





## Introduction to the International Comparison Programme and Purchasing Power Parities

### What is the ICP and how is it implemented?

The International Comparison Programme (ICP) is one of the biggest international statistical initiatives worldwide. It is led by the ICP global office at The World Bank, under the auspices of the United Nations Statistical Commission. The ICP aims at providing comparable price and volume measures of gross domestic product (GDP) and its aggregates across countries and regions. The main output of the ICP is purchasing power parities (PPPs).

Since the ICP conducts multilateral price comparisons, price data should be correct, reliable and comparable (box 1.1).

The programme is implemented in different rounds or cycles; each has a benchmark year. Many countries worldwide, divided into different regions, participate.

The ICP has gone through different stages throughout its history from its first round in 1970, which covered 10 economies, to the latest global cycle in 2017, which included 176 economies. In 2016, The United Nations Statistical Commission endorsed the ICP as a permanent statistical programme, and recommended the implementation of more frequent rounds through the adoption of a rolling survey approach and increased integration between the ICP and national statistical programmes such as the Consumer Price Index (CPI). A more elaborate history of the ICP is in annex I.

#### Box 1.1. How is comparability ensured between different countries?

*The ICP requires price data collection of the exact same items by participating countries in each region, as well as price data collection of the exact same global items by all countries in different regions across the globe. To make sure that prices are collected for the same items and are thus comparable, structured product descriptions are developed for each item, whether a good or a service. Structured product descriptions are very detailed specifications indicating the amount to be priced for each item (for example, 1 kilogramme), the brand to be priced, the dimensions and other specifications. Comparable prices are necessary for computing reliable PPPs.*

The ICP governance structure consists of the United Nations Statistical Commission, the Governing Board, the Inter-agency Coordination Group, the Technical Advisory Group and its task forces, and global, regional and national implementing agencies. The governance structure is presented in more detail in annex I.

## What does the ICP produce?

The ICP produces the following indicators:

- **Purchasing power parities:** PPPs convert different currencies to a common currency, and, in the process of conversion, equalize their purchasing power by eliminating differences in price levels between economies. They show, with reference to a base economy, the relative price of a given basket of goods and services in each of the economies being compared.
- **Price-level indices:** PLIs are standardized indices obtained by dividing an economy's PPPs by its market exchange rate. They express the price level of a given economy relative to another.
- **PPP-based GDP and its expenditure components:** These are expenditures valued at a common currency while correcting for price-level differences. They are obtained by dividing, for each economy, its nominal GDP and expenditure components by its respective PPPs.
- **PPP-based per capita GDP and its expenditure components:** These are obtained by dividing, for each economy, its PPP-based GDP and expenditure components by its population.

## What are PPPs?

PPPs are estimated currency converters, derived from cross-country price relatives, that allow for reliable comparisons of GDPs and their economic components across countries, while adjusting

for exchange rate distortions and price-level differences. PPPs measure the number of currency units needed in a certain country to buy the same basket of goods and services that a single unit of another country's currency can buy.

For example, the PPP of Kuwait to Bahrain measures the number of units of Kuwaiti dinar required in Kuwait to purchase the same basket of goods and services that would cost one unit of Bahraini dinar when purchased in Bahrain.

Market exchange rates are distorted by price-level differences. They do not reflect the real purchasing power of a currency in comparison to another. This is because many goods and services in an economy are not internationally traded, and because the demand and supply of currencies are not only driven by international trade, but also are influenced by many other factors, such as currency speculation, interest rates, government intervention and capital flow.

Unlike market exchange rates, PPPs convert a basket of goods and services from one currency to another by eliminating price-level differences. They hence allow for the comparison of the purchasing powers of different currencies.

PPPs thus enable the relative comparison of the sizes of economies and the welfare of their inhabitants in real terms, controlling for price-level differences.

## What is the PLI?

The PLI provides a measure of the difference in price levels between different economies. It is calculated as the ratio of PPP to the market exchange rate:

$$PLI = \frac{PPP}{Exchange\ Rate} * 100$$

A PLI for economy A compares its price level to that of another economy or region for which the price level would be considered 100. If the PLI of economy

A is higher than 100, it means that the same basket of goods and services in economy A is more expensive than it is in the comparator economy or region. Conversely, if the PLI is lower than 100, the basket is less expensive in economy A.

In other words, the PLI is a spatial price index that compares differences in price levels between countries in a given year, by setting one country – or region – as a base (PLI=100). A country with a PLI greater than 100 is generally more expensive than the base country or region, and a country with a PLI less than 100 is generally less expensive than the base country/region. The PLIs in two different countries can also be compared if they are both expressed in terms of the same base. In this case, the country with the higher PLI is more expensive and vice versa. PLIs, like PPPs, can be calculated at the levels of GDP and its main components as well as at more detailed levels of different aggregates.

## What is PPP-based GDP or real GDP?

GDP is a macroeconomic measure of an economy's output value. It measures the size of an economy, and can be estimated using three approaches: the expenditure approach, the income approach and the production approach. The ICP uses the expenditure approach, where detailed expenditures are further estimated for the GDP and its aggregates down to 155 Basic Headings on an annual basis. GDP is the sum of expenditures by households, non-profit institutions serving households, the government, gross capital formation and the balance of net exports.

To compare nominal expenditures between participating countries when estimated in their local currencies, local currencies should be converted into a common currency, while at the same time adjusting for price-level differences between the countries. In the ICP, price-level differences are indirectly removed by deriving volumes, using direct measures of relative prices,

which are PPPs. Therefore, PPP-based GDP, referred to as real GDP, is different from nominal exchange-rate-based GDP in that it removes the effect of price-level differences and allows for cross-country comparisons.

A distinction should be made between real GDP in a temporal and a spatial context. In a temporal context, real GDP refers to GDP adjusted for inflation, while in a spatial context, such as the ICP, it refers to GDP adjusted for price-level differences using PPPs. When used for spatial comparisons, as previously mentioned, real GDP is adjusted for price-level differences between countries and is converted into the same currency using PPPs. Nominal GDP, which is converted using market exchange rates, does not provide accurate cross-country comparisons as it does not adjust for price-level differences between countries and contains a lot of distortion. Nominal GDP and real GDP are converted from local currency to another through the following formulas:

$$\text{Nominal GDP} = \frac{\text{GDP in Local Currency Units}}{\text{Exchange Rate}}$$

$$\text{Real GDP} = \frac{\text{GDP in Local Currency Units}}{\text{PPP}}$$

A comparison of exchange-rate-based GDPs would reflect differences in volumes of goods and services produced in the countries being compared as well as differences in price levels between the countries. Thus, nominal GDP does not reflect a reliable image of the relative sizes of economies. The existence of higher price levels in high-income countries than in low-income countries implies that price-level differences for non-traded goods and services between high- and low-income countries are more pronounced than they are for traded goods and services. If these price-level differences are not taken into account when conducting GDP comparisons, the size of the economies of high-income countries with higher price levels would be overstated, while the size of economies in low-income

countries with lower price levels would be understated. This is known as the Penn effect. Since the exchange rate is the same for all items, there is no distinction between traded and non-traded items when GDP is converted using market exchange rates. PPPs do not suffer from the same bias, however, and thus provide an accurate and reliable comparison of economy sizes.

## Different uses of PPPs

The uses of PPPs are diverse and are not limited to economic analysis. In addition to their uses in measuring real economy sizes and comparing productivity, well-being and income between different countries, PPPs are also used in measures related to health, energy, education and the environment. Some of the main uses of PPPs are detailed below.

### • PPP uses in economic analysis

PPPs reflect the real purchasing power of currencies, and are used to measure and compare the real sizes of economies. As previously mentioned, the GDP is a measure of the size of an economy. Cross-country comparisons of nominal GDP converted using exchange rates do not provide correct or reliable comparisons, as there are price-level differences between countries that in turn lead to distorted comparisons. When converting GDPs into common currencies using PPPs instead of exchange rates, however, the comparison becomes more accurate and reliable. Therefore, PPPs are used in economic analysis to showcase price-level differences between countries and allow for sound comparative analysis of the real sizes of economies and their contributions to the global economy or/and to their corresponding regional economies.

PPPs are also used to measure and compare real per capita income and consumption levels,

**Table 1.1.** Main uses of PPPs

<b>Output and productivity</b>	<b>Cost of living</b>
<ul style="list-style-type: none"> <li>• Relative size and structure of the economy</li> <li>• Overall productivity</li> </ul>	<ul style="list-style-type: none"> <li>• Price levels</li> <li>• Price structures</li> </ul>
<b>Standards of living and material well-being</b>	<b>Income inequality</b>
<ul style="list-style-type: none"> <li>• GDP per capita</li> <li>• Actual individual household consumption per capita</li> </ul>	<ul style="list-style-type: none"> <li>• Distribution of income and economic inequality within and across countries</li> </ul>
<b>Global poverty</b>	<b>Education</b>
<ul style="list-style-type: none"> <li>• Identification of the poor and viability of global poverty goals</li> </ul>	<ul style="list-style-type: none"> <li>• Education and expenditure comparison across countries</li> </ul>
<b>Health</b>	<b>Wages</b>
<ul style="list-style-type: none"> <li>• Health-care costs and expenditures comparisons across countries</li> </ul>	<ul style="list-style-type: none"> <li>• Wage pressures and competitiveness across countries</li> </ul>
<b>Competitiveness</b>	<b>Environment</b>
<ul style="list-style-type: none"> <li>• Competitiveness and efficiency of industrial production</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental impact of energy uses</li> </ul>
<b>Trade</b>	<b>Cross-country investment costs</b>
<ul style="list-style-type: none"> <li>• Trade Barriers and price levels</li> </ul>	<ul style="list-style-type: none"> <li>• Labour and material costs comparisons</li> <li>• Possible investment barriers</li> <li>• Possible investment opportunities</li> </ul>
<b>Energy</b>	
<ul style="list-style-type: none"> <li>• Energy efficiency and intensity</li> </ul>	

allowing for intraregional, interregional and international per capita comparisons, and to compare the relative well-being of people across different countries and regions. Moreover, PPPs allow the most real and reliable measure of the international poverty line and national poverty levels through the elimination of price-level differences across nations.

For national policymaking, PPPs are used to conduct comparative economic analysis with neighbouring countries or the surrounding region, and to gain more insights into better industry competitiveness, investment opportunities, and government decisions on subsidies, taxation and other fiscal instruments. If PPPs produced at the subnational level, countries can use them to estimate the purchasing power of the same national currency across different parts of the country, and to estimate and compare varying price levels, consumption patterns and corresponding costs of living between different regions of the country. PPPs, whether national or subnational, are also used in setting wages adjusted to cost-of-living differences, assessing poverty and inequality, and setting fiscal policy and public transfers.

- **PPP uses in the Sustainable Development Goals**

PPPs enter into the computation of indicators for some of the global Sustainable Development

Goals (SDGs), thus assisting in tracking progress made towards achieving the goals and the 2030 Agenda for Sustainable Development. PPPs are currently used under 8 of the 17 SDGs, namely 1 to 4 and 7 to 10 (figure 1.1). Uses under each goal will be covered in more detail in chapter III.

- **PPP uses in measuring welfare**

The material well-being of an individual is reflected by per capita actual individual consumption (AIC) for the economy he/she resides in. AIC measures individual goods and services actually consumed by households, and not only purchased by them. It comprises individual consumption expenditures by households and the government as well as non-profit institutions serving households. This measure is especially important when entities such as governments and non-profit institutions provide households with services such as health and education, which are consumed by households but not actually purchased by them. Comparing the well-being of residents in different countries requires comparing per capita AIC between the countries while at the same time controlling for price-level differences. This is achieved by observing PPP-based AIC instead of AIC in market exchange rate terms.

- **PPP uses by the general public**

The users of PPPs are diverse and include international organizations, policymakers,

**Figure 1.1.** Eight SDGs use PPPs for tracking progress



researchers, academics and the private sector. The United Nations, the World Bank, the International Monetary Fund, the Organization for Economic Co-operation and Development and the European Commission all use PPPs.

Aside from economic research, analysis, wage adjustments and policymaking, PPPs can also be used by individuals to make informed decisions. For instance, they can guide individuals in

relocation decisions when offered new jobs in other countries. They can also help determine the real amount of money required to consume a certain basket of goods and services when spending time in another country. Though PPPs are recommended for many uses as discussed above, these uses come with some limitations. Box 1.2. summarizes the cases where PPP uses are recommended while also pointing out the cases where they are not recommended.

### **Box 1.2. When is it recommended to use PPPs or not?**

#### *Recommended uses*

1. To make spatial comparisons of:
  - GDP: relative size of economies
  - GDP per hour worked: labour productivity
  - GDP per capita: income per capita
  - AIC per capita: a measure of average material well-being
2. To make spatial comparisons of price levels
3. To group economies by their:
  - Volume index of GDP or AIC per capita
  - Price levels of GDP or AIC

#### *Recommended uses with limitations*

1. To analyse changes over time in relative GDP per capita and relative prices
2. To analyse price convergence
3. To make spatial comparisons of the cost of living
4. To use PPPs calculated for GDP and its expenditure components as deflators for other values, such as household income

#### *Uses not recommended*

1. As a precise measure to establish strict rankings of economies
2. As a means of constructing national growth rates
3. As a measure to generate output and productivity comparisons by industry
4. As an indicator of the undervaluation or overvaluation of currencies
5. As an equilibrium exchange rate

## What is the link between the ICP and the CPI?

Whereas the ICP produces a spatial price index measuring changes in the price level across countries within the same time period, the CPI is a temporal price index measuring changes in the price level across time periods within the same country. Both the CPI and the ICP require extensive data collection at the national level. CPI computation requires the collection of nationally representative and important household consumption items specified by each country and differing by country. The ICP, on the other hand, requires the collection of prices for a unified basket containing goods and services that extend far beyond household consumption items and are comparable across countries, and thus they may not all be representative or important in each country.

In the Arab region, countries have achieved a high degree of integration and synergy between the CPI and the ICP. For instance, countries started to include a subset of items from the regional

ICP list within their own national CPI lists when these items are considered important to the country. They are in some cases using the ICP item specifications as well. Integration between the CPI and the ICP is also achieved the other way around. During the development of the regional ICP product list for household consumption, the ICP regional office at the Economic and Social Commission for Western Asia (ESCWA) coordinates with its member countries and includes items that are common in national CPI lists of the participating member countries to increase the number of overlapping household consumption items between CPI and ICP.

This integration process is very important, as it allows actual data collection of prices for a considerable number of items on a regular basis, without additional burdens on national statistical offices. This facilitates annual data collection for the ICP towards the production of reliable annual PPPs. ESCWA is continuously working towards the achievement of higher integration between the ICP and the CPI through various initiatives.