

## Theoretical aspects of Economic Growth

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**Annotation:** *Economic growth is an increase in the production of economic goods and services, compared from one period of time to another. It can be measured in nominal or real (adjusted for inflation) terms. Traditionally, aggregate economic growth is measured in terms of gross national product (GNP) or gross domestic product (GDP), although alternative metrics are sometimes used.*

**Key words:** *economic growth, GDP, GNP, increase, productivity, quality of life, standard of living.*

In simplest terms, economic growth refers to an increase in aggregate production in an economy. Often, but not necessarily, aggregate gains in production correlate with increased average marginal productivity. That leads to an increase in incomes, inspiring consumers to open up their wallets and buy more, which means a higher material quality of life or standard of living. In economics, growth is commonly modeled as a function of physical capital, human capital, labor force, and technology. Simply put, increasing the quantity or quality of the working age population, the tools that they have to work with, and the recipes that they have available to combine labor, capital, and raw materials, will lead to increased economic output. There are a few ways to generate economic growth. The first is an increase in the amount of physical capital goods in the economy. Adding capital to the economy tends to increase productivity of labor. Newer, better, and more tools mean that workers can produce more output per time period. For a simple example, a fisherman with a net will catch more fish per hour than a fisherman with a pointy stick. However two things are critical to this process. Someone in the economy must first engage in some form of saving (sacrificing their current consumption) in order to free up the resources to create the new capital, and the new capital must be the right type, in the right place, at the right time for workers to actually use it productively. A second method of producing economic growth is technological improvement. An example of this is the invention of gasoline fuel; prior to the discovery of the energy-generating power of gasoline, the economic value of petroleum was relatively low. The use of gasoline became a better and more productive method of transporting goods in process and distributing final goods more efficiently. Improved technology allows workers to produce more output with the same stock of capital goods, by combining them in novel ways that are more productive. Like capital growth, the rate of technical growth is highly dependent on the rate of savings and investment, since savings and investment are necessary to engage in research and development. Another way to generate economic growth is to grow the labor force. All else equal, more workers generate more economic goods and services. During the 19th century, a portion of the robust U.S. economic growth was due to a high influx of cheap, productive immigrant labor. Like capital driven growth however, there are some key conditions to this process. Increasing the labor force also necessarily increases the amount of output that must be consumed in order to provide for the basic subsistence of the new workers, so the new

workers need to be at least productive enough to offset this and not be net consumers. Also just like additions to capital, it is important for the right type of workers to flow to the right jobs in the right places in combination with the right types of complementary capital goods in order to realize their productive potential. The last method is increases in human capital. This means laborers become more skilled at their crafts, raising their productivity through skills training, trial and error, or simply more practice. Savings, investment, and specialization are the most consistent and easily controlled methods. Human capital in this context can also refer to social and institutional capital; behavioral tendencies toward higher social trust and reciprocity and political or economic innovations like improved protections for property rights are in effect types of human capital that can increase the productivity of the economy. A growing or more productive economy makes more goods and provides more services than before. However, some goods and services are considered more valuable than others. For example, a smartphone is considered more valuable than a pair of socks. Growth has to be measured in the value of goods and services, not only the quantity. Another problem is not all individuals place the same value on the same goods and services. A heater is more valuable to a resident of Alaska, while an air conditioner is more valuable to a resident of Florida. Some people value steak more than fish, and vice versa. Because value is subjective, measuring for all individuals is very tricky.

The common approximation is to use the current market value. In the United States, this is measured in terms of U.S. dollars and added all together to produce aggregate measures of output including Gross Domestic Product. Growth is usually calculated in real terms – i.e., inflation-adjusted terms – to eliminate the distorting effect of inflation on the prices of goods produced. Measurement of economic growth uses national income accounting. Since economic growth is measured as the annual percent change of gross domestic product (GDP), it has all the advantages and drawbacks of that measure. The economic growth-rates of countries are commonly compared using the ratio of the GDP to population (per-capita income). The "rate of economic growth" refers to the geometric annual rate of growth in GDP between the first and the last year over a period of time. This growth rate represents the trend in the average level of GDP over the period, and ignores any fluctuations in the GDP around this trend.

Economists refer to an increase in economic growth caused by more efficient use of inputs (increased productivity of labor, of physical capital, of energy or of materials) as intensive growth. In contrast, GDP growth caused only by increases in the amount of inputs available for use (increased population, for example, or new territory) counts as extensive growth. Living standards vary widely from country to country, and furthermore, the change in living standards over time varies widely from country to country. Below is a table which shows GDP per person and annualized per person GDP growth for a selection of countries over a period of about 100 years. The GDP per person data are adjusted for inflation, hence they are "real". GDP per person (more commonly called "per capita" GDP) is the GDP of the entire country divided by the number of people in the country; GDP per person is conceptually analogous to "average income". It has been observed that GDP growth is influenced by the size of the economy. The relation between GDP growth and GDP across the countries at a particular point of time is convex. Growth increases with GDP reaches its maximum and then begins to decline. There exists some extremum value. This is not exactly middle-income trap. It is observed for both developed and developing economies. Actually, countries having this property belong to conventional growth domain. However, the extremum could be extended by technological and policy innovations and some countries move into innovative growth domain with

higher limiting values. In national income accounting, per capita output can be calculated using the following factors: output per unit of labor input (labor productivity), hours worked (intensity), the percentage of the working-age population actually working (participation rate) and the proportion of the working-age population to the total population (demographics). "The rate of change of GDP/population is the sum of the rates of change of these four variables plus their cross products."

Economists distinguish between long-run economic growth and short-run economic changes in production. Short-run variation in economic growth is termed the business cycle. Generally, economists attribute the ups and downs in the business cycle to fluctuations in aggregate demand. In contrast, economic growth is concerned with the long-run trend in production due to structural causes such as technological growth and factor accumulation.

Increases in labor productivity (the ratio of the value of output to labor input) have historically been the most important source of real per capita economic growth. In a famous estimate, MIT Professor Robert Solow concluded that technological progress has accounted for 80 percent of the long-term rise in U.S. per capita income, with increased investment in capital explaining only the remaining 20 percent.

Increases in productivity lower the real cost of goods. Over the 20th century the real price of many goods fell by over 90%. Economic growth has traditionally been attributed to the accumulation of human and physical capital and the increase in productivity and creation of new goods arising from technological innovation. Further division of labour (specialization) is also fundamental to rising productivity. Before industrialization technological progress resulted in an increase in the population, which was kept in check by food supply and other resources, which acted to limit per capita income, a condition known as the Malthusian trap. The rapid economic growth that occurred during the Industrial Revolution was remarkable because it was in excess of population growth, providing an escape from the Malthusian trap. Countries that industrialized eventually saw their population growth slow down, a phenomenon known as the demographic transition.

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