

The International Comparison Program: An Overview and the Latest Results

by Wendy Low, Economics Accounts Division
and Sarah Ng, Prices Division
Singapore Department of Statistics

Introduction

The International Comparison Program (ICP) is a global statistical initiative conducted under the auspices of the United Nations Statistical Commission (UNSC). It collects price and expenditure data with the objective of estimating Purchasing Power Parities (PPPs) to facilitate international comparisons of macroeconomic aggregates such as Gross Domestic Product (GDP) and its components. The ICP is led and coordinated by the ICP Global Office at the World Bank in partnership with regional agencies overseeing activities in their regions. Incepted in 1968, the 2017 and 2021 ICP mark the 9th and 10th cycle conducted.

This article presents the concept of PPP, the work that the Singapore Department of Statistics (DOS) was involved in for the latest 2021 ICP, and highlights the results from the 2017 ICP.

Purchasing Power Parity (PPP)

For comparisons of economic output across economies, market exchange rates are traditionally used to convert national accounts aggregate based on a reference currency. However, market exchange rates are volatile and do not account for differences in price levels across economies and hence may not accurately reflect the real value of an economy's output.

On the other hand, PPP refers to the number of currency units required to purchase a comparable basket of goods and services that can be bought with one unit of the currency of the reference economy.

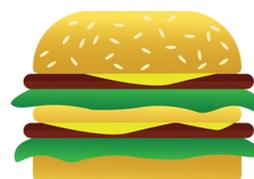
PPPs for GDP and its various components are generally less volatile as they are estimated based on the comparison of actual prices across economies of a standard basket of items suitably weighted by relevant GDP expenditures. Compared to market exchange rates, PPPs adjust for the differences in the purchasing powers of the different currencies by eliminating price level differences. Hence, they can better estimate the volume of output across economies in real terms.

Apart from GDP expenditure broken down by detailed categories, national annual average prices for a comparable basket of well-defined goods and services across economies are required to compute PPPs.

BOX 1 AN EXAMPLE OF PPP BASED ON A SINGLE COMMODITY

To illustrate, the Big Mac, an item available in most economies and is generally similar in terms of quality and specifications is used.

Suppose a Big Mac costs S\$5.90 in Singapore and US\$5.65 in the United States (US). The PPP for Big Mac (S\$ per US\$) is computed by taking the ratio of the price of a Big Mac in Singapore to the price of a Big Mac in the US, i.e., $5.90/5.65 = 1.04$. The resulting value of 1.04 implies that S\$1.04 has the same purchasing power as US\$1 for 1 unit of Big Mac.



Singapore : S\$5.90

USA : US\$5.65

PPP = $5.90/5.65$
= 1.04 S\$ per US\$

In the example, the Big Mac is a single, standard product and is not representative of the typical consumption basket of many economies.

The aim of the ICP is to produce PPPs that take into account the relative prices among the different economies for a broad range of goods and services, including consumer products, capital and government expenditures, which together make up the GDP.

Price Level Index (PLI)

Another indicator produced by the ICP is the Price Level Index (PLI). It is used to assess how price levels of economies compare against one another.

The PLI is computed as the ratio of PPP to the market exchange rate of the currency of a given economy relative to the currency of the reference economy, multiplied by 100.

A PLI above 100 points implies that the price level of the economy is higher than that of the reference economy.

BOX 2 ILLUSTRATION OF PLI

Continuing from the example in Box 1, suppose the prevailing exchange rate is S\$1.37 to US\$1. A tourist from the US visiting Singapore exchanges US\$5.65 (price of a Big Mac in the US) to S\$7.74 at a bank upon arrival (based on the prevailing exchange rate). He will be able to buy a Big Mac in Singapore with S\$1.84 left to spare.

The PLI for Big Mac in Singapore is thus $1.04/1.37 \times 100 = 76$ points. This means that the price level of Big Mac in Singapore is about three-quarters of that in the US.

Computation of PPP and PLI

	US *	Singapore
Cost of Big Mac in local currency	US\$5.65	S\$5.90
PPP	1.00	1.04
Market Exchange Rate	1.00	1.37
PLI for Big Mac	100	76

* Reference Economy

2021 ICP Cycle

Similar to the last ICP in 2017, close to 180 economies participated in the 2021 ICP.

They are classified into 6 regions, namely Africa, Asia and the Pacific, Commonwealth of Independent States, Eurostats-OECD PPP Program, Latin America and Caribbean as well as Western Asia. Activities in each region were coordinated by a Regional Implementing Agency (RIA).

Singapore participated in the 2021 ICP, along with other 20 economies under the Asia and the Pacific region, with the Asian Development Bank (ADB) as the RIA.

Coverage of ICP Price Surveys

ICP price surveys comprise final goods and services in the GDP and its expenditure components. Data collected for the 2021 ICP covered household consumption items, machinery and equipment, construction items, housing rental and volume as well as government compensation (Table 1).

The conduct of the different price surveys spanned across the whole year of 2021.

Expenditure Data from National Accounts

Under the ICP, GDP is compiled using the expenditure approach and comprises six main aggregates, including "individual consumption expenditure by households", "individual and collective consumption expenditure by government" and "gross fixed capital formation" (Table 2).

These main aggregates are further broken down into 155 basic headings. PPPs are calculated for each basic heading using the item level price data or the reference PPPs for certain basic headings.

These PPPs for the basic headings are then aggregated upward using the GDP expenditure data associated with the corresponding basic headings.

TABLE 1 2021 ICP PRICE SURVEYS *

Survey Coverage	Data Collected	Survey Period
Household Consumption	<ul style="list-style-type: none"> National annual average prices of 990 household consumption goods / services 	Monthly from Jan to Dec 2021
Machinery and Equipment	<ul style="list-style-type: none"> National annual average prices of 182 machinery and equipment 	One-time price collection in Q3 2021
Construction	<ul style="list-style-type: none"> National average price of 52 construction materials / machines and workers compensation 	One-time price collection in July 2021
Housing Rent Survey	<ul style="list-style-type: none"> Rent information by dwelling size / usable surface on 20 dwelling types 	Price collection in Jun and Dec 2021
Housing Volume Indicators	<ul style="list-style-type: none"> Housing volume quantity indicators include number of dwelling units, total population, number of occupants, number of households, number of rooms, and useful floor space Housing volume quality indicators include access to electricity, water, toilet, and housing material 	One-time data collection for 2021
Government Compensation	<ul style="list-style-type: none"> National annual average compensation for 35 government occupations, including base information on work hours, work days, holidays and leave 	One-time price collection for 2021

* Information refers to survey conducted by the ADB for the Asia and the Pacific region. The schedule for surveys was made flexible for economies to begin the conduct of price surveys at a later month due to COVID-19.

TABLE 2 NUMBER OF ITEMS PRICED, NUMBER OF BASIC HEADINGS, AND GROSS DOMESTIC PRODUCT BY MAIN AGGREGATES / CATEGORIES, 2021 ICP

Main Aggregate / Category	Number of Basic Headings	Number of Items Priced
Individual consumption expenditure by households	110	1,010
Food and Non-Alcoholic Beverages	29	295
Alcoholic Beverages, Tobacco and Narcotics	5	18
Clothing and Footwear	5	95
Housing, Water, Electricity, Gas and Other Fuels	8	39
Furnishings, Household Equipment and Routine Maintenance of the House	13	121
Health	7	160
Transport	13	91
Communication	3	33
Recreation and Culture	13	74
Education	1	7
Restaurants and Hotels	2	29
Miscellaneous Goods and Services	10	48
Net Purchases Abroad	1	0*
Individual consumption expenditure by non-profit institutions serving households (NPISHs)	5	0*
Individual consumption expenditure by government	21	14
Health	12	9
Education	6	5
Others	3	0*
Collective consumption expenditure by government	5	21
Gross capital formation	12	234
Machinery and Equipment	6	182
Construction	3	52
Others	3	0*
Balance of exports and imports	2	0*
GDP	155	1,279

* Not collected; PPPs of closely related basic headings or a group of basic headings are used as reference PPPs.

Household Consumption Price Survey 2021

The household consumption product list for 2021 ICP for Asia and the Pacific comprised 990 items commonly consumed by households in their day-to-day basic needs and other necessities, e.g. food items, garments, transport, etc.

To ensure that the PPPs derived are meaningful, the products priced are "like-for-like" across economies.

Detailed product specifications are provided for every price-determining characteristics for each item in the product list, such as brand, quantity, unit of measure and material. Economies were to strictly follow the listed product specifications for the price collection.

BOX 3

EXAMPLE OF STRUCTURED PRODUCT DESCRIPTIONS OF "BOY'S DRESS SHIRT, WKB-M"

Item Name	Structured Product Descriptions
Boy's dress shirt, WKB-M	Brand: Well known Brand stratum: Medium Quantity: 1 Unit of measurement: Piece Material: 50-80% cotton Sleeve length: Long Collar: Yes Color: No design; solid color Size: Boys (6-12)

With reference to the catalogue of household products for the 2021 ICP for Asia and the Pacific

In Singapore, prices for available household consumption items are primarily sourced from DOS's retail price survey where the prices collected are used for the compilation of the Consumer Price Index (CPI).

For the 2021 ICP price survey, the prices of around 46 per cent of household consumption items were available from the retail price survey. For those not available from the retail price survey, their prices are collected specifically for ICP purposes through the conduct of additional price surveys or obtained from prices online. These made up about 25 per cent of items in the household consumption product list.

The remaining items were not priced as they are not commonly available in Singapore. Examples include:

- Flight, domestic, return ticket, 500-800km,
- Internet connection, 1 - 4 Mbps, and
- Cut up watermelon from street vendor

As of Apr 2022, Q1 – Q3 2021 data from Singapore have been submitted and Q4 2021 data will be submitted before the next workshop in 2H 2022. Regional price data validation will continue for the whole year of 2022. Results of the 2021 ICP are expected to be released in Q4 2023.

Impact of COVID-19 on 2021 ICP

Due to COVID-19, the ICP benchmark year was postponed from 2020 to 2021. Price collection of items for the household consumption price survey was initially scheduled to start from January 2021. Depending on economies' circumstances, the option to begin the conduct of price collection at a later month while maintaining a 12-month coverage was provided to participating economies. In addition, regional meetings and workshops meant to be held at physical venues, were conducted virtually.

On price collection, new COVID-19 related items such as "COVID-19 RT-PCR test", "Alcohol-based hand sanitizer" and "Respirator masks," were added to the household consumption price survey. Mobility restrictions and low demand for leisure travel affected the price collection of air travel related items such as "Flight, international, return tickets" and "Package holiday by air" in several economies including Singapore.

As a result of the tightening of safe management measures in Singapore to manage COVID-19 over various periods in 2021, price collection activities had to be adjusted accordingly. For example, during Phase 2 Heightened Alert and the closure of wet markets due to the outbreak of COVID-19 clusters, ICP field collection activities were scaled back or halted temporarily. Where available and assessed representative, alternative data collection modes such as online prices and email surveys were adopted in place of ICP field collections.

Results from the 2017 ICP

Relative Price Levels

PLI tends to exhibit a positive relationship with income (i.e. PPP-based per capita GDP) (Chart 1). For example, high-income economies such as Iceland, Norway and Switzerland were the most expensive places to live and work in 2017, with their relative price levels about 1.8 to 2 times the world average (i.e., World =100). In comparison, lower middle-income economies such as Egypt, Arab Republic and Sudan had the lowest PLIs in 2017.

Singapore’s PLI was 96.2, slightly lower than the world average and comparable to Qatar’s. Against other high-income economies in Asia and the Pacific, Singapore’s price level was 17 per cent lower than Hong Kong’s and 24 per cent and 37 per cent higher than Taiwan’s and Brunei Darussalam’s respectively.

PPP-based GDP

On the basis of PPP-based GDP, the world economy was valued at US\$119.5 trillion in 2017. Mainland China and the United States were the two largest economies, each accounting for around 16 per cent of world GDP shares. This was followed by India with a world share of 7 per cent, Japan and Germany each with 4 per cent.

These five economies had a collective PPP-based GDP of US\$56.7 trillion in 2017, accounting for nearly half of the world’s GDP.

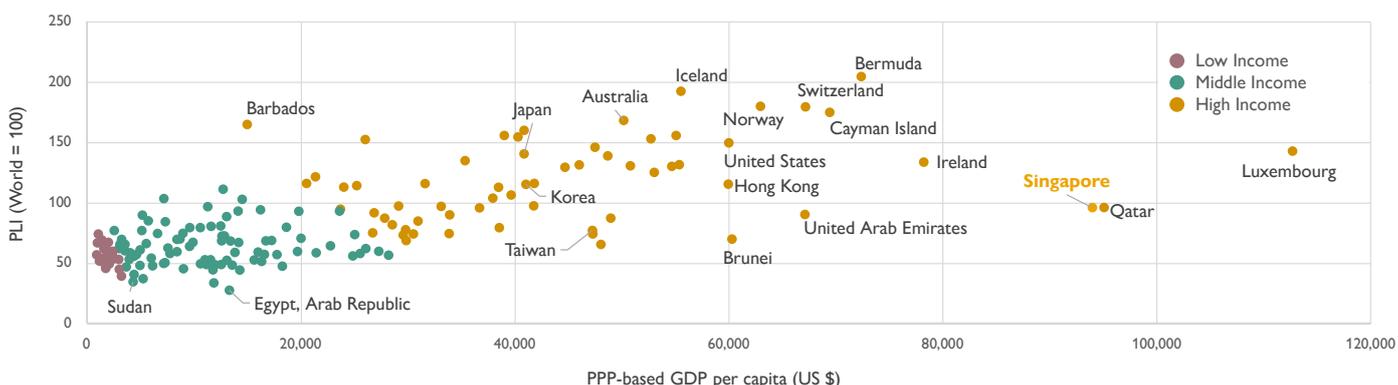
In contrast, measuring GDP using market exchange rates tend to understate the relative sizes of economies with low domestic price levels, and vice versa (Table 3). For example, based on market exchange rates, the sizes of economies such as India and Indonesia (with low domestic price levels) were largely understated relative to other high-income economies.

Singapore’s GDP at PPP and at market exchange rates each accounted for 0.4 per cent of the global output in 2017.

Conclusion

Apart from producing internationally comparable volume measure of GDP and its expenditure components, PPPs provide a common basis to assess the progress of economies towards meeting the Sustainable Development Goals (SDGs). The ICP program also serves as a platform for building statistical capacity in price statistics and national accounts through the undertaking of ICP activities as well as the sharing of experiences among participating economies.

CHART 1 RELATIVE PRICE LEVELS (WORLD=100) AND PER CAPITA GDP BY ECONOMY, 2017



Source: 2017 International Comparison Program

TABLE 3 RELATIVE SIZES OF ECONOMIES, 2017

Economies	GDP at PPP			GDP at Market Exchange Rates		
	US\$Bil	Share (World=100)	Rank	US\$Bil	Share (World=100)	Rank
Mainland China	19,617.4	16.41	1	12,143.6	15.23	2
United States	19,519.4	16.33	2	19,519.4	24.49	1
India	8,050.5	6.73	3	2,552.5	3.20	7
Japan	5,173.0	4.33	4	4,860.0	6.10	3
Germany	4,381.8	3.67	5	3,665.9	4.60	4
Singapore	527.4	0.44	39	338.4	0.43	34

Source: 2017 International Comparison Program