



THE CONFERENCE BOARD

Purchasing Power Parities and Size of GDP

Using Purchasing Power Parity Conversion to Compute the Level of Regional and Global GDP

The calculation of measures of regional and global GDP growth requires levels of GDP to weigh the growth rates of individual countries and regions by their size of GDP.

The most straightforward way to obtain such weights is to use exchange rate-converted GDP in dollar terms. However, the use of exchange rates can provide a misleading representation of the size of economies relative to each other because it is based on the assumption that price levels in countries are identical. In other words, using exchange rates implies that one dollar buys the same basket of goods and services in different countries. This is obviously an incorrect assumption, and it is especially erroneous for countries at different levels of development. Using exchange rates typically understates the size of lower-income economies because prices are lower in these economies, especially for nontradable goods and services.

The bias created by using exchange rates to measure the size of economies can be substantial, as can be seen in the calculation of purchasing power parities (PPPs). PPPs represent comparisons of prices for identical goods and services in the national currency of each country relative to a common standard (e.g., the U.S. dollar). A comparison of PPPs with exchange rates suggests that lower-income economies have substantially lower price levels, which are systemically related to the level of per capita income.

The measurement of PPPs has a long tradition of at least half a century, and they are now commonly used by the [Organisation for Economic Co-operation and Development](#) (OECD), the [World Economic Outlook Database](#) of the International Monetary Fund (IMF), and the [World Development Indicators](#) of the World Bank to measure the size of economies and per capita incomes. The latest PPP-measurement round was carried out by the World Bank for 145 countries in the year 2005 under the umbrella of the International Comparison Project.¹ The 2005 PPPs, extrapolated to adjacent years with national accounts deflators, have been used to compute the country and region weights for [The Conference Board Global Economic Outlook 2011](#).

¹ World Bank (2008), [Global Purchasing Power Parities and Real Expenditures, 2005 International Comparison Program](#), Washington D.C.

The Comparative Level of GDP in China and the United States

An interesting by-product of PPP-converted GDP levels is that they can also be used to directly compare the relative size of economies. In contrast to exchange-rate converted GDP, PPP-converted GDP measures what one dollar can buy in each economy. This comparison is particularly interesting for a comparison of China and the United States. The World Bank PPP for 2005 is 3.45 renminbi to the U.S. dollar, suggesting a relative price level of 42 percent relative to the United States. This results in a measure of Chinese GDP of 42 percent (in this case the same percentage as the relative price level, by coincidence) of that of the United States in 2005.

There are major discrepancies, however, between different measures of PPP-converted GDP, especially for the case of China. These depend on factors related to the exact methodology, price measures, and weighting systems that are employed to compute the various PPP. Typically, the original 2005 PPP used by the World Bank and the International Monetary Fund is relatively high compared to various alternatives. As a result the level of GDP for China comes out relatively low (42 percent in 2005). In contrast, both [Angus Maddison's Statistics on World Population, GDP and Per Capita GDP, 1-2008 AD](#) and the [Penn World Tables version 6.3](#) provide PPPs based on previous rounds of prices, which indicate much lower price levels in China and, therefore, much higher GDP. According to these measures, China's GDP would have been 75–80 percent of the U.S. level in 2005 and would have already surpassed the U.S. level by now.

A recent evaluation of the 2005 World Bank PPPs by Angus Deaton and Alan Heston concludes that they have some important deficiencies.² In particular, the authors suggest that the China/U.S. 2005 PPP was based on price measures for outlets carrying types and brands in 11 cities that could have been as much as 20 percent higher than national prices. As an alternative, Deaton and Heston propose to raise the estimates of China GDP in U.S. dollars by 10 percent relative to the World Bank estimate for 2005. In addition to the specific China adjustment, Deaton and Heston propose an adjustment for global weighting for individual countries and an adjustment for the net foreign balance using a PPP rather than an exchange rate. Taken together, these measures would raise China's GDP in PPP-converted dollars by 13 percentage points (from 42 to 55 percent of the U.S. level) relative to the World Bank/IMF measure in 2005.³

The measures of PPP-converted GDP for China in [The Conference Board Global Economic Outlook 2011](#), which adopted the procedures proposed by Deaton and Heston, are higher than those of the World Bank and the IMF, but significantly lower than those found in Maddison and

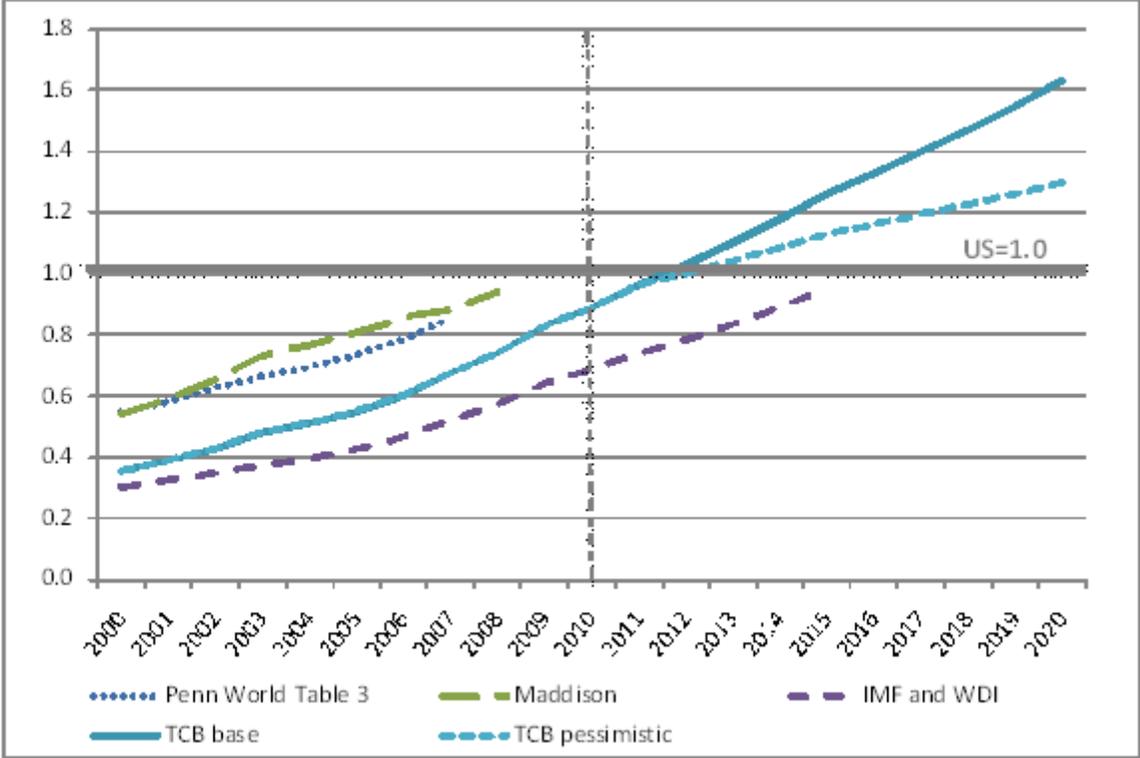
² Deaton, Angus and Alan Heston (2010), [Understanding PPPs and PPP-based National Accounts](#), *American Economic Journal: Macroeconomics*, 2:4, 1–35.

³ See also Chen, Vivian, Abhay Gupta, Andre Therrien, Gad Levanon and Bart van Ark (2010), [Recent Productivity Developments in the World Economy: An Overview from The Conference Board Total Economy Database](#), *International Productivity Monitor*, Spring, pp. 3-19.

PWT 6.3 (Chart 1).⁴ Extrapolating the measures forward from 2005, The Conference Board measure of GDP suggests that China will overtake the United States in the size of its GDP by 2012, driven in large part by the difference in growth rates between China and the United States between 2007 and 2009. According to the IMF measure, China’s GDP will overtake that of the United States in 2016. If the base scenario in [The Conference Board Global Outlook](#) is realized, GDP in China would be as much as 60 percent higher as the U.S. GDP by 2020. In a more negative scenario, China would reach a larger size of only 30 percent beyond the U.S. by 2020.

It is important to realize that, according to these measures, average GDP per capita in China in 2010 was still only 21 percent of the U.S. level, and it will rise to 40 percent in 2020 in the base scenario and to 32 percent in the pessimistic scenario. Despite China’s coming leadership in terms of the size of its economy, it remains far behind the United States and other advanced economies in terms of average living standards, even with the significant narrowing of the per capita income gap in the next decade.

Chart 1: Level of GDP in China in PPP-converted U.S. dollars relative to the United States (US=1.0)



Sources: IMF, [World Economic Outlook Database](#), World Bank, [World Development Indicators](#), Angus Maddison, [Statistics on World Population, GDP and Per Capita GDP, 1-2008 AD](#), [Penn World Tables version 6.3](#), and [The Conference Board Global Economic Outlook 2010](#).

⁴ The next version of PWT (Version 7) will use the PPP measure for China proposed by Deaton and Heston.