

Chapter 3

ICP in the Asia and Pacific Region and Purchasing Power Parities

Introduction

Measuring poverty with the use of the international poverty lines of \$1/day and \$2/day requires converting these yardsticks into local currency units before counting the poor and calculating the incidence of poverty in the countries of the region. What is the best way to convert the IPL? Analysts prefer PPPs of currencies for converting nominal aggregates, like consumption, investment, and GDP expressed in local currency units, into real aggregates expressed in a common currency unit. Exchange rates, which are used in international trade and other transactions, are considered less suitable for compiling real aggregates for comparison across countries. The main objective of this chapter is to present the conceptual framework, the methodology for measuring the PPPs, and an overview of the current estimates of PPPs available from the 2005 ICP Asia Pacific. The contents of this chapter are based on ADB (2007b). Readers may refer to Part 2 of ADB (2007b).

Concept and Uses of Purchasing Power Parities

Over the last four decades, a consensus has emerged on the need to compile PPPs for the purpose of expressing cross-country aggregate data in a common currency unit. There is also an increasing realization that MERs do not reflect the purchasing power of local currencies; and that the exchange

rates are the result of fluctuations in the demand and supply for currencies of different countries, which are influenced by capital movements and other considerations.

In concept, PPPs of currencies are always defined with respect to a reference currency, which needs to be explicitly identified. The PPP of currency A in terms of a reference currency B measures the number of units of currency A that has the same purchasing power as one unit of currency B with respect to a specific basket of goods and services. For example, a PPP at the GDP level of 15 Indian rupees (Rs) per \$1 means that Rs15 have the same purchasing power as \$1 in terms of purchasing goods and services that make up the GDP.

Identifying the basket of goods and services is crucial for the purposes of interpreting and using a given PPP. The most celebrated example of a PPP is the Big Mac index, which shows the purchasing power of different currencies, or their ability to purchase a single specific commodity, a Big Mac. If a Big Mac costs 12 Hong Kong dollars (HK\$) in Hong Kong, China and 5.70 Malaysian ringgit (RM) in Malaysia, then the PPP is HK\$2.11/RM1.00. Though the Big Mac-based PPP is simple to understand, it is also easy to appreciate the limited use of such a PPP in comparing the purchasing power of currencies in Hong Kong, China and Malaysia with respect to the basket of goods and services that represent the typical consumption in those economies.

In practice, PPPs at the GDP level is commonly used for comparing real incomes across countries. As GDP encompasses all goods and services in the domestic market, real per capita incomes are obtained by converting per capita incomes in local currency units into a common or reference currency unit. Part 5 of ADB (2007b) provides PPPs for currencies of 23 participating economies at the GDP level and for broad aggregates such as private consumption, government consumption, and gross fixed capital formation. The breakdown for some of these aggregates is also provided.

A point to note is that it is important to choose the most appropriate and most pertinent PPP for the particular comparison at hand. It is inappropriate to use the GDP-level PPP for the purpose of comparing, for example, total expenditure on food or housing.

Given the availability of PPPs for different benchmark years from various phases of the ICP, PPPs are extensively used⁵ in assessing the performance of nations and in empirical analyses on catch-up and convergence. Real per capita incomes based on PPPs are used in the construction of the human development index (United Nations Development Programme 2006) and in the study of global and regional inequality. It should be noted that despite the versatility of PPPs, it is still necessary to use exchange rates when trade-related aggregates like imports and the current account balance are being compared.

The critical aspect is the choice of appropriate PPPs for converting a given aggregate in nominal terms. An incorrect choice will result in incorrect conclusions regarding the volumes or real aggregates involved. The term “volume” is used to refer to an aggregate that has been adjusted for price level differences. This is a term that is similar to “quantity” used with respect to a single commodity. This issue is particularly relevant in the context of measuring poverty and translating the IPL into local currency units.

The preceding discussion shows that for purposes of studying poverty, the real aggregates should be derived using PPPs that measure differences in price levels across countries but should focus on the goods and services that are relevant to the poor. Since this report is devoted to issues concerning the compilation of PPPs for measuring

poverty, the discussion in the ensuing parts will focus on measurement and the choice of aggregation methodology for compiling poverty PPPs.

Basic Framework for the 2005 ICP Asia Pacific

At the recommendation of the Statistical Commission of the United Nations, work on the ICP with 2005 as the benchmark year began in 2002. Given the extensive and truly global coverage with 146 participating countries, the ICP work for the 2005 benchmark was distributed among regions. The ICP covered five geographic regions—Africa, Asia and Pacific region, Commonwealth of Independent States, Latin America and West Asia, and a sixth region comprising countries involved in the OECD/Eurostat PPP program. ADB assumed the role of regional coordinator of ICP in the Asia and Pacific region.

The coverage of ICP in the region is impressive as it included, for the very first time, both India and the PRC together in an international comparisons exercise. The two are the most populous and fastest growing economies of the world, and account for a majority of the poor in the world. Their participation has reinforced the global nature of the ICP and has provided reliable PPPs for the currencies of these countries based on price data collected following international standards and guidelines. It is useful to note that with the exception of Brunei Darussalam; Hong Kong, China; Macao, China; Singapore; and Taipei, China, most economies in the 2005 ICP Asia Pacific consider poverty measurement and poverty reduction as central issues for their governments.

All 23 participating economies worked in close collaboration with ADB in conducting extensive price surveys in their respective areas. They participated actively in workshops specially designed for the purpose of comparing and validating price data they collected, using specially designed product lists and price surveys.

The main objective of the 2005 ICP Asia Pacific was to compile PPPs at the GDP level as well as at the more disaggregated level. Table 1 shows the broad categories used in the comparisons.

The classification in Table 1 follows the standard national accounts classification of GDP from the expenditure side of the national accounts.

⁵ See ADB (2007b, 9–12) for a more detailed discussion of the uses of PPPs.

Table 1. Main Aggregates Used in the 2005 ICP Asia Pacific Comparisons

Gross Domestic Product
1. Individual Consumption Expenditure by Households
01. Food and nonalcoholic beverages
02. Alcoholic beverages, tobacco, and narcotics
03. Clothing and footwear
04. Housing, water, electricity, and gas
05. Furnishings, household equipment, and maintenance
06. Health
07. Transport
08. Communication
09. Recreation and culture
10. Education
11. Restaurants and hotels
12. Miscellaneous goods and services
13. Net purchases abroad
2. Individual Consumption Expenditure by NPISHs
3. Individual Consumption Expenditure by Government
01. Housing
02. Health
03. Recreation and culture
04. Education
05. Social protection
4. Collective Consumption Expenditure by Government
5. Gross Fixed Capital Formation
01. Machinery and equipment
02. Construction
03. Other products
6. Changes in Inventories and Acquisitions Less Disposal of Valuables
01. Changes in inventories
02. Acquisitions less disposal of valuables
7. Balance of Exports and Imports
ICP = International Comparison Program; NPISHs = nonprofit institutions serving households.

In implementing the ICP, PPPs were computed at 155 basic headings, which were then aggregated upward to arrive at PPPs for major aggregates.

Methodology for the ICP

The methodology for compiling PPPs and real aggregates is fully set out in the *ICP 2003-2006 Handbook*, henceforth referred to as the *ICP Handbook* (World Bank 2007). The handbook describes procedures to be followed at various stages of the implementation of the ICP, and presents various statistical methods in compiling PPPs. This section gives a brief overview of the methodology; further details are in ADB (2007b).

The ICP uses a hierarchical structure in compiling PPPs. At the first stage, basic price data are aggregated to provide PPPs for 155 basic headings, which are progressively aggregated to yield PPPs at the desired level of aggregation. As in the case of the consumer price index (CPI), compiling PPPs requires data on prices as well as weights that reflect the importance of different products.

The following steps are involved in the process of compiling PPPs.

The first and most important step is to prepare a list of goods and services that will be priced in the economies that participated in the 2005 ICP Asia Pacific. The lists are prepared separately for the main aggregates: household consumption, government consumption, and gross fixed capital formation. No price data are collected for imports and exports, as exchange rates are used for the purpose of comparing the balance of trade.

There are two main considerations in making the list of products. The first is that the selected products must be comparable across the participating economies. *Comparability* of products ensures that their prices can be used in making price comparisons and the resulting price levels are based on comparing “like with like.” The second consideration is *representativity* of the products included in the list. If price comparisons based on these products are to accurately reflect the price levels in different economies, then the products priced for this purpose must be representative of the consumption of people in different economies. *Comparability* and *representativity* are two competing considerations that need to be balanced in preparing the products list.

The second step in the process is to compare and validate the price data based on prices collected through poverty-specific price surveys conducted in each participating economy. There are a number of statistical techniques, ranging from the identification of outliers to a more sophisticated approach through the use of Quaranta tables and Dikhanov tables (see Part 4 of ADB 2007b for a detailed description of these tables). Once the price data are validated and finalized, national average prices of the items in the product list are used in compiling PPPs at the basic headings. Basic headings are aggregates at the lowest level for which weights are available. For example, in the case of rice, 20 different types with different characteristics are identified for the purpose of price collection, but no weights indicating the importance of different rice varieties are available for the purpose of aggregation. However, basic heading weights are available for rice across the participating economies.

In the 2005 ICP Asia Pacific, 155 basic headings were used. Of these, 110 basic headings belonged to the individual consumption expenditure by households; individual consumption expenditure by nonprofit institutions serving households had one

basic heading; individual consumption expenditure by government had 21 basic headings; collective consumption expenditure by government had five basic headings; gross fixed capital formation had 12 basic headings; change in inventories and acquisition less disposal of valuables had four basic headings; and two basic headings represented the balance of exports and imports (see Tables 4 and 6 of ADB 2007b for details).

The third step is to compile PPPs at the basic heading level using price data for goods and services belonging to a particular basic heading. The statistical procedure used in this process of aggregating price data is known as the “country-product-dummy (CPD)” method. The *ICP Handbook* provides technical details of the procedure and is also described in detail in Chapter 5 of this report. The next step is to combine the basic heading PPPs with weights drawn from the national accounts to yield PPPs at a desired level of aggregation. For example, to compute the PPPs for a broad consumption category like “food and nonalcoholic beverages”, the PPPs for all the basic headings under this broad category are aggregated using the relative weights accorded to

Table 2. Summary Results for 2005 ICP Asia Pacific PPPs

Economy (1)	Currency (2)	GDP (billion LCU) (3)	GDP PPP (4)	Real GDP ^a (billion RM) (5)
Bangladesh	Taka	3,934	13.06	301
Bhutan	Ngultrum	37	9.077	4
Cambodia	Riel	25,693	737.4	35
Fiji Islands	Fiji dollar	5	0.825	6
India	Indian rupee	34,339	8.460	4,059
Indonesia	Rupiah	2,784,960	2,269	1,227
Lao People's Democratic Republic	Kip	30,594	1,723	18
Malaysia	Ringgit	519	1.000	519
Maldives	Rufiyaa	10	4.691	2
Mongolia	Tugrik	2,810	240.6	12
Nepal	Nepalese Rupee	620	13.06	47
Pakistan	Pakistani Rupee	7,047	11.02	640
Philippines	Philippines Peso	5,438	12.55	433
Sri Lanka	Sri Lankan Rupee	2,408	20.28	119
Thailand	Baht	7,088	9.188	771
Viet Nam	Dông	839,211	2,718	309

PPP = purchasing power parity; GDP = gross domestic product; HFCE = household final consumption expenditure; LCU = local currency unit; RM = Malaysian ringgit.

^a Real refers to purchasing power parity-adjusted values.

Source: Derived from ADB (2007b, Tables 23 and 24).

different basic headings. In ADB (2007b), a total of 26 categories are used to publish the final results. The Eltetö-Köves-Szulc (EKS) method of aggregation is used in computing PPPs for aggregates above the basic heading level. The EKS method is an index number method used for multilateral price comparisons satisfying some basic properties like transitivity, base invariance, and characteristicity. A full description of these properties is in ADB (2007b, 16-17) and in the *ICP Handbook*.

Data on expenditure weights are critical to the computation of PPPs. The participating economies were required to provide national average weights for the 155 basic headings. A variety of sources, including expenditure weights from the CPI, HES, government expenditure accounts, and capital expenditure surveys, were used in compiling weights at the national level for all the basic headings (see ADB 2007b). It must be noted that these weights are for the population as a whole and may not reflect the weights or expenditure patterns of any particular segment of the population.

The final step in the process of aggregation is to combine the PPPs of the basic heading to derive an estimate of PPP for GDP for all the participating economies. In the 2005 ICP Asia Pacific, PPPs for different currencies are computed using the Hong Kong dollar as the numeraire currency. Summary results are presented in Part 2, and detailed results in Part 5 of ADB (2007b).

Overview of the Results

Table 2 presents PPPs and real values at the aggregate level. For purposes of illustration, results are presented at the GDP level and for household final consumption expenditure (HFCE) (interchangeably referred to as individual consumption expenditures by households [ICEH]). In this table, the Malaysian ringgit is the reference currency for presenting the PPPs. The aggregation methodology used in computing PPPs ensured that the choice of the reference currency does not alter the relativities between pairs of countries. Column (3) presents

Table 2. Summary Results for 2005 ICP Asia Pacific PPPs (continued)

HFCE (billion LCU) (6)	HFCE ^a PPP (7)	Real HFCE (billion RM) (8)	Exchange Rate (LCU/RM) (9)	Population (thousand) (10)
2,987	12.06	248	16.99	136,990
15	8.733	2	11.64	635
20,866	764.0	27	1,081	13,828
4	0.732	5	0.447	842
20,198	7.379	2,737	11.64	1,101,318
1,788,138	1,983	902	2,563	218,869
18,194	1,770	10	2,814	5,651
233	1.000	233	1.000	26,128
4	4.606	1	3.380	294
1,547	247.1	6	318.2	2,548
507	12.52	40	18.84	25,343
5,367	9.796	548	15.72	153,963
3,773	11.44	330	14.55	85,261
1,674	18.94	88	26.54	19,668
4,003	8.261	485	10.62	64,763
486,989	2,800	174	4,188	83,120

GDP for the 16 participating countries, expressed in the local currency units listed in column (2). Column (4) presents PPPs of different currencies expressed relative to the Malaysian ringgit. For example, the PPP for the Indonesian rupiah (Rp) is 2,269. This means that Rp2,269 and RM1.00 have the same purchasing power when goods and services included in the GDP are considered. Column (9) presents the corresponding exchange rates for purposes of comparative analysis. A comparison of the exchange rate of the rupiah with its PPP suggests that the price level in Indonesia is lower in Malaysia.

Table 2 also presents PPPs and real values corresponding to the aggregate representing HFCE.⁶ The population data in the last column can be used to derive per capita real HFCE, which can be compared across countries. Part 2 of ADB (2007b) gives a more complete description and discussion of results from the 2005 ICP Asia Pacific.

An important aspect that will later be considered in more detail may be noted here. The PPPs for the same currency are different for different aggregates. For example, for the Bangladesh currency, the taka (Tk), the PPP is Tk13.06 when GDP is considered but is lower at Tk12.06 for HFCE. Two points may be noted here. First, if GDP PPPs are used for comparing real HFCE, it is likely that real consumption in Bangladesh will be underestimated, as a higher PPP of Tk13.06 is used in place of Tk12.06. Second, in Bangladesh, consumption goods with a PPP of Tk12.06 are relatively cheaper than investment and other goods that make up the GDP. Hence it is important that appropriate PPPs are used for converting a given real aggregate.

Need for Poverty-Specific PPPs

Thus far, this chapter has provided an overview of the 2005 ICP Asia Pacific methodology and an intuitive understanding of the PPPs. It is important to understand the scope and meaning of PPPs from the 2005 ICP Asia Pacific so as to assess their suitability for the purpose of converting the IPL into a common currency unit.

⁶ If interest is on total consumption by households and by government on behalf of households in the areas of health and education, then it is useful to consider the aggregate *actual final consumption expenditure* (AFCE). For more details and estimates of HFCE, see ADB (2007b).

For the purpose of converting the IPL, e.g. \$1/day IPL, it is necessary to compile PPPs specifically to convert a given poverty line into currencies of different countries. To obtain meaningful poverty lines in local currency units, it is important that the PPPs used for conversion represent the poor and the prices paid by the poor, after considering the relative importance of different goods and services as reflected by the expenditure share weights of the poor households.

As described in Chapter 2, the general practice of the World Bank in deriving its estimates of national, regional, and global poverty is to convert the IPL into local currency units using PPPs derived from the ICP for the consumption aggregate of the national accounts. These PPPs are available for the benchmark years of the ICP, but for the non-benchmark years, PPPs published in the Penn World Tables are used.⁷ The approach used by the World Bank—in particular, its use of PPP data from the ICP, Penn World Tables, and World Bank extrapolations—has attracted considerable attention in recent years and various limitations of the current approach have been identified. (Deaton 2000, and Reddy and Pogge 2003 have a comprehensive summary of some of the relevant issues.) This report elaborates on and canvasses these issues and possible solutions. It also pursues the objective of assessing the sensitivity of the estimates of PPPs to the use of alternative data sources and aggregation methodologies. These issues constitute the substance of the ensuing chapters.

⁷ Penn World Tables provided by Summers and Heston (1991) on their University of Pennsylvania site (http://pwt.econ.upenn.edu/php_site/pwt_index.php) are the only source of extrapolated PPPs. A description of the methodology used in compiling Penn World Tables is available in the website. The latest version of the Penn World Tables (Version 6.2) provides PPPs for 180 countries for the period 1950 to 2004. Readers may also refer to Summers and Heston (1991) for the methodology used in the earlier versions. A special feature of the Penn World Tables is that extrapolated PPPs are available not only at the GDP level but also at a more disaggregated level. Other PPP extrapolations from the World Bank and by Maddison (2001 and 2007) are essentially at the GDP level and, therefore, are less applicable in the context of converting IPLs.