Statistical Insights: Purchasing Power Parities – not only about Big Macs

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All travellers know that the prices of goods and services vary between countries. In order to capture these price differences, Eurostat and the OECD collect data on the prices of identical goods and services in their member countries, and compile "Purchasing Power Parities" (PPPs) – conversion rates that neutralise price differences between countries. The collection spans hundreds of products and allows PPPs to be calculated for various classes of goods and services, and for macroeconomic aggregates such as gross domestic product (GDP). PPPs help economists and other users of statistics who want to compare GDP, income and consumption across economies with a

proper adjustment for price differentials, in order to better assess the size of economies, productivity and material well-being.

Purchasing power parities (PPPs) compare the prices of similar products, expressed in different currencies

The Big Mac index from The Economist magazine is a well-known example of an international price comparison of a product with similar characteristics across countries. In its latest edition (January 2017), this price comparison shows for instance that the average price of a Big Mac is 5 dollars in the United States and 4 euros in France. So the "Big Mac PPP" between France and the US is the ratio of 4 euros to 5 dollars (or equivalently 0.8 euro to the dollar).

Price relatives vary from product to product, so many products must be sampled to construct PPPs for entire economies

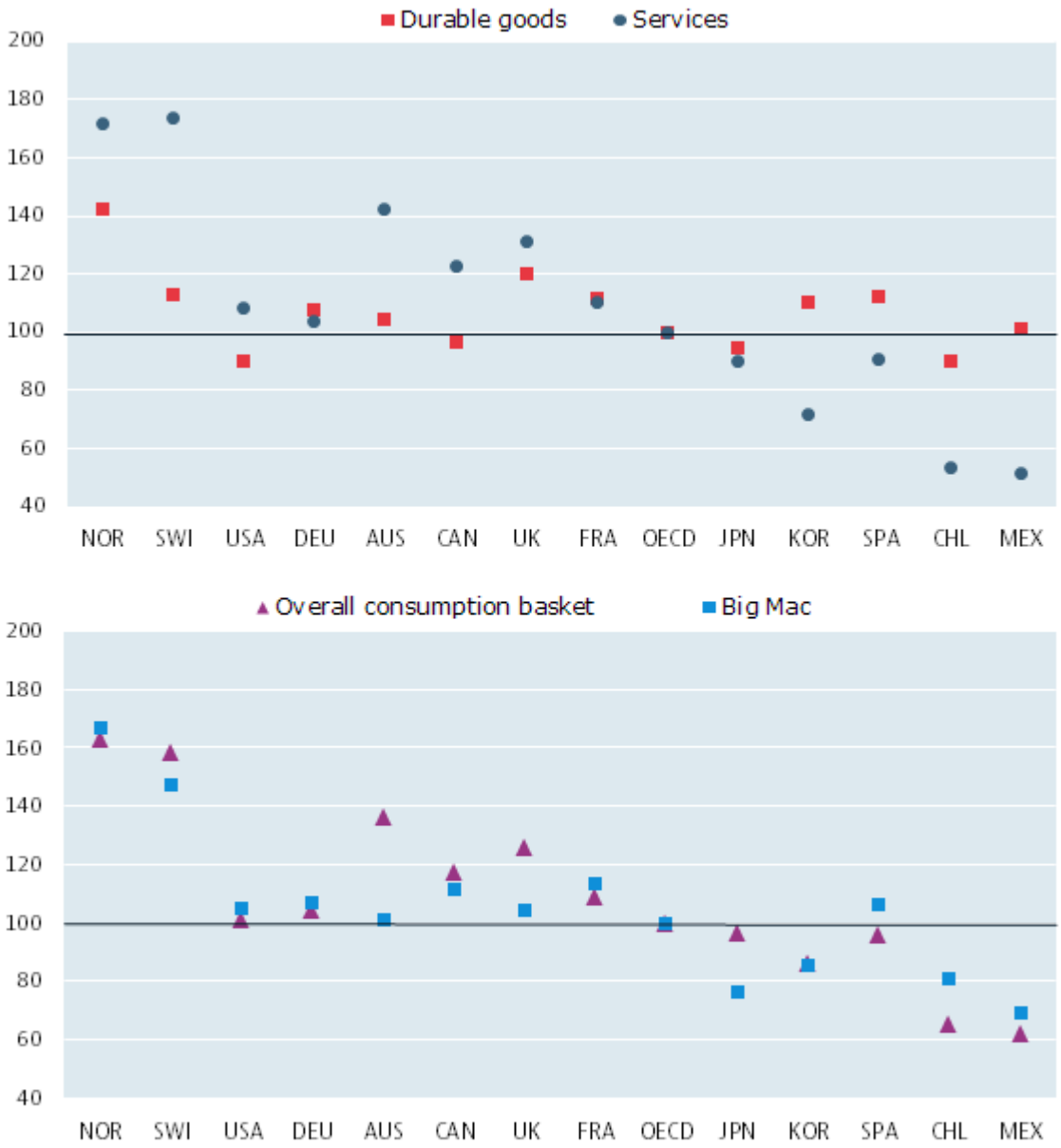
Because price relatives vary from product to product, the OECD and Eurostat collect prices on around 2,500 products. This allows PPPs to be constructed for different groups of products, and to compare price levels, once the prices have been converted into a single currency. This is illustrated in Figure 1, showing how prices for different product groups differ across countries.

The top part of Figure 1 shows that the prices of durable goods (e.g., cars, TVs and computers) vary less between countries than the prices of services (e.g., housing, education and health). This is because durable goods are frequently traded across countries, which tends to equalise their price levels. On the other hand, services are often purchased locally and are less traded across countries, thus making it possible to have larger price differences across countries. The comparison shows that services tend to be more expensive in high-income countries (e.g., Switzerland) than in lower-income countries (e.g., Mexico). This is the so-called

Balassa-Samuelson effect: the higher productivity in advanced countries for the production of tradeable goods leads to higher wages across all sectors in these countries. Since cross-country differences in services productivity are smaller than in tradable goods productivity, these higher wages lead to higher services prices in advanced countries.

The bottom part of Figure 1 shows that overall consumption prices tend to be higher in high-income countries, reflecting the large share of services in the consumption basket of households (typically around 70%). Furthermore, overall consumption prices and Big Mac prices show a similar pattern, although for some countries the difference between Big Mac prices and overall consumption prices can be quite significant. In Australia for instance, Big Mac prices are close to the OECD average whereas overall prices for household final consumption are nearly 40% higher.

Figure 1: International price level comparisons for different product groups
(ratio to the OECD average in 2014)



Notes: Figure 1 shows 2014 Price Level Indices (PLIs) for different product groups. PLIs convert prices into a single currency using exchange rates, and convert these to an index number by setting the price level for the OECD area at 100. Countries are shown in descending order of GDP per capita (computation based on PPPs).

Source: OECD (2014 PPPs and exchange rates), The Economist (July 2014 Big Mac prices) and authors' computations.

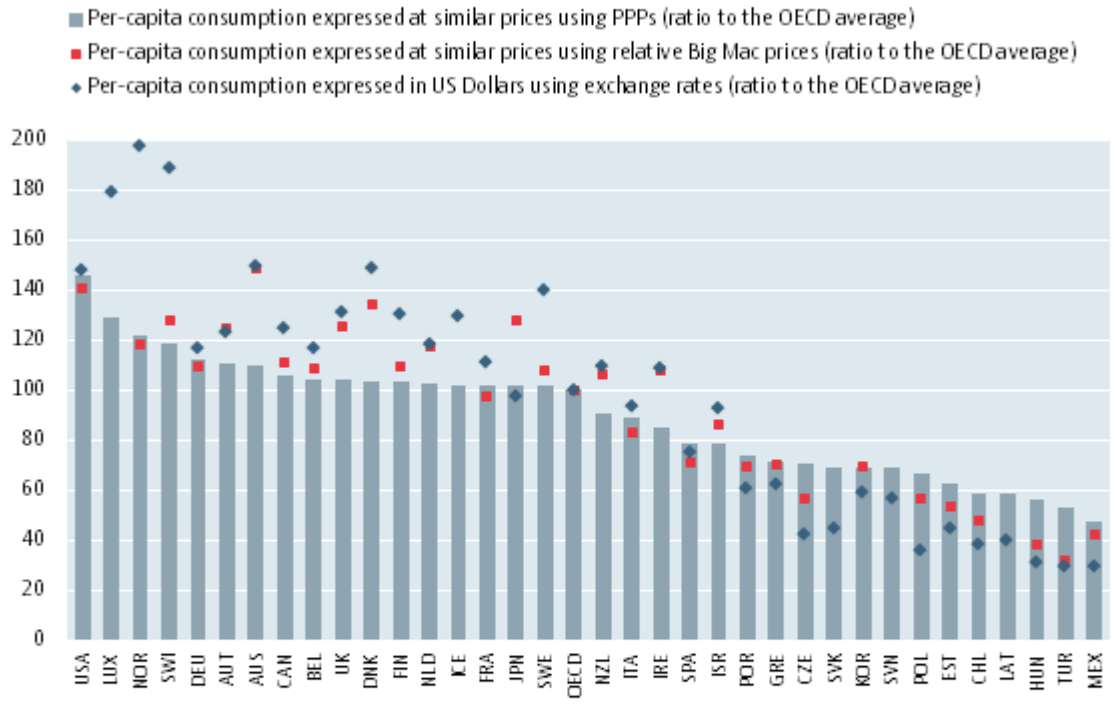
Using the Eurostat-OECD PPPs is the best way to compare macroeconomic aggregates across OECD countries: better than using exchange rates or PPPs based on single products

Perhaps the most intuitive way to compare macroeconomic aggregates across countries when they are expressed in different currencies is to use exchange rates. However, such

comparisons do not account for the fact that prices are different across countries, even if expressed in the same currency. Making it possible to adequately adjust for price differentials is precisely the purpose of PPPs.

Figure 2 shows that conclusions derived from international comparisons of per-capita household final consumption, a useful indicator of material well-being, vary significantly depending on whether exchange rates or PPPs are used to convert consumption in national currency to a common unit. In 2014, the differences reached up to 70% for Norway, where average consumption prices were well above the OECD average (see Figure 1). The difference between measures based on PPPs and relative Big Mac prices is usually lower. Nevertheless, and consistently with Figure 1, measures based on relative Big Mac prices tend to overstate consumption per capita in high-income countries and to understate it in lower-income countries, as compared to measures based on PPPs which take into account the whole range of goods and services consumed by households.

Figure 2: International comparisons of per-capita consumption using exchange rates, relative Big Mac prices and PPPs
(ratio to the OECD average in 2014)



Notes: Figure 2 shows household final consumption per capita by country compared to the OECD average (i) converted into US Dollars using exchange rates, (ii) expressed at average OECD prices using relative Big Mac prices, and (iii) expressed at average OECD prices using Eurostat-OECD PPPs. For (ii), the OECD average has been computed without the five OECD countries for which Big Mac prices were unavailable in The Economist's online database (Iceland, Latvia, Luxembourg, Slovakia and Slovenia). Countries are shown in descending order of household final consumption per capita (computation based on PPPs).

Source: OECD (national accounts, 2014 PPPs and exchange rates), The Economist (July 2014 Big Mac prices) and authors' computations.

The measures explained

Household actual individual consumption (AIC) is the measure of household final consumption used in this article. It covers all goods and services actually consumed by households, including both consumer goods and services purchased directly by them ("household final consumption expenditure"), and services provided by government and non-profit institutions for free or at significantly reduced prices (e.g. health and education services). In a nutshell, AIC measures what households consume and not only what they directly pay for.

Purchasing Power Parities (PPPs) convert different currencies to a common currency and, in the process of conversion, equalise their purchasing power by eliminating the differences

in price levels between countries. Thus, when GDP or consumption values are converted to a common currency with PPPs, they are valued at the same price level and so reflect only differences in the volumes of goods and services purchased in the countries. In their simplest form, PPPs are nothing more than price relatives that show the ratio of the prices in national currencies of the same good or service in different countries. For example, as mentioned in the text, if the price of a Big Mac is 4 Euros in France and 5 Dollars in the United States, then the PPP for Big Macs between France and the United States is the ratio of 4 Euros to 5 Dollars, or 0.8 Euro to the Dollar, meaning that for every Dollar spent on a Big Mac in the United States, 0.8 Euro would be spent in France to obtain the same burger. If the currency exchange rate is one Euro to the Dollar, it can be concluded that Big Macs are cheaper in France than in the United States. The OECD and Eurostat compile PPPs for large baskets of goods and services.

Note that the Eurostat-OECD PPPs are not suitable for gauging the under- or overvaluation of currencies since PPPs cover the whole range of goods and services produced or consumed in an economy, including many non-tradeable ones. Furthermore, currency exchange rates are also affected by capital movements.

Where to find the underlying data?

The OECD database on PPPs is available on OECD.STAT and includes the following datasets:
> Annual PPPs and exchange rates: this dataset contains annual PPPs for GDP, household actual individual consumption and final consumption expenditure, as well exchange rates for OECD countries and some non-member economies.
> 2014 PPP benchmark results: this dataset contains the detailed results of the latest (2014) Eurostat-OECD price comparison for the 47 countries that participated in the 2014

round of the Eurostat-OECD PPP Programme. Similar detailed results are also available for 2011, 2008 and 2005.

In addition, The Economist’s online database contains local Big Mac prices in up to 56 countries from 2000 to 2017.

Further reading

> Bournot S., Koechlin F., Schreyer P. (2011): 2008 Benchmark PPPs: Measurement and Uses. OECD Statistics Brief No. 17

> OECD/Eurostat (2012), Eurostat-OECD Methodological Manual on Purchasing Power Parities (2012 Edition), OECD Publishing, Paris

> The Economist (2017), The Big Mac index. January 12th 2017 edition

OECD Purchasing Power Parities (PPPs), data and methodology

The World Bank International Comparison Program (ICP) http://icp.worldbank.org