

Measuring Economic Growth

Economic activity is commonly measured by the “Gross Domestic Product” (GDP) of a country or region. Years ago, economists used to measure economic growth using GNP, or Gross National Product. GNP measures everything produced by the nationals (citizens) of a given country, regardless of where they are located. GDP measures what is produced domestically within a given country, by both foreign and domestic companies. GDP is considered a better measure of the vitality of a given economic system.

GDP measures the total monetary value of the goods and services produced in a given economy.

The theoretical equation for total output is:

$$\text{GDP} = P * Q$$

Q = Total quantity of goods produced

P = Price of each good

Translated, it means the level of GDP is a function of how many people are working, how much each of them produces, and how much each good costs. It is calculated as:

- The total number of workers in a given economy
- Multiplied by the total number of goods produced per worker
- Multiplied again by the price of each good produced

Total GDP measures the aggregate production of an economy and is a measure of how wealthy a given economy is. But it does not measure how much each individual in that economy benefits from that production. GDP per capita represents the share of total GDP that each individual receives. It is measured by dividing total GDP by the total population. The larger GDP per capita is, the more each individual – on average – benefits from the economy’s overall production. The real benefits of economic growth for the individuals occur when GDP per capita grows.

As an example, let’s imagine we have an economy with 10 people, and each of them produces 10 items. The cost of each item is \$10. The total GDP of this economy would be:

$$10 \text{ people} * 10 \text{ items} * \$10 \text{ per item} = 1,000$$

$$\text{GDP per capita} = 100 (1,000 \div 10)$$

Now, let’s say the total number of workers increases from 10 to 11. Total GDP will increase, but GDP per capita remains the same.

$$11 \text{ people} * 10 \text{ items} * \$10 \text{ per item} = 1,100$$

$$\text{GDP per capita} = 100 (1,100 \div 11)$$

The size of the pie grew, but each worker's share remained the same. So what happens if the number of workers remains the same, but each worker produces more goods?

$$10 \text{ people} * 11 \text{ items} * \$10 \text{ per item} = 1,100$$
$$\text{GDP per capita} = 110 (1,100 \div 10)$$

The pie is larger, and each person's share is larger as well. The workers in the economy are now benefiting from economic growth.

But there's a final possibility. What if you have the same number of people working, each of them producing the same goods, but the price of those goods goes up?

$$10 \text{ people} * 10 \text{ items} * \$11 \text{ per item} = 1,100$$
$$\text{GDP per capita} = 110 (1,100 \div 10)$$

Nominal GDP (the dollar value of the current pie) will grow, and so will nominal GDP per capita, but are the workers really better off? They may have more money in their pockets, but the cost of what they need to buy has gone up, so their real well-being has not changed.

The ultimate goal of economic growth is to grow real (inflation-adjusted) GDP per capita so that over time the total size of the pie grows, but so do the benefits that accrue to the people who labor in the economy.

GDP and the Money Supply

There is another way that economists measure GDP, which is by the size of the money supply. That is because it takes money to make the economy work. The money supply is the total amount of "money" in circulation. There are several measures of the money supply, but the one most often used by the Fed is called "M2." M2 includes currency and coins held by the non-bank public, checkable deposits, and travelers' checks, savings deposits, money market deposit accounts, small time deposits under \$100,000, and shares in retail money market mutual funds.ⁱ

Total GDP is the total of goods produced times the price of each item. It is also the total amount of money in circulation multiplied by the number of times each dollar is spent. The total amount of money in circulation is called the Money Supply (M) and the number of times each dollar is spent is called Velocity (V). The equation is:

$$\text{GDP} = \text{Money Supply} * \text{Velocity}$$

If GDP also equals Price * Quantity, then you could say that

$$\text{Price} * \text{Quantity} = \text{Money Supply} * \text{Velocity}$$

That is, the price of all goods produced times the quantity of goods produced is equal to the total amount of money in circulation multiplied by the number of times each dollar is spent.

The important thing to understand is that the supply of money is a critical part of making the economy grow. In order to increase the number of items produced (Q) without increasing the price (P) you need to increase the money supply (M) or the speed of economic activity (V). On the other hand, if you increase the money supply (M) without increasing the production of goods (Q) or the speed of activity (V), then price (P) will go up, meaning inflation. The supply of money is controlled almost entirely by the Central Bank when they raise and lower interest rates. It is the Central Bank's job to ensure that there is sufficient money in circulation to maintain output without generating inflation.

ⁱ Source: St. Louis Fed - <https://www.stlouisfed.org/en/financial-crisis/data/m2-monetary-aggregate#:~:text=M2%20is%20a%20measure%20of,retail%20money%20market%20mutual%20funds>.