

Economic Performance

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- The total income of an economy is used to judge economic well being.
- Economies with a larger output satisfy the demands of their inhabitants.
- Gross Domestic Product estimates the income and output of a country.
- Gross Domestic Product provides a dollar value for economic activity.
- Gross Domestic Product is the best assessment of economic performance.

Definition

Gross Domestic Product is the market value of all final goods and services produced within a country in a given period of time.

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Gross Domestic Product is the **market value** of all final goods and services produced within a country in a given period of time.

- We add diverse products into one value of economic activity.
- The value of economic activity is calculated by market prices.
- Market prices are what people are willing to pay for products.
- Market prices reflect the value of those products to the people.

Definition

Gross Domestic Product is the market value **of all** final goods and services produced within a country in a given period of time.

- GDP includes items sold legally in formal markets.
- GDP excludes items produced and sold illicitly.
- GDP excludes items sold in informal and black markets.
- GDP excludes items produced and consumed at home.

Definition

Gross Domestic Product is the market value of all **final** goods and services produced within a country in a given period of time.

- Final goods are those items intended for consumption by the end user.
- Intermediate goods are ingredients in the production of final goods.
- GDP only includes the value of final goods to avoid double counting.
- The value of intermediate goods is included in the prices of final goods.
- Not when an intermediate good is added to inventory for sale at a later date.

Definition

Gross Domestic Product is the market value of all final **goods and services** produced within a country in a given period of time.

- GDP includes tangible goods and intangible services.
- Tangible goods include durable and non-durable goods.
- Durable goods are items that last for a long period of time.
- Non-durable goods do not last for a long period of time.
- Services include intangible work done for consumers.

Definition

Gross Domestic Product is the market value of all final goods and services **produced** within a country in a given period of time.

- GDP includes goods and services currently produced.
- GDP does not include items produced in the past.
- GDP does not include the sale of old or used items.

Definition

Gross Domestic Product is the market value of all final goods and services produced **within a country** in a given period of time.

- GDP is the value of production within the geographic confines of a country.
- GDP includes items produced domestically by nationals and foreigners.
- Production of citizens abroad is not included in the GDP of their country.

Definition

Gross Domestic Product is the market value of all final goods and services produced within a country **in a given period of time**.

- GDP is the value of production that takes place within a specific interval of time.
- GDP is reported for a year or a quarter, which represents GDP at an annual rate.
- The annual rate of GDP is the value of production during a quarter multiplied by 4.

- Gross Domestic Product increases because the economy is producing a larger quantity of goods and services.
- Gross Domestic Product increases because goods and services in the economy are being sold at higher prices.
- The performance of the economy should reflect the ability of the economy to produce more goods and services.

Definition

Nominal Gross Domestic Product is the economy's production of goods and services valued at current prices.

$$\textit{Nominal GDP}_{2017} = [(P_{2017} Q_{2017})_{Item1} + (P_{2017} Q_{2017})_{Item2} + \dots]$$

$$\textit{Nominal GDP}_{2018} = [(P_{2018} Q_{2018})_{Item1} + (P_{2018} Q_{2018})_{Item2} + \dots]$$

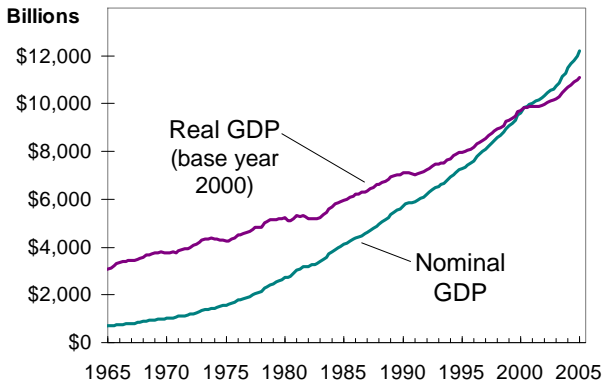
Definition

Real Gross Domestic Product is the economy's production of goods and services valued at constant base year prices.

$$\text{Real GDP}_{2017} = [(P_{base} Q_{2017})_{Item1} + (P_{base} Q_{2017})_{Item2} + \dots]$$

$$\text{Real GDP}_{2018} = [(P_{base} Q_{2018})_{Item1} + (P_{base} Q_{2018})_{Item2} + \dots]$$

Nominal and Real GDP in the U.S., 1965-2005



Definition

GDP growth rate is the percentage change in Gross Domestic Product from one period to another.

$$\text{GDP Growth} = \left(\frac{GDP_t - GDP_{t-1}}{GDP_{t-1}} \right) (100)$$

Definition

Annualizing the growth rate is adjusting the rate to reflect the amount a variable would have changed over a year's time had it continued to grow at the given rate.

$$\text{Annualized GDP Growth} = \left[\left(\frac{GDP_t}{GDP_{t-1}} \right)^4 - 1 \right] (100)$$

Example

Assume an economy produces hot dogs and burgers only. Calculate Nominal GDP and Real GDP.

Year	Hot Dogs		Burgers	
	Price	Quantity	Price	Quantity
Year1	\$1	100	\$2	50
Year2	\$2	150	\$3	100
Year3	\$3	200	\$4	150

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Solution

Year	Hot Dogs	Burgers	Nominal GDP
Year1	$\$1 \times 100 = \100	$\$2 \times 50 = \100	\$200
Year2	$\$2 \times 150 = \300	$\$3 \times 100 = \300	\$600
Year3	$\$3 \times 200 = \600	$\$4 \times 150 = \600	\$1200

Solution

Year	Hot Dogs	Burgers	Real GDP
Year1	$\$1 \times 100 = \100	$\$2 \times 50 = \100	\$200
Year2	$\$1 \times 150 = \150	$\$2 \times 100 = \200	\$350
Year3	$\$1 \times 200 = \200	$\$2 \times 150 = \300	\$500

Definition

The GDP Deflator measures the current level of prices relative to the level of prices in the base year.

$$GDP \text{ Deflator} = \left[\frac{Nominal \text{ GDP}}{Real \text{ GDP}} \right] \times 100$$

$$GDP \text{ Deflator}_{2018} = \left[\frac{(P_{2018} Q_{2018})_{Item1} + (P_{2018} Q_{2018})_{Item2} + \dots}{(P_{base} Q_{2018})_{Item1} + (P_{base} Q_{2018})_{Item2} + \dots} \right] \times 100$$

Solution

Year	Nominal GDP	Real GDP	GDP Deflator
Year1	\$200	\$200	$\left(\frac{200}{200}\right) \times 100 = 100$
Year2	\$600	\$350	$\left(\frac{600}{350}\right) \times 100 = 171$
Year3	\$1200	\$500	$\left(\frac{1200}{500}\right) \times 100 = 240$

- GDP does not take into account activity in black markets or informal markets.
- GDP does not take into account the effect of production on the environment.
- GDP does not take into account subsistence production and volunteer work.
- GDP does not take into account human happiness and life satisfaction.
- GDP does not take into account the impact of leisure on the quality of life.
- GDP does not take into account income inequality between rich and poor.

- GDP is the income of everyone in the economy and the total expenditure on the economy's output.
- Total expenditure has to equal total income because every transaction has a buyer and a seller.
- Every dollar of spending on a product by some buyer is a dollar of income for some seller.
- The expenditure of buyers on purchasing a product is income to the sellers of the product.

- GDP is allocated among consumption spending, investment spending, government spending and net exports.
- These consider expenditure by domestic households, firms and governments on goods and services.
- These consider expenditure by foreign households, firms and governments on goods and services.
- This equation is an identity that holds at all times, and is called the national income accounts identity.

$$Y = C + I + G + NX$$

Y : Gross Domestic Product

C: Consumption Spending

I: Investment Spending

G: Government Spending

NX: Net exports

Definition

Consumption Spending is spending by households on goods and services, with the exception of purchases of new housing.

- Goods include durable goods and non-durable goods.
- Durable goods are those that last for a long period of time.
- Non-durable goods do not last for a long period of time.
- A service is the non material equivalent of a good.
- For renters, consumption includes periodic rental payments to landlords.
- For homeowners, consumption includes the imputed rental value of the house.

Definitions

The consumption function is the relationship between consumption and disposable income, or income after taxes.

$$C = C(Y - T)$$

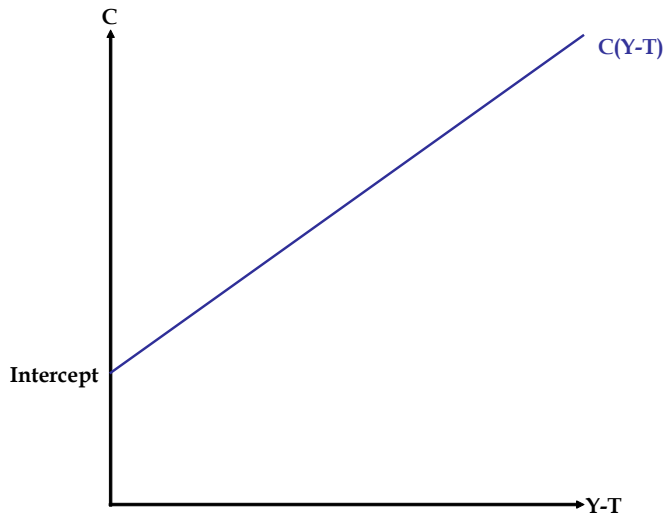
Definition

The intercept of the consumption function determines consumption spending when disposable income equals zero.

Definition

The slope of the consumption function, or the marginal propensity to consume, is the change in consumption spending when disposable income increases by one dollar.

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Definition

Investment Spending is spending on capital equipment and structures, inventories, and household purchases of new housing.

- Investment spending is divided into business fixed investment, residential investment, and changes in inventory.
- Business fixed investment is spending on new plant, factories and equipment by firms.
- Residential investment is the purchase of new housing by households and landlords.
- Residential investment includes the purchase price, down payment and mortgage payments.
- Inventory includes items produced and not sold in a given period, but may be sold at a later time.

Definition

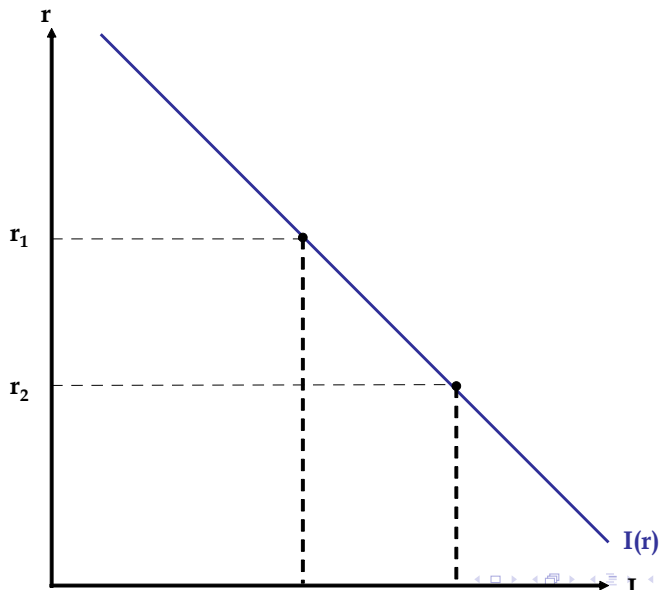
The investment function is the relationship between investment spending and the interest rate. If the cost of borrowing is high, we borrow less and invest less. If the cost of borrowing is low, we borrow more and invest more.

Definition

The interest rate measures the cost of the funds used to finance investment.

$$I = I(r)$$

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Definition

Government Spending is spending by local, state and federal governments on goods and services.

- Federal government spending includes defense and non-defense spending.
- State and local government spending includes only non-defense spending.
- Non defense includes the salaries of government workers and public works.
- Excludes transfer payments not made in exchange for a currently produced item.
- Government spending depends on the government ideology and the budget deficit.

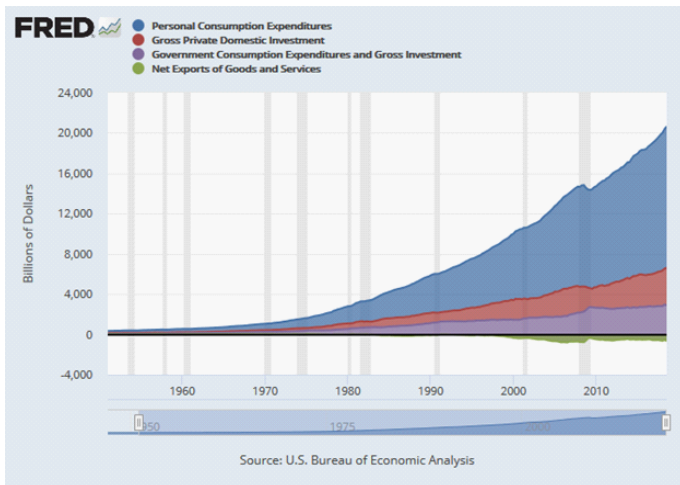
Definition

Net Exports equal the purchases of domestically produced goods by foreigners minus the domestic purchases of foreign goods.

$$\text{Net Exports} = \text{Exports} - \text{Imports}$$

- The purchases of domestically produced goods by foreigners is a country's exports.
- The purchases of foreign produced goods by nationals is a country's imports.
- When a household, a firm or the government buys a good or a service from abroad, imports increase.
- This also increases either consumption, investment, or government spending, and does not affect GDP.
- The trade balance depends on trade policy, the exchange rate, transportation costs and tastes.

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$$Y = Wage + Rent + Interest + Profit$$

- Compensation of employees or wages and fringe benefits earned by workers.
- Proprietor's income which is the income of non-corporate businesses.
- Rental income include the imputed rent that homeowners pay to themselves less depreciation.
- Corporate profits is the income of corporations after payments to their workers and creditors.
- Net interest is the interest businesses pay less the interest they receive, plus interest earned from foreigners.

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An economy solely in the business of the production and sale of rocking chairs.

	Value Added	Price	Y	Wage	Rent	Interest	Profits
Alpha Lumber	\$10	\$10	\$10	\$8	\$1		\$1
Beta Furniture	\$60	\$70	\$60	\$55			\$5
Gamma Retailer	\$30	\$100	\$30	\$20	\$2	\$3	\$5
Total	\$100		\$100	\$83	\$3	\$3	\$11

Example

Determine the effect of these transactions on GDP.

- **Drug Lords increase their production of cocaine.**

Example

Determine the effect of these transactions on GDP.

- **Drug Lords increase their production of cocaine.**
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- **A company increases production of paper used in Hallmark cards.**

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- **A company increases production of paper used in writing.**

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- **A collector sells a Mickey Mantle card to another collector.**

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Example

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- **Ford produces cars in France.**

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- **Ford produces cars in France.**
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- **Ford produces cars in France.**
 - Nothing.
- **Ford expands its factory in USA.**

Example

Determine the effect of these transactions on GDP.

- **Ford produces cars in France.**
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- **Ford expands its factory in USA.**
 - ↑ Investment.

Example

Determine the effect of these transactions on GDP.

- **Ford produces cars in France.**
 - Nothing.
- **Ford expands its factory in USA.**
 - ↑ Investment.
- **A family buys a new car.**

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- **A family buys a new car.**
 - ↑ Consumption.
- **A family buys a new house.**

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 - Nothing.
- **Ford expands its factory in USA.**
 - ↑ Investment.
- **A family buys a new car.**
 - ↑ Consumption.
- **A family buys a new house.**
 - ↑ Investment.

Example

Determine the effect of these transactions on GDP.

- **Ford adds some Mustang cars to its inventory.**

Example

Determine the effect of these transactions on GDP.

- **Ford adds some Mustang cars to its inventory.**
 - ↑ Investment.

Example

Determine the effect of these transactions on GDP.

- **Ford adds some Mustang cars to its inventory.**
 - ↑ Investment.
- **Ford sells a Mustang car from its inventory.**

Example

Determine the effect of these transactions on GDP.

- **Ford adds some Mustang cars to its inventory.**
 - ↑ Investment.
- **Ford sells a Mustang car from its inventory.**
 - ↓ Investment & ↑ Consumption.

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- **California State paves Highway 101.**

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 - ↑ Government Expenditure.

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- **Federal Government increases unemployment benefits.**

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 - Nothing.
- **Americans buy a bottle of French wine.**

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- **Ford adds some Mustang cars to its inventory.**
 - ↑ Investment.
- **Ford sells a Mustang car from its inventory.**
 - ↓ Investment & ↑ Consumption.
- **California State paves Highway 101.**
 - ↑ Government Expenditure.
- **Federal Government increases unemployment benefits.**
 - Nothing.
- **Americans buy a bottle of French wine.**
 - ↑ Imports & ↑ Consumption.

Definition

Gross Domestic Product GDP is total income earned domestically by nationals and foreigners, but it does not include income earned by nationals abroad.

Definition

Gross National Product GNP is the market value of all final goods and services produced by factors of production owned by a country's citizens.

Definition

Gross National Product GNP is total income earned by nationals domestically and abroad, but it does not include the income earned by foreigners within a country.

Definition

The production technology determines how much output is produced from given amounts of factors of production.

Definition

Factors of production are the inputs, such as capital and labor, that are used to produce goods and services.

Definition

Capital is the set of tools and equipment that workers use, while Labor is the total time people spend working.

$$Y = F(K, L)$$

$$\bar{Y} = F(\bar{K}, \bar{L})$$

Definition

A production function has constant returns to scale if an increase of an equal percentage in all factors of production cause an increase in output of the same percentage.

$$zY = F(zK, zL)$$



Capital



Labor



To make a product, the firm needs two factors of production, capital and labor. Let's represent the firm's technology by the usual production function:

$$Y = F(K, L)$$

- A competitive firm is small relative to the entire market.
- The competitive firm has no influence on market prices.
- The competitive firm has no influence on the workers wages.
- The competitive firm has no influence on the capital rents.
- The goal of the firm is to choose L and K to maximize profits

$$\begin{aligned} \textit{Profit} &= \textit{Revenues} - \textit{Labor Costs} - \textit{Capital Costs} \\ &= PY - WL - RK \\ &= PF(K, L) - WL - RK \end{aligned}$$

Definition

The marginal product of labor is the extra amount of output from one extra unit of labor, holding the amount of capital constant.

Definition

Diminishing marginal productivity means that, holding capital fixed, the marginal product of labor decreases as the amount of labor increases.

$$\begin{aligned}\Delta Profit &= \Delta Revenue - \Delta Cost \\ 0 &= (P)(MPL) - W \\ (P)(MPL) &= W\end{aligned}$$

Definition

The marginal product of capital is the amount of extra output from an extra unit of capital, holding the amount of labor constant.

Definition

Diminishing marginal productivity means that, holding labor fixed, the marginal product of capital decreases as the amount of capital increases.

$$\begin{aligned}\Delta Profit &= \Delta Revenue - \Delta Cost \\ 0 &= (P)(MPK) - R \\ (P)(MPK) &= R\end{aligned}$$

Example

Calculate the labor wage and the capital rent for the following production function

$$Y = F(K, L) = AK^\alpha L^{1-\alpha}$$

Solution

$$MPL = AK^\alpha (1 - \alpha) L^{1-\alpha-1}$$

$$W = (P)(MPL) = PAK^\alpha (1 - \alpha) L^{1-\alpha-1}$$

$$MPK = AL^{1-\alpha} \alpha K^{\alpha-1}$$

$$R = (P)(MPK) = PAL^{1-\alpha} \alpha K^{\alpha-1}$$

Example

Calculate the labor wage and the capital rent for the following production function

$$Y = F(K, L) = AK^{\frac{1}{2}}L^{\frac{1}{2}}$$

$$A = 100, K = 100, L = 100, P = 10$$

Solution

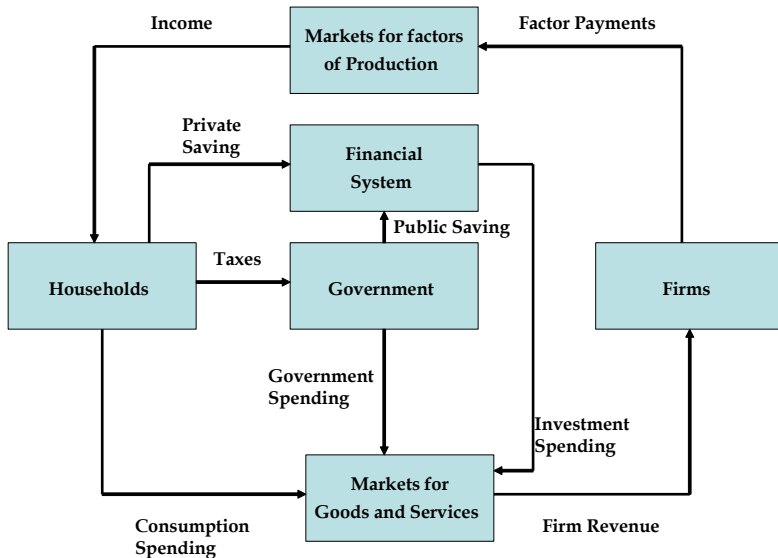
$$MPL = AK^{\frac{1}{2}} \left(\frac{1}{2}\right) L^{-\frac{1}{2}} = (100)(100)^{\frac{1}{2}} \left(\frac{1}{2}\right) (100)^{-\frac{1}{2}} = 50$$

$$W = P(MPL) = 50P = 500$$

$$MPK = A \left(\frac{1}{2}\right) K^{-\frac{1}{2}} L^{\frac{1}{2}} = (100) \left(\frac{1}{2}\right) (100)^{-\frac{1}{2}} (100)^{\frac{1}{2}} = 50$$

$$R = P(MPK) = 50P = 500$$

Economic Performance



$$Y = C + I + G$$

$$Y - C - G = I$$

$$Y - C - G + T - T = I$$

$$\left(\underbrace{Y - T - C}_{\text{Private Saving}} \right) + \left(\underbrace{T - G}_{\text{Public Saving}} \right) = I$$

$$S = I$$

Definition

National saving is the total income in the economy that remains after paying for consumption spending and government spending.

Definition

Private saving is the amount of income that households have left after paying their taxes and their consumption spending.

Definition

Public saving is the amount of taxes that the government has left after paying for government spending.