

6.7: PPP and Cross-Country Comparisons

Learning objective

1. Learn why using PPP exchange rates to convert income data to a common currency is a better method for making cross-country comparisons.

Probably the most important application of purchasing power parity (PPP) exchange rates is in making cross-country comparisons of income, wages, or gross domestic product (GDP). Suppose that we would like to compare per capita GDP between two countries—say, the United States and China. In 2004, GDP in the United States was approximately \$12 trillion; in China GDP was about ¥16 trillion. With a population in the United States of 290 million people, per capita U.S. GDP works out to \$41,400 per person. China's population was approximately 1.3 billion people in 2004, so its GDP per capita works out to 11,500 yuan (¥) per person. However, we can't compare these two per capita figures since they are in different units—dollars and yuan. Thus we need to convert units, either turn dollars into yuan or yuan into dollars.

The simplest approach to make this conversion is to use the spot exchange rate that prevailed in 2004, which was 8.28 yuan per dollar. Converting yuan to dollars yields a per capita GDP for China of \$1,390. Note that at \$41,400 per person, U.S. per capita GDP was almost thirty times higher than China's.

However, there is a problem using this method. One thing that is quickly recognized by Americans when they travel in and around China is that many goods and services seem considerably cheaper than they are in the United States. From a Chinese traveler's perspective, many U.S. goods would seem considerably more expensive. The implication is that although U.S. GDP per person is thirty times higher, that income may not purchase thirty times more goods and services in the U.S. because the prices of U.S. goods and services are so much higher when converted at the current exchange rate. Since presumably we are comparing per capita GDPs to compare how “well-off” people are in one country relative to another, these per capita figures will not accurately reflect these differences.

A solution is found in the purchasing power parity theory (PPP). When prices for similar goods differ as described in the previous paragraph, we would say the U.S. dollar is overvalued with respect to the yuan and with respect to PPP. At the same time, we would say the yuan is undervalued vis-à-vis the dollar. One way to reach comparable (or equalized) values of goods and services between the countries is to apply the PPP exchange rate in the conversion. The PPP exchange rate is that exchange rate that would equalize the value of comparable market baskets of goods and services between two countries.

For example, the estimated PPP exchange rate between the U.S. dollar and yuan in 2004 was 1.85 ¥/\$. If this exchange rate had prevailed between the countries, the prices of U.S. goods would seem, on average, to be approximately equal to the prices that prevailed in China. Now, if we use this exchange rate to make the conversion to dollars of GDP per capita in China, then we will get a number that reflects the purchasing power of Chinese income in terms of the prices that prevail in the United States—that is, in terms of prices that are equalized between the countries.

Thus if we take China's GDP per capita of ¥11,500 and convert to dollars with the PPP exchange rate, we get \$6,250 per person. The units derived in this expression would typically be called “international dollars.” What this means is that ¥11,500 will buy a bundle of goods and services in China that would cost \$6,250 if purchased in the United States at U.S. prices. In other words, ¥11,500 is equal to \$6,250 when the prices of goods and services are equalized between countries.

The PPP method of conversion is a much more accurate way of making cross-country comparisons of values between countries. In this example, although China's per capita GDP was still considerably lower than in the United States (\$6,250 vs. \$41,400), it is nonetheless four and a half times higher than using the spot exchange rate (\$6,250 vs. \$1,390). The higher value takes account of the differences in prices between the countries and thus better reflects the differences in purchasing power of per capita GDP.

The PPP conversion method has become the standard method used by the World Bank and others in making cross-country comparisons of GDP, GDP per capita, and average incomes and wages. For most comparisons concerning the size of economies or standards of living, using PPP is a more accurate method and can fundamentally change our perception of how countries compare. To see how, consider Table 6.1, constructed from World Bank data. It shows a ranking of the top ten countries in total GDP converting to dollars using both the current exchange rate method and the PPP method.

Rank	Country	Using Current Exchange Rate (\$)	Country	Using PPP Exchange Rate (\$)
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Rank	Country	Using Current Exchange Rate (\$)	Country	Using PPP Exchange Rate (\$)
1	United States	14,204	United States	14,204
2	Japan	4,909	China	7,903
3	China	4,326	Japan	4,355
4	Germany	3,653	India	3,338
5	France	2,853	Germany	2,925
6	United Kingdom	2,646	Russia	2,288
7	Italy	2,293	United Kingdom	2,176
8	Brazil	1,613	France	2,112
9	Russia	1,608	Brazil	1,977
10	Spain	1,604	Italy	1,841
11	Canada	1,400	Mexico	1,542
12	India	1,217	Spain	1,456

Figure 6.7.1: Table 6.1 GDP Rankings (in Billions of Dollars), 2008

The United States remains at the top of the list using both methods. However, several countries rise up in the rankings. China rises from the third largest economy using current exchange rates to the second largest using PPP. This means that in terms of the physical goods and services produced by the economies, China really does produce more than Japan. PPP conversion gives a better representation of the relative sizes of these countries.

Similarly, India rises from twelfth rank to fourth. Russia also moves up into sixth place from ninth. At the same time, Japan, Germany, the United Kingdom, France, Italy, Brazil, and Spain all move down in the rankings. Canada moves out of the top twelve, being replaced by Mexico, which rises up to eleventh.

For those countries whose GDP rises in value when converting by PPP (i.e., China, India, and Russia), their currencies are undervalued with respect to the U.S. dollar. So using the current exchange rate method underestimates the true size of their economies. For the other countries, their currencies are overvalued to the dollar, so converting their GDPs at current exchange rates gives an overestimate of the true size of their economies.

Key takeaways

- Using purchasing power parity (PPP) exchange rates to convert income data to a common currency is a better way to make international comparisons because it compensates for the differential costs of living.
- “International dollars” is the term used for the units for data converted to U.S. dollars using the PPP exchange rate.
- International rankings can vary significantly between data converted using actual versus PPP exchange rates.

Exercises

1. In February 2004, the Mexican peso–U.S. dollar exchange rate was 11 $p/\$$. The price of a hotel room in Mexico City was 1,000 pesos. The price of a hotel room in New York City was \$200.
 - Calculate the price of the Mexican hotel room in terms of U.S. dollars.
 - Calculate the price of the U.S. hotel room in terms of Mexican pesos.
 - Now suppose the exchange rate rises to 12 $p/\$$. What does the exchange rate change indicate has happened to the value of the U.S. dollar relative to the value of the Mexican peso?
1. Does the currency change benefit the U.S. tourist traveling to Mexico City or the Mexican tourist traveling to New York City? Explain why.

2. In 2008, Brazil's per capita income in nominal terms was \$8,295 while its per capita income in purchasing power parity (PPP) terms was \$10,466. Based on this information, if you were an American traveling in Brazil, would Brazilian products seem expensive or inexpensive relative to U.S. products?
3. In 2008, Germany's per capita income in nominal terms was \$44,729 while its per capita income in PPP terms was \$35,539. Based on this information, if you were a German traveling in the United States, would U.S. products seem expensive or inexpensive relative to German products?

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