



Comparing GDP among Countries

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It is common to use GDP as a measure of economic welfare or standard of living in a nation. When comparing the GDP of different nations for this purpose, two issues immediately arise. First, the GDP of a country is measured in its own currency: the United States uses the U.S. dollar; Canada, the Canadian dollar; most countries of Western Europe, the euro; Japan, the yen; Mexico, the peso; and so on. Thus, comparing GDP between two countries requires converting to a common currency. A second issue is that countries have very different numbers of people. For instance, the United States has a much larger economy than Mexico or Canada, but it also has roughly three times as many people as Mexico and nine times as many people as Canada. So, if we are trying to compare standards of living across countries, we need to divide GDP by population.

Converting Currencies with Exchange Rates

To compare the GDP of countries with different currencies, it is necessary to convert to a “common denominator” using an exchange rate, which is the value of one currency in terms of another currency. Exchange rates are expressed either as the units of country A’s currency that need to be traded for a single unit of country B’s currency (for example, Japanese yen per British pound), or as the inverse (for example, British pounds per Japanese yen). Two types of exchange rates can be used for this purpose, market exchange rates and purchasing power parity (PPP) equivalent exchange rates. Market exchange rates vary on a day-to-day basis depending on supply and demand in foreign exchange markets. PPP-equivalent exchange rates provide a longer run measure of the exchange rate. For this reason, PPP-equivalent exchange rates are typically used for cross country comparisons of GDP. Exchange rates will be discussed in more detail in [Exchange Rates and International Capital Flows](#). The following Work It Out feature explains how to convert GDP to a common currency.

Converting GDP to a Common Currency

Comparing GDP among Countries

Using the exchange rate to convert GDP from one currency to another is straightforward. Say that the task is to compare Brazil's GDP in 2012 of 4,403 billion reals with the U.S. GDP of \$16,245 trillion for the same year.

Step 1. Determine the exchange rate for the specified year. In 2012, the exchange rate was 1.869 reals = \$1. (These numbers are realistic, but rounded off to simplify the calculations.)

Step 2. Convert Brazil's GDP into U.S. dollars:

$$\begin{aligned}\text{Brazil's GDP in \$ U.S.} &= \frac{\text{Brazil's GDP in reals}}{\text{Exchange rate (reals/\$ U.S.)}} \\ &= \frac{4,403 \text{ billion reals}}{1.869 \text{ reals per \$ U.S.}} \\ &= \$2,355.8 \text{ billion}\end{aligned}$$

Step 3. Compare this value to the GDP in the United States in the same year. The U.S. GDP was \$16,245 in 2012 which is nearly seven times that of GDP in Brazil in 2012.

Step 4. View [\[link\]](#) which shows the size of and variety of GDPs of different countries in 2012, all expressed in U.S. dollars. Each is calculated using the process explained above.

Comparing GDPs Across Countries, 2012 (Source: <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx>)

Country	GDP in Billions of Domestic Currency	Domestic Currency/U.S. Dollars (PPP Equivalent)	GDP (in billions of U.S. dollars)	
Brazil	4,403	reals	1.869	2,356
Canada	1,818	dollars	1.221	1,488
China	51,932	yuan	4.186	12,406
Egypt	1,542	pounds	2.856	540
Germany	2,644	euros	0.827	3,197
India	97,514	rupees	20.817	4,684
Japan	475,868	yen	102.826	4,628
Mexico	15,502	pesos	8.813	1,759
South Korea	1,302,128	won	806.81	1,614

Comparing GDP among Countries

Country	GDP in Billions of Domestic Currency	Domestic Currency/U.S. Dollars(PPP Equivalent)	GDP (in billions of U.S. dollars)	
United Kingdom	1,539	pounds	0.659	2,336
United States	16,245	dollars	1.000	16,245

GDP Per Capita

The U.S. economy has the largest GDP in the world, by a considerable amount. The United States is also a populous country; in fact, it is the third largest country by population in the world, although well behind China and India. So is the U.S. economy larger than other countries just because the United States has more people than most other countries, or because the U.S. economy is actually larger on a per-person basis? This question can be answered by calculating a country's GDP per capita; that is, the GDP divided by the population.

$$\text{GDP per capita} = \text{GDP/population}$$

The second column of [\[link\]](#) lists the GDP of the same selection of countries that appeared in the previous [Tracking Real GDP over Time](#) and [\[link\]](#), showing their GDP as converted into U.S. dollars (which is the same as the last column of the previous table). The third column gives the population for each country. The fourth column lists the GDP per capita, which is calculated by dividing the second column by the third.

GDP Per Capita, 2012(Source: <http://www.imf.org/external/pubs/ft/weo/2013/01/weodata/index.aspx>)

Country	GDP (in billions of U.S. dollars)	Population (in millions)	Per Capita GDP (in U.S. dollars)
Brazil	\$2,356	198.36	11,875
Canada	\$1,488	34.83	42,734
China	\$ 12,406	1354.04	9,162
Egypt	\$540	82.50	6,545
Germany	\$3,197	81.90	\$39,028
India	\$4,684	1223.17	\$3,830
Japan	\$4,628	127.61	\$36,266

Comparing GDP among Countries

Country	GDP (in billions of U.S. dollars)	Population (in millions)	Per Capita GDP (in U.S. dollars)
Mexico	\$1,614	50.01	\$32,272
South Korea	\$1,759	114.87	\$15,312
United Kingdom	\$2,336	63.24	\$36,941
United States	\$16,245	314.18	\$51,706

Notice that the ranking by GDP is different from the ranking by GDP per capita. India has a somewhat larger GDP than Germany, but on a per capita basis, Germany has more than 10 times India's standard of living. Will China soon have a better standard of living than the U.S.? Read the following Clear It Up feature to find out.

Is China going to surpass the United States in terms of standard of living?

As shown in [\[link\]](#), China has the second largest GDP of the countries: \$12,406 compared to the United States' \$16,245. Perhaps it will surpass the United States, but probably not any time soon. China has a much larger population so that in per capita terms, its GDP is less than one fifth that of the United States (\$9,162 compared to \$51,706). The Chinese people are still quite poor relative to the United States and other developed countries. One caveat: For reasons to be discussed shortly, GDP per capita can give us only a rough idea of the differences in living standards across countries.

The high-income nations of the world—including the United States, Canada, the Western European countries, and Japan—typically have GDP per capita in the range of \$20,000 to \$50,000. Middle-income countries, which include much of Latin America, Eastern Europe, and some countries in East Asia, have GDP per capita in the range of \$6,000 to \$12,000. The low-income countries in the world, many of them located in Africa and Asia, often have GDP per capita of less than \$2,000 per year.

Key Concepts and Summary

Since GDP is measured in a country's currency, in order to compare different countries' GDPs, we need to convert them to a common currency. One way to do that is with the exchange rate, which is the price of one country's currency in terms of another. Once GDPs are expressed in a common currency, we can compare each country's GDP per capita by dividing GDP by population. Countries with large populations often have large GDPs, but GDP alone can be a misleading indicator of the wealth of a nation. A better measure is GDP per capita.

Self-Check Question

Is it possible for GDP to rise while at the same time per capita GDP is falling? Is it possible for GDP to fall while per capita GDP is rising?

Yes. The answer to both questions depends on whether GDP is growing faster or slower than population. If population grows faster than GDP, GDP increases, while GDP per capita decreases. If GDP falls, but population falls faster, then GDP decreases, while GDP per capita increases.

The Central African Republic has a GDP of 1,107,689 million CFA francs and a population of 4.862 million. The exchange rate is 284.681 CFA francs per dollar. Calculate the GDP per capita of Central African Republic.

Start with Central African Republic's GDP measured in francs. Divide it by the exchange rate to convert to U.S. dollars, and then divide by population to obtain the per capita figure. That is, $1,107,689 \text{ million francs} / 284.681 \text{ francs per dollar} / 4.862 \text{ million people} = \$800.28 \text{ GDP per capita}$.

Review Question

What are the two main difficulties that arise in comparing the GDP of different countries?

Critical Thinking Question

Cross country comparisons of GDP per capita typically use purchasing power parity equivalent exchange rates, which are a measure of the long run equilibrium value of an exchange rate. In fact, we used PPP equivalent exchange rates in this module. Why could using market exchange rates, which sometimes change dramatically in a short period of time, be misleading?

Why might per capita GDP be only an imperfect measure of a country's standard of living?

Problems

Ethiopia has a GDP of \$8 billion (measured in U.S. dollars) and a population of 55 million. Costa Rica has a GDP of \$9 billion (measured in U.S. dollars) and a population of 4 million. Calculate the per capita GDP for each country and identify which one is higher.

Comparing GDP among Countries

In 1980, Denmark had a GDP of \$70 billion (measured in U.S. dollars) and a population of 5.1 million. In 2000, Denmark had a GDP of \$160 billion (measured in U.S. dollars) and a population of 5.3 million. By what percentage did Denmark's GDP per capita rise between 1980 and 2000?

The Czech Republic has a GDP of 1,800 billion koruny. The exchange rate is 20 koruny/ U.S. dollar. The Czech population is 20 million. What is the GDP per capita of the Czech Republic expressed in U.S. dollars?