GDP

Microeconomics

Microeconomics is the study of how households and firms make choices, how they interact in markets and how the government attempts to influence their choices.

Macroeconomics

Macroeconomics is the study of the economy as a whole, including topics such as inflation, unemployment and economic growth.

Economic growth

The ability of the economy to produce increasing quantities of goods and services.

Economic growth model

A model that explains changes in real GDP per capita in the long run.

Unemployment rate

The percentage of the labor force that is unemployed.

Business cycle

Alternating periods of economic expansion and economic contraction relative to the long-term trend rate of economic growth.

Expansion

The period of a business cycle during which total production and total employment are increasing above trend growth rates.

Contraction

The period of a business cycle during which total production and total employment are falling below trend growth rates.

Recession

The period of a business cycle during which total production and total employment are decreasing.

Inflation rate

The percentage increase in the general level of prices in the economy from one year to the next.

Gross domestic product (GDP)

The market value of all final goods and services produced in a country during a period of time.

GDP is measured using market values, not quantities

The word value is important in the definition of GDP. In microeconomics, we measure production in terms of quantity. For example, the number of loaves of bread produced by Bakers Delight stores, billions of tons of wheat grown by Australian farmers, or the number of students graduating from Australian universities. When we measure total production in the economy, we can't just add together the quantities of every good and service because the result would be a meaningless jumble. Tons of wheat would be added to packets of cereal, numbers of restaurant meals, numbers of graduates and so on. Instead, we measure production by taking the value in dollar terms of all the goods and services produced.

GDP includes only the market value of final goods and services

In measuring GDP, we include only the market value of final goods and services. A final good or service is one that is purchased by its final user and is not included in the production of any other good or service. Example: In calculating GDP, we include the value of the bread but not the value of the flour. If we included the value of the flour, we would be double counting—the value of the flour would be counted once when sold to Bakers Delight stores and a second time when the bread was sold to a customer.

Final good or service

A new good or service that is the end product of the production process and that is purchased by the final user.

Intermediate good or service

A good or service that is an input into the production of another good or service.

GDP includes only current production

GDP includes only production that takes place during the indicated time period. For example, GDP in 2018 includes only the goods and services produced during that year. In particular, GDP does not include the value of used goods. If you buy a new DVD of Star Trek from Kmart, the purchase is included in GDP. If, six months later, you resell that DVD on eBay, that transaction is not included in GDP since nothing new has actually been produced.

Measuring GDP using the Value-added method

Value-added: The market value a firm adds to a product.

Value added refers to the additional market value a firm adds to a product and is equal to the difference between the price the firm sells a good for and the price it paid other firms for intermediate goods.

TABLE 13.1 Calculating value added			
FIRM	VALUE OF PRODUCT	VALUE ADDED	
Sheep farmer	Value of raw wool = $1.00	Value added by sheep farmer	= $1.00
Woollen mill	Value of raw wool woven into woollen thread = $3.00	Value added by woollen mill = ($3.00 − $1.00)	= 2.00
Clothing manufacturer	Value of woollen thread made into a jumper = $15.00	Value added by clothing manufacturer = ($15.00 − $3.00)	= 12.00
Big W	Value of jumper for sale by Big W = $35.00	Value added by Big W = ($35.00 − $15.00)	= 20.00
	Total value added		**= $35.00**

Net Domestic Product (NDP)

Net domestic product (NDP) is calculated by measuring GDP and subtracting the value of depreciation on capital equipment. Depreciation is the reduction in the value of capital equipment that results from use or obsolescence.

NDP = GDP – Depreciation

Gross National Income (GNI)

GDP is the market value of final goods and services produced within Australia. Gross national income, or GNI, is Australia's GDP, plus income generated overseas by Australian residents and firms, minus the income generated in Australia by non-residents and foreign firms.

GNI = GDP + (EX$_{FS}$ - IM$_{FS}$)

GNI = Gross National Income

GDP = Gross Domestic Product

EX$_{FS}$ = Money flowing from foreign countries

IM$_{FS}$ = Money flowing from foreign countries

Suppose that in 2020 a very simple economy produces only the following four goods and services: eye examinations, pizzas, textbooks and paper. Assume that all of the paper in this economy is used in the production of textbooks.

Use the information in the following table to calculate GDP.

PRODUCTION AND PRICE STATISTICS		
(1) PRODUCT	(2) QUANTITY	(3) PRICE PER UNIT ($)
Eye examinations	100	50.00
Pizzas	80	10.00
Textbooks	20	100.00
Paper	2000	0.10

Solving the problem

STEP 1 **Review the chapter material.** This problem is about GDP, so you may want to review the section 'Measuring total production: gross domestic product', which begins on page 401.

STEP 2 **Determine which goods and services listed in the table should be included in the calculation of GDP.** GDP is the market value of all final goods and services. Therefore, we need to calculate the value of the final goods and services listed in the table. Eye examinations, pizzas and textbooks are final goods. Paper would also be a final good if, for instance, a consumer bought it to use in a printer. However, here we are assuming that publishers purchase all the paper to use in manufacturing textbooks, so the paper is an intermediate good and its value is not included in GDP.

STEP 3 **Calculate the value of the three final goods and services listed in the table.** Value is equal to the quantity produced multiplied by the price per unit, so we multiply the numbers in column (1) by the numbers in column (2):

PRODUCT	(1) QUANTITY	(2) PRICE PER UNIT ($)	(3) VALUE ($)
Eye examinations	100	50	5000
Pizzas	80	10	800
Textbooks	20	100	2000

STEP 4 **Add the value for each of the three final goods and services to find GDP.** GDP = value of eye examinations produced + value of pizzas produced + value of textbooks produced = $5000 + $800 + $2000 = $7800.

The circular flow and measurement of GDP

The circular-flow diagram illustrates the flow of transactions in the economy. Firms sell goods and services to three groups: domestic households, foreign firms and households, and the government. To produce goods and services firms use factors of production: labor, capital, natural resources and entrepreneurship. Households supply the factors of production to firms in exchange for income in the form of wages, interest, profit and rent. Firms make payments of wages and interest to households in exchange for hiring workers and other factors of production. The sum of wages, interest, rent and profit is total income in the economy. We can measure GDP as the total income received by households. The diagram also shows that households use their income to purchase goods and services, pay taxes and save. Firms and the government borrow the funds that flow from households into the financial system. We can measure GDP either by calculating the total value of expenditures on final goods and services or by calculating the value of total income.

The ABS divides its statistics on GDP into four major categories of expenditures. These are **consumption, investment, government and net exports expenditures**. Economists use these categories to understand why GDP fluctuates and to forecast future GDP.

Personal consumption expenditures, or 'consumption'

Spending by households on goods and services, not including spending on new houses. Consumption expenditures are made by households and are divided into three categories:

1. 1 Expenditures on services, such as medical care, education and haircuts
2. 2 Expenditures on non-durable goods, such as food and clothing
3. 3 Expenditures on durable goods, such as cars and furniture.

The spending by households on new houses is not included in consumption. Instead, spending on new houses is included in the investment category.

Gross private domestic investment, or 'investment'

Spending by firms on new factories, office buildings, machinery and inventories, plus spending by households on new houses. Spending on gross private domestic investment, or simply investment, is divided into three categories:

1. 1 Business fixed investment is spending by firms on new factories, office buildings and machinery used to produce other goods.
2. 2 Residential investment is spending by households and firms on new housing.
3. 3 Changes in business inventories are changes in the stocks of goods that have been produced but not yet sold. If, for example, a car manufacturer has $20 million worth of unsold cars at the beginning of the year and $35 million worth of unsold cars at the end of the year, then the firm has spent $15 million on inventory investment during the year.

***For example, a Telstra share represents part ownership of that company. When you buy Telstra shares nothing new is produced—there is just a transfer in ownership. Similarly, buying a rare coin or putting $1000 in a savings account does not result in an increase in production. GDP is not affected by any of these activities, so they are not included in the economic definition of investment.

Government consumption and gross investment, or 'government purchases'

Government purchases are spending by federal, state and local governments on goods and services, such as education, roads and submarines. Again, government spending on transfer payments is not included in government purchases because it does not result in the production of new goods and services.

Net exports of goods and services, or 'net exports'

Net exports are equal to the expenditure on exports minus the expenditure on imports. Exports are goods and services produced in Australia but purchased by foreign firms, households and governments. We add exports to our other categories of expenditures because otherwise we would not be including all spending on new goods and services produced in Australia. We subtract imports from total expenditure, because otherwise we would be including spending that does not result in production of new goods and services in Australia.

An equation for GDP and some actual values

A simple equation sums up the components of GDP:

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

The equation tells us that GDP (denoted as Y) equals consumption (C) plus investment (I) plus government purchases (G) plus net exports (NX).

Why GDP is an imperfect measure of economic wellbeing? What types of production does GDP not measure? Even if GDP included these types of production, why would it still be an imperfect measure of economic wellbeing?

GDP is an imperfect measure of economic wellbeing because GDP measures only market income and does not include the non-observed economy. For example, it does not count the following two types of production:

Household production

Household production refers to goods and services people produce for themselves.

With few exceptions, we do not attempt to estimate the value of goods and services that are not bought and sold in markets. If a carpenter makes and sells bookcases, the value of those bookcases will be counted in GDP. If the carpenter makes a bookcase for personal use, it will not be counted in GDP.

The most important type of household production is the services a homemaker provides to the homemaker's family. If a person has been caring for children, cleaning the house, maintaining the garden and preparing the family meals, the value of such services is not included in GDP. If the person then decides to work outside the home, enrolls the children in day care, hires a cleaning service, hires a gardener and begins buying the family's meals in restaurants, the value of GDP will rise by the amount paid for day care, cleaning services, gardening services and restaurant meals, even though production of these services has not actually increased.

The underground economy

Individuals and firms sometimes conceal the buying and selling of goods and services, in which case their production won't be counted in GDP.

Individuals and firms conceal what they buy and sell for three basic reasons:

- they are dealing in illegal goods and services, such as drugs or prostitution;
- they want to avoid paying taxes on the income they earn; or
- they want to avoid government regulations.

This concealed buying and selling is referred to as the underground economy.

Even if GDP did measure household and underground economy production, it would still be an imperfect measure of economic well-being because of following:

- The distribution of GDP
- The value of leisure is not included in GDP
- The level and quality of health care and education
- GDP is not adjusted for pollution or other negative effects of production
- GDP is not adjusted for changes in crime and other social problems

Nominal GDP

The market value of final goods and services measured at current year prices. Nominal GDP is calculated by summing the current values of final goods and services.

Real GDP

A measure of the volume of final goods and services, holding prices constant. Real GDP is a measure of the volume of final goods and services, holding prices constant.

Economic growth rate

The rate of change of real GDP from one year to the next.

$$Growth\ rate = \frac{Real\ GDP_{current\ year} - Real\ GDP_{previous\ year}}{Real\ GDP_{previous\ year}} \times 100\%$$

Price level

A measure of the average prices of goods and services in the economy.

GDP deflator

A measure of the price level, calculated by dividing nominal GDP by real GDP and multiplying by 100.

$$GDP\ deflator = \frac{nominal\ GDP}{real\ GDP} \times 100$$

To see why the GDP deflator is a measure of the price level, think about what would happen if prices of goods and services rose while production remained the same. In that case, nominal GDP would increase but real GDP would remain constant, so the GDP deflator would increase. In reality, both prices and production usually increase each year, but the more prices increase relative to the increase in production, the more nominal GDP increases relative to real GDP and the higher the value for the GDP deflator. Increases in the GDP deflator allow economists and policy-makers to track increases in the price level over time.

The following table gives the values for nominal and real GDP for 2015/2016 and 2016/2017.

	2015/16	2016/17
Nominal GDP	$1.654 trillion	$1.758 trillion
Real GDP	$1.660 trillion	$1.695 trillion

We can use the information from the table to calculate values for the GDP price deflator for 2015/2016 and 2016/2017.

FORMULA	APPLIED TO 2015/16	APPLIED TO 2016/17
$\frac{GDP}{deflator} = \frac{nominal\ GDP}{real\ GDP} \times 100$	$\left(\frac{\$1.654\ trillion}{\$1.660\ trillion}\right) \times 100 = 99.6$	$\left(\frac{\$1.758\ trillion}{\$1.695\ trillion}\right) \times 100 = 103.7$

From these values for the deflator, we can calculate that the price level changed between 2015/2016 and 2016/2017 by 4.1 per cent:

$$\frac{103.7 - 99.6}{99.6} \times 100 = 4.1\%$$

This is higher than in recent years, in part because average prices were lower than usual in 2015/2016 as prices for commodity exports fell along with falling prices of some other tradable goods. However in 2016/2017 some commodity prices rose considerably, contributing to a 4.1 per cent rise in the price level when measured using the GDP deflator.
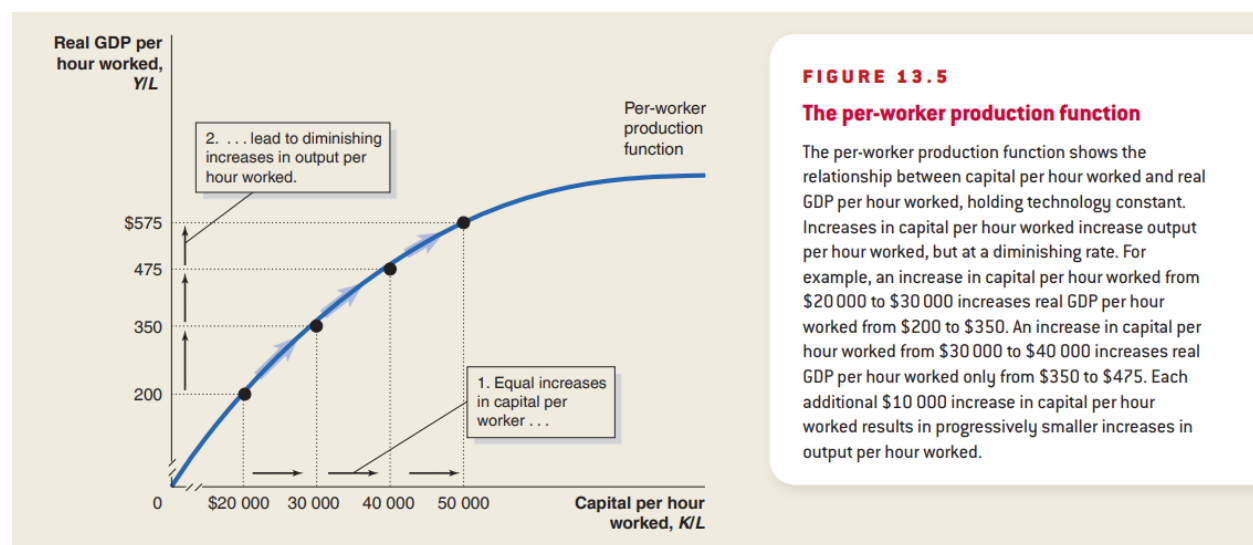
Technological change

A change in the ability of a firm to produce output with a given quantity of inputs.

There are three main sources of technological change:

1. Better machinery and equipment. Beginning with the steam engine during the Industrial Revolution, the invention of new machinery has been an important source of rising labor productivity. Today, continuing improvements in computers, software, factory machines, tools, and many other machines contribute to increases in labor productivity.
2. Increases in human capital. Capital refers to physical capital, including computers, office furniture, machines, tools, warehouses and trucks. The more physical capital workers have available, the more output they can produce. Human capital is the accumulated knowledge and skills workers acquire from education and training or from their life experiences. As workers increase their human capital through education or on-the-job training, their productivity will also increase. The more educated and experienced workers are, the greater is their human capital.
3. Better means of organizing and managing production. Labor productivity will increase if managers can do a better job of organizing production. For example, the just-in-time system, first developed by Toyota Motor Corporation, involves assembling goods from parts that arrive at the factory at exactly the time they are needed. With this system, Toyota needs fewer workers to store and keep track of parts in the factory, so the quantity of goods produced per hour worked increases.

FIGURE 13.5

The per-worker production function

The per-worker production function shows the relationship between capital per hour worked and real GDP per hour worked, holding technology constant. Increases in capital per hour worked increase output per hour worked, but at a diminishing rate. For example, an increase in capital per hour worked from $20 000 to $30 000 increases real GDP per hour worked from $200 to $350. An increase in capital per hour worked from $30 000 to $40 000 increases real GDP per hour worked only from $350 to $475. Each additional $10 000 increase in capital per hour worked results in progressively smaller increases in output per hour worked.

New growth theory

A model of long-run economic growth that emphasizes that technological change is influenced by economic incentives, and so is determined by the working of the market system.
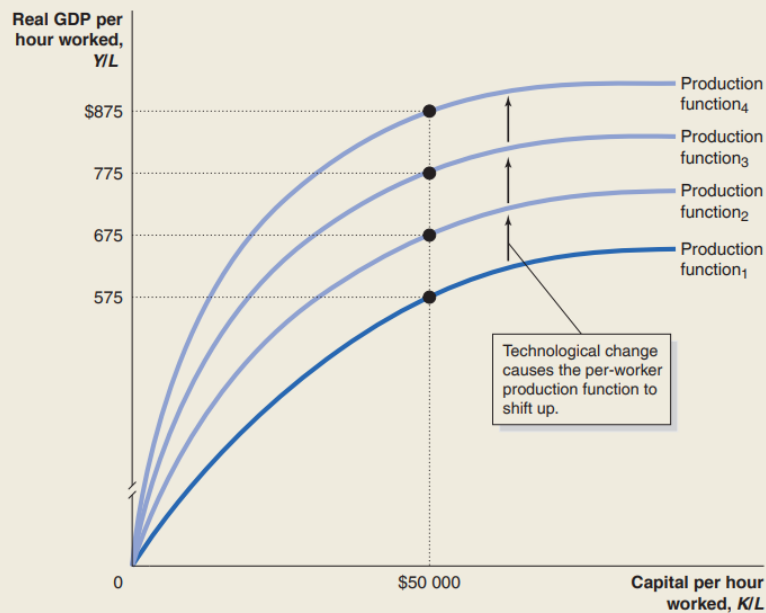
Real GDP per hour worked, Y/L

$875

775

675

575

Production function₄

Production function₃

Production function₂

Production function₁

Technological change causes the per-worker production function to shift up.

0

$50 000

Capital per hour worked, K/L