	1.65	1.46	485.78
Education[a]	2.15	1.59	0.10	90.93	0.13	1.00	1.62	300.71	92.94	0.61	0.18	1.02	32.00	10.60	2.13	2.46	1.78	0.57	0.17	2.55	2.43	1.39	445.24
Transportation and communication	5.42	3.19	0.14	347.21	0.25	1.00	3.63	843.51	711.90	0.94	0.35	1.46	114.66	79.22	8.30	6.08	4.34	0.63	0.23	9.50	2.78	2.81	2,248.00
Transportation	6.01	3.06	0.10	313.41	0.20	1.00	3.52	735.38	717.83	0.89	0.28	1.53	93.50	72.67	8.22	5.71	3.41	0.57	0.21	8.92	2.71	2.55	2,032.48
Communication	2.79	3.95	0.47	526.59	0.47	1.00	3.91	1,368.73	689.78	1.19	0.68	1.74	262.12	104.51	9.18	7.57	9.81	0.89	0.34	11.17	3.18	4.01	2,937.68
Recreation and culture[a]	7.41	4.53	0.22	379.68	0.27	1.00	4.56	876.29	897.30	1.13	0.37	2.18	155.10	66.96	6.81	6.76	4.82	0.73	0.16	10.79	3.68	3.32	1,683.11
Restaurants and hotels	4.51	2.67	0.18	252.52	0.23	1.00	3.67	723.00	608.37	0.98	0.24	1.19	119.79	42.94	4.66	5.90	3.27	0.61	0.16	10.89	2.43	1.89	1,254.33
Miscellaneous goods and services[a]	5.09	2.82	0.15	271.47	0.21	1.00	3.23	661.58	546.11	1.06	0.30	1.40	92.57	58.29	5.37	5.57	3.61	0.76	0.20	7.00	2.96	2.56	1,207.26
Individual Consumption Expenditure by Government	2.77	1.76	0.10	118.13	0.15	1.00	2.32	358.86	149.03	0.78	0.20	0.99	34.95	21.67	3.45	3.42	2.90	0.53	0.16	2.67	2.40	1.65	594.48
Collective Consumption Expenditure by Government	3.76	1.82	0.09	201.94	0.16	1.00	2.91	516.14	271.15	0.94	0.24	1.07	62.68	36.12	5.39	3.93	3.82	0.68	0.15	4.28	2.59	2.32	865.87
Gross Fixed Capital Formation	5.19	4.11	0.15	299.20	0.18	1.00	3.58	696.19	567.80	0.92	0.30	1.64	125.97	59.38	6.09	6.41	3.68	0.70	0.15	9.85	2.99	2.56	1,562.53
Machinery and equipment	8.34	6.28	0.16	496.43	0.23	1.00	5.33	1,038.22	942.20	0.90	0.38	1.85	170.20	99.68	8.73	9.89	5.42	0.87	0.15	14.60	3.45	3.74	2,338.42
Construction	3.41	2.72	0.14	182.04	0.14	1.00	2.39	477.77	339.67	0.80	0.23	1.36	93.00	34.07	4.20	4.01	2.48	0.54	0.13	6.51	2.63	1.69	1,060.56
Other products	8.37	6.10	0.16	457.29	0.23	1.00	5.40	1,019.14	936.90	0.90	0.37	1.82	165.78	97.53	8.93	10.34	5.37	0.86	0.15	14.47	3.43	3.71	2,335.64
Changes in Inventories and Acquisitions Less Disposals of Valuables	5.37	3.69	0.16	324.93	0.19	1.00	3.53	777.76	621.73	1.00	0.31	1.66	123.41	61.16	5.65	5.69	3.89	0.73	0.18	9.60	3.03	2.68	1,565.61
Balance of Exports and Imports	9.53	6.00	0.16	521.39	0.23	1.00	6.00	1,126.73	1,031.61	1.03	0.39	1.88	162.58	105.08	9.51	11.09	5.56	0.83	0.16	14.20	3.79	3.92	2,634.86
Individual Consumption Expenditure by Households[b]	4.38	3.02	0.15	264.43	0.18	1.00	2.71	689.25	553.23	0.91	0.28	1.56	102.82	49.30	4.56	4.51	3.32	0.65	0.19	7.61	2.86	2.26	1,333.17
Individual Consumption Expenditure by Households without Housing[b]	4.68	3.02	0.15	280.53	0.20	1.00	2.80	756.95	583.01	0.95	0.30	1.42	104.14	53.03	4.83	4.84	3.59	0.69	0.19	8.24	2.84	2.47	1,323.30
Government Final Consumption Expenditure	3.34	1.79	0.09	158.14	0.16	1.00	2.65	445.73	222.35	0.87	0.22	1.03	48.14	30.84	4.52	3.67	3.40	0.61	0.15	3.49	2.51	2.01	740.37
Domestic Absorption	4.43	3.15	0.14	256.42	0.18	1.00	2.94	656.30	499.83	0.92	0.28	1.50	101.16	49.09	4.86	4.72	3.40	0.67	0.17	7.45	2.86	2.32	1,299.71

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.2: Price Level Indexes, 2011 (Revised)

(Hong Kong, China = 100)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE
Gross Domestic Product	47	52	83	50	79	100	50	60	49	82	71	80	63	48	51	43	62	81	100	53	76	60	50
Actual Individual Consumption by Households[a]	44	48	89	48	77	100	44	58	49	88	70	80	57	44	47	40	59	79	118	49	75	56	47
Food and non-alcoholic beverages	55	54	89	60	83	100	47	74	68	100	77	81	73	59	54	50	67	83	113	67	85	68	60
Food	54	53	89	59	82	100	46	74	67	100	76	80	73	58	53	49	68	83	116	66	85	67	60
Bread and cereals	61	60	80	60	88	100	50	81	79	110	86	104	83	69	58	58	76	95	127	71	101	81	64
Meat and fish	60	49	91	62	89	100	49	67	64	98	69	56	57	53	57	50	58	79	122	60	85	59	64
Fruits and vegetables	34	46	104	53	68	100	39	68	53	97	80	115	116	46	41	32	74	71	108	59	75	64	49
Other food and non-alcoholic beverages	60	60	85	64	92	100	50	80	77	97	77	78	76	68	58	54	66	89	100	73	82	72	61
Alcoholic beverages, tobacco and narcotics	28	67	179	38	83	100	53	82	49	65	95	48	46	52	51	34	42	93	222	45	72	71	33
Clothing and footwear	64	59	145	54	98	100	46	103	55	129	109	89	102	53	53	57	96	124	133	59	84	68	55
Clothing	67	59	143	55	97	100	45	105	56	133	109	95	102	54	55	59	99	129	129	59	86	70	57
Housing, water, electricity, gas and other fuels[a]	30	42	73	44	42	100	36	30	36	73	47	111	56	31	33	24	44	59	131	30	76	32	48
Furnishings, household equipment and routine household maintenance	46	60	156	50	95	100	56	69	55	116	89	85	93	52	49	53	57	97	129	67	90	74	52
Health and education[a]	23	28	64	19	58	100	23	34	14	67	48	49	20	14	22	19	38	60	108	21	54	36	18
Health[a]	24	29	64	22	60	100	19	45	23	76	50	42	20	19	21	17	47	52	109	24	44	37	18
Education[a]	23	27	60	17	55	100	27	27	9	59	46	55	20	10	22	22	32	69	104	18	64	35	17
Transportation and communication	57	53	87	67	108	100	61	75	69	91	89	78	71	75	87	55	78	76	143	67	74	72	85
Transportation	63	51	62	60	87	100	59	65	70	86	71	82	58	69	86	51	61	69	127	63	72	65	77
Communication	29	66	291	101	203	100	65	121	67	116	173	93	161	99	97	68	176	107	209	79	84	102	111
Recreation and culture[a]	78	76	138	73	117	100	76	78	87	109	93	116	95	64	72	61	87	88	101	76	97	85	64
Restaurants and hotels	47	45	112	48	98	100	61	64	59	96	62	63	74	41	49	53	59	73	98	77	64	48	48
Miscellaneous goods and services[a]	53	47	91	52	91	100	54	59	53	103	76	75	57	55	56	50	65	91	123	49	78	65	46
Individual Consumption Expenditure by Government	29	29	61	23	66	100	39	32	14	76	51	53	21	21	36	31	52	63	102	19	63	42	23
Collective Consumption Expenditure by Government	39	30	54	39	72	100	49	46	26	91	60	57	39	34	57	35	69	81	92	30	68	59	33
Gross Fixed Capital Formation	54	69	96	57	77	100	60	62	55	89	76	88	77	57	64	58	66	84	90	69	79	65	59
Machinery and equipment	88	105	101	95	99	100	89	92	91	88	96	99	105	95	92	89	97	104	96	103	91	95	89
Construction	36	45	84	35	62	100	40	42	33	78	59	73	57	32	44	36	45	65	83	46	69	43	40
Other products	88	102	101	88	98	100	90	90	91	87	95	97	102	93	94	93	97	104	94	102	91	95	89
Changes in Inventories and Acquisitions Less Disposals of Valuables	56	62	99	62	84	100	59	69	60	97	79	89	76	58	59	51	70	88	111	68	80	69	59
Balance of Exports and Imports	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Individual Consumption Expenditure by Households[b]	46	50	91	51	78	100	45	61	54	89	71	83	63	47	48	41	60	79	120	54	75	58	51
Individual Consumption Expenditure by Households without Housing[b]	49	50	95	54	85	100	47	67	57	92	76	76	64	50	51	44	65	83	120	58	75	63	50
Government Final Consumption Expenditure	35	30	55	30	69	100	44	40	22	84	56	55	30	29	48	33	61	73	94	25	66	51	28
Domestic Absorption	46	53	86	49	77	100	49	58	48	89	71	80	62	47	51	43	61	80	106	52	76	59	49

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

b Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.3: Price Level Indexes, 2011 (Revised)
(Asia and the Pacific = 100)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE
Gross Domestic Product	67	75	120	72	113	144	71	86	71	118	102	115	90	68	73	62	89	116	144	76	110	87	72
Actual Individual Consumption by Households[a]	70	76	140	75	121	157	70	91	77	139	110	126	90	70	73	62	92	123	186	77	117	89	75
Food and non-alcoholic beverages	83	83	135	91	126	152	71	113	104	152	117	123	112	89	82	76	101	126	172	102	130	103	91
Food	83	82	136	91	125	154	71	113	103	154	118	123	111	88	81	76	104	127	178	101	131	103	92
Bread and cereals	85	83	111	84	122	139	70	113	110	152	120	145	115	97	80	81	105	132	176	98	141	112	89
Meat and fish	86	69	130	88	127	143	70	96	92	139	99	80	81	76	82	72	83	113	175	86	122	84	91
Fruits and vegetables	62	84	188	95	122	180	71	122	95	175	144	207	209	82	73	58	133	128	195	107	135	114	89
Other food and non-alcoholic beverages	91	91	130	97	139	152	76	122	116	147	116	119	115	103	88	82	101	135	153	111	124	109	92
Alcoholic beverages, tobacco and narcotics	39	94	249	54	116	140	75	115	69	91	132	67	64	73	71	48	59	129	310	63	101	99	46
Clothing and footwear	73	67	165	61	112	114	53	117	62	147	124	102	117	60	61	65	109	141	151	68	95	78	63
Clothing	75	66	161	62	108	112	51	118	62	149	122	107	114	61	61	66	111	144	145	67	97	79	64
Housing, water, electricity, gas and other fuels[a]	64	89	156	93	90	212	77	63	77	155	99	235	119	66	71	51	93	126	278	64	162	69	103
Furnishings, household equipment and routine household maintenance	56	74	192	62	116	123	69	84	68	142	110	105	115	64	60	66	71	119	159	83	111	91	64
Health and education[a]	51	62	140	43	128	221	50	75	31	149	107	108	45	30	48	42	83	133	238	46	118	80	39
Health[a]	56	68	150	50	140	233	44	104	54	178	117	98	47	43	49	40	110	122	254	55	101	87	43
Education[a]	50	58	131	38	120	220	59	59	20	130	102	120	43	22	49	49	70	151	229	40	141	78	37
Transportation and communication	79	74	121	92	150	139	84	104	96	127	123	108	98	105	121	76	108	105	198	93	102	100	118
Transportation	96	78	95	92	133	152	89	99	106	131	108	124	88	105	132	78	93	104	194	96	109	99	117
Communication	29	65	285	99	199	98	64	119	66	113	169	91	158	98	95	67	173	105	205	77	82	100	109
Recreation and culture[a]	89	86	157	83	133	114	87	89	99	125	106	133	109	73	82	70	99	101	115	87	111	97	73
Restaurants and hotels	70	65	165	71	145	147	90	94	87	140	91	93	108	60	72	78	86	108	145	113	94	71	70
Miscellaneous goods and services[a]	73	64	125	71	124	137	74	80	72	141	104	102	76	76	77	69	89	125	168	67	107	89	63
Individual Consumption Expenditure by Government	52	52	108	40	117	178	69	57	26	135	91	94	38	37	65	55	93	113	181	34	113	75	40
Collective Consumption Expenditure by Government	61	47	84	60	110	154	75	71	41	140	93	88	59	53	87	55	106	126	141	47	105	91	51
Gross Fixed Capital Formation	71	89	124	74	100	130	77	80	71	116	98	114	100	73	83	75	86	109	117	90	102	85	77
Machinery and equipment	88	105	101	95	99	100	89	92	91	88	96	99	105	95	92	89	98	104	96	103	91	96	89
Construction	62	79	146	61	107	173	69	73	57	134	102	126	99	56	76	63	77	113	144	79	120	75	70
Other products	89	103	102	88	99	101	91	91	92	88	96	98	103	94	95	94	97	105	95	103	91	95	89
Changes in Inventories and Acquisitions Less Disposals of Valuables	76	83	133	84	113	134	79	93	81	130	105	119	102	78	80	69	94	119	149	91	107	92	80
Balance of Exports and Imports	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Individual Consumption Expenditure by Households[b]	72	79	143	80	123	157	71	96	84	139	112	130	99	74	75	64	94	124	188	84	118	90	79
Individual Consumption Expenditure by Households without Housing[b]	73	75	141	80	128	149	70	100	84	138	113	113	96	75	76	65	96	124	179	87	112	94	75
Government Final Consumption Expenditure	57	49	90	49	112	163	72	64	35	137	92	89	48	48	77	54	100	119	154	40	108	84	46
Domestic Absorption	68	77	126	72	113	147	72	85	71	131	103	117	91	68	75	62	90	118	156	77	111	87	72

BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

b Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.4: Real Expenditure, 2011 (Revised)

(HK$ billion)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	2,202.9	27.1	172.9	198.7	40.4	1,934.4	28,688.0	11,666.7	140.4	346.9	3,253.8	27.0	129.2	877.5	298.6	4,016.7	2,807.0	72,641.0	2,171.4	961.4	4,943.1	4,776.3	2,103.6	144,424.9
Actual Individual Consumption by Households[a]	1,761.9	14.6	27.7	176.4	30.7	1,289.5	18,921.1	7,022.4	88.0	77.0	1,811.4	10.1	80.6	576.9	258.9	3,705.3	2,300.9	32,178.8	734.4	775.4	3,138.5	3,168.9	1,409.3	79,558.8
Food and non-alcoholic beverages	723.2	3.8	3.5	62.9	9.9	137.5	5,176.8	1,676.8	23.6	5.0	314.4	2.2	18.1	250.5	126.8	1,294.8	822.7	5,743.6	48.7	166.9	316.3	663.4	335.8	17,926.8
Food	726.8	3.6	3.1	60.7	9.4	131.9	5,165.8	1,550.9	20.8	4.7	302.1	1.9	16.8	249.4	126.8	1,263.3	750.3	5,604.2	42.5	165.6	295.3	588.7	325.1	17,410.0
Bread and cereals	287.4	0.9	0.8	19.0	1.8	12.1	1,161.9	421.1	4.6	0.7	38.0	0.4	1.7	56.3	48.3	249.0	245.4	1,060.7	6.8	53.5	57.3	108.4	90.3	3,926.6
Meat and fish	126.1	0.5	1.1	18.0	2.0	74.1	393.8	456.8	9.6	2.2	112.7	0.8	7.4	83.1	19.5	116.7	302.2	1,953.3	15.4	23.5	93.4	167.4	126.6	4,106.2
Fruits and vegetables	157.0	1.1	0.5	10.2	3.3	16.5	1,633.4	261.4	4.1	1.1	59.4	0.3	1.2	75.2	28.5	262.7	78.9	1,665.9	8.5	20.4	102.3	213.4	57.6	4,663.0
Other food and non-alcoholic beverages	151.4	1.2	1.1	14.9	2.8	34.7	1,994.3	517.4	5.4	1.0	108.8	0.8	8.3	43.0	30.4	661.2	194.5	1,147.8	18.4	65.0	68.1	180.3	56.9	5,307.7
Alcoholic beverages, tobacco and narcotics	58.0	0.3	0.0	8.1	2.0	12.6	414.7	258.1	6.1	0.5	22.7	0.5	7.0	9.7	7.8	40.5	39.2	587.8	7.2	29.7	71.9	86.6	65.6	1,736.7
Clothing and footwear	72.9	0.9	0.5	2.9	1.1	59.9	1,082.5	151.9	1.6	2.9	30.9	0.2	2.1	17.0	5.6	119.4	18.9	1,409.5	17.3	32.6	109.7	81.4	55.8	3,277.8
Clothing	62.9	0.6	0.5	1.5	0.9	40.5	891.9	129.8	1.3	2.2	26.9	0.2	1.9	14.2	4.5	95.5	12.7	1,124.0	14.2	30.7	92.6	75.2	45.9	2,670.6
Housing, water, electricity, gas and other fuels[a]	450.6	2.9	3.8	28.4	5.2	210.2	3,595.7	1,233.9	13.3	13.1	403.3	2.0	12.3	122.5	40.7	1,171.8	371.2	5,913.5	105.5	115.4	497.6	449.4	313.0	15,075.5
Furnishings, household equipment and routine household maintenance	55.0	0.2	0.6	3.1	1.5	71.1	453.8	238.7	4.3	1.1	70.9	0.5	0.6	6.6	4.3	90.1	91.4	1,272.0	33.5	15.4	113.9	99.5	74.4	2,702.4
Health and education[a]	305.4	5.1	10.7	59.9	5.8	183.3	4,339.7	1,522.7	19.3	13.9	398.3	2.8	33.0	134.9	52.1	847.0	347.5	10,502.4	129.4	167.5	803.4	852.9	619.2	21,356.3
Health[a]	117.7	2.7	2.7	27.4	1.6	98.1	2,099.6	433.8	5.8	6.1	146.5	1.5	10.2	58.0	23.5	534.2	79.9	7,249.1	58.6	80.5	508.9	393.4	280.0	12,219.9
Education[a]	189.4	2.4	8.5	32.7	4.4	85.3	2,172.1	1,213.9	15.2	7.9	258.9	1.4	23.8	76.5	28.4	318.6	290.6	3,709.2	72.5	87.3	325.9	465.4	342.1	9,732.3
Transportation and communication	64.3	1.6	4.8	9.7	2.7	116.8	2,289.0	945.7	8.1	7.7	271.6	1.3	13.4	16.8	5.9	215.9	229.3	3,089.7	100.6	102.6	451.1	395.6	86.8	8,431.0
Transportation	52.0	1.3	5.2	10.4	2.3	90.3	2,051.3	801.9	6.7	6.2	221.1	0.5	13.9	12.8	4.1	182.6	225.6	2,154.7	81.8	103.7	349.0	380.0	88.8	6,846.2
Communication	12.8	0.3	0.3	0.2	0.5	26.5	282.4	152.0	1.4	1.5	48.6	0.7	0.9	3.9	1.7	35.7	23.0	802.0	19.1	4.4	97.4	35.4	5.0	1,555.6
Recreation and culture[a]	7.3	0.6	1.1	3.2	0.4	145.4	120.4	229.7	0.9	5.8	85.7	0.2	1.4	4.6	6.7	26.6	27.1	1,559.9	112.3	49.4	206.2	92.6	46.0	2,733.3
Restaurants and hotels	37.4	0.2	1.0	8.3	0.3	125.2	307.4	532.7	7.6	12.1	181.6	0.3	1.0	27.7	4.8	28.1	80.7	1,758.4	81.3	16.3	230.1	288.1	63.5	3,794.3
Miscellaneous goods and services[a]	56.7	0.3	1.4	4.4	2.3	227.4	2,005.7	345.1	6.1	6.7	215.9	0.6	2.5	14.5	12.0	188.1	270.3	2,374.0	101.6	84.6	435.8	289.0	55.5	6,700.7
Individual Consumption Expenditure by Government	51.0	3.8	10.3	20.7	2.9	65.1	1,187.9	738.9	8.1	10.5	296.6	1.8	21.0	19.0	13.7	171.1	137.7	7,953.4	71.3	108.4	455.3	538.0	209.4	12,095.8
Collective Consumption Expenditure by Government	95.2	5.7	38.2	9.6	4.5	103.4	2,304.6	860.8	18.6	13.6	260.0	6.4	14.1	134.3	16.8	345.0	142.2	4,524.3	139.8	76.6	415.6	420.9	189.8	10,139.8
Gross Fixed Capital Formation	529.2	14.0	46.0	20.2	7.5	455.3	7,881.8	3,521.9	40.7	40.0	678.1	8.3	50.6	230.8	50.6	389.4	494.9	31,892.3	607.9	192.7	1,120.2	1,166.0	529.3	49,967.7
Machinery and equipment	72.8	3.5	14.5	5.2	3.7	199.5	1,604.5	445.1	3.8	7.9	195.2	2.4	20.7	63.7	7.7	74.6	105.7	7,140.6	183.3	72.4	399.9	510.9	90.3	11,228.1
Construction	603.5	12.3	31.3	16.5	2.9	214.2	6,783.9	3,750.6	33.3	34.9	423.3	6.6	22.8	161.8	40.9	297.2	366.0	25,891.9	341.6	121.7	489.5	553.8	532.3	40,732.8
Other products	9.7	0.3	2.9	1.0	0.4	41.5	636.6	194.2	8.8	1.9	80.2	–	4.4	18.9	7.8	54.6	63.1	2,367.4	94.4	3.3	198.4	36.7	22.0	3,848.5
Changes in Inventories and Acquisitions Less Disposals of Valuables	14.0	-0.1	-2.2	0.9	1.0	11.7	1,338.3	174.8	1.5	4.0	32.7	0.1	10.4	0.8	42.3	53.9	43.1	1,786.5	28.0	53.4	11.9	41.9	89.8	3,738.6
Balance of Exports and Imports	-79.6	-4.1	56.9	-0.1	-1.7	74.5	-788.4	172.0	-2.3	165.7	361.2	2.5	-17.7	-15.6	-36.4	-113.6	-63.4	1,515.5	598.6	-67.0	254.3	58.7	-43.6	2,026.2
Individual Consumption Expenditure by Households[b]	1,664.9	11.7	20.2	156.7	27.9	1,224.4	17,575.4	6,297.5	78.7	67.8	1,556.8	8.6	66.0	538.1	241.6	3,472.9	2,145.6	25,674.6	664.5	675.7	2,729.3	2,707.6	1,228.9	68,835.5
Individual Consumption Expenditure by Households without Housing[b]	1,415.4	10.0	17.3	132.0	24.0	1,051.6	15,059.6	5,391.8	67.5	56.9	1,334.8	7.3	56.3	462.2	207.2	2,982.9	1,842.6	22,005.6	569.0	580.3	2,330.0	2,327.4	1,051.6	58,983.6
Government Final Consumption Expenditure	149.7	9.5	48.8	27.7	7.4	168.5	3,576.8	1,591.6	28.1	24.1	546.7	8.4	33.5	170.6	30.5	528.3	276.6	11,940.6	212.4	177.0	865.0	927.1	390.1	21,739.1
Domestic Absorption	2,397.3	34.8	101.1	203.3	43.5	1,860.0	30,638.2	11,637.8	147.8	134.1	2,772.9	23.9	158.7	927.8	367.3	4,326.6	2,959.0	71,482.6	1,485.0	1,096.3	4,660.5	4,773.6	2,227.2	144,459.4

0.0 = magnitude is less than half of unit employed; – = magnitude equals zero; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.5: Economy Shares of Real Expenditure to Asia and the Pacific, 2011 (Revised)
(%)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	1.53	0.02	0.12	0.14	0.03	1.34	19.86	8.08	0.10	0.24	2.25	0.02	0.09	0.61	0.21	2.78	1.94	50.30	1.50	0.67	3.42	3.31	1.46	100.00
Actual Individual Consumption by Households[a]	2.21	0.02	0.03	0.22	0.04	1.62	23.78	8.83	0.11	0.10	2.28	0.01	0.10	0.73	0.33	4.66	2.89	40.45	0.92	0.97	3.94	3.98	1.77	100.00
Food and non-alcoholic beverages	4.03	0.02	0.02	0.35	0.06	0.77	28.88	9.35	0.13	0.03	1.75	0.01	0.10	1.40	0.71	7.22	4.59	32.04	0.27	0.93	1.76	3.70	1.87	100.00
Food	4.17	0.02	0.02	0.35	0.05	0.76	29.67	8.91	0.12	0.03	1.73	0.01	0.10	1.43	0.73	7.26	4.31	32.19	0.24	0.95	1.70	3.38	1.87	100.00
Bread and cereals	7.32	0.02	0.02	0.49	0.05	0.31	29.59	10.72	0.12	0.02	0.97	0.01	0.04	1.43	1.23	6.34	6.25	27.01	0.17	1.36	1.46	2.76	2.30	100.00
Meat and fish	3.07	0.01	0.03	0.44	0.05	1.81	9.59	11.12	0.23	0.05	2.74	0.02	0.18	2.02	0.47	2.84	7.36	47.57	0.37	0.57	2.27	4.08	3.08	100.00
Fruits and vegetables	3.37	0.02	0.01	0.22	0.07	0.35	35.03	5.61	0.09	0.02	1.27	0.01	0.03	1.61	0.61	5.63	1.69	35.73	0.18	0.44	2.19	4.58	1.24	100.00
Other food and non-alcoholic beverages	2.85	0.02	0.02	0.28	0.05	0.65	37.57	9.75	0.10	0.02	2.05	0.01	0.16	0.81	0.57	12.46	3.66	21.63	0.35	1.22	1.28	3.40	1.07	100.00
Alcoholic beverages, tobacco and narcotics	3.34	0.02	0.00	0.47	0.11	0.73	23.88	14.86	0.35	0.03	1.31	0.03	0.40	0.56	0.45	2.33	2.26	33.85	0.41	1.71	4.14	4.98	3.78	100.00
Clothing and footwear	2.22	0.03	0.02	0.09	0.03	1.83	33.02	4.63	0.05	0.03	0.94	0.01	0.06	0.52	0.17	3.64	0.58	43.00	0.53	1.00	3.35	2.48	1.70	100.00
Clothing	2.36	0.02	0.02	0.06	0.03	1.52	33.40	4.86	0.05	0.08	1.01	0.01	0.07	0.53	0.17	3.58	0.48	42.09	0.53	1.15	3.47	2.82	1.72	100.00
Housing, water, electricity, gas and other fuels[a]	2.99	0.02	0.03	0.19	0.03	1.39	23.85	8.18	0.09	0.09	2.68	0.01	0.08	0.81	0.27	7.77	2.46	39.23	0.70	0.77	3.30	2.98	2.08	100.00
Furnishings, household equipment and routine household maintenance	2.04	0.01	0.02	0.11	0.05	2.63	16.79	8.83	0.16	0.04	2.62	0.02	0.02	0.24	0.16	3.34	3.38	47.07	1.24	0.57	4.21	3.68	2.75	100.00
Health and education[a]	1.43	0.02	0.05	0.28	0.03	0.86	20.32	7.13	0.09	0.07	1.87	0.01	0.15	0.63	0.24	3.97	1.63	49.18	0.61	0.78	3.76	3.99	2.90	100.00
Health[a]	0.96	0.02	0.02	0.22	0.01	0.80	17.18	3.55	0.05	0.05	1.20	0.01	0.08	0.47	0.19	4.37	0.65	59.32	0.48	0.66	4.16	3.22	2.29	100.00
Education[a]	1.95	0.02	0.09	0.34	0.04	0.88	22.32	12.47	0.16	0.08	2.66	0.01	0.24	0.79	0.29	3.27	2.99	38.11	0.74	0.90	3.35	4.78	3.52	100.00
Transportation and communication	0.76	0.02	0.06	0.11	0.03	1.39	27.15	11.22	0.10	0.09	3.22	0.02	0.16	0.20	0.07	2.56	2.72	36.65	1.19	1.22	5.35	4.69	1.03	100.00
Transportation	0.76	0.02	0.08	0.15	0.03	1.32	29.96	11.71	0.10	0.09	3.23	0.01	0.20	0.19	0.06	2.67	3.30	31.47	1.19	1.51	5.10	5.55	1.30	100.00
Communication	0.82	0.02	0.02	0.01	0.03	1.70	18.15	9.77	0.09	0.10	3.12	0.05	0.06	0.25	0.11	2.30	1.48	51.56	1.22	0.28	6.26	2.28	0.32	100.00
Recreation and culture[a]	0.27	0.02	0.04	0.12	0.02	5.32	4.40	8.40	0.03	0.21	3.14	0.01	0.05	0.17	0.24	0.97	0.99	57.07	4.11	1.81	7.54	3.39	1.68	100.00
Restaurants and hotels	0.99	0.00	0.03	0.22	0.01	3.30	8.10	14.04	0.20	0.32	4.79	0.01	0.03	0.73	0.13	0.74	2.13	46.34	2.14	0.43	6.06	7.59	1.67	100.00
Miscellaneous goods and services[a]	0.85	0.00	0.02	0.07	0.03	3.39	29.93	5.15	0.09	0.10	3.22	0.01	0.04	0.22	0.18	2.81	4.03	35.43	1.52	1.26	6.50	4.31	0.83	100.00
Individual Consumption Expenditure by Government	0.42	0.03	0.09	0.17	0.02	0.54	9.82	6.11	0.07	0.09	2.45	0.01	0.17	0.16	0.11	1.41	1.14	65.75	0.59	0.90	3.76	4.45	1.73	100.00
Collective Consumption Expenditure by Government	0.94	0.06	0.38	0.09	0.04	1.02	22.73	8.49	0.18	0.13	2.56	0.06	0.14	1.32	0.17	3.40	1.40	44.62	1.38	0.76	4.10	4.15	1.87	100.00
Gross Fixed Capital Formation	1.06	0.03	0.09	0.04	0.02	0.91	15.77	7.05	0.08	0.08	1.36	0.02	0.10	0.46	0.10	0.78	0.99	63.83	1.22	0.39	2.24	2.33	1.06	100.00
Machinery and equipment	0.65	0.03	0.13	0.05	0.03	1.78	14.29	3.96	0.03	0.07	1.74	0.02	0.18	0.57	0.07	0.66	0.94	63.60	1.63	0.65	3.56	4.55	0.80	100.00
Construction	1.48	0.03	0.08	0.04	0.01	0.53	16.65	9.21	0.08	0.09	1.04	0.02	0.06	0.40	0.10	0.73	0.90	63.57	0.84	0.30	1.20	1.36	1.31	100.00
Other products	0.25	0.01	0.08	0.03	0.01	1.08	16.54	5.04	0.23	0.05	2.08	–	0.11	0.49	0.20	1.42	1.64	61.51	2.45	0.09	5.15	0.95	0.57	100.00
Changes in Inventories and Acquisitions Less Disposals of Valuables	0.37	–0.00	–0.06	0.02	0.03	0.31	35.80	4.68	0.04	0.11	0.87	0.00	0.28	0.02	1.13	1.44	1.15	47.79	0.75	1.43	0.32	1.12	2.40	100.00
Balance of Exports and Imports	–3.93	–0.20	2.81	–0.01	–0.09	3.68	–38.91	8.49	–0.11	8.18	17.83	0.12	–0.88	–0.77	–1.80	–5.61	–3.13	74.79	29.54	–3.31	12.55	2.90	–2.15	100.00
Individual Consumption Expenditure by Households[b]	2.42	0.02	0.03	0.23	0.04	1.78	25.53	9.15	0.11	0.10	2.26	0.01	0.10	0.78	0.35	5.05	3.12	37.30	0.97	0.98	3.96	3.93	1.79	100.00
Individual Consumption Expenditure by Households without Housing[b]	2.40	0.02	0.03	0.22	0.04	1.78	25.53	9.14	0.11	0.10	2.26	0.01	0.10	0.78	0.35	5.06	3.12	37.31	0.96	0.98	3.95	3.95	1.78	100.00
Government Final Consumption Expenditure	0.69	0.04	0.22	0.13	0.03	0.78	16.45	7.32	0.13	0.11	2.51	0.04	0.15	0.78	0.14	2.43	1.27	54.93	0.98	0.81	3.98	4.26	1.79	100.00
Domestic Absorption	1.66	0.02	0.07	0.14	0.03	1.29	21.21	8.06	0.10	0.09	1.92	0.02	0.11	0.64	0.25	3.00	2.05	49.48	1.03	0.76	3.23	3.30	1.54	100.00

0.00 = magnitude is less than half of unit employed; – = magnitude equals zero; = magnitude equals zero; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.6: Per Capita Real Expenditure, 2011 (Revised)
(HK$)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	14,715	39,896	439,565	13,888	47,339	273,549	23,589	48,211	22,951	627,887	111,962	66,359	46,365	17,669	11,270	22,680	29,803	54,043	418,895	47,607	213,157	72,134	23,874	40,517
Actual Individual Consumption by Households[a]	11,770	21,456	70,526	12,331	35,883	182,347	15,558	29,019	14,394	139,419	62,327	24,814	28,936	11,616	9,773	20,922	24,430	23,940	141,677	38,396	135,339	47,858	15,995	22,320
Food and non-alcoholic beverages	4,831	5,525	8,884	4,394	11,562	19,439	4,257	6,929	3,855	8,963	10,819	5,385	6,504	5,044	4,786	7,311	8,735	4,273	9,397	8,263	13,639	10,019	3,811	5,029
Food	4,855	5,345	7,974	4,244	10,997	18,647	4,248	6,409	3,408	8,530	10,394	4,731	6,042	5,022	4,787	7,133	7,966	4,169	8,205	8,201	12,735	8,890	3,690	4,884
Bread and cereals	1,920	1,326	1,991	1,331	2,134	1,711	955	1,740	760	1,312	1,307	962	609	1,133	1,823	1,406	2,605	789	1,316	2,649	2,471	1,637	1,025	1,102
Meat and fish	843	701	2,790	1,255	2,390	10,484	324	1,888	1,566	3,893	3,878	2,015	2,648	1,673	736	659	3,209	1,453	2,969	1,164	4,026	2,528	1,437	1,152
Fruits and vegetables	1,049	1,641	1,221	713	3,852	2,330	1,343	1,080	674	1,936	2,044	618	439	1,515	1,074	1,484	837	1,239	1,635	1,009	4,411	3,223	654	1,308
Other food and non-alcoholic beverages	1,012	1,836	2,900	1,040	3,225	4,913	1,640	2,138	876	1,887	3,744	1,933	2,976	866	1,146	3,733	2,065	854	3,555	3,219	2,937	2,723	646	1,489
Alcoholic beverages, tobacco and narcotics	387	389	126	566	2,328	1,787	341	1,067	995	986	780	1,135	2,519	196	296	228	416	437	1,390	1,471	3,100	1,307	744	487
Clothing and footwear	487	1,275	1,367	206	1,271	8,474	890	628	265	5,282	1,064	542	749	343	211	674	201	1,049	3,338	1,616	4,732	1,230	633	920
Clothing	420	863	1,147	103	1,061	5,730	733	537	208	3,935	927	404	666	286	171	539	135	836	2,742	1,518	3,993	1,135	521	749
Housing, water, electricity, gas and other fuels[a]	3,010	4,299	9,602	1,983	6,111	29,727	2,957	5,099	2,178	23,684	13,878	4,962	4,417	2,466	1,536	6,617	3,941	4,400	20,359	5,715	21,456	6,787	3,553	4,229
Furnishings, household equipment and routine household maintenance	367	303	1,577	214	1,708	10,053	373	986	710	1,930	2,438	1,132	203	133	161	509	971	946	6,471	762	4,912	1,503	844	758
Health and education[a]	2,040	7,539	27,230	4,187	6,816	25,924	3,568	6,292	3,159	25,147	13,706	7,005	11,834	2,716	1,966	4,783	3,689	7,814	24,970	8,293	34,645	12,881	7,028	5,991
Health[a]	786	4,033	6,981	1,914	1,925	13,867	1,726	1,792	941	11,021	5,041	3,732	3,664	1,168	889	3,016	849	5,393	11,303	3,988	21,943	5,941	3,178	3,428
Education[a]	1,265	3,555	21,547	2,285	5,115	12,057	1,786	5,016	2,479	14,356	8,908	3,424	8,553	1,540	1,074	1,799	3,086	2,760	13,985	4,322	14,052	7,029	3,883	2,730
Transportation and communication	429	2,292	12,097	678	3,185	16,518	1,882	3,908	1,320	13,907	9,347	3,296	4,824	339	225	1,219	2,434	2,299	19,411	5,078	19,451	5,975	986	2,365
Transportation	347	1,905	13,169	727	2,662	12,769	1,687	3,314	1,089	11,188	7,609	1,126	5,001	257	156	1,031	2,396	1,603	15,773	5,136	15,051	5,739	1,008	1,921
Communication	85	376	809	14	549	3,748	232	628	229	2,691	1,672	1,786	326	78	63	202	244	597	3,676	218	4,201	535	57	436
Recreation and culture[a]	48	838	2,840	221	512	20,567	99	949	143	10,411	2,949	375	497	92	252	150	288	1,160	21,666	2,448	8,890	1,399	523	767
Restaurants and hotels	250	263	2,534	580	359	17,703	253	2,201	1,236	21,979	6,250	677	364	558	181	159	857	1,308	15,690	807	9,922	4,351	720	1,064
Miscellaneous goods and services[a]	379	479	3,544	309	2,680	32,155	1,649	1,426	1,002	12,137	7,430	1,567	898	292	453	1,062	2,870	1,766	19,600	4,191	18,793	4,365	630	1,880
Individual Consumption Expenditure by Government	340	5,635	26,252	1,449	3,352	9,203	977	3,053	1,326	18,957	10,204	4,420	7,527	382	516	966	1,462	5,917	13,760	5,365	19,635	8,125	2,377	3,393
Collective Consumption Expenditure by Government	636	8,315	97,009	668	5,252	14,627	1,895	3,557	3,045	24,643	8,945	15,845	5,047	2,705	635	1,948	1,509	3,366	26,967	3,795	17,920	6,357	2,154	2,845
Gross Fixed Capital Formation	3,535	20,649	117,023	1,410	8,823	64,383	6,481	14,554	6,652	72,324	23,331	20,320	18,170	4,647	1,911	2,199	5,255	23,727	117,279	9,542	48,307	17,610	6,007	14,018
Machinery and equipment	487	5,182	36,917	361	4,324	28,218	1,319	1,839	614	14,330	6,715	6,017	7,444	1,282	290	421	1,122	5,312	35,363	3,586	17,244	7,716	1,025	3,150
Construction	4,032	18,128	79,510	1,153	3,377	30,292	5,578	15,499	5,439	63,182	14,564	16,355	8,198	3,258	1,544	1,678	3,886	19,263	65,905	6,024	21,107	8,363	6,041	11,427
Other products	65	499	7,382	72	482	5,873	523	802	1,442	3,373	2,760	–	1,566	381	295	309	670	1,761	18,214	165	8,554	554	249	1,080
Changes in Inventories and Acquisitions Less Disposals of Valuables	93	-92	-5,478	60	1,190	1,660	1,100	722	253	7,210	1,124	304	3,731	15	1,596	304	457	1,329	5,402	2,644	511	634	1,019	1,049
Balance of Exports and Imports	-531	-6,106	144,701	-8	-2,034	10,532	-648	711	-372	299,974	12,428	6,131	-6,367	-315	-1,374	-642	-674	1,127	115,480	-3,320	10,966	887	-495	568
Individual Consumption Expenditure by Households[b]	11,122	17,216	51,391	10,951	32,651	173,144	14,452	26,024	12,874	122,664	53,569	21,101	23,675	10,835	9,122	19,610	22,781	19,101	128,182	33,458	117,693	40,892	13,947	19,311
Individual Consumption Expenditure by Households without Housing[b]	9,455	14,734	44,026	9,229	28,121	148,713	12,383	22,281	11,042	103,027	45,929	17,914	20,208	9,306	7,822	16,843	19,564	16,372	109,759	28,736	100,474	35,150	11,935	16,547
Government Final Consumption Expenditure	1,000	14,038	124,044	1,936	8,651	23,830	2,941	6,577	4,601	43,569	18,810	20,751	12,036	3,436	1,151	2,983	2,937	8,884	40,966	8,763	37,301	14,002	4,427	6,099
Domestic Absorption	16,014	51,287	257,096	14,209	50,881	263,017	25,193	48,092	24,166	242,793	95,413	58,807	56,971	18,682	13,865	24,430	31,417	53,181	286,479	54,286	200,968	72,094	25,278	40,527

– = magnitude equals zero; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy.

a Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

b Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.7: Per Capita Real Expenditure Index, 2011 (Revised)
(Asia and the Pacific = 100)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	36	98	1,085	34	117	675	58	119	57	1,550	276	164	114	44	28	56	74	133	1,034	117	526	178	59	100
Actual Individual Consumption by Households[a]	53	96	316	55	161	817	70	130	64	625	279	111	130	52	44	94	109	107	635	172	606	214	72	100
Food and non-alcoholic beverages	96	110	177	87	230	387	85	138	77	178	215	107	129	100	95	145	174	85	187	164	271	199	76	100
Food	99	109	163	87	225	382	87	131	70	175	213	97	124	103	98	146	163	85	168	168	261	182	76	100
Bread and cereals	174	120	181	121	194	155	87	158	69	119	119	87	55	103	165	128	237	72	119	240	224	149	93	100
Meat and fish	73	61	242	109	207	910	28	164	136	338	337	175	230	145	64	57	279	126	258	101	350	219	125	100
Fruits and vegetables	80	125	93	55	294	178	103	83	51	148	156	47	34	116	82	113	64	95	125	77	337	246	50	100
Other food and non-alcoholic beverages	68	123	195	70	217	330	110	144	59	127	251	130	200	58	77	251	139	57	239	216	197	183	43	100
Alcoholic beverages, tobacco and narcotics	80	80	26	116	478	367	70	219	204	202	160	233	517	40	61	47	85	90	285	302	636	268	153	100
Clothing and footwear	53	139	149	22	138	922	97	68	29	574	116	59	81	37	23	73	22	114	363	176	515	134	69	100
Clothing	56	115	153	14	142	765	98	72	28	525	124	54	89	38	23	72	18	112	366	203	533	152	70	100
Housing, water, electricity, gas and other fuels[a]	71	102	227	47	144	703	70	121	51	560	328	117	104	58	36	156	93	104	481	135	507	160	84	100
Furnishings, household equipment and routine household maintenance	48	40	208	28	225	1,326	49	130	94	255	322	149	27	18	21	67	128	125	854	101	648	198	111	100
Health and education[a]	34	126	454	70	114	433	60	105	53	420	229	117	198	45	33	80	62	130	417	138	578	215	117	100
Health[a]	23	118	204	56	56	405	50	52	27	321	147	109	107	34	26	88	25	157	330	116	640	173	93	100
Education[a]	46	130	789	84	187	442	65	184	91	526	326	125	313	56	39	66	113	101	512	158	515	257	142	100
Transportation and communication	18	97	511	29	135	698	80	165	56	588	395	139	204	14	9	52	103	97	821	215	822	253	42	100
Transportation	18	99	686	38	139	665	88	173	57	583	396	59	260	13	8	54	125	83	821	267	784	299	53	100
Communication	20	86	185	3	126	859	53	144	52	617	383	409	75	18	14	46	56	137	842	50	963	123	13	100
Recreation and culture[a]	6	109	370	29	67	2,682	13	124	19	1,358	385	49	65	12	33	15	38	151	2,825	319	1,159	182	68	100
Restaurants and hotels	23	25	238	55	34	1,663	24	207	116	2,065	587	64	34	52	17	81	81	123	1,474	76	932	409	68	100
Miscellaneous goods and services[a]	20	26	189	16	143	1,711	88	76	53	646	395	83	48	16	24	56	153	94	1,043	223	1,000	232	34	100
Individual Consumption Expenditure by Government	10	166	774	43	99	271	29	90	39	559	301	130	222	11	15	28	43	174	405	158	579	239	70	100
Collective Consumption Expenditure by Government	22	292	3,410	23	185	514	67	125	107	866	314	557	177	95	22	68	53	118	948	133	630	223	76	100
Gross Fixed Capital Formation	25	147	835	10	63	459	46	104	47	516	166	145	130	33	14	16	37	169	837	68	345	126	43	100
Machinery and equipment	15	164	1,172	11	137	896	42	58	19	455	213	191	236	41	9	13	36	169	1,123	114	547	245	33	100
Construction	35	159	696	10	30	265	49	136	48	553	127	143	72	29	14	15	34	169	577	53	185	73	53	100
Other products	6	46	684	7	45	544	48	74	134	312	256	–	145	35	27	29	62	163	1,687	15	792	51	23	100
Changes in Inventories and Acquisitions Less Disposals of Valuables	9	–9	–522	6	113	158	105	69	24	687	107	29	356	1	152	29	44	127	515	252	49	60	97	100
Balance of Exports and Imports	–93	–1,074	25,456	–1	–358	1,853	–114	125	–65	52,771	2,186	1,079	–1,120	–55	–242	–113	–118	198	20,315	–584	1,929	156	–87	100
Individual Consumption Expenditure by Households[b]	58	89	266	57	169	897	75	135	67	635	277	109	123	56	47	102	118	99	664	173	609	212	72	100
Individual Consumption Expenditure by Households without Housing[b]	57	89	266	56	170	899	75	135	67	623	278	108	122	56	47	102	118	99	663	174	607	212	72	100
Government Final Consumption Expenditure	16	230	2,034	32	142	391	48	108	75	714	308	340	197	56	19	49	48	146	672	144	612	230	73	100
Domestic Absorption	40	127	634	35	126	649	62	119	60	599	235	145	141	46	34	60	78	131	707	134	496	178	62	100

– = magnitude equals zero; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Each real aggregate value is derived by using a purchasing power parity that is specific to that aggregate, so real aggregates may not sum up to the total of their real components for an economy.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.8: Nominal Expenditure, 2011 (Revised)

(HK$ billion)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	1,034.5	14.2	144.2	99.9	31.8	1,934.4	14,219.6	6,950.9	69.4	285.7	2,319.3	21.6	81.0	417.8	151.5	1,727.4	1,744.7	58,945.1	2,174.5	508.2	3,780.5	2,886.5	1,055.0	100,597.7
Actual Individual Consumption by Households[a]	780.2	7.0	24.7	84.2	23.7	1,289.5	8,393.0	4,087.7	43.4	68.1	1,263.7	8.1	46.2	256.4	120.8	1,466.2	1,353.6	25,293.9	868.0	382.5	2,348.5	1,788.7	669.0	50,667.2
Food and non-alcoholic beverages	396.0	2.0	3.1	37.5	8.2	137.5	2,423.0	1,242.3	16.1	4.9	241.7	1.8	13.3	147.1	68.1	647.8	548.7	4,753.1	55.1	111.8	269.8	450.4	201.4	11,780.8
Food	394.3	1.9	2.8	36.0	7.7	131.9	2,376.2	1,144.2	13.9	4.7	231.0	1.5	12.2	143.6	67.2	622.2	506.7	4,633.4	49.4	109.4	252.1	394.7	194.6	11,331.6
Bread and cereals	176.0	0.5	0.6	11.5	1.6	12.1	585.7	342.9	3.7	0.8	32.8	0.4	1.4	39.1	27.9	145.4	186.2	1,006.2	8.7	37.8	57.9	87.4	58.1	2,824.8
Meat and fish	75.6	0.2	1.0	11.1	1.8	74.1	192.3	307.2	6.2	2.1	77.9	0.5	4.2	44.4	11.1	58.5	175.0	1,537.3	18.8	14.2	79.7	98.5	80.5	2,872.2
Fruits and vegetables	53.6	0.5	0.5	5.4	2.2	16.5	641.2	177.6	2.2	1.0	47.6	0.3	1.4	34.4	11.6	84.8	58.4	1,187.0	9.2	12.1	76.6	135.6	28.3	2,588.0
Other food and non-alcoholic beverages	90.8	0.7	1.0	9.5	2.5	34.7	1,003.8	414.5	4.1	1.0	83.4	0.6	6.3	29.2	17.6	359.0	129.1	1,022.6	18.5	47.7	55.6	129.0	34.5	3,495.8
Alcoholic beverages, tobacco and narcotics	16.2	0.2	0.1	3.1	1.7	12.6	221.7	212.1	3.0	0.4	21.5	0.2	3.2	5.1	4.0	13.9	16.5	544.7	16.0	13.4	51.9	61.4	21.8	1,244.6
Clothing and footwear	46.9	0.5	0.5	1.6	1.1	59.9	503.3	156.1	0.9	3.8	33.6	0.2	2.1	9.0	3.0	68.1	18.1	1,748.3	23.0	19.3	91.9	55.7	30.9	2,878.2
Clothing	41.9	0.3	0.6	0.8	0.9	40.5	404.5	136.6	0.7	2.9	29.4	0.2	1.9	7.7	2.5	56.1	12.5	1,447.5	18.4	18.2	79.9	52.8	26.1	2,382.9
Housing, water, electricity, gas and other fuels[a]	134.7	1.2	2.8	12.5	2.2	210.2	1,304.2	364.2	4.9	9.6	187.8	2.2	6.9	38.3	13.6	281.7	161.7	3,505.8	138.1	34.9	379.9	145.9	151.6	7,094.9
Furnishings, household equipment and routine household maintenance	25.1	0.1	1.0	1.5	1.4	71.1	255.9	163.9	2.4	1.2	63.2	0.4	0.5	3.4	2.1	48.1	52.5	1,233.9	43.3	10.3	102.9	73.5	38.6	2,196.2
Health and education[a]	71.2	1.4	6.8	11.6	3.4	183.3	978.7	518.2	2.7	9.4	193.2	1.4	6.7	18.5	11.4	162.8	130.7	6,339.1	139.4	34.8	431.0	311.0	109.4	9,676.1
Health[a]	28.5	0.8	1.8	5.9	1.0	98.1	393.3	194.2	1.3	4.6	73.6	0.6	2.1	10.8	5.0	92.2	37.9	3,794.4	64.0	19.1	221.6	146.3	51.6	5,248.8
Education[a]	42.7	0.6	5.0	5.7	2.4	85.3	585.4	324.0	1.4	4.7	119.6	0.8	4.7	7.7	6.4	70.5	92.8	2,544.6	75.4	15.7	209.5	164.7	57.8	4,427.4
Transportation and communication	36.6	0.8	4.2	6.5	2.9	116.8	1,387.5	708.0	5.6	7.0	241.1	1.0	9.5	12.7	5.2	118.4	179.0	2,336.8	143.9	68.6	331.8	284.0	74.1	6,081.8
Transportation	32.8	0.7	3.2	6.2	2.0	90.3	1,203.1	523.3	4.6	5.3	157.2	0.4	8.0	8.8	3.6	94.0	138.5	1,478.1	104.1	65.1	249.8	247.7	68.5	4,495.5
Communication	3.8	0.2	0.9	0.2	1.0	26.5	184.4	184.6	0.9	1.7	83.9	0.7	1.5	3.9	1.6	24.4	40.5	858.6	39.9	3.5	82.0	36.3	5.6	1,586.4
Recreation and culture[a]	5.6	0.4	1.5	2.3	0.5	145.4	91.6	178.6	0.8	6.3	79.9	0.2	1.3	2.9	4.8	16.2	23.5	1,374.5	113.5	37.6	200.4	78.6	29.4	2,396.0
Restaurants and hotels	17.7	0.1	1.1	4.0	0.3	125.2	188.2	341.8	4.5	11.6	112.2	0.2	0.7	11.3	2.4	15.0	47.4	1,287.7	80.0	12.5	147.9	139.3	30.2	2,581.3
Miscellaneous goods and services[a]	30.3	0.2	1.1	2.3	2.1	227.4	1,080.1	202.7	3.2	6.9	164.3	0.5	1.4	8.0	6.8	94.4	175.5	2,170.0	124.8	41.7	341.0	188.9	25.4	4,899.1
Individual Consumption Expenditure by Government	14.8	1.1	6.3	4.7	1.9	65.1	459.7	235.3	1.2	7.9	151.2	1.0	4.5	3.9	5.0	52.7	71.8	5,041.8	72.6	20.4	288.4	227.0	47.2	6,785.5
Collective Consumption Expenditure by Government	37.6	1.7	20.8	3.7	3.2	103.4	1,119.0	394.3	4.9	12.4	156.6	3.7	5.4	46.2	9.5	122.3	97.5	3,685.8	128.0	23.1	284.1	249.0	62.4	6,574.7
Gross Fixed Capital Formation	288.3	9.6	44.0	11.6	5.8	455.3	4,708.5	2,176.1	22.4	35.6	512.1	7.2	39.2	130.4	32.4	224.9	327.0	26,872.3	548.8	133.6	884.1	761.3	313.9	38,544.7
Machinery and equipment	63.8	3.7	14.7	4.9	3.6	199.5	1,427.6	410.1	3.4	6.9	186.6	2.4	21.7	60.4	7.1	66.5	103.0	7,453.3	175.8	74.5	364.4	487.7	80.2	11,221.9
Construction	216.1	5.6	26.4	5.8	1.8	214.2	2,707.4	1,590.4	11.0	27.1	249.4	4.8	13.1	52.5	18.0	107.5	162.9	16,956.7	284.3	55.8	339.9	238.8	214.2	23,503.7
Other products	8.5	0.3	2.9	0.9	0.4	41.5	573.5	175.6	8.0	1.6	76.1	–	4.4	17.5	7.3	50.9	61.0	2,462.2	88.8	3.4	179.7	34.8	19.5	3,819.1
Changes in Inventories and Acquisitions Less Disposals of Valuables	7.9	-0.0	-2.1	0.5	0.9	11.7	787.4	120.7	0.9	3.9	25.7	0.1	7.9	0.4	25.1	27.6	30.1	1,577.6	31.0	36.1	9.5	28.7	53.4	2,785.0
Balance of Exports and Imports	-79.6	-4.1	56.9	-0.1	-1.7	74.5	-788.4	172.0	-2.3	165.7	361.2	2.5	-17.7	-15.6	-36.4	-113.6	-63.4	1,515.5	598.6	-67.0	254.3	58.7	-43.6	2,026.2
Individual Consumption Expenditure by Households[b]	765.4	5.9	18.4	79.5	21.8	1,224.4	7,933.3	3,852.4	42.2	60.2	1,112.5	7.1	41.7	252.5	115.8	1,413.5	1,281.8	20,252.1	795.4	362.1	2,060.0	1,561.7	621.8	43,881.7
Individual Consumption Expenditure by Households without Housing[b]	694.9	5.0	16.4	71.0	20.5	1,051.6	7,038.7	3,622.3	38.2	52.6	1,010.9	5.5	36.1	233.2	105.1	1,301.3	1,189.3	18,257.8	681.5	336.5	1,746.2	1,464.8	528.1	39,507.7
Government Final Consumption Expenditure	52.4	2.8	27.0	8.4	5.1	168.5	1,578.7	629.7	6.1	20.3	307.8	4.6	9.9	50.1	14.5	175.0	169.3	8,727.7	200.7	43.5	572.6	476.0	109.6	13,360.2
Domestic Absorption	1,114.1	18.3	87.3	100.0	33.6	1,860.0	15,007.9	6,778.9	71.6	120.0	1,958.1	19.1	98.8	433.4	187.9	1,841.1	1,808.2	57,429.7	1,575.9	575.3	3,526.2	2,827.7	1,098.6	98,571.5

– = magnitude equals zero; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.9: Economy Shares of Nominal Expenditure to Asia and the Pacific, 2011 (Revised)
(%)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	1.03	0.01	0.14	0.10	0.03	1.92	14.14	6.91	0.07	0.28	2.31	0.02	0.08	0.42	0.15	1.72	1.73	58.59	2.16	0.51	3.76	2.87	1.05	100.00
Actual Individual Consumption by Households[a]	1.54	0.01	0.05	0.17	0.05	2.55	16.57	8.07	0.09	0.13	2.49	0.02	0.09	0.51	0.24	2.89	2.67	49.92	1.71	0.75	4.64	3.53	1.32	100.00
Food and non-alcoholic beverages	3.36	0.02	0.03	0.32	0.07	1.17	20.57	10.55	0.14	0.04	2.05	0.02	0.11	1.25	0.58	5.50	4.66	40.35	0.47	0.95	2.29	3.82	1.71	100.00
Food	3.48	0.02	0.02	0.32	0.07	1.16	20.97	10.10	0.12	0.04	2.04	0.01	0.11	1.27	0.59	5.49	4.47	40.89	0.44	0.97	2.22	3.48	1.72	100.00
Bread and cereals	6.23	0.02	0.02	0.41	0.06	0.43	20.73	12.14	0.13	0.03	1.16	0.01	0.05	1.38	0.99	5.15	6.59	35.62	0.31	1.34	2.05	3.09	2.06	100.00
Meat and fish	2.63	0.01	0.03	0.39	0.06	2.58	6.69	10.69	0.21	0.07	2.71	0.02	0.15	1.55	0.39	2.04	6.09	53.53	0.65	0.49	2.78	3.43	2.80	100.00
Fruits and vegetables	2.07	0.02	0.02	0.21	0.09	0.64	24.78	6.86	0.08	0.04	1.84	0.01	0.05	1.33	0.45	3.28	2.26	45.86	0.36	0.47	2.96	5.24	1.09	100.00
Other food and non-alcoholic beverages	2.60	0.02	0.03	0.27	0.07	0.99	28.71	11.86	0.12	0.03	2.39	0.02	0.18	0.84	0.50	10.27	3.69	29.25	0.53	1.36	1.59	3.69	0.99	100.00
Alcoholic beverages, tobacco and narcotics	1.30	0.01	0.01	0.25	0.13	1.02	17.81	17.04	0.24	0.03	1.72	0.02	0.26	0.41	0.32	1.12	1.33	43.77	1.29	1.07	4.17	4.93	1.76	100.00
Clothing and footwear	1.63	0.02	0.03	0.06	0.04	2.08	17.49	5.42	0.23	0.13	1.17	0.01	0.07	0.31	0.10	2.37	0.63	60.74	0.80	0.67	3.19	1.94	1.07	100.00
Clothing	1.76	0.01	0.03	0.03	0.04	1.70	16.97	5.73	0.03	0.12	1.23	0.01	0.08	0.32	0.10	2.35	0.53	60.75	0.77	0.76	3.35	2.21	1.10	100.00
Housing, water, electricity, gas and other fuels[a]	1.90	0.02	0.04	0.18	0.03	2.96	18.38	5.13	0.07	0.13	2.65	0.03	0.10	0.54	0.19	3.97	2.28	49.41	1.95	0.49	5.35	2.06	2.14	100.00
Furnishings, household equipment and routine household maintenance	1.14	0.01	0.04	0.07	0.06	3.24	11.65	7.46	0.11	0.06	2.88	0.02	0.02	0.16	0.09	2.19	2.39	56.18	1.97	0.47	4.68	3.35	1.76	100.00
Health and education[a]	0.74	0.01	0.07	0.12	0.03	1.89	10.11	5.36	0.03	0.10	2.00	0.01	0.07	0.19	0.12	1.68	1.35	65.51	1.44	0.36	4.45	3.21	1.13	100.00
Health[a]	0.54	0.02	0.03	0.11	0.02	1.87	7.49	3.70	0.03	0.09	1.40	0.01	0.04	0.21	0.10	1.76	0.72	72.29	1.22	0.36	4.22	2.79	0.98	100.00
Education[a]	0.96	0.01	0.11	0.13	0.05	1.93	13.22	7.32	0.03	0.11	2.70	0.02	0.11	0.17	0.14	1.59	2.10	57.48	1.70	0.35	4.73	3.72	1.31	100.00
Transportation and communication	0.60	0.01	0.07	0.11	0.05	1.92	22.81	11.64	0.09	0.12	3.97	0.02	0.16	0.21	0.09	1.95	2.94	38.42	2.37	1.13	5.45	4.67	1.22	100.00
Transportation	0.73	0.01	0.07	0.14	0.04	2.01	26.76	11.64	0.10	0.12	3.50	0.01	0.18	0.20	0.08	2.09	3.08	32.88	2.31	1.45	5.56	5.51	1.52	100.00
Communication	0.24	0.01	0.06	0.01	0.06	1.67	11.62	11.64	0.06	0.11	5.29	0.04	0.09	0.24	0.10	1.54	2.55	54.12	2.51	0.22	5.17	2.29	0.35	100.00
Recreation and culture[a]	0.24	0.02	0.06	0.10	0.02	6.07	3.82	7.46	0.03	0.26	3.34	0.01	0.06	0.12	0.20	0.68	0.98	57.37	4.74	1.57	8.37	3.28	1.23	100.00
Restaurants and hotels	0.69	0.00	0.04	0.16	0.01	4.85	7.29	13.24	0.17	0.45	4.34	0.01	0.03	0.44	0.58	0.58	1.84	49.89	3.10	0.48	5.73	5.40	1.17	100.00
Miscellaneous goods and services[a]	0.62	0.00	0.03	0.05	0.04	4.64	22.05	4.14	0.14	0.14	3.35	0.01	0.03	0.16	0.14	1.93	3.58	44.29	2.55	0.85	6.96	3.85	0.52	100.00
Individual Consumption Expenditure by Government	0.22	0.02	0.09	0.07	0.03	0.96	6.77	3.47	0.02	0.12	2.23	0.01	0.07	0.06	0.07	0.78	1.06	74.30	1.07	0.30	4.25	3.35	0.70	100.00
Collective Consumption Expenditure by Government	0.57	0.03	0.32	0.06	0.05	1.57	17.02	6.00	0.07	0.19	2.38	0.06	0.08	0.70	0.15	1.86	1.48	56.06	1.95	0.35	4.32	3.79	0.95	100.00
Gross Fixed Capital Formation	0.75	0.02	0.11	0.03	0.02	1.18	12.22	5.65	0.06	0.09	1.33	0.02	0.10	0.34	0.08	0.58	0.85	69.72	1.42	0.35	2.29	1.98	0.81	100.00
Machinery and equipment	0.57	0.03	0.13	0.04	0.03	1.78	12.72	3.65	0.03	0.06	1.66	0.02	0.19	0.54	0.06	0.59	0.92	66.42	1.57	0.66	3.25	4.35	0.71	100.00
Construction	0.92	0.02	0.11	0.02	0.01	0.91	11.52	6.77	0.05	0.12	1.06	0.02	0.06	0.22	0.08	0.46	0.69	72.15	1.21	0.24	1.45	1.02	0.91	100.00
Other products	0.22	0.01	0.08	0.02	0.01	1.09	15.02	4.60	0.21	0.04	1.99	–	0.12	0.46	0.19	1.33	1.60	64.47	2.33	0.09	4.71	0.91	0.51	100.00
Changes in Inventories and Acquisitions Less Disposals of Valuables	0.28	-0.00	-0.08	0.02	0.03	0.42	28.27	4.33	0.03	0.14	0.92	0.00	0.28	0.02	0.90	0.99	1.08	56.65	1.11	1.30	0.34	1.03	1.92	100.00
Balance of Exports and Imports	-3.93	-0.20	2.81	-0.01	-0.09	3.68	-38.91	8.49	-0.11	8.18	17.83	0.12	-0.88	-0.77	-1.80	-5.61	-3.13	74.79	29.54	-3.31	12.55	2.90	-2.15	100.00
Individual Consumption Expenditure by Households[b]	1.74	0.01	0.04	0.18	0.05	2.79	18.08	8.78	0.10	0.14	2.54	0.02	0.10	0.58	0.26	3.22	2.92	46.15	1.81	0.83	4.69	3.56	1.42	100.00
Individual Consumption Expenditure by Households without Housing[b]	1.76	0.01	0.04	0.18	0.05	2.66	17.82	9.17	0.10	0.13	2.56	0.01	0.09	0.59	0.27	3.29	3.01	46.21	1.72	0.85	4.42	3.71	1.34	100.00
Government Final Consumption Expenditure	0.39	0.02	0.20	0.06	0.04	1.26	11.82	4.71	0.05	0.15	2.30	0.03	0.07	0.37	0.11	1.31	1.27	65.33	1.50	0.33	4.29	3.56	0.82	100.00
Domestic Absorption	1.13	0.02	0.09	0.10	0.03	1.89	15.23	6.88	0.07	0.12	1.99	0.02	0.10	0.44	0.19	1.87	1.83	58.26	1.60	0.58	3.58	2.87	1.11	100.00

0.00 = magnitude is less than half of unit employed; – = magnitude equals zero; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.
[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.10: Per Capita Nominal Expenditure, 2011 (Revised)

(HK$)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	6,911	20,851	366,586	6,980	37,256	273,549	11,692	28,724	11,337	517,164	79,804	53,144	29,081	8,413	5,720	9,754	18,525	43,854	419,491	25,167	163,021	43,593	11,974	28,222
Actual Individual Consumption by Households[a]	5,212	10,321	62,743	5,882	27,709	182,347	6,901	16,892	7,095	123,254	43,482	19,887	16,591	5,162	4,561	8,279	14,372	18,818	167,452	18,940	101,271	27,014	7,593	14,214
Food and non-alcoholic beverages	2,645	2,998	7,878	2,623	9,568	19,439	1,992	5,134	2,635	8,951	8,316	4,361	4,775	2,962	2,572	3,658	5,826	3,536	10,638	5,535	11,636	6,803	2,286	3,305
Food	2,634	2,851	7,080	2,513	8,966	18,647	1,954	4,728	2,276	8,530	7,949	3,782	4,381	2,892	2,538	3,514	5,380	3,447	9,520	5,416	10,871	5,960	2,209	3,179
Bread and cereals	1,176	794	1,591	805	1,869	1,711	482	1,417	601	1,439	1,130	1,000	504	787	1,051	821	1,977	749	1,669	1,873	2,499	1,320	660	792
Meat and fish	505	340	2,537	776	2,131	10,484	158	1,269	1,007	3,798	2,680	1,135	1,500	895	420	330	1,858	1,144	3,624	702	3,439	1,488	913	806
Fruits and vegetables	358	761	1,275	377	2,610	2,330	527	734	355	1,886	1,637	710	509	692	436	479	620	883	1,774	600	3,302	2,047	321	726
Other food and non-alcoholic beverages	607	1,103	2,476	665	2,958	4,913	825	1,713	671	1,829	2,869	1,516	2,262	588	665	2,027	1,371	761	3,571	2,360	2,396	1,948	392	981
Alcoholic beverages, tobacco and narcotics	108	263	226	217	1,936	1,787	182	876	492	642	739	544	1,150	102	151	78	175	405	3,091	662	2,237	927	248	349
Clothing and footwear	313	752	1,982	111	1,249	8,474	414	645	145	6,831	1,155	484	767	181	113	385	193	1,301	4,431	958	3,964	842	351	807
Clothing	280	510	1,645	57	1,027	5,730	333	564	116	5,219	1,012	385	679	155	94	317	133	1,077	3,541	902	3,445	797	297	668
Housing, water, electricity, gas and other fuels[a]	900	1,802	7,036	871	2,577	29,727	1,072	1,505	794	17,302	6,462	5,491	2,468	771	512	1,591	1,717	2,608	26,645	1,730	16,380	2,203	1,721	1,990
Furnishings, household equipment and routine household maintenance	167	183	2,465	107	1,616	10,053	210	677	392	2,229	2,174	963	190	69	78	271	557	918	8,358	512	4,436	1,110	438	616
Health and education[a]	475	2,128	17,315	813	3,946	25,924	805	2,141	440	16,927	6,647	3,439	2,420	373	429	919	1,388	4,716	26,896	1,724	18,587	4,698	1,242	2,715
Health[a]	190	1,185	4,490	414	1,158	13,867	323	803	216	8,405	2,531	1,570	737	217	188	521	402	2,823	12,352	947	9,554	2,210	586	1,472
Education[a]	285	942	12,824	398	2,788	12,057	481	1,339	223	8,522	4,116	1,869	1,683	155	240	398	985	1,893	14,544	777	9,033	2,488	656	1,242
Transportation and communication	244	1,221	10,568	451	3,440	16,518	1,141	2,926	911	12,724	8,298	2,573	3,402	256	196	668	1,900	1,738	27,768	3,397	14,306	4,289	841	1,706
Transportation	219	973	8,217	437	2,326	12,769	989	2,163	758	9,614	5,410	918	2,876	178	135	531	1,470	1,100	20,073	3,226	10,771	3,741	778	1,261
Communication	25	248	2,351	15	1,113	3,748	152	763	153	3,110	2,888	1,655	526	78	61	138	430	639	7,696	171	3,534	548	63	445
Recreation and culture[a]	38	634	3,915	161	598	20,567	75	738	124	11,394	2,750	435	474	59	180	91	249	1,023	21,900	1,860	8,643	1,187	334	672
Restaurants and hotels	118	117	2,847	281	354	17,703	155	1,413	729	20,995	3,859	428	268	228	89	84	503	958	15,429	619	6,378	2,104	343	724
Miscellaneous goods and services[a]	202	225	3,239	161	2,427	32,155	888	837	530	12,492	5,652	1,167	511	162	256	533	1,864	1,614	24,082	2,065	14,704	2,852	289	1,374
Individual Consumption Expenditure by Government	99	1,654	15,892	328	2,202	9,203	378	973	191	14,367	5,202	2,338	1,618	79	188	298	762	3,751	14,010	1,009	12,438	3,428	536	1,904
Collective Consumption Expenditure by Government	251	2,530	52,761	259	3,755	14,627	920	1,629	800	22,442	5,389	9,039	1,946	930	360	690	1,035	2,742	24,699	1,144	12,251	3,761	708	1,844
Gross Fixed Capital Formation	1,926	14,163	111,812	809	6,821	64,383	3,872	8,993	3,661	64,523	17,622	17,819	14,079	2,626	1,225	1,270	3,471	19,992	105,876	6,615	38,123	11,497	3,562	10,813
Machinery and equipment	426	5,429	37,346	343	4,261	28,218	1,174	1,695	560	12,547	6,422	5,945	7,793	1,216	267	375	1,094	5,545	33,908	3,687	15,714	7,365	910	3,148
Construction	1,443	8,227	67,019	403	2,088	30,292	2,226	6,572	1,791	49,026	8,581	11,874	4,689	1,056	681	607	1,730	12,615	54,837	2,761	14,659	3,607	2,432	6,594
Other products	57	507	7,446	63	472	5,873	472	726	1,310	2,951	2,619	-	1,597	353	277	288	647	1,832	17,131	168	7,750	525	221	1,071
Changes in Inventories and Acquisitions Less Disposals of Valuables	53	-57	-5,432	37	1,005	1,660	647	499	152	6,971	883	269	2,832	9	948	156	320	1,174	5,985	1,786	409	434	606	781
Balance of Exports and Imports	-531	-6,106	144,701	-8	-2,034	10,532	-648	711	-372	299,974	12,428	6,131	-6,367	-315	-1,374	-642	-674	1,127	115,480	-3,320	10,966	887	-495	568
Individual Consumption Expenditure by Households[b]	5,113	8,666	46,851	5,554	25,507	173,144	6,523	15,920	6,904	108,886	38,280	17,548	14,973	5,084	4,373	7,982	13,610	15,067	153,442	17,931	88,833	23,586	7,057	12,311
Individual Consumption Expenditure by Households without Housing[b]	4,642	7,430	41,671	4,966	24,017	148,713	5,788	14,969	6,240	95,146	34,783	13,597	12,944	4,697	3,969	7,348	12,628	13,583	131,468	16,663	75,299	22,123	5,994	11,084
Government Final Consumption Expenditure	350	4,184	68,653	587	5,957	23,830	1,298	2,602	992	36,809	10,590	11,377	3,564	1,008	548	988	1,797	6,493	38,708	2,153	24,690	7,189	1,244	3,748
Domestic Absorption	7,442	26,957	221,885	6,988	39,290	263,017	12,341	28,013	11,709	217,190	67,376	47,013	35,448	8,727	7,094	10,396	19,198	42,726	304,011	28,486	152,055	42,706	12,469	27,653

– = magnitude equals zero; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei, China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.1.1: Per Capita Nominal Expenditure Index, 2011 (Revised)

(Asia and the Pacific = 100)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	24	74	1,299	25	132	969	41	102	40	1,832	283	188	103	30	20	35	66	155	1,486	89	578	154	42	100
Actual Individual Consumption by Households[a]	37	73	441	41	195	1,283	49	119	50	867	306	140	117	36	32	58	101	132	1,178	133	712	190	53	100
Food and non-alcoholic beverages	80	91	238	79	289	588	60	155	80	271	252	132	144	90	78	111	176	107	322	167	352	206	69	100
Food	83	90	223	79	282	587	61	149	72	268	250	119	138	91	80	111	169	108	299	170	342	187	69	100
Bread and cereals	148	100	201	102	236	216	61	179	76	182	143	126	64	99	133	104	250	94	211	236	315	167	83	100
Meat and fish	63	42	315	96	264	1,301	20	158	125	471	333	141	186	111	52	41	231	142	450	87	427	185	113	100
Fruits and vegetables	49	105	176	52	360	321	73	101	49	260	225	98	70	95	60	66	85	122	244	83	455	282	44	100
Other food and non-alcoholic beverages	62	112	252	68	302	501	84	175	68	186	293	155	231	60	68	207	140	78	364	241	244	199	40	100
Alcoholic beverages, tobacco and narcotics	31	75	65	62	555	512	52	251	141	184	212	156	329	29	43	22	50	116	885	190	641	266	71	100
Clothing and footwear	39	93	245	14	155	1,050	51	80	18	846	143	60	95	22	14	48	24	161	549	119	491	104	43	100
Clothing	42	76	246	9	154	857	50	84	17	781	151	58	102	23	14	47	20	161	530	135	515	119	44	100
Housing, water, electricity, gas and other fuels[a]	45	91	354	44	129	1,494	54	76	40	869	325	276	124	39	26	80	86	131	1,339	87	823	111	86	100
Furnishings, household equipment and routine household maintenance	27	30	400	17	262	1,632	34	110	64	362	353	156	31	11	13	44	90	149	1,357	83	720	180	71	100
Health and education[a]	18	78	638	30	145	955	30	79	16	624	245	127	89	14	16	34	51	174	991	64	685	173	46	100
Health[a]	13	80	305	28	79	942	22	55	15	571	172	107	50	15	13	35	27	192	839	64	649	150	40	100
Education[a]	23	76	1,033	32	224	971	39	108	18	686	331	151	136	12	19	32	79	152	1,171	63	727	200	53	100
Transportation and communication	14	72	619	26	202	968	67	171	53	746	486	151	199	15	11	39	111	102	1,627	199	838	251	49	100
Transportation	17	77	652	35	184	1,012	78	171	60	762	429	73	228	14	11	42	117	87	1,592	256	854	297	62	100
Communication	6	56	528	3	250	842	34	171	34	699	649	372	118	17	14	31	97	144	1,729	38	794	123	14	100
Recreation and culture[a]	6	94	582	24	89	3,060	11	110	18	1,695	409	65	71	9	27	14	37	152	3,258	277	1,286	177	50	100
Restaurants and hotels	16	16	393	39	49	2,445	21	195	101	2,899	533	59	37	32	12	12	69	132	2,131	85	881	291	47	100
Miscellaneous goods and services[a]	15	16	236	12	177	2,340	65	61	39	909	411	85	37	12	19	39	136	117	1,752	150	1,070	208	21	100
Individual Consumption Expenditure by Government	5	87	835	17	116	483	20	51	10	755	273	123	85	4	10	16	40	197	736	53	653	180	28	100
Collective Consumption Expenditure by Government	14	137	2,861	14	204	793	50	88	43	1,217	292	490	105	50	20	37	56	149	1,339	62	664	204	38	100
Gross Fixed Capital Formation	18	131	1,034	7	63	595	36	83	34	597	163	165	130	24	11	12	32	185	979	61	353	106	33	100
Machinery and equipment	14	172	1,186	11	135	896	37	54	18	399	204	189	248	39	8	12	35	176	1,077	117	499	234	29	100
Construction	22	125	1,016	6	32	459	34	100	27	744	130	180	71	16	10	9	26	191	832	42	222	55	37	100
Other products	5	47	695	6	44	548	44	68	122	275	244	–	149	33	26	27	60	171	1,599	16	723	49	21	100
Changes in Inventories and Acquisitions Less Disposals of Valuables	7	–7	–695	5	129	212	83	64	19	892	113	34	362	1	121	20	41	150	766	229	52	56	78	100
Balance of Exports and Imports	–93	–1,074	25,456	–1	–358	1,853	–114	125	–65	52,771	2,186	1,079	–1,120	–55	–242	–113	–118	198	20,315	–584	1,929	156	–87	100
Individual Consumption Expenditure by Households[b]	42	70	381	45	207	1,406	53	129	56	884	311	143	122	41	36	65	111	122	1,246	146	722	192	57	100
Individual Consumption Expenditure by Households without Housing[b]	42	67	376	45	217	1,342	52	135	56	858	314	123	117	42	36	66	114	123	1,186	150	679	200	54	100
Government Final Consumption Expenditure	9	112	1,832	16	159	636	35	69	26	982	283	304	95	27	15	26	48	173	1,033	57	659	192	33	100
Domestic Absorption	27	97	802	25	142	951	45	101	42	785	244	170	128	32	26	38	69	155	1,099	103	550	154	45	100

– = magnitude equals zero; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.12: Nominal Expenditure Shares, 2011 (Revised)
(%)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE	AP
Gross Domestic Product	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Actual Individual Consumption by Households[a]	75.42	49.50	17.12	84.27	74.37	66.66	59.02	58.81	62.58	23.83	54.49	37.42	57.05	61.36	79.74	84.88	77.58	42.91	39.92	75.26	62.12	61.97	63.41	50.37
Food and non-alcoholic beverages	38.27	14.38	2.15	37.58	25.68	7.11	17.04	17.87	23.24	1.73	10.42	8.21	16.42	35.21	44.98	37.50	31.45	8.06	2.54	21.99	7.14	15.61	19.09	11.71
Food	38.12	13.67	1.93	36.01	24.06	6.82	16.71	16.46	20.07	1.65	9.96	7.12	15.06	34.38	44.37	36.02	29.04	7.86	2.27	21.52	6.67	13.67	18.45	11.26
Bread and cereals	17.01	3.81	0.43	11.53	5.02	0.63	4.12	4.93	5.30	0.28	1.42	1.88	1.73	9.36	18.38	8.42	10.67	1.71	0.40	7.44	1.53	3.03	5.51	2.81
Meat and fish	7.30	1.63	0.69	11.12	5.72	3.83	1.35	4.42	8.89	0.73	3.36	2.13	5.16	10.64	7.34	3.39	10.03	2.61	0.86	2.79	2.11	3.41	7.63	2.86
Fruits and vegetables	5.18	3.65	0.35	5.41	7.01	0.85	4.51	2.56	3.13	0.36	2.05	1.34	1.75	8.22	7.63	4.91	3.35	2.01	0.42	2.38	2.03	4.70	2.68	2.57
Other food and non-alcoholic beverages	8.78	5.29	0.68	9.53	7.94	1.80	7.06	5.96	5.92	0.35	3.60	2.85	7.78	6.99	11.62	20.78	7.40	1.73	0.85	9.38	1.47	4.47	3.27	3.48
Alcoholic beverages, tobacco and narcotics	1.57	1.26	0.06	3.11	5.20	0.65	1.56	3.05	4.34	0.12	0.93	1.02	3.95	1.22	2.63	0.80	0.95	0.92	0.74	2.63	1.37	2.13	2.07	1.24
Clothing and footwear	4.53	3.61	0.54	1.59	3.35	3.10	3.54	2.25	1.28	1.32	1.45	0.91	2.64	2.15	1.97	3.94	1.04	2.97	1.06	3.81	2.43	1.93	2.93	2.86
Clothing	4.05	2.44	0.45	0.81	2.76	2.09	2.84	1.96	1.02	1.01	1.27	0.72	2.33	1.85	1.64	3.25	0.72	2.46	0.84	3.59	2.11	1.83	2.48	2.37
Housing, water, electricity, gas and other fuels[a]	13.02	8.64	1.92	12.47	6.92	10.87	9.17	5.24	7.00	3.35	8.10	10.33	8.49	9.17	8.96	16.31	9.27	5.95	6.35	6.87	10.05	5.05	14.37	7.05
Furnishings, household equipment and routine household maintenance	2.42	0.88	0.67	1.54	4.34	3.67	1.80	2.36	3.46	0.43	2.72	1.81	0.65	0.82	1.37	2.78	3.01	2.09	1.99	2.03	2.72	2.55	3.66	2.18
Health and education[a]	6.88	10.20	4.72	11.64	10.59	9.48	6.88	7.46	3.88	3.27	8.33	6.47	8.32	4.43	7.50	9.42	7.49	10.75	6.41	6.85	11.40	10.78	10.37	9.62
Health[a]	2.76	5.68	1.22	5.94	3.11	5.07	2.77	2.79	1.91	1.63	3.17	2.95	2.53	2.58	3.29	5.34	2.17	6.44	2.94	3.76	5.86	5.07	4.89	5.22
Education[a]	4.12	4.52	3.50	5.71	7.48	4.41	4.12	4.66	1.97	1.65	5.16	3.52	5.79	1.85	4.20	4.08	5.32	4.32	3.47	3.09	5.54	5.71	5.48	4.40
Transportation and communication	3.53	5.85	2.88	6.47	9.23	6.04	9.76	10.19	8.03	2.46	10.40	4.84	11.70	3.04	3.42	6.85	10.26	3.96	6.62	13.50	8.78	9.84	7.02	6.05
Transportation	3.17	4.66	2.24	6.26	6.24	4.67	8.46	7.53	6.68	1.86	6.78	1.73	9.89	2.12	2.36	5.44	7.94	2.51	4.79	12.82	6.61	8.58	6.50	4.47
Communication	0.36	1.19	0.64	0.21	2.99	1.37	1.30	2.66	1.35	0.60	3.62	3.11	1.81	0.92	1.06	1.41	2.32	1.46	1.83	0.68	2.17	1.26	0.53	1.58
Recreation and culture[a]	0.55	3.04	1.07	2.31	1.60	7.52	0.64	2.57	1.10	2.20	3.45	0.82	1.63	0.70	3.15	0.94	1.35	2.33	5.22	7.39	5.30	2.72	2.79	2.38
Restaurants and hotels	1.71	0.56	0.78	4.03	0.95	6.47	1.32	4.92	6.43	4.06	4.84	0.81	0.92	2.71	1.55	0.87	2.72	2.18	3.68	2.46	3.91	4.83	2.86	2.57
Miscellaneous goods and services[a]	2.93	1.08	0.88	2.31	6.52	11.75	7.60	2.92	4.68	2.42	7.08	2.20	1.76	1.92	4.47	5.47	10.06	3.68	5.74	8.21	9.02	6.54	2.41	4.87
Individual Consumption Expenditure by Government	1.43	7.93	4.34	4.70	5.91	3.36	3.23	3.39	1.69	2.78	6.52	4.40	5.56	0.94	3.28	3.05	5.59	8.55	3.34	4.01	7.63	7.86	4.48	6.75
Collective Consumption Expenditure by Government	3.64	12.13	14.39	3.71	10.08	5.35	7.87	5.67	7.06	4.34	6.75	17.01	6.69	11.05	6.30	7.08	5.59	6.25	5.89	4.55	7.52	8.63	5.91	6.54
Gross Fixed Capital Formation	27.87	67.92	30.50	11.59	18.31	23.54	33.11	31.31	32.29	12.48	22.08	33.53	48.41	31.22	21.41	13.02	18.74	45.59	25.24	26.29	23.39	26.37	29.75	38.32
Machinery and equipment	6.16	26.04	10.19	4.92	11.44	10.32	10.04	5.90	4.94	2.43	8.05	11.19	26.80	14.46	4.66	3.85	5.91	12.64	8.08	14.65	9.64	16.90	7.60	11.16
Construction	20.89	39.46	18.28	5.77	5.61	11.07	19.04	22.88	15.80	9.48	10.75	22.34	16.12	12.56	11.91	6.22	9.34	28.77	13.07	10.97	8.99	8.27	20.31	23.36
Other products	0.82	2.43	2.03	0.91	1.27	2.15	4.03	2.53	11.55	0.57	3.28	–	5.49	4.20	4.84	2.95	3.49	4.18	4.08	0.67	4.75	1.20	1.85	3.80
Changes in Inventories and Acquisitions Less Disposals of Valuables	0.76	-0.27	-1.48	0.53	2.70	0.61	5.54	1.74	1.34	1.35	1.11	0.51	9.74	0.11	16.57	1.60	1.73	2.68	1.43	7.10	0.25	1.00	5.06	2.77
Balance of Exports and Imports	-7.69	-29.28	39.47	-0.11	-5.46	3.85	-5.54	2.47	-3.28	58.00	15.57	11.54	-21.89	-3.74	-24.02	-6.58	-3.64	2.57	27.53	-13.19	6.73	2.03	-4.13	2.01
Individual Consumption Expenditure by Households[b]	73.99	41.56	12.78	79.57	68.46	63.30	55.79	55.42	60.90	21.05	47.97	33.02	51.49	60.43	76.46	81.83	73.47	34.36	36.58	71.25	54.49	54.10	58.94	43.62
Individual Consumption Expenditure by Households without Housing[b]	67.17	35.63	11.37	71.14	64.46	54.36	49.50	52.11	55.04	18.40	43.59	25.59	44.51	55.83	69.40	75.33	68.17	30.97	31.34	66.21	46.19	50.75	50.06	39.27
Government Final Consumption Expenditure	5.07	20.07	18.73	8.41	15.99	8.71	11.10	9.06	8.75	7.12	13.27	21.41	12.26	11.99	9.58	10.13	9.70	14.81	9.23	8.56	15.15	16.49	10.39	13.28
Domestic Absorption	107.69	129.28	60.53	100.11	105.46	96.15	105.54	97.53	103.28	42.00	84.43	88.46	121.89	103.74	124.02	106.58	103.64	97.43	72.47	113.19	93.27	97.97	104.13	97.99

– = magnitude equals zero; AP = Asia and the Pacific; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Asian Development Bank estimates.

Table A2.13: Gross Domestic Product, 2011 (Revised)

(billion local currency units)

Expenditure Category	BAN	BHU	BRU	CAM	FIJ	HKG	IND	INO	LAO	MAC	MAL	MLD	MON	MYA	NEP	PAK	PHI	PRC	SIN	SRI	TAP	THA	VIE
Gross Domestic Product	9,855.16	84.95	23.30	52,068.70	7.33	1,934.43	85,256.19	7,831,726.00	71,543.55	294.35	911.73	40.51	13,173.76	43,900.00	1,440.78	19,161.47	9,708.33	48,930.06	351.37	7,219.11	14,312.20	11,306.91	2,779,880.24
Actual Individual Consumption by Households[a]	7,432.83	42.05	3.99	43,880.59	5.45	1,289.48	50,322.02	4,605,767.64	44,775.07	70.15	496.77	15.16	7,515.65	26,938.90	1,148.82	16,264.13	7,531.98	20,996.33	140.26	5,433.11	8,890.97	7,006.71	1,762,838.51
Food and non-alcoholic beverages	3,771.94	12.21	0.50	19,568.96	1.88	137.46	14,527.43	1,399,721.16	16,625.94	5.09	95.01	3.32	2,163.07	15,457.20	647.99	7,185.16	3,053.35	3,945.50	8.91	1,587.74	1,021.56	1,764.45	530,776.00
Food	3,756.43	11.62	0.45	18,748.23	1.76	131.86	14,246.93	1,289,172.52	14,359.95	4.85	90.82	2.88	1,984.35	15,094.00	639.23	6,902.18	2,819.41	3,846.18	7.97	1,553.65	954.42	1,546.00	512,783.00
Bread and cereals	1,676.43	3.24	0.10	6,001.70	0.37	12.10	3,511.69	386,407.55	3,792.01	0.82	12.91	0.76	228.16	4,108.60	264.87	1,613.02	1,036.25	835.24	1.40	537.26	219.39	342.27	153,144.00
Meat and fish	719.75	1.39	0.16	5,791.00	0.42	74.14	1,152.88	346,088.57	6,356.96	2.16	30.62	0.86	679.60	4,670.00	105.79	648.92	973.74	1,276.14	3.04	201.25	301.90	385.95	212,047.00
Fruits and vegetables	510.77	3.10	0.08	2,815.20	0.51	16.48	3,844.34	200,146.26	2,240.51	1.07	18.70	0.54	230.61	3,610.40	109.91	941.14	324.95	985.29	1.49	172.13	289.91	531.06	74,627.00
Other food and non-alcoholic beverages	864.99	4.49	0.16	4,961.05	0.58	34.74	6,018.52	467,078.78	4,236.47	1.04	32.78	1.16	1,024.70	3,068.20	167.42	3,982.08	718.41	848.83	2.99	677.10	210.37	505.18	90,958.00
Alcoholic beverages, tobacco and narcotics	154.35	1.07	0.01	1,620.73	0.38	12.63	1,329.25	238,922.37	3,106.29	0.37	8.44	0.41	520.83	534.50	37.94	154.11	91.77	452.16	2.59	189.85	196.41	240.57	57,560.00
Clothing and footwear	446.92	3.06	0.13	827.28	0.25	59.93	3,017.85	175,860.06	914.37	3.89	13.20	0.37	347.35	946.00	28.35	755.81	100.89	1,451.29	3.71	274.84	348.01	218.27	81,479.00
Clothing	398.90	2.08	0.10	424.35	0.20	40.52	2,425.18	153,881.21	729.26	2.97	11.56	0.29	307.45	811.00	23.56	621.89	69.74	1,201.57	2.97	258.82	302.46	206.69	68,868.00
Housing, water, electricity, gas and other fuels[a]	1,283.44	7.34	0.45	6,495.35	0.51	210.22	7,819.83	410,308.90	5,008.63	9.85	73.82	4.19	1,117.84	4,023.96	129.09	3,124.55	899.92	2,910.19	22.32	496.14	1,438.07	571.52	399,481.14
Furnishings, household equipment and routine household maintenance	238.85	0.75	0.16	800.88	0.32	71.09	1,534.50	184,625.21	2,476.47	1.27	24.84	0.73	86.15	358.20	19.71	533.30	291.90	1,024.24	7.00	146.76	389.49	287.83	101,638.70
Health and education[a]	678.02	8.67	1.10	6,063.24	0.78	183.33	5,868.09	583,864.39	2,774.63	9.63	75.94	2.62	1,096.21	1,944.10	108.00	1,805.32	727.18	5,262.03	22.53	494.47	1,631.84	1,218.43	288,350.70
Health[a]	271.57	4.83	0.29	3,091.03	0.23	98.06	2,358.09	218,842.05	1,365.17	4.78	28.92	1.20	333.76	1,133.90	47.45	1,022.90	210.78	3,149.73	10.35	271.65	838.78	573.16	136,019.72
Education[a]	406.46	3.84	0.82	2,972.21	0.55	85.26	3,509.99	365,022.34	1,409.46	4.85	47.02	1.43	762.45	810.20	60.55	782.42	516.39	2,112.30	12.18	222.81	793.06	645.27	152,330.98
Transportation and communication	348.24	4.97	0.67	3,366.42	0.68	116.81	8,319.16	797,687.51	5,747.15	7.24	94.80	1.96	1,541.14	1,333.90	49.35	1,313.08	995.79	1,939.73	23.26	974.36	1,255.96	1,112.34	195,211.05
Transportation	312.51	3.96	0.52	3,257.58	0.46	90.30	7,213.55	589,664.98	4,782.50	5.47	61.80	0.70	1,302.82	928.50	34.02	1,042.59	770.43	1,227.00	16.81	925.28	945.67	970.25	180,580.40
Communication	35.73	1.01	0.15	108.83	0.22	26.51	1,105.61	208,022.53	964.65	1.77	32.99	1.26	238.32	405.40	15.33	270.49	225.36	712.73	6.45	49.08	310.29	142.09	14,630.65
Recreation and culture[a]	53.77	2.58	0.25	1,200.94	0.12	145.44	549.28	201,286.84	784.29	6.48	31.42	0.33	214.83	306.37	45.43	179.64	130.68	1,140.96	18.34	533.64	758.80	307.83	77,502.62
Restaurants and hotels	168.70	0.48	0.18	2,095.98	0.07	125.19	1,128.41	385,156.06	4,599.68	11.95	44.09	0.33	121.58	1,190.80	22.38	165.90	263.72	1,068.95	12.92	177.51	559.92	545.68	79,613.00
Miscellaneous goods and services[a]	288.61	0.92	0.21	1,201.91	0.48	227.39	6,475.71	228,335.14	3,345.71	7.11	64.58	0.89	231.53	843.87	64.47	1,047.25	976.79	1,801.29	20.17	592.43	1,290.90	739.79	67,014.30
Individual Consumption Expenditure by Government	141.04	6.74	1.01	2,449.54	0.43	65.08	2,756.27	265,162.21	1,208.46	8.18	59.43	1.78	732.99	404.84	47.26	584.57	399.40	4,185.19	11.73	289.44	1,092.00	889.12	124,493.00
Collective Consumption Expenditure by Government	358.25	10.31	3.35	1,931.36	0.74	103.44	6,709.14	444,288.56	5,049.93	12.77	61.57	6.89	881.49	4,851.22	90.72	1,356.46	542.44	3,059.60	20.69	328.24	1,075.60	975.45	164,322.94
Gross Fixed Capital Formation	2,746.77	57.70	7.11	6,035.28	1.34	455.29	28,230.76	2,451,914.02	23,103.71	36.72	201.33	13.58	6,377.73	13,704.98	308.54	2,494.89	1,819.27	22,306.58	88.68	1,897.67	3,346.95	2,982.10	827,032.18
Machinery and equipment	607.35	22.12	2.37	2,560.72	0.84	199.55	8,559.20	462,113.25	3,536.07	7.14	73.36	4.53	3,530.11	6,348.02	67.15	737.39	573.39	6,186.98	28.40	1,057.52	1,379.61	1,910.40	211,201.05
Construction	2,058.45	33.52	4.26	3,002.58	0.41	214.22	16,232.84	1,791,932.43	11,301.15	27.90	98.04	9.05	2,124.27	5,513.20	171.64	1,192.66	906.60	14,075.71	45.93	791.98	1,286.96	935.53	564,516.51
Other products	80.98	2.07	0.47	471.98	0.09	41.53	3,438.73	197,868.34	8,266.49	1.68	29.93	0.21	723.35	1,843.76	69.75	564.84	339.29	2,043.89	14.35	48.18	680.38	136.17	51,314.62
Changes in Inventories and Acquisitions Less Disposals of Valuables	75.14	-0.23	-0.35	277.93	0.20	11.74	4,721.05	135,944.61	961.00	3.97	10.08	0.21	1,282.91	46.80	238.77	306.58	167.66	1,309.58	5.01	512.35	35.92	112.62	140,574.06
Balance of Exports and Imports	-757.83	-24.87	9.20	-56.47	-0.40	74.48	-4,726.79	193,811.17	-2,346.15	170.73	141.99	4.67	-2,884.02	-1,641.90	-346.08	-1,260.59	-353.02	1,257.97	96.73	-952.27	962.76	230.03	-114,887.46
Individual Consumption Expenditure by Households[b]	7,291.78	35.31	2.98	41,431.05	5.02	1,224.40	47,565.75	4,340,605.42	43,566.61	61.97	437.34	13.38	6,782.66	26,528.06	1,101.57	15,679.56	7,132.58	16,811.14	128.52	5,143.67	7,798.98	6,117.60	1,638,345.51
Individual Consumption Expenditure by Households without Housing[b]	6,619.59	30.27	2.65	37,040.87	4.73	1,051.64	42,202.01	4,081,324.97	39,378.69	54.15	397.38	10.36	5,863.65	24,508.66	999.84	14,434.55	6,617.87	15,155.71	110.12	4,779.88	6,610.76	5,738.10	1,391,560.71
Government Final Consumption Expenditure	499.30	17.05	4.36	4,380.91	1.17	168.52	9,465.42	709,450.78	6,258.39	20.95	120.99	8.67	1,614.48	5,262.06	137.98	1,941.03	941.84	7,244.79	32.42	617.68	2,167.60	1,864.56	288,815.94
Domestic Absorption	10,612.99	109.82	14.11	52,125.16	7.73	1,859.95	89,982.98	7,637,914.83	73,889.70	123.61	769.75	35.84	16,057.78	45,541.90	1,786.85	20,422.07	10,061.35	47,672.09	254.64	8,171.37	13,349.44	11,076.88	2,894,767.69

– = magnitude equals zero; BAN = Bangladesh; BHU = Bhutan; BRU = Brunei Darussalam; CAM = Cambodia; FIJ = Fiji; HKG = Hong Kong, China; IND = India; INO = Indonesia; LAO = Lao People's Democratic Republic; MAC = Macau, China; MAL = Malaysia; MLD = Maldives; MON = Mongolia; MYA = Myanmar; NEP = Nepal; PAK = Pakistan; PHI = Philippines; PRC = People's Republic of China; SIN = Singapore; SRI = Sri Lanka; TAP = Taipei,China; THA = Thailand; VIE = Viet Nam.

Note: Expenditure aggregates presented are the best possible estimates provided by the participating economies, using most recent available data sources, and some of these aggregates may be different from the published expenditure estimates by the economies.

[a] Includes individual consumption expenditure by households, nonprofit institutions serving households, and government.

[b] Includes expenditure by nonprofit institutions serving households.

Source: Economy sources.

Appendix 3: Household Price Survey Coverage by Type of Outlet and Location, 2017

Economy	Total Number of Outlets	Outlet Type (%)									Location Type (%)	
		Large Shops	Medium and Small Shops	Markets	Street Outlets	Bulk and Discount Shops	Specialized Shops	Private Service Providers	Public or Semipublic Service Providers	Other Kinds of Trades and Outlets	Urban	Rural
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Bangladesh	720ª	...	...	...	...	...	...	...	...	...	71.7	28.3
Bhutan	482	0.4	48.8	8.1	–	–	13.1	27.0	2.7	–	84.4	15.6
Brunei Darussalam	213	4.7	4.2	2.3	–	–	53.1	28.6	7.0	–	100.0	–
Cambodia	1,244	3.6	21.1	45.2	5.5	0.2	0.5	21.2	2.6	0.2	73.0	27.0
China, People's Republic of	39,587	10.4	10.8	3.0	12.3	0.4	16.3	18.3	10.8	17.7	79.1	20.9
Fiji	878	13.4	27.3	6.8	0.1	0.2	9.5	8.1	33.7	0.8	100.0	–
Hong Kong, China	1,880	6.5	3.0	18.4	–	–	46.8	22.5	2.8	–	100.0	n.a.
India	897ᵇ	...	...	...	...	...	...	...	...	...	64.3	35.7
Indonesia	1,156	12.7	22.0	8.6	3.7	0.3	26.3	24.4	1.4	0.7	97.6	2.4
Lao People's Democratic Republic	1,254	0.8	1.0	76.7	–	0.4	4.3	9.5	3.7	3.6	65.1	34.9
Malaysia	9,641	22.0	19.0	21.0	–	–	3.0	17.0	18.0	–	88.3	11.7
Maldives	241	0.4	20.7	0.4	–	–	44.4	27.8	3.3	2.9	68.9	31.1
Mongolia	2,714	4.5	28.8	7.0	0.5	0.0	2.8	46.1	6.8	3.3	40.0	60.0
Myanmar	3,568	2.2	24.7	45.7	3.7	0.3	11.7	7.7	2.0	2.0	96.1	3.9
Nepal	4,016	7.7	51.0	2.6	4.0	0.2	14.5	15.0	2.4	2.5	96.7	3.3
Pakistan	120	...	...	...	...	...	...	...	...	...	80.0	20.0
Philippines	6,399	5.6	8.0	25.4	9.2	0.0	29.8	16.4	2.7	2.8	86.6	13.4
Singapore	792	1.9	2.8	3.0	–	–	32.8	53.7	2.0	3.8	100.0	n.a.
Sri Lanka	3,948	7.3	32.9	8.1	2.1	1.4	29.1	16.3	2.4	0.6	61.0	39.0
Taipei,China	596	2.5	3.4	13.3	–	–	48.8	25.7	5.0	1.3	100.0	–
Thailand	3,534	4.9	10.2	13.9	1.5	1.0	35.5	23.7	8.9	0.5	84.9	15.1
Viet Nam	983	7.3	24.3	14.6	8.3	0.2	13.3	23.8	8.0	–	74.0	26.0

... = data not available, – = magnitude equals zero, 0.0 = magnitude is less than half of unit employed, n.a. = not applicable.
ª Refers to sample locations that may comprise various outlets.
ᵇ Indicates the number of markets. One market may comprise a number of shops from which prices were collected for each of the items.
Source: Economy sources.

Appendix 4: 2017 International Comparison Program Expenditure Classification

The International Comparison Program (ICP) classification of expenditure for gross domestic product (GDP) is the basis for breaking down the GDP expenditures into detailed categories in a standard manner by all economies. This classification is also the basis for identifying the products to be priced under each of the detailed categories to obtain representative prices. The World Bank updated this classification to reflect the lessons learned during the 2005 and 2011 ICP cycles of comparisons and to take account of the changes introduced in the System of National Accounts 2008 (United Nations 2009). Detailed GDP expenditures common classification is initially used in the regional and in the global comparison.

Each economy was required to provide gross domestic expenditures in local currency units, disaggregated into 155 basic headings according to the 2017 ICP expenditure classification. In many cases, when basic heading level estimates are not directly available, a higher-level aggregate is broken down by a set of related indicators by the implementing agencies of the participating economies. These higher-level aggregates can be a class or a group, because for most economies, expenditures at the level of a category or a main aggregate are generally available.

In the 2017 ICP cycle, 155 basic headings were further aggregated to 126 classes, 63 groups, 28 categories, and 6 main aggregates. Table A4.1 provides an overview of the 2017 ICP expenditure classification with a breakdown of GDP expenditures into the 155 basic headings (the lowest level of classification aggregate) and higher-level aggregates, average share of GDP expenditures for each category, and the number of items priced for each basic heading.

The 2017 ICP expenditure classification introduced several changes compared to the 2005 and 2011 ICP cycles (Table A4.2). Gross capital formation (GCF) has been introduced as a main aggregate. It replaces the former main aggregates of gross fixed capital formation (GFCF) and changes in inventories and acquisitions less disposals of valuables, which are now aggregates at the expenditure category level. Other changes concern actual and imputed rentals for housing and individual consumption expenditure by nonprofit institutions serving households (NPISH). Previously, these were single basic headings, but now actual and imputed rentals for housing are broken down into two basic headings, one for actual rentals for housing (1104111) and the other for imputed rentals for housing (1104211), while NPISH expenditures are divided across five basic headings that cover the individual services provided by NPISH (housing, health, recreation and culture, education, and social protection and other services). Another change in the classification stemmed from the recommendations in the System of National Accounts 2008 that concerned the changes under GFCF from the revised classification of fixed assets relating to research and development, military weapons systems and ammunition, computer software and databases, land improvements, and ownership transfer costs on non-produced assets including land. Some other minor changes in the descriptions of few categories were also affected in the revision (Table A4.3).

Table A4.1: 2017 International Comparison Program Expenditure Classification: Gross Domestic Product Structure and Number of Items Priced

Code	Name	Expenditure Level	Share in GDP (%)	Number of Items for Pricing	Number of Items Priced in Basic Headings		
					Average	Minimum	Maximum
1000000	Gross Domestic Product	GDP	100.00	1,126			
1100000	Individual Consumption Expenditure by Households	Main Aggregate	45.18	879			
1101000	Food and non-alcoholic beverages	Category	10.55	248			
1101100	Food	Group	10.12	225			
1101110	Bread and cereals	Class	2.30	52			
1101111	Rice	Basic Heading	1.11	16	9	2	16
1101112	Other cereals, flour and other cereal products	Basic Heading	0.71	12	7	2	12
1101113	Bread	Basic Heading	0.14	6	4	1	6
1101114	Other bakery products	Basic Heading	0.23	11	9	1	11
1101115	Pasta products and couscous	Basic Heading	0.11	7	6	3	7
1101120	Meat	Class	1.86	43			
1101121	Beef and veal	Basic Heading	0.24	13	8	–	13
1101122	Pork	Basic Heading	0.75	7	5	–	7
1101123	Lamb, mutton and goat	Basic Heading	0.12	6	4	–	6
1101124	Poultry	Basic Heading	0.50	10	8	2	10
1101125	Other meats and meat preparations	Basic Heading	0.26	7	4	–	7
1101130	Fish and seafood	Class	0.93	23			
1101131	Fresh, chilled or frozen fish and seafood	Basic Heading	0.78	17	11	1	17
1101132	Preserved or processed fish and seafood	Basic Heading	0.15	6	5	1	6
1101140	Milk, cheese and eggs	Class	1.21	24			
1101141	Fresh milk	Basic Heading	0.53	4	2	1	4
1101142	Preserved milk and other milk products	Basic Heading	0.39	10	8	5	10
1101143	Cheese and curd	Basic Heading	0.02	5	4	1	5
1101144	Eggs and egg-based products	Basic Heading	0.26	5	4	1	5
1101150	Oils and fats	Class	0.44	12			
1101151	Butter and margarine	Basic Heading	0.10	4	3	2	4
1101153	Other edible oils and fats	Basic Heading	0.34	8	5	1	8
1101160	Fruit	Class	1.06	16			
1101161	Fresh or chilled fruit	Basic Heading	0.86	12	10	7	12
1101162	Frozen, preserved or processed fruit and fruit-based products	Basic Heading	0.20	4	3	–	4
1101170	Vegetables	Class	1.33	30			
1101171	Fresh or chilled vegetables, other than potatoes and other tuber vegetables	Basic Heading	1.00	15	14	8	15
1101172	Fresh or chilled potatoes and other tuber vegetables	Basic Heading	0.15	4	3	1	4
1101173	Frozen, preserved or processed vegetables and vegetable-based products	Basic Heading	0.18	11	7	2	11
1101180	Sugar, jam, honey, chocolate and confectionery	Class	0.26	12			
1101181	Sugar	Basic Heading	0.14	3	2	1	3
1101182	Jams, marmalades and honey	Basic Heading	0.02	3	3	2	3
1101183	Confectionery, chocolate and ice cream	Basic Heading	0.10	6	5	1	6
1101190	Food products n.e.c.	Class	0.73	13			
1101191	Food products n.e.c.	Basic Heading	0.73	13	10	6	13
1101200	Non-alcoholic beverages	Group	0.44	23			
1101210	Coffee, tea and cocoa	Class	0.18	15			
1101211	Coffee, tea and cocoa	Basic Heading	0.18	15	9	3	15
1101220	Mineral waters, soft drinks, fruit and vegetable juices	Class	0.26	8			
1101221	Mineral waters, soft drinks, fruit and vegetable juices	Basic Heading	0.26	8	6	4	8
1102000	Alcoholic beverages, tobacco and narcotics	Category	1.23	16			
1102100	Alcoholic beverages	Group	0.36	13			
1102110	Spirits	Class	0.23	4			
1102111	Spirits	Basic Heading	0.23	4	3	–	4
1102120	Wine	Class	0.04	5			
1102121	Wine	Basic Heading	0.04	5	4	–	5
1102130	Beer	Class	0.09	4			
1102131	Beer	Basic Heading	0.09	4	3	–	4
1102200	Tobacco	Group	0.82	3			
1102210	Tobacco	Class	0.82	3			
1102211	Tobacco	Basic Heading	0.82	3	2	–	3
1102300	Narcotics	Group	0.05				
1102310	Narcotics	Class	0.05				
1102311	Narcotics	Basic Heading	0.05	a	a	a	a
1103000	Clothing and footwear	Category	2.50	82			
1103100	Clothing	Group	1.98	69			
1103110	Clothing materials, other articles of clothing and clothing accessories	Class	0.45	5			

Table A4.1: *continued*

Code	Name	Expenditure Level	Share in GDP (%)	Number of Items for Pricing	Number of Items Priced in Basic Headings		
					Average	Minimum	Maximum
1103111	Clothing materials, other articles of clothing and clothing accessories	Basic Heading	0.45	5	3	2	5
1103120	Garments	Class	1.46	62			
1103121	Garments	Basic Heading	1.46	62	50	26	59
1103140	Cleaning, repair and hire of clothing	Class	0.07	2			
1103141	Cleaning, repair and hire of clothing	Basic Heading	0.07	2	2	–	2
1103200	Footwear	Group	0.52	13			
1103210	Shoes and other footwear	Class	0.50	11			
1103211	Shoes and other footwear	Basic Heading	0.50	11	10	6	11
1103220	Repair and hire of footwear	Class	0.01	2			
1103221	Repair and hire of footwear	Basic Heading	0.01	2	2	–	2
1104000	Housing, water, electricity, gas and other fuels	Category	7.18	17			
1104a	Actual and imputed rentals for housing	Group	4.80				
1104a	Actual and imputed rentals for housing	Class	4.80				
1104a	Actual and imputed rentals for housing	Basic Heading	4.80	a	a	a	a
1104300	Maintenance and repair of the dwelling	Group	0.61	5			
1104310	Maintenance and repair of the dwelling	Class	0.61	5			
1104311	Maintenance and repair of the dwelling	Basic Heading	0.61	5	4	2	5
1104400	Water supply and miscellaneous services relating to the dwelling	Group	0.34	2			
1104410	Water supply	Class	0.16	2			
1104411	Water supply	Basic Heading	0.16	2	2	–	2
1104420	Miscellaneous services relating to the dwelling	Class	0.18				
1104421	Miscellaneous services relating to the dwelling	Basic Heading	0.18	a	a	a	a
1104500	Electricity, gas and other fuels	Group	1.42	10			
1104510	Electricity	Class	0.76	4			
1104511	Electricity	Basic Heading	0.76	4	2	–	4
1104520	Gas	Class	0.29	3			
1104521	Gas	Basic Heading	0.29	3	1	–	2
1104530	Other fuels	Class	0.38	3			
1104531	Other fuels	Basic Heading	0.38	3	2	–	3
1105000	Furnishings, household equipment and routine household maintenance	Category	2.10	110			
1105100	Furniture and furnishings, carpets and other floor coverings	Group	0.47	21			
1105110	Furniture and furnishings	Class	0.40	17			
1105111	Furniture and furnishings	Basic Heading	0.40	17	12	2	17
1105120	Carpets and other floor coverings	Class	0.04	4			
1105121	Carpets and other floor coverings	Basic Heading	0.04	4	3	–	4
1105130	Repair of furniture, furnishings and floor coverings	Class	0.03				
1105131	Repair of furniture, furnishings and floor coverings	Basic Heading	0.03	a	a	a	a
1105200	Household textiles	Group	0.19	10			
1105210	Household textiles	Class	0.19	10			
1105211	Household textiles	Basic Heading	0.19	10	7	2	10
1105300	Household appliances	Group	0.60	40			
1105310	Major household appliances whether electric or not	Class	0.43	17			
1105311	Major household appliances whether electric or not	Basic Heading	0.43	17	11	7	17
1105320	Small electric household appliances	Class	0.10	23			
1105321	Small electric household appliances	Basic Heading	0.10	23	18	6	23
1105330	Repair of household appliances	Class	0.07				
1105331	Repair of household appliances	Basic Heading	0.07	a	a	a	a
1105400	Glassware, tableware and household utensils	Group	0.13	14			
1105410	Glassware, tableware and household utensils	Class	0.13	14			
1105411	Glassware, tableware and household utensils	Basic Heading	0.13	14	12	4	14
1105500	Tools and equipment for house and garden	Group	0.02	10			
1105510	Major tools and equipment	Class	0.00	2			
1105511	Major tools and equipment	Basic Heading	0.00	2	2	–	2
1105520	Small tools and miscellaneous accessories	Class	0.02	8			
1105521	Small tools and miscellaneous accessories	Basic Heading	0.02	8	8	5	8
1105600	Goods and services for routine household maintenance	Group	0.68	15			
1105610	Non-durable household goods	Class	0.52	11			
1105611	Non-durable household goods	Basic Heading	0.52	11	10	6	11
1105620	Domestic services and household services	Class	0.16	4			
1105621	Domestic services	Basic Heading	0.14	2	2	–	2
1105622	Household services	Basic Heading	0.02	2	1	–	2
1106000	Health	Category	2.60	173			
1106100	Medical products, appliances and equipment	Group	1.44	155			
1106110	Pharmaceutical products	Class	1.11	133			

Table A4.1: *continued*

Code	Name	Expenditure Level	Share in GDP (%)	Number of Items for Pricing	Number of Items Priced in Basic Headings		
					Average	Minimum	Maximum
1106111	Pharmaceutical products	Basic Heading	1.11	133	35	9	64
1106120	Other medical products	Class	0.15	12			
1106121	Other medical products	Basic Heading	0.15	12	9	4	12
1106130	Therapeutic appliances and equipment	Class	0.18	10			
1106131	Therapeutic appliances and equipment	Basic Heading	0.18	10	7	1	10
1106200	Outpatient services	Group	0.62	18			
1106210	Medical services	Class	0.31	7			
1106211	Medical services	Basic Heading	0.31	7	6	–	7
1106220	Dental services	Class	0.06	4			
1106221	Dental services	Basic Heading	0.06	4	3	–	4
1106230	Paramedical services	Class	0.25	7			
1106231	Paramedical services	Basic Heading	0.25	7	6	–	7
1106300	Hospital services	Group	0.54				
1106310	Hospital services	Class	0.54				
1106311	Hospital services	Basic Heading	0.54	a	a	a	a
1107000	Transport	Category	5.20	74			
1107100	Purchase of vehicles	Group	1.66	29			
1107110	Motorcars	Class	1.31	17			
1107111	Motorcars	Basic Heading	1.31	17	6	–	17
1107120	Motorcycles	Class	0.29	7			
1107121	Motorcycles	Basic Heading	0.29	7	4	–	7
1107130	Bicycles	Class	0.06	5			
1107131	Bicycles	Basic Heading	0.06	5	4	1	5
1107140	Animal drawn vehicles	Class	0.00				
1107141	Animal drawn vehicles	Basic Heading	0.00	a	a	a	a
1107200	Operation of personal transport equipment	Group	2.05	22			
1107220	Fuels and lubricants for personal transport equipment	Class	1.31	9			
1107221	Fuels and lubricants for personal transport equipment	Basic Heading	1.31	9	6	3	9
1107230	Maintenance and repair of personal transport equipment	Class	0.51	9			
1107231	Maintenance and repair of personal transport equipment	Basic Heading	0.51	9	7	1	9
1107240	Other services in respect of personal transport equipment	Class	0.23	4			
1107241	Other services in respect of personal transport equipment	Basic Heading	0.23	4	3	–	4
1107300	Transport services	Group	1.49	23			
1107310	Passenger transport by railway	Class	0.14	5			
1107311	Passenger transport by railway	Basic Heading	0.14	5	3	–	5
1107320	Passenger transport by road	Class	1.02	6			
1107321	Passenger transport by road	Basic Heading	1.02	6	4	–	6
1107330	Passenger transport by air	Class	0.27	6			
1107331	Passenger transport by air	Basic Heading	0.27	6	4	–	6
1107340	Passenger transport by sea and inland waterway	Class	0.03	4			
1107341	Passenger transport by sea and inland waterway	Basic Heading	0.03	4	2	–	4
1107350	Combined passenger transport	Class	0.01				
1107351	Combined passenger transport	Basic Heading	0.01	a	a	a	a
1107360	Other purchased transport services	Class	0.03	2			
1107361	Other purchased transport services	Basic Heading	0.03	2	2	–	2
1108000	Communication	Category	1.55	31			
1108100	Postal services	Group	0.04	3			
1108110	Postal services	Class	0.04	3			
1108111	Postal services	Basic Heading	0.04	3	3	1	3
1108200	Telephone and telefax equipment	Group	0.36	11			
1108210	Telephone and telefax equipment	Class	0.36	11			
1108211	Telephone and telefax equipment	Basic Heading	0.36	11	8	2	11
1108300	Telephone and telefax services	Group	1.15	17			
1108310	Telephone and telefax services	Class	1.15	17			
1108311	Telephone and telefax services	Basic Heading	1.15	17	7	1	14
1109000	Recreation and culture	Category	1.97	60			
1109100	Audio-visual, photographic and information processing equipment	Group	0.36	22			
1109110	Audio-visual, photographic and information processing equipment	Class	0.32	13			
1109111	Audio-visual, photographic and information processing equipment	Basic Heading	0.32	13	8	1	13
1109140	Recording media	Class	0.01	6			
1109141	Recording media	Basic Heading	0.01	6	4	1	6
1109150	Repair of audio-visual, photographic and information processing equipment	Class	0.02	3			
1109151	Repair of audio-visual, photographic and information processing equipment	Basic Heading	0.02	3	2	–	3
1109200	Other major durables for recreation and culture	Group	0.04				

Table A4.1: *continued*

Code	Name	Expenditure Level	Share in GDP (%)	Number of Items for Pricing	Number of Items Priced in Basic Headings		
					Average	Minimum	Maximum
1109210	Major durables for outdoor and indoor recreation	Class	0.04				
1109211	Major durables for outdoor and indoor recreation	Basic Heading	0.04	a	a	a	a
1109230	Maintenance and repair of other major durables for recreation and culture	Class	0.00				
1109231	Maintenance and repair of other major durables for recreation and culture	Basic Heading	0.00	a	a	a	a
1109300	Other recreational items and equipment, gardens and pets	Group	0.24	16			
1109310	Other recreational items and equipment	Class	0.15	9			
1109311	Other recreational items and equipment	Basic Heading	0.15	9	7	3	9
1109330	Gardens and pets	Class	0.08	5			
1109331	Gardens and pets	Basic Heading	0.08	5	4	–	5
1109350	Veterinary and other services for pets	Class	0.01	2			
1109351	Veterinary and other services for pets	Basic Heading	0.01	2	2	–	2
1109400	Recreational and cultural services	Group	0.51	8			
1109410	Recreational and sporting services	Class	0.19	4			
1109411	Recreational and sporting services	Basic Heading	0.19	4	3	1	4
1109420	Cultural services	Class	0.22	4			
1109421	Cultural services	Basic Heading	0.22	4	3	2	4
1109430	Games of chance	Class	0.10				
1109431	Games of chance	Basic Heading	0.10	a	a	a	a
1109500	Newspapers, books and stationery	Group	0.16	7			
1109510	Newspapers, books and stationery	Class	0.16	7			
1109511	Newspapers, books and stationery	Basic Heading	0.16	7	6	3	7
1109600	Package holidays	Group	0.67	7			
1109610	Package holidays	Class	0.67	7			
1109611	Package holidays	Basic Heading	0.67	7	5	–	7
1110000	Education	Category	2.48	7			
1110100	Education	Group	2.48	7			
1110110	Education	Class	2.48	7			
1110111	Education	Basic Heading	2.48	7	6	2	7
1111000	Restaurants and hotels	Category	2.34	21			
1111100	Catering services	Group	2.09	17			
1111110	Catering services	Class	2.09	17			
1111111	Catering services	Basic Heading	2.09	17	12	4	17
1111200	Accommodation services	Group	0.25	4			
1111210	Accommodation services	Class	0.25	4			
1111211	Accommodation services	Basic Heading	0.25	4	4	2	4
1112000	Miscellaneous goods and services	Category	5.65	40			
1112100	Personal care	Group	0.83	23			
1112110	Hairdressing salons and personal grooming establishments	Class	0.28	5			
1112111	Hairdressing salons and personal grooming establishments	Basic Heading	0.28	5	5	4	5
1112120	Appliances, articles and products for personal care	Class	0.55	18			
1112121	Appliances, articles and products for personal care	Basic Heading	0.55	18	17	14	18
1112200	Prostitution	Group	0.00				
1112210	Prostitution	Class	0.00				
1112211	Prostitution	Basic Heading	0.00	a	a	a	a
1112300	Personal effects n.e.c.	Group	0.55	17			
1112310	Jewellery, clocks and watches	Class	0.31	12			
1112311	Jewellery, clocks and watches	Basic Heading	0.31	12	7	1	12
1112320	Other personal effects	Class	0.24	5			
1112321	Other personal effects	Basic Heading	0.24	5	5	2	5
1112400	Social protection	Group	0.02				
1112410	Social protection	Class	0.02				
1112411	Social protection	Basic Heading	0.02	a	a	a	a
1112500	Insurance	Group	1.19				
1112510	Insurance	Class	1.19				
1112511	Insurance	Basic Heading	1.19	a	a	a	a
1112600	Financial services n.e.c.	Group	2.09				
1112610	Financial intermediation services indirectly measured (fisim)	Class	1.20				
1112611	Financial intermediation services indirectly measured (fisim)	Basic Heading	1.20	a	a	a	a
1112620	Other financial services n.e.c.	Class	0.88				
1112621	Other financial services n.e.c.	Basic Heading	0.88	a	a	a	a
1112700	Other services n.e.c.	Group	0.98				
1112710	Other services n.e.c.	Class	0.98				
1112711	Other services n.e.c.	Basic Heading	0.98	a	a	a	a
1113000	Net purchases abroad	Category	−0.18				

Table A4.1: *continued*

Code	Name	Expenditure Level	Share in GDP (%)	Number of Items for Pricing	Number of Items Priced in Basic Headings		
					Average	Minimum	Maximum
1113100	Net purchases abroad	Group	−0.18				
1113110	Net purchases abroad	Class	−0.18				
1113111	Net purchases abroad*	Basic Heading	−0.18	a	a	a	a
1200000	**Individual Consumption Expenditure by NPISH**	**Main Aggregate**	**0.20**				
1201000	Housing	Category	0.02				
1201100	Housing	Group	0.02				
1201110	Housing	Class	0.02				
1201111	Housing*	Basic Heading	0.02	a	a	a	a
1202000	Health	Category	0.04				
1202100	Health	Group	0.04				
1202110	Health	Class	0.04				
1202111	Health*	Basic Heading	0.04	a	a	a	a
1203000	Recreation and culture	Category	0.02				
1203100	Recreation and culture	Group	0.02				
1203110	Recreation and culture	Class	0.02				
1203111	Recreation and culture*	Basic Heading	0.02	a	a	a	a
1204000	Education	Category	0.07				
1204100	Education	Group	0.07				
1204110	Education	Class	0.07				
1204111	Education*	Basic Heading	0.07	a	a	a	a
1205000	Social protection and other services	Category	0.05				
1205100	Social protection and other services	Group	0.05				
1205110	Social protection and other services	Class	0.05				
1205111	Social protection and other services*	Basic Heading	0.05	a	a	a	a
1300000	**Individual Consumption Expenditure by Government**	**Main Aggregate**	**7.60**	14			
1301000	Housing	Category	0.01				
1301100	Housing	Group	0.01				
1301110	Housing	Class	0.01				
1301111	Housing	Basic Heading	0.01	a	a	a	a
1302000	Health	Category	3.42	9			
1302100	Health benefits and reimbursements	Group	1.02				
1302110	Medical products, appliances and equipment	Class	0.48				
1302111	Pharmaceutical products	Basic Heading	0.34	a	a	a	a
1302112	Other medical products	Basic Heading	0.06	a	a	a	a
1302113	Therapeutic appliances and equipment	Basic Heading	0.07	a	a	a	a
1302120	Health services	Class	0.54				
1302121	Outpatient medical services	Basic Heading	0.17	a	a	a	a
1302122	Outpatient dental services	Basic Heading	0.03	a	a	a	a
1302123	Outpatient paramedical services	Basic Heading	0.11	a	a	a	a
1302124	Hospital services	Basic Heading	0.24	a	a	a	a
1302200	Production of health services	Group	2.40	9			
1302210	Compensation of employees	Class	0.88	9			
1302211	Compensation of employees	Basic Heading	0.88	9	8	4	9
1302220	Intermediate consumption	Class	1.40				
1302221	Intermediate consumption	Basic Heading	1.40	a	a	a	a
1302230	Gross operating surplus	Class	0.13				
1302231	Gross operating surplus	Basic Heading	0.13	a	a	a	a
1302240	Net taxes on production	Class	0.01				
1302241	Net taxes on production	Basic Heading	0.01	a	a	a	a
1302250	Receipts from sales	Class	−0.02				
1302251	Receipts from sales	Basic Heading	−0.02	a	a	a	a
1303000	Recreation and culture	Category	0.32				
1303100	Recreation and culture	Group	0.32				
1303110	Recreation and culture	Class	0.32				
1303111	Recreation and culture	Basic Heading	0.32	a	a	a	a
1304000	Education	Category	2.81	5			
1304100	Education benefits and reimbursements	Group	0.07				
1304110	Education benefits and reimbursements	Class	0.07				
1304111	Education benefits and reimbursements	Basic Heading	0.07	a	a	a	a
1304200	Production of education services	Group	2.74	5			
1304210	Compensation of employees	Class	1.92	5			
1304211	Compensation of employees	Basic Heading	1.92	5	4	3	5
1304220	Intermediate consumption	Class	0.59				
1304221	Intermediate consumption	Basic Heading	0.59	a	a	a	a

Table A4.1: *continued*

Code	Name	Expenditure Level	Share in GDP (%)	Number of Items for Pricing	Number of Items Priced in Basic Headings		
					Average	Minimum	Maximum
1304230	Gross operating surplus	Class	0.27				
1304231	Gross operating surplus	Basic Heading	0.27	a	a	a	a
1304240	Net taxes on production	Class	−0.01				
1304241	Net taxes on production	Basic Heading	−0.01	a	a	a	a
1304250	Receipts from sales	Class	−0.04				
1304251	Receipt from sales	Basic Heading	−0.04	a	a	a	a
1305000	Social protection	Category	1.04				
1305100	Social protection	Group	1.04				
1305110	Social protection	Class	1.04				
1305111	Social protection	Basic Heading	1.04	a	a	a	a
1400000	**Collective Consumption Expenditure by Government**	Main Aggregate	6.56	20			
1401000	Collective services	Category	6.56	20			
1401100	Collective services	Group	6.56	20			
1401110	Compensation of employees	Class	3.78	20			
1401111	Compensation of employees	Basic Heading	3.78	20	17	12	20
1401120	Intermediate consumption	Class	2.38				
1401121	Intermediate consumption	Basic Heading	2.38	a	a	a	a
1401130	Gross operating surplus	Class	0.57				
1401131	Gross operating surplus	Basic Heading	0.57	a	a	a	a
1401140	Net taxes on production	Class	−0.02				
1401141	Net taxes on production	Basic Heading	−0.02	a	a	a	a
1401150	Receipts from sales	Class	−0.15				
1401151	Receipts from sales	Basic Heading	−0.15	a	a	a	a
1500000	**Gross Capital Formation**	Main Aggregate	38.88	213			
1501000	Gross fixed capital formation	Category	36.90	213			
1501100	Machinery and equipment	Group	7.95	161			
1501110	Metal products and equipment	Class	5.40	139			
1501111	Fabricated metal products, except machinery and equipment	Basic Heading	0.58	10	4	1	10
1501112	Electrical and optical equipment	Basic Heading	1.77	56	29	6	51
1501115	General purpose machinery	Basic Heading	0.86	26	10	2	22
1501116	Special purpose machinery	Basic Heading	2.18	47	15	2	38
1501120	Transport equipment	Class	2.55	22			
1501121	Road transport equipment	Basic Heading	1.90	22	8	–	22
1501122	Other transport equipment	Basic Heading	0.65	a	a	a	a
1501200	Construction	Group	24.31	52	41	23	51
1501210	Residential buildings	Class	5.29				
1501211	Residential buildings	Basic Heading	5.29	b	b	b	b
1501220	Nonresidential buildings	Class	8.80				
1501221	Nonresidential buildings	Basic Heading	8.80	b	b	b	b
1501230	Civil engineering works	Class	10.22				
1501231	Civil engineering works	Basic Heading	10.22	b	b	b	b
1501300	Other products	Group	4.64				
1501310	Other products	Class	4.64				
1501311	Other products	Basic Heading	4.64	a	a	a	a
1502000	Changes in inventories	Category	1.80				
1502100	Changes in inventories	Group	1.80				
1502110	Changes in inventories	Class	1.80				
1502111	Changes in inventories*	Basic Heading	1.80	a	a	a	a
1503000	Acquisitions less disposals of valuables	Category	0.18				
1503100	Acquisitions less disposals of valuables	Group	0.18				
1503110	Acquisitions less disposals of valuables	Class	0.18				
1503111	Acquisitions less disposals of valuables*	Basic Heading	0.18	a	a	a	a
1600000	**Balance of Exports and Imports**	Main Aggregate	1.57				
1601000	Balance of exports and imports	Category	1.57				
1601100	Balance of exports and imports	Group	1.57				
1601110	Balance of exports and imports	Class	1.57				
1601111	Exports of goods and services	Basic Heading	29.94	a	a	a	a
1601112	Imports of goods and services	Basic Heading	−28.36	a	a	a	a

0.00 = magnitude is less than half of the unit employed; – = magnitude equals zero, GDP = gross domestic product, NPISH = nonprofit institutions serving households, n.e.c = not elsewhere classified.

Notes: Shares here refer to the share of different components in region's total GDP based on exchange rate-converted GDP estimates of 22 participating economies. Number of items for pricing was based on the final list of items.

* Newly introduced basic heading.

a Reference purchasing power parities, listed in Appendix 5, were used.

b Only one set of items of construction inputs was used for each of the three basic heading of construction.

Sources: Economy sources. World Bank. 2016b. *International Comparison Program: Classification of Final Expenditure on GDP.* Washington, DC: World Bank. http://pubdocs.worldbank.org/en/708531575560035925/pdf/ICP-Classification-description-2019-1205.pdf.

Table A4.2: 2017 International Comparison Program Expenditure Classification: Changes in Classification from 2011

2011 ICP Classification			2017 ICP Revised Classification		
Code	Headings	Level	Code	Headings	Level
110117	Vegetables	Class	1101170	Vegetables	Class
1101171	Fresh or chilled vegetables other than potatoes	Basic Heading	1101171	Fresh or chilled vegetables, other than potatoes and other tubers	Basic Heading
1101172	Fresh or chilled potatoes	Basic Heading	1101172	Fresh or chilled potatoes	Basic Heading
1101173	Frozen, preserved or processed vegetables and vegetable-based products		1101173	Frozen, preserved or processed vegetables and vegetable-based products	Basic Heading
110400	HOUSING, WATER, ELECTRICITY, GAS, AND OTHER FUELS	Category	1104000	HOUSING, WATER, ELECTRICITY, GAS AND OTHER FUELS	Category
110410	ACTUAL AND IMPUTED RENTALS FOR HOUSING	Group	1104100	ACTUAL RENTALS FOR HOUSING	Group
110411	Actual and imputed rentals for housing	Class	1104110	Actual rentals for housing	Class
1104111	Actual and imputed rentals for housing	Basic Heading	1104111	Actual rentals for housing	Basic Heading
			1104200	IMPUTED RENTALS FOR HOUSING	Group
			1104210	Imputed rentals for housing	Class
			1104211	Imputed rentals for housing	Basic Heading
111311	Balance of expenditures of residents abroad and expenditures of non-residents in the economic territory	Class	1113110	Net purchases abroad	Class
1113111	Final consumption expenditure of resident households in the rest of the world	Basic Heading	1113111	Net purchases abroad	Basic Heading
1113112	Final consumption expenditure of non-resident households in the economic territory	Basic Heading			
120000	INDIVIDUAL CONSUMPTION EXPENDITURE BY NPISH	Main Aggregate	1200000	INDIVIDUAL CONSUMPTION EXPENDITURE BY NPISH	Main Aggregate
120100	INDIVIDUAL CONSUMPTION EXPENDITURE BY NPISH	Category	1201000	HOUSING	Category
120110	INDIVIDUAL CONSUMPTION EXPENDITURE BY NPISH	Group	1201100	HOUSING	Group
120111	Individual consumption expenditure by NPISH	Class	1201110	Housing	Class
1201111	Individual consumption expenditure by NPISH	Basic Heading	1201111	Housing	Basic Heading
			1202000	HEALTH	Category
			1202100	HEALTH	Group
			1202110	Health	Class
			1202111	Health	Basic Heading
			1203000	RECREATION AND CULTURE	Category
			1203100	RECREATION AND CULTURE	Group
			1203110	Recreation and culture	Class
			1203111	Recreation and culture	Basic Heading
			1204000	EDUCATION	Category
			1204100	EDUCATION	Group
			1204110	Education	Class
			1204111	Education	Basic Heading
			1205000	SOCIAL PROTECTION AND OTHER SERVICES	Category
			1205100	SOCIAL PROTECTION AND OTHER SERVICES	Group
			1205110	Social protection and other services	Class
			1205111	Social protection and other services	Basic Heading
			1500000	GROSS CAPITAL FORMATION	Main Aggregate (new)
150000	GROSS FIXED CAPITAL FORMATION	Main Aggregate	1501000	GROSS FIXED CAPITAL FORMATION	Category
150100	MACHINERY AND EQUIPMENT	Category	1501100	MACHINERY AND EQUIPMENT	Group
150110	METAL PRODUCTS AND EQUIPMENT	Group	1501110	Metal products and equipment	Class
150111	Fabricated metal products, except machinery and equipment	Class			
1501111	Fabricated metal products, except machinery and equipment	Basic Heading	1501111	Fabricated metal products, except machinery and equipment - *formerly 1501111*	Basic Heading
150112	General purpose machinery	Class	1501112	Electrical and optical equipment – *formerly 1501141*	Basic Heading
1501121	General purpose machinery	Basic Heading	1501115	General purpose machinery - *formerly 1501121*	Basic Heading
150113	Special purpose machinery	Class	1501116	Special purpose machinery - *formerly 1501131*	Basic Heading
1501131	Special purpose machinery	Basic Heading			
150114	Electrical and optical equipment	Class			
1501141	Electrical and optical equipment	Basic Heading			
150115	Other manufactured goods nec	Class			
1501151	Other manufactured goods nec	Basic Heading			
150120	TRANSPORT EQUIPMENT	Group			
150121	Road transport equipment	Class	1501120	Transport equipment	Class
1501211	Motor vehicles, trailers and semi-trailers	Basic Heading	1501121	Road transport equipment – *formerly 1501211 and 1501212*	Basic Heading
1501212	Other road transport	Basic Heading			
150122	Other transport equipment	Class			
1501221	Other transport equipment	Basic Heading	1501122	Other transport equipment – *formerly 1501221*	Basic Heading
150300	OTHER PRODUCTS	Category			
150310	OTHER PRODUCTS	Group	1501300	OTHER PRODUCTS	Group
150311	Other products	Class	1501310	Other products	Class
1503111	Other products	Basic Heading	1501311	Other products – *formerly 1501151 and 1503111*	Basic Heading

Table A4.2: *continued*

2011 ICP Classification			2017 ICP Revised Classification		
Code	**Headings**	**Level**	**Code**	**Headings**	**Level**
160000	**CHANGES IN INVENTORIES AND ACQUISITIONS LESS DISPOSALS OF VALUABLES**	Main Aggregate			
160100	CHANGES IN INVENTORIES	Category	1502000	CHANGES IN INVENTORIES	Category
160110	CHANGES IN INVENTORIES	Group	1502100	CHANGES IN INVENTORIES	Group
160111	Changes in inventories	Class	1502110	Changes in inventories	Class
1601111	Opening value of inventories	Basic Heading	1502111	Change in inventories – *formerly 1601111 and 1601112*	Basic Heading
1601112	Closing value of inventories	Basic Heading			
160200	ACQUISITIONS LESS DISPOSALS OF VALUABLES	Category	1503000	ACQUISITIONS LESS DISPOSALS OF VALUABLES	Category
160210	ACQUISITIONS LESS DISPOSALS OF VALUABLES	Group	1503100	ACQUISITIONS LESS DISPOSALS OF VALUABLES	Group
160211	Acquisitions less disposals of valuables	Class	1503110	Acquisitions less disposals of valuables	Class
1602111	Acquisitions of valuables	Basic Heading	1503111	Acquisitions less disposals of valuables – *formerly 1602111 and 1602112*	Basic Heading
1602112	Disposals of valuables	Basic Heading			

ICP = International Comparison Program, n.e.c = not elsewhere classified, NPISH = nonprofit institutions serving households.
Source: World Bank. 2016b. *International Comparison Program: Classification of Final Expenditure on GDP.* Washington, DC.
http://pubdocs.worldbank.org/en/708531575560035925/pdf/ICP-Classification-description-2019-1205.pdf.

Table A4.3: 2017 International Comparison Program Expenditure Classification: Changes in Description from 2011

2011 ICP Classification			2017 ICP Revised Classification		
Code	**Headings**	**Level**	**Code**	**Headings**	**Level**
1101115	Pasta products	Basic Heading	1101115	Pasta products and couscous	Basic Heading
1101143	Cheese	Basic Heading	1101143	Cheese and curd	Basic Heading
1101171	Fresh or chilled vegetables other than potatoes	Basic Heading	1101171	Fresh or chilled vegetables, other than potatoes and other tubers	Basic Heading
110200	ALCOHOL BEVERAGES, TOBACCO AND NARCOTICS	Category	1102000	ALCOHOLIC BEVERAGES, TOBACCO AND NARCOTICS	Category
110210	ALCOHOL BEVERAGES	Group	1102100	ALCOHOLIC BEVERAGES	Group
110500	FURNISHING, HOUSEHOLD EQUIPMENT AND ROUTINE MAINTENANCE OF THE HOUSE	Category	1105000	FURNISHINGS, HOUSEHOLD EQUIPMENT AND ROUTINE HOUSEHOLD MAINTENANCE	Category
111230	PERSONAL EFFECTS	Group	1112300	PERSONAL EFFECTS N.E.C.	Group
111260	FINANCIAL SERVICES	Group	1112600	FINANCIAL SERVICES N.E.C.	Group
111262	Other financial services	Class	1112620	Other financial services n.e.c.	Class
1112621	Other financial services	Basic Heading	1112621	Other financial services n.e.c.	Basic Heading
111270	OTHER SERVICES	Group	1112700	OTHER SERVICES N.E.C.	Group
111271	Other services n.e.c.	Class	1112710	Other services n.e.c.	Class
1112711	Other services n.e.c.	Basic Heading	1112711	Other services n.e.c.	Basic Heading
111300	BALANCE OF EXPENDITURES OF RESIDENTS ABROAD AND EXPENDITURES OF NON-RESIDENTS IN THE ECONOMIC TERRITORY	Category	1113000	NET PURCHASES ABROAD	Category
111310	BALANCE OF EXPENDITURES OF RESIDENTS ABROAD AND EXPENDITURES OF NON-RESIDENTS IN THE ECONOMIC TERRITORY	Group	1113100	NET PURCHASES ABROAD	Group
111311	Balance of expenditures of residents abroad and expenditures of non-residents in the economic territory	Class	1113110	Net purchases abroad	Class

ICP = International Comparison Program, n.e.c. = not elsewhere classified.
Note: The red-highlighted text reflects the changes in the description in ICP classification.
Source: World Bank. 2016b. *International Comparison Program: Classification of Final Expenditure on GDP.* Washington, DC.
http://pubdocs.worldbank.org/en/708531575560035925/pdf/ICP-Classification-description-2019-1205.pdf.

Appendix 5: List of Reference Purchasing Power Parities

2011 International Comparison Program			2017 International Comparison Program[a]		
Code	Description	Reference	Code	Description	Reference
1100000	**Individual Consumption Expenditure by Households**				
1102311	Narcotics	Tobacco	1102311	Narcotics	Tobacco
1104111	Actual and imputed rentals for housing	Volume relatives of individual consumption expenditures by households	1104A	Actual and imputed rentals for housing	Volume relatives of individual consumption expenditures by households
1104421	Miscellaneous services relating to the dwelling	Maintenance and repair of dwelling water supply	1104421	Miscellaneous services relating to the dwelling	Maintenance and repair of dwelling water supply
1105131	Repair of furniture, furnishings and floor coverings	Maintenance and repair of dwelling	1105131	Repair of furniture, furnishings and floor coverings	Maintenance and repair of dwelling
1105331	Repair of household appliances	Maintenance and repair of dwelling	1105331	Repair of household appliances	Maintenance and repair of dwelling
1105511	Major tools and equipment	Major household appliances whether electric or not small electric household appliances small tools and miscellaneous accessories	1105511	Major tools and equipment	Not a reference BH in 2017 ICP
1105622	Household services	Maintenance and repair of dwelling	1105622	Household services	Not a reference BH in 2017 ICP
1106311	Hospital services	Medical services dental services paramedical services	1106311	Hospital services	Medical services dental services paramedical services
1107121	Motorcycles	Motorcars	1107121	Motorcycles	Not a reference BH in 2017 ICP
1107141	Animal drawn vehicles	Bicycles	1107141	Animal drawn vehicles	Bicycles
1107341	Passenger transport by sea and inland waterway	Passenger transport by railway passenger transport by road passenger transport by air	1107341	Passenger transport by sea and inland waterway	Not a reference BH in 2017 ICP
1107351	Combined passenger transport	Fuels and lubricants for personal transport equipment maintenance and repair of personal transport equipment other services in respect of personal transport equipment passenger transport by railway passenger transport by road passenger transport by air	1107351	Combined passenger transport	Fuels and lubricants for personal transport equipment maintenance and repair of personal transport equipment other services in respect of personal transport equipment passenger transport by railway passenger transport by road passenger transport by air passenger transport by sea and inland waterway
1107361	Other purchased transport services	Fuels and lubricants for personal transport equipment maintenance and repair of personal transport equipment other services in respect of personal transport equipment passenger transport by railway passenger transport by road passenger transport by air	1107361	Other purchased transport services	Not a reference BH in 2017 ICP
1109211	Major durables for outdoor and indoor recreation	Bicycles audio-visual, photographic and information processing equipment recording media	1109211	Major durables for outdoor and indoor recreation	Bicycles audio-visual, photographic and information processing equipment recording media repair of audio-visual, photographic and information processing equipment
1109231	Maintenance and repair of other major durables for recreation and culture	PPPs for maintenance and repair of the dwelling; and audio-visual, photographic and information processing equipment	1109231	Maintenance and repair of other major durables for recreation and culture	Maintenance and repair of personal transport equipment repair of audio-visual, photographic and information processing equipment
1109331	Gardens and pets	PPPs for ICEH on the domestic market (excluding reference PPPs basic headings)	1109331	Gardens and pets	Not a reference BH in 2017 ICP
1109351	Veterinary and other services for pets	Weighted PPPs for ICEH on the domestic market (excluding reference PPPs basic headings)	1109351	Veterinary and other services for pets	Not a reference BH in 2017 ICP
1109431	Games of chance	PPP for recreational and sporting services	1109431	Games of chance	Recreational and sporting services
1112211	Prostitution	PPP for individual consumption expenditure by households (110000), excluding health and education BHs and BHs with reference PPPs	1112211	Prostitution	PPP for individual consumption expenditure by households (110000), excluding health and education BHs and BHs with reference PPPs
1112411	Social protection	Compensation of employees from health and education services	1112411	Social protection	Compensation of employees from health and education services
1112511	Insurance	PPP for individual consumption expenditure by households (110000), excluding health and education BHs and BHs with reference PPPs	1112511	Insurance	PPP for individual consumption expenditure by households (110000), excluding health and education BHs and BHs with reference PPPs
1112611	Financial intermediation services indirectly measured (FISIM)	PPP for individual consumption expenditure by households (110000), excluding health and education BHs and BHs with reference PPPs	1112611	Financial intermediation services indirectly measured (FISIM)	PPP for individual consumption expenditure by households (110000), excluding health and education BHs and BHs with reference PPPs
1112621	Other financial services, n.e.c.	PPP for individual consumption expenditure by households (110000), excluding health and education BHs and BHs with reference PPPs	1112621	Other financial services n.e.c.	PPP for individual consumption expenditure by households (110000), excluding health and education BHs and BHs with reference PPPs
1112711	Other services n.e.c.	PPPs for ICEH on the domestic market (excluding health and education basic headings and reference PPPs basic headings)	1112711	Other services n.e.c.	PPP for individual consumption expenditure by households (110000), excluding health and education BHs and BHs with reference PPPs
1113111	Net purchases abroad	Exchange rates	1113111	Net purchases abroad	Exchange rates

Appendix 5: *continued*

2011 International Comparison Program			2017 International Comparison Program[a]		
Code	Description	Reference	Code	Description	Reference
1200000	**Individual Consumption Expenditure by NPISH**				
1201111	Housing NPISH	Actual and imputed rentals for housing	1201111	Housing NPISH	Actual and imputed rentals for housing
1202111	Health - NPISH	Compensation of employees from production of health services	1202111	Health - NPISH	Compensation of employees from production of health services
1203111	Recreation and culture NPISH	Cultural services Recreational and sporting services	1203111	Recreation and culture NPISH	Cultural services Recreational and sporting services
1204111	Education - NPISH	Compensation of employees from production of education services	1204111	Education - NPISH	Compensation of employees from production of education services
1205111	Social protection and other services - NPISH	Compensation of employees from production of health and education services	1205111	Social protection and other services - NPISH	Compensation of employees from production of health and education services
1300000	**Individual Consumption Expenditure by Government**				
1301111	Housing	Actual and imputed rents	1301111	Housing	Actual and imputed rents
1302111	Pharmaceutical products	Pharmaceutical products (HHC)	1302111	Pharmaceutical products	Pharmaceutical products (HHC)
1302112	Other medical products	Other medical products (HHC)	1302112	Other medical products	Other medical products (HHC)
1302113	Therapeutic appliances and equipment	Therapeutic appliances and equipment (HHC)	1302113	Therapeutic appliances and equipment	Therapeutic appliances and equipment (HHC)
1302121	Outpatient medical services	Medical services (HHC)	1302121	Outpatient medical services	Medical services (HHC)
1302122	Outpatient dental services	Dental services (HHC)	1302122	Outpatient dental services	Dental services (HHC)
1302123	Outpatient paramedical services	Paramedical services (HHC)	1302123	Outpatient paramedical services	Paramedical services (HHC)
1302124	Hospital services	Hospital services (HHC)	1302124	Hospital services	Hospital services (HHC)
1302221	Intermediate consumption	PPP for individual consumption expenditure by households (110000), excluding BHs with reference PPPs	1302221	Intermediate consumption	PPP for individual consumption expenditure by households (110000), excluding BHs with reference PPPs
1302231	Gross operating surplus	PPP for gross fixed capital formation (150000), excluding BHs with reference PPPs	1302231	Gross operating surplus	PPP for gross fixed capital formation (150000), excluding BHs with reference PPPs
1302241	Net taxes on production	Compensation of employees from production of health services	1302241	Net taxes on production	Compensation of employees from production of health services
1302251	Receipts from sales: health services	Compensation of employees from production of health services	1302251	Receipts from sales	Compensation of employees from production of health services
1303111	Recreation and culture	Cultural services Recreational and sporting services	1303111	Recreation and culture	Cultural services Recreational and sporting services
1304111	Education benefits and reimbursements	Education (1110000)	1304111	Education benefits and reimbursements	Education (1110000)
1304221	Intermediate consumption	PPP for individual consumption expenditure by households (110000), excluding BHs with reference PPPs	1304221	Intermediate consumption	PPP for individual consumption expenditure by households (110000), excluding BHs with reference PPPs
1304231	Gross operating surplus	PPP for gross fixed capital formation (150000), excluding BHs with reference PPPs	1304231	Gross operating surplus	PPP for gross fixed capital formation (150000), excluding BHs with reference PPPs
1304241	Net taxes on production	Compensation of employees from production of education services	1304241	Net taxes on production	Compensation of employees from production of education services
1304251	Receipt from sales: education	Compensation of employees from production of education services	1304251	Receipt from sales	Compensation of employees from production of education services
1305111	Social protection	Compensation of employees from production of health and education services	1305111	Social protection	Compensation of employees from production of health and education services
1400000	**Collective Consumption Expenditure by Government**				
1401121	Intermediate consumption	PPP for individual consumption expenditure by households (110000), excluding BHs with reference PPPs	1401121	Intermediate consumption	PPP for individual consumption expenditure by households (110000), excluding BHs with reference PPPs
1401131	Gross operating surplus	PPP for gross fixed capital formation (150000), excluding BHs with reference PPPs	1401131	Gross operating surplus	PPP for gross fixed capital formation (150000), excluding BHs with reference PPPs
1401141	Net taxes on production	Compensation of employees from production of collective services	1401141	Net taxes on production	Compensation of employees from production of collective services
1401151	Receipts from sales: collective services	Compensation of employees from production of collective services	1401151	Receipts from sales	Compensation of employees from production of collective services
1500000	**Gross Capital Formation**				
1501122	Other transport equipment	Road transport equipment	1501122	Other transport equipment	Road transport equipment
1501311	Other products	Electrical and optical equipment General purpose machinery Special purpose machinery Road transport equipment	1501311	Other products	Electrical and optical equipment General purpose machinery Special purpose machinery Road transport equipment
1502111	Change in inventories	Referenced to BHs classified as containing predominantly goods, excluding BHs with reference PPPs	1502111	Change in inventories	Referenced to BHs classified as containing predominantly goods, excluding BHs with reference PPPs
1503111	Acquisitions less disposals of valuables	Exchange rates	1503111	Acquisitions less disposals of valuables	Exchange rates
1600000	**Balance of Exports and Imports**				
1601111	Exports of goods and services	Exchange rates	1601111	Exports of goods and services	Exchange rates
1601112	Imports of goods and services	Exchange rates	1601112	Imports of goods and services	Exchange rates

BH = basic heading, HHC = household consumption, ICEH = individual consumption expenditure by households, ICP = International Comparison Program, NPISH = nonprofit institutions serving households, PPP = purchasing power parity.
a Based on the references used in the 2011 ICP and recommendations from the ICP Global Office.
Source: Based on ICP Inter-Agency Coordination Group meeting (23 - 25 October 2019) and recommendations from the 2017 ICP Technical Advisory Group.

Appendix 6: Deriving Price Level Indexes and Per Capita Real Expenditure Indexes with Asia and the Pacific = 100

The price level index (PLI), being a ratio of purchasing power parity (PPP) to exchange rate, provides *relative—* rather than *absolute—*indication of average price level in an economy with respect to that of the reference economy. By construction, the PLI for the reference economy is 100 because its PPP and exchange rate are both equal to 1, whereas for other economies, PLIs are interpreted on the basis of deviation from 100.[1] A PLI value of less than 100 implies that the general price level in that economy is less than that in the reference economy. Similarly, for example, a PLI value of 110 implies that the general price level in that economy is 10% higher than that in the reference economy.

When we find the PLI for an economy is 60 (with Hong Kong, China = 100), we know that the price level is lower by 40% than that of Hong Kong, China. However, what we do not know from this PLI is whether the general price level in Hong Kong, China is low or high relative to the region and whether the price level in the economy concerned is also low or high relative to the region. Hence, it is useful to express price levels relative to that of the regional average, as a supplement to PLIs relative to the reference economy. This practice also provides a PLI value for the reference economy that can be interpreted relative to the regional average rather than to itself.

To provide this information, several tables in this publication present PLIs as well as per capita volume indexes for which the reference is the average of all 22 economies in Asia and the Pacific. The procedures used in deriving these indicators are described below.

A. Price Level Index Relative to the Reference Economy (Hong Kong, China = 100)

The PLI for any given economy is defined as the ratio of the PPP and the exchange rate (XR) of the currency of the economy with respect to a reference currency. For economy j, the PLI is defined as:

$$PLI_j = \frac{PPP_j}{XR_j} \times 100 \tag{1}$$

Hence, by construction, the PLI for the reference economy is equal to 100.

B. Price Level Index Relative to the Region (Asia and the Pacific = 100)

When the price level index for Asia and the Pacific is set at 100, this means that the total nominal gross domestic product (GDP) of the region is made equal to its total real GDP. This equalization is achieved by multiplying each nominal GDP with a constant conversion factor (μ)—the ratio of region's total real GDP and total nominal GDP (as in equation 2 below). The same constant conversion factor (μ) is used to multiply each PLI relative to reference economy (Hong Kong, China = 100) to come up with the PLI relative to the region (Asia and the Pacific = 100), as shown in equation 3.

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[1] The base is expressed as 100, as commonly practiced. A similar practice applies to time series price indexes such as a consumer price index, where the index for the base period is 100.

$$\text{Conversion Factor} = \frac{\text{Total Real GDP}}{\text{Total Nominal GDP}} = \frac{\sum_{j=1}^{22}(GDP_j/PPP_j)}{\sum_{j=1}^{22}(GDP_j/XR_j)} = \mu \text{ (constant)} \tag{2}$$

$$PLI \text{ (Asia and the Pacific = 100)} = PLI \text{ (Hong Kong, China = 100)} \times \mu \tag{3}$$

Another implication of this conversion is that the PLIs relative to the region (Asia and the Pacific = 100) have a real-GDP-weighted average of 100. Also, note that those PLIs (Asia and the Pacific = 100) do not depend on which currency is used as the reference currency. The PLIs would be identical even with another currency, although the constant (μ) used to convert from the reference currency to the regional average would be different.

The step-by-step calculation is demonstrated in Table A3. The table shows GDPs in local currency units (column 1), PPPs (Hong Kong dollar = 1.00) (column 2), and exchange rates between each local currency and the Hong Kong dollar (column 3). In column 5, the GDP of each economy is converted into real terms using the PPPs (column 1/column 2). The GDPs of each economy are summed to obtain region's total real GDP in Hong Kong dollars (column 5). Column 6 shows GDPs of economies in nominal terms converted using exchange rates (column 1/column 3). These GDPs are summed to obtain the region's total nominal GDP in Hong Kong dollars. To calculate the conversion factor μ, we divide the region's total *real* GDP by the total *nominal* GDP (see footnote "b," Table A3). This is the constant μ which is used to multiply each PLI relative to the reference economy (Hong Kong, China = 100) (column 9) to get the PLI relative to the region (Asia and the Pacific = 100) (column 10). In practice, for the 2017 International Comparison Program (ICP), the conversion factor was 1.5607 for GDP.

This methodology is applied at each level of analysis (i.e., for each expenditure aggregate for which results are required). Thus, the conversion factor differs from one expenditure category to another.

C. Per Capita Real Expenditure Indexes (Asia and the Pacific = 100)

In addition to PLIs, this publication also presents per capita real expenditures as indexes with Asia and the Pacific equal to 100. To derive this, the region's population-weighted average of per capita real expenditures is used as a divisor to each economy's per capita real expenditure:

$$\text{Per Capita Real Expenditure Index (Asia and the Pacific = 100)}_j$$

$$= \frac{\text{Per Capita Real Expenditure}_j}{\text{Per Capita Real Expenditure of the Region}} \tag{4}$$

The step-by-step calculation is demonstrated in Table A3. Each per capita real GDP (in column 7) is divided by 61,375, which is the per capita real GDP for Asia and the Pacific. This same calculation process is applied at all levels of aggregation including GDP.

Table A6: Deriving Price Level Indexes and Per Capita Real Expenditure Indexes (Asia and the Pacific = 100)

Economy	GDP in LCU (billion)	PPPs (HK$ = 1.00)	Exchange Rates (HK$ = 1.00)	Population (million)	Real GDP (HK$ billion)	Nominal GDP (HK$ billion)	Per Capita Real Expenditure (HK$)	Per Capita Real Expenditure Index (Asia and the Pacific = 100)	PLI (Hong Kong, China = 100)	PLI (Asia and the Pacific = 100)
	(1)	(2)	(3)	(4)	(5) = (1)/(2)	(6) = (1)/(3)	(7) = (5)/(4) * 1000	(8) = (7)/61,375 * 100[a]	(9) = (2)/(3) * 100	(10) = (9) * μ[b]
Bangladesh	21,131	4.95	10.32	161.80	4,272	2,047	26,401	43	48	75
Bhutan	165	3.20	8.36	0.73	52	20	70,855	115	38	60
Brunei Darussalam	17	0.11	0.18	0.43	156	95	362,379	590	61	95
Cambodia	89,831	237.61	519.75	15.85	378	173	23,853	39	46	71
China, People's Republic of	82,075	0.70	0.87	1,386.40	117,929	94,638	85,061	139	80	125
Fiji	11	0.16	0.27	0.88	71	42	80,772	132	59	92
Hong Kong, China	2,663	1.00	1.00	7.39	2,663	2,663	360,247	587	100	156
India	166,226	3.43	8.36	1,309.20	48,395	19,893	36,965	60	41	64
Indonesia	13,587,213	781.12	1,716.98	261.89	17,394	7,913	66,419	108	45	71
Lao People's Democratic Republic	140,698	463.97	1,071.64	6.90	303	131	43,944	72	43	68
Malaysia	1,353	0.28	0.55	32.02	4,916	2,453	153,532	250	50	78
Maldives	75	1.36	1.97	0.49	55	38	112,187	183	69	107
Mongolia	27,876	131.66	313.06	3.15	212	89	67,241	110	42	66
Myanmar	85,981	61.00	174.56	53.15	1,409	493	26,519	43	35	55
Nepal	2,611	5.20	13.41	28.83	503	195	17,431	28	39	60
Pakistan	33,270	5.59	13.53	199.11	5,954	2,459	29,905	49	41	64
Philippines	15,808	3.22	6.47	104.92	4,902	2,444	46,721	76	50	78
Singapore	467	0.15	0.18	5.61	3,171	2,637	564,960	921	83	130
Sri Lanka	13,317	8.22	19.56	21.44	1,621	681	75,587	123	42	66
Taipei,China	17,501	2.62	3.91	23.56	6,688	4,480	283,878	463	67	105
Thailand	15,452	2.14	4.36	67.65	7,232	3,548	106,892	174	49	77
Viet Nam	5,005,975	1,230.21	2,870.44	94.24	4,069	1,744	43,179	70	43	67
Asia and the Pacific[c]	n.a.	n.a.	n.a.	3,786	232,344	148,874	61,375[a]	100	n.a.	100[d]

GDP = gross domestic product, HK$ = Hong Kong dollar, LCU = local currency unit, n.a. = not applicable, PLI = price level index, PPP = purchasing power parity.

[a] The number 61,375 is the per capita real expenditure (column 7) for Asia and the Pacific.

[b] The conversion factor μ, in this case 1.5607, is obtained by dividing total real GDP (column 5) by total nominal GDP (column 6) for Asia and the Pacific: 232,344/148,874 = 1.5607.

[c] The results for Asia and the Pacific, where applicable, are the sum of the values in that column for all 22 participating economies.

[d] The value 100 in column 10 is the real-GDP-weighted average of price level indexes (Asia and the Pacific = 100).

Appendix 7: Participating Economies: Implementing Agencies and Local Currency Units

Economy	Implementing Agency	Local Currency Units
Bangladesh	Bangladesh Bureau of Statistics	taka (Tk)
Bhutan	National Statistics Bureau	ngultrum (Nu)
Brunei Darussalam	Department of Economic Planning and Statistics	Brunei dollar(s) (B$)
Cambodia	National Institute of Statistics	riel(s) (KR)
China, People's Republic of	National Bureau of Statistics of China	yuan (CNY)
Fiji	Fiji Bureau of Statistics	Fiji dollar(s) (F$)
Hong Kong, China	Census and Statistics Department	Hong Kong dollar(s) (HK$)
India	Ministry of Statistics and Programme Implementation	Indian rupee(s) (₹)
Indonesia	Badan Pusat Statistik	rupiah (Rp)
Lao People's Democratic Republic	Lao Statistics Bureau	kip (KN)
Malaysia	Department of Statistics Malaysia	ringgit (RM)
Maldives	National Bureau of Statistics	rufiyaa (Rf)
Mongolia	National Statistics Office	togrog (MNT)
Myanmar	Central Statistical Organization	kyat(s) (MK)
Nepal	Central Bureau of Statistics	Nepalese rupee(s) (NRe/NRs)
Pakistan	Pakistan Bureau of Statistics	Pakistani rupee(s) (PRe/PRs)
Philippines	Philippine Statistics Authority	peso(s) (₱)
Singapore	Department of Statistics	Singapore dollar(s) (S$)
Sri Lanka	Department of Census and Statistics	Sri Lankan rupee(s) (SLRe/SLRs)
Taipei,China	Directorate-General of Budget, Accounting, and Statistics	NT dollar(s) (NT$)
Thailand	Trade Policy and Strategy Office	baht (B)
Viet Nam	General Statistics Office	dong (D)

Source: 2017 International Comparison Program for Asia and the Pacific.

Appendix 8: Timeline: 2017 International Comparison Program for Asia and the Pacific

The 47th Session of the United Nations Statistical Commission
8–11 March 2016, United Nations headquarters, New York

The United Nations Statistical Commission (UNSC) endorsed the International Comparison Program (ICP) global comparison as a permanent element of the global statistical work program and endorsed the conduct of the ICP at more frequent intervals, with 2017 as the next benchmark year. Further, the UNSC identified the Asian Development Bank (ADB) the regional coordinator for the 2017 ICP for Asia and the Pacific, among other regional coordinators.

Approval of ADB Regional Research and Development Technical Assistance
24 November 2016, ADB headquarters, Manila, Philippines

The ADB regional research and development technical assistance was approved by ADB's President on 24 November 2016 with the aim of computing the 2017 purchasing power parity (PPP)-based gross domestic product (GDP) measures for Asia and the Pacific to allow cross-economy comparisons of economic outputs, free of price and exchange rate distortions.

Organizational Meeting of the ICP Asia Pacific Regional Advisory Board
11 January 2017, Ha Noi, Viet Nam, attended by 17 participants

The meeting set the overall direction of the 2017 ICP for Asia and the Pacific as well as the governance framework and research agenda. The meeting was also vital in obtaining the support and commitment from stakeholders, including the ICP Global Office, international organizations, and implementing agencies from the participating economies.

Inception Meeting of the Heads of Implementing Agencies from Participating Economies
11 January 2017, Ha Noi, Viet Nam, attended by 28 participants

The meeting introduced the heads of the implementing agencies to the objectives, work program, data, and related statistical requirements of the 2017 ICP for Asia and the Pacific. The meeting also discussed the proposed schedule of price collection and Framework of Partnership that defines the roles and responsibilities of ADB and the implementing agencies from the participating economies.

Training and Workshop on the 2017 International Comparison Program for Asia and the Pacific
25 and 27–28 February 2017, Bangkok, Thailand, attended by 50 participants

Following the decisions taken in the inception meetings with the Regional Advisory Board and heads of the implementing agencies from the participating economies on 11 January 2017, the workshop deliberated on technical and operational preparations for the 2017 ICP, reviewed the 2017 household list, and undertook a technical review of the household sampling designs submitted by the implementing agencies with technical advice from a sampling expert.

In-Country Training for the ICP for the Central Statistical Organization, Myanmar
3–7 April 2017, Nay Pyi Taw, Myanmar, attended by 33 participants

ADB trained the Central Statistical Organization price statisticians in ICP concepts and methodologies, which included field training in correctly identifying ICP items based on the structured product descriptions (SPDs).

Videoconference Training on the 2017 ICP Asia Pacific Software Suite for the Central Statistical Organization, Myanmar
2 August 2017, ADB headquarters, Manila, Philippines, attended by 11 participants

ADB developed the International Comparison Program Asia Pacific Software Suite (ICP APSS) for household consumption price surveys for the 2017 ICP. To further improve the system and in preparation for using the software for processing of 2017 household prices, ADB held a training and test application with the Central Statistical Organization of Myanmar before the software's deployment to the implementing agencies from participating economies.

First Regional Technical Evaluation and Review Workshop
4–7 October 2017, Bangkok, Thailand, attended by 48 participants

The workshop reviewed the status of household prices collected from April to July 2017, identified data quality issues on prices collected, and discussed issues on the specifications of household items priced. ADB familiarized participants with the 2017 ICP housing survey using (i) the rental survey form and quantity approach developed by the ICP Global Office and (ii) survey forms, item lists and specifications, and price collection methods for the specialized surveys of construction and machinery and equipment.

Videoconference Training on the 2017 ICP Asia Pacific Software Suite for the Pakistan Bureau of Statistics
7–8 November 2017, ADB headquarters, Manila, Philippines, attended by nine participants

ADB conducted another training and test application for the ICP APSS for household consumption price surveys for the 2017 ICP with the Pakistan Bureau of Statistics to further improve the system, based on feedback from the training with the Central Statistical Organization of Myanmar.

Second Regional Technical Evaluation and Review Workshop
29–31 January and 1 February 2018, Bangkok, Thailand, attended by 34 participants

Price statisticians from the 22 economies and the ADB ICP team reviewed 6-month household price collection from April to September 2017, including electronics and software items, and resolved data issues after the inter-economy data validation. They discussed in detail the housing services surveys, including a presentation on the ADB-developed web-based version for the household module of the 2017 ICP APSS. The price statisticians also provided their feedback on the 2017 Data Access and Archiving Policy. ADB clearly communicated parameters for intra- and inter-economy data validation to the economies.

Third Regional Technical Evaluation and Review Workshop
3–9 May 2018, Bangkok, Thailand, attended by 36 participants

Price statisticians and the ADB ICP team reviewed household prices collected from April 2017 to the latest data submission and discussed the data requirements and methodology for housing services using the volume approach. Because of the delayed start of the 2017 household price surveys, ADB introduced the methodology for extrapolating prices of household products to full year 2017 national average prices. Participants were also given the opportunity to access the ICP Global Office's PPP eLearning course.

Fourth Regional Technical Evaluation and Review Workshop
23–28 July 2018, Bangkok, Thailand, attended by 49 participants

ADB convened the technical discussion to validate data for prices for household items from April 2017 to March 2018—including pharmaceutical items (concepts, definitions, pricing guidelines, and product splitting guidelines and tool—and review the status of the 2017 housing volume feedback forms. National experts for machinery and equipment and construction joined the price statisticians in reviewing and validating the 2017 prices for machinery and equipment and construction items.

Fifth Regional Technical Evaluation and Review Workshop
10–13 October 2018, Chiang Mai, Thailand, attended by 51 participants

National accounts experts joined the price statisticians in discussing the national accounts framework and the requirements for splitting GDP expenditures into the 155 basic headings needed for the 2017 PPP computation. Topics also covered the validation of housing rental data and conceptual aspects for data collection of government compensation.

Sixth Regional Technical Evaluation and Review Workshop
4–14 December 2018, Jakarta, Indonesia, attended by 74 participants

National accountants and national experts for machinery and equipment and construction, together with the price statisticians, undertook the technical review and validation of all data inputs for the 2017 PPP computation, including

i.   prices of household products for April 2017–March 2018;
ii.   prices of machinery and equipment and construction items;
iii. housing rental survey data and housing volume indicators;
iv. 2017 government compensation data; and
v.   2011–2017 GDP weights for 155 basic headings.

International experts for machinery and equipment, construction, and national accounts provided valuable technical advice.

Seventh Regional Technical Evaluation and Review Workshop
1–5 April 2019, Bangkok, Thailand, attended by 68 participants

The workshop attended by national accountants and price statisticians conducted a technical review and validation of price data of pharmaceutical items; 2011–2017 housing volume indicators and 2017 housing rental survey data; 2017 government compensation; and 2011–2017 GDP expenditure weights for PPP computation.

First Experts Group Meeting for the 2017 ICP for Asia and the Pacific
10–14 June 2019, ADB headquarters, Manila, Philippines, attended by 10 participants

The 5-day Experts Group meeting focused on resolving issues on the estimation of household expenditures, machinery and equipment and construction prices, estimates of price levels and per capita real consumption for these major components of gross fixed capital formation (GFCF), and housing and consumption of dwelling services. The Experts Group made recommendations to be implemented to ensure robust 2017 PPPs.

**Technical Evaluation and Review Meeting on the 2017 ICP Prices Submitted by
the Lao Statistics Bureau**
17–19 July 2019, Vientiane, Lao People's Democratic Republic, attended by 17 participants

The in-country sessions with the Lao Statistics Bureau undertook a detailed technical review of the 2017 ICP prices to address remaining concerns and/or issues not resolved through bilateral communications and regional data validation workshops. Other topics covered the extrapolation of household price data to derive calendar year 2017 estimates, GDP expenditure weights estimation, and matters related to ICP implementation in the Lao People's Democratic Republic.

Technical Evaluation and Review Meeting on the 2017 ICP Prices Submitted by the Trade Policy and Strategy Office
22–24 July 2019, Nonthaburi, Thailand, attended by 28 participants

Through bilateral discussions with the Trade Policy and Strategy Office, the ADB ICP team was able to jointly address issues specific to Thailand on finalizing price data and completing data requirements for government compensation. The meetings also reviewed the required GDP expenditure weights.

Videoconference Technical Evaluation and Review on the 2017 ICP Prices Submitted by the Badan Pusat Statistik-Statistics Indonesia
2 and 5 August 2019, ADB headquarters, Manila, Philippines, attended by 18 participants

The ADB ICP team ensured the quality of Indonesia's price data for PPP estimation through a videoconference by jointly checking items that were not SPD-compliant, the highest prices in the region, and prices with large inflation differences between the CPI and ICP items. The team also examined prices of non-household items and significant changes in the GDP structure for remaining concerns.

Second Experts Group Meeting for the 2017 ICP for Asia and the Pacific
21–23 August 2019, Bangkok, Thailand, attended by eight participants

The 3-day Experts Group meeting made the final recommendations on the methodologies to be used to compute the 2017 PPPs for the region. The meeting also reviewed preliminary PPPs, price level indexes (PLIs), and per capita real expenditure shares estimated from available data under various scenarios and compared results with 2011 ICP results to understand changes from 2011 to 2017.

Second Meeting of the 2017 ICP Asia Pacific Regional Advisory Board Meeting
26–27 August 2019, Bangkok, Thailand, attended by 25 participants

The meeting reviewed the progress of the 2017 ICP and timelines, methods for estimating 2017 PPPs and real expenditures on GDP and major aggregates, preliminary 2017 results, and plans including the 2020 ICP cycle, in view of the ICP being adopted as a regular work program.

First Regional Technical Workshop to Review Preliminary 2017 Purchasing Power Parities
28–30 August 2019, Bangkok, Thailand, attended by 32 participants

Price statisticians discussed the findings and recommendations of the 2017 ICP Asia Pacific Regional Advisory Board and the Experts Group for estimating 2017 PPPs and real expenditures on GDP and major aggregates, along with preliminary 2017 results, and resolved remaining data issues.

Second Regional Technical Workshop to Review Preliminary 2017 Purchasing Power Parities and Preparatory Activities for the 2020 ICP for Asia and the Pacific
3–6 December 2019, Bangkok, Thailand, attended by 51 participants

The workshop provided a venue to discuss the preliminary results of the 2017 ICP based on the recommendations of the Experts Group and the Regional Advisory Board. Preparatory activities for the 2020 ICP cycle, specifically to discuss the updated product lists, proposed sampling designs by economies, regional work plan, and institutional arrangements were also taken up.

Third Meeting of the 2017 ICP Asia Pacific Regional Advisory Board
10 February 2020, ADB headquarters, Manila, Philippines, attended by 30 participants

The meeting sought the Regional Advisory Board's approval and endorsement of the 2017 ICP regional results, which incorporated the recommendations of the Expert Groups convened in June and August 2019.

Second Meeting of the Heads of Implementing Agencies from Participating Economies on the Presentation of the 2017 ICP Regional Results
10–11 February 2020, ADB headquarters, Manila, Philippines, attended by 52 participants

The high-level meeting presented the Regional Advisory Board-endorsed 2017 ICP regional results to the heads of the implementing agencies from the participating economies and the 2017 ICP economy-level coordinators.

Glossary

Term	Definition
Actual individual consumption by households (AICH)	The sum of individual consumption expenditures by households (ICEH), expenditures by nonprofit institutions serving households (NPISH), and individual consumption expenditure by government (ICEG) at purchasers' prices.
Additivity	A concept that the real expenditures for higher-level aggregates can be obtained simply by adding the real expenditures of the sub-aggregates of which they are composed. *Real expenditures obtained using Gini-Éltető-Köves-Szulc (GEKS)-based purchasing power parities (PPPs) are not additive, so the sum of the real expenditures for the components of gross domestic product (GDP) does not equal the real expenditure on GDP.*
Aggregation	The process of weighting and averaging PPPs for basic headings to obtain PPPs for each level of aggregation up to GDP.
Base currency	The currency unit selected to be the common currency in which PPPs and real and nominal expenditures are expressed. Also called the "numéraire currency" or the "reference currency."
Base economy	The economy, or group of economies, for which the value of the PPP is set at 1.00 and the value of the price level index (PLI) and of the volume index is set at 100. Also known as the "reference economy."
Base economy invariance, invariant	The property under which the relativities between the PPPs, PLIs, and volume indexes of economies are not affected by the choice of reference economy.
Basic heading	In principle, a group of similar, well-defined goods or services for which a sample of products can be selected that are both representative of their type and of the purchases made in economies. In practice, a basic heading is defined as the lowest level aggregate for which expenditure data are available.
Benchmark	A standard, or point of reference, against which an estimate can be compared, assessed, measured, or judged. PPPs are computed using price data from a full list of household and non-household products and weights derived from the expenditures on GDP for a specified reference year. In the International Comparison Program (ICP), a reference year is often referred to as "benchmark year" or simply "benchmark."

Term	Definition
Big Mac index	An index developed and used by *The Economist* to illustrate the use of PPPs. It is based on a comparison of price of a McDonald's Big Mac hamburger across different economies.
Binary comparison	A price or volume comparison between two economies that draws on data only for those two economies. Also referred to as a "bilateral comparison."
Changes in inventories	The value of physical change in inventories of raw materials, supplies and finished goods held by producers; inventories of goods acquired for resale by wholesalers and retailers; inventories of all goods stored by government; work-in-progress in manufacturing, construction and service industries; or work-in-progress on cultivated assets (e.g., the natural growth prior to harvest of agricultural crops, vineyards, orchards, plantations, and timber tracts and the natural growth in livestock raised for slaughter).
Characteristicity	The property that requires transitive multilateral comparisons between members of a group of economies to retain the essential features of the direct binary comparisons that existed between them before transitivity. A transitive multilateral comparison between a pair of economies is influenced by the price and quantity data of all other economies. Characteristicity requires that the impact of these influences be kept to a minimum. In other words, the multilateral PPP between two economies should deviate as little as possible from their binary PPP.
Classification of individual consumption according to purpose (COICOP)	A classification used to identify the objectives of both individual consumption expenditure and actual individual consumption.
Classification of the functions of government (COFOG)	A classification used to identify the socioeconomic objectives of current transactions, capital outlays, and acquisition of financial assets by general government and its subsectors.
Collective consumption expenditure by government (CCEG)	The final consumption expenditure of government on collective services provided by the government simultaneously to all members of the community.
Comparability	A requirement for economies to price products that are identical or, if not identical, equivalent. Two or more products are said to be comparable either if their physical and economic characteristics are identical, or if they are sufficiently similar that consumers are indifferent to the choice between them.

Term	Definition
Comparison-resistant	A term first used to describe nonmarket services that are difficult to compare across economies because (i) they have no economically significant prices with which to value outputs; (ii) their units of output cannot be otherwise defined and measured, or the institutional arrangements for their provision and the conditions of payment differ from economy to economy; and (iii) their quality varies between economies but the differences cannot be identified and quantified. Increasingly, the term is being used to describe capital goods and many market services whose complexity, variation, and economy specificity make it difficult for them to be priced comparably across economies.
Compensation of employees	The total remuneration, in cash or in kind, payable by enterprises to employees in return for their work during the accounting period. In the context of the International Comparison Program, it refers to the compensation paid to the government employees.
Component	A subset of goods or services or both that make up some defined aggregate.
Consumer price index (CPI)	An index of price changes in consumer goods and services within an economy across time.
Country-product-dummy (CPD) method	This is a multilateral method used to obtain transitive PPPs at the basic heading level through regression analysis. This method is anchored on the "law of one price" which simply states that the observed price of a commodity in an economy is the product of the international average price of the commodity, general price level in the economy and a random disturbance term. This method regresses log price on country and product dummy variables and hence the label. The method produces measures of reliability for the estimated PPPs.
Dwellings	Buildings that are used entirely or primarily as residences, including any associated structures, such as garages, and all permanent fixtures customarily installed in residences. Movable structures, such as caravans, used as principal residences of households are included.
Expenditure weight or share	The share of nominal expenditure of a basic heading or expenditure share of a higher level component of gross domestic product.

Term	Definition
Fixity	The principle that the PPPs between economies in a region (and therefore the volume relativities) do not change when the results from that region are combined with those from another region (or regions).
Gini-Éltető-Köves-Szulc (GEKS) method	The GEKS method produces transitive PPPs that are as close as possible to the nontransitive PPPs originally calculated in the binary comparisons. This procedure is also called Éltető-Köves-Szulc (EKS) method.
Goods	Physical objects for which a demand exists, over which ownership rights can be established, and whose ownership can be transferred from one institutional unit to another by engaging in transactions on the market. They are in demand because they may be used to satisfy the needs or wants of households or the community or used to produce other goods or services.
Government final consumption expenditure (GFCE)	The total value of actual and imputed final consumption expenditures incurred by government on individual goods and services and final consumption expenditure of government on collective services.
Gross capital formation (GCF)	The total value of expenditure on gross fixed capital formation (GFCF), changes in inventories, and acquisitions less disposals of valuables.
Gross domestic product (GDP)—expenditure based	Actual individual consumption by households (AICH) at purchasers' prices *plus* collective consumption expenditure by government (CCEG) at purchasers' prices *plus* gross capital formation (GCF) at purchasers' prices *plus* the free on board (FOB) value of exports of goods and services *less* the FOB value of imports of goods and services.
Gross fixed capital formation (GFCF)	The total value of acquisitions less disposals of fixed assets by resident institutional units during the accounting period *plus* the additions to the value of nonproduced assets realized by the productive activity of resident institutional units.
Individual consumption expenditure by government (ICEG)	The total value of actual and imputed final consumption expenditures incurred by government on behalf of individuals. These include expenditures incurred by the government considered to be individual services such as housing, health, recreation and culture, education, and social protection.

Term	Definition
Individual consumption expenditure by households (ICEH)	The total value of actual and imputed final consumption expenditures incurred by households for goods and services consumed by the households. In the context of the 2017 ICP in Asia and the Pacific, also includes the individual consumption expenditure by NPISH.
Inter-economy data validation	The process in which the average prices for the same products in different economies are checked against each other.
Intra-economy data validation	The process in which the individual price observations are edited and checked for variations within economies. It is also the level of validation at which the first checks are carried out on the average prices of an economy.
Local currency unit (LCU)	The monetary unit in which economic values are expressed in an economy.
Lorenz curve	A graphical representation of the distribution of income or wealth, developed by Max Lorenz in 1905. The horizontal axis of the graph represents the poorest to richest cumulative percentiles of population, while the vertical axis represents the cumulative income or wealth.
Multilateral comparison	A simultaneous price or volume comparison between all pairs of economies within a group of economies of interest.
National annual average price	A price that has been averaged over all price quotations and across all localities of an economy to account for regional variations in prices and over the days, weeks, months, or quarters of the reference year to allow for seasonal variations in prices.
Net purchases abroad	Purchases by residential households in the rest of the world (as tourists, people traveling on business and government officials, crews, border and seasonal workers, diplomatic and military personal stationed abroad) *less* purchases by nonresidential households in the economic territory of the country (as tourists, people traveling on business, and government officials, crews, border and seasonal workers, diplomatic and military personal stationed abroad).
Nominal expenditure	Expenditure in the currency units of an economy converted to a common currency using the exchange rate of a reference economy.

Term	Definition
Nonprofit institutions serving households (NPISH)	Nonprofit institutions that are not predominantly financed and controlled by government and that provide goods or services to households free or at prices that are not economically significant, and whose main resources are voluntary contributions by households.
Outlet	A shop, market, service establishment, internet site, mail order service, or other place from where goods or services can be purchased and from where the purchasers' or list prices of the items sold can be obtained.
Outlier	A term generally used to describe any extreme value in a set of survey data. Extreme values are not necessarily wrong, but the fact that they are considered extreme suggests that they need to be investigated to establish whether they are actual errors.
Per capita expenditure	Total expenditure divided by the total population of a given economy or the reference geography.
Price	The price of a good or service is defined as the value of one unit of that good or service.
Price level index (PLI)	The ratio of PPP to exchange rate with respect to a common reference currency. PLI is measured relative to the reference economy or relative to the whole region.
Productivity adjustment	This is an adjustment made to wages and salaries of employees in different economies to reflect differences in labor productivity across economies.
Purchasing power parity (PPP)	The amount of currency units required to purchase a common basket of goods and services in an economy that can be purchased with one unit of the reference currency in the reference economy.
Real expenditure	Expenditure in local currency units converted into a common currency unit using purchasing power parities.
Reference purchasing power parities (PPPs)	Used for basic headings for which it is difficult to collect price data. PPPs of a closely related basic heading or a group of basic headings is used as a reference PPP.
Relative price levels	The ratios of PPPs for components of GDP to the overall PPP for GDP for an economy. They indicate whether the price level for a given basic heading or aggregate is higher or lower relative to the general price level in the economy.

Term	Definition
Resident	An institutional unit is resident in an economy when it has a center of economic interest in the economic territory.
Rest of the world	The rest of the world consists of all nonresident institutional units that enter into transactions with resident units, or that have other economic links with resident units.
Services	Services are the result of a production activity that changes the conditions of the consuming units, or facilitates the exchange of products or financial assets.
Structured product descriptions (SPDs)	Generic descriptions that list price determining characteristics relevant to a particular narrow cluster of products.
System of National Accounts (SNA)	A coherent, consistent, and integrated set of macroeconomic accounts, balance sheets, and tables based on a set of internationally agreed concepts, definitions, classifications, and accounting rules (United Nations 2009).
Transitivity	An important property of PPP whereby the direct PPP between any two economies yields the same result as an indirect comparison via any other economy.
Volume measure	Volume measures are the same as real expenditures.

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Purchasing Power Parities and Real Expenditures
Results and Methodology

This publication provides a comprehensive account of the 2017 International Comparison Program (ICP) cycle for 22 economies in Asia and the Pacific. It provides in-depth analyses of estimates of purchasing power parities (PPPs), total and per capita real (PPP-converted) gross domestic product and its component expenditures, and price level indexes showing relative costs of living. The PPPs enable comparison in real terms across economies by removing the price level differences among them. This report also presents in detail the conceptual framework and methodological approaches used in implementing the ICP.

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