

What macroeconomics is all about

Learning objectives

View most macroeconomic issues as being about either long-run growth or short-run fluctuations, and see that government policy enters both categories.

Understand the meaning and importance of the key macroeconomic variables, including national income, unemployment, inflation, interest rates, exchange rates, and trade flows.

Define GDP and explain why the value of production, income and expenditure are the same for an economy.

Distinguish between nominal GDP and real GDP and define the GDP deflator.

Explain and describe the limitations of real GDP as a measure of the standard of living.

Macroeconomics is largely concerned with the behaviour of economic aggregate, such as total output, total investment, total exports, and the price level.

Growth versus fluctuations

Economic growth

Can governments do anything to promote economic growth?

Do some government policies, directed to quite different goals, have unintended consequences on the long-term rate of economic growth?

What is the connection between the monetary policy conducted by the Bank of Canada and the rate of growth of the Canadian economy?

Does the adherence to a low-inflation policy have any effects on the growth rate?

The government's fiscal policy also enters into the discussion of economic growth.

Many economists believe that when governments spend less than they raise in tax revenue—and thus have a budget surplus—the reduced need for borrowing drives down interest rates and stimulates investment by the private sector.

Short-term fluctuations

The economy's short-term fluctuations in output and employment are often called business cycles.

Understanding business cycles requires an understanding of monetary policy.

GDP, income and expenditure

Gross domestic product (GDP) the market value of all the final goods and services produced within a country in a given time period.

To calculate GDP, we value all the final goods and services.

A final good or service is a good or service that is produced for its final user and not as a component of another good or service.

An intermediate good or service which is a good or service that is produced by one firm, bought by another and used as a component of a final good or service.

Transactions at Three Different Stages of Production					
	Firm R	Firm I	Firm F	All Firms	
A. Purchases from other firms	\$ 0	\$100	\$130	\$230	Total interfirm sales
B. Purchases of factors of production (wages, rent, interest, profits)	<u>100</u>	<u>30</u>	<u>50</u>	<u>180</u>	Total value added
A + B = value of product	<u>\$100</u>	<u>\$130</u>	<u>\$180</u>	<u>\$410</u>	Total value of all sales

Where produced

Only goods and services produced within a country count as part of GDP.

When produced

A given time period usually a quarter or a year.

Circular flows in the Canadian Economy.

Four groups buy the final goods and services produced: households, firms, governments, and the rest of the world.

Four types of expenditure correspond to these groups:

- Consumption expenditure
- Investment
- Government expenditure
- Net exports of goods and services.

Consumption expenditure: expenditure by households on consumption goods and services.

Investment: the purchase of new capital goods (tools, machines, buildings) and additions to inventories.

Government expenditure: expenditure by all levels of governments on goods and services.

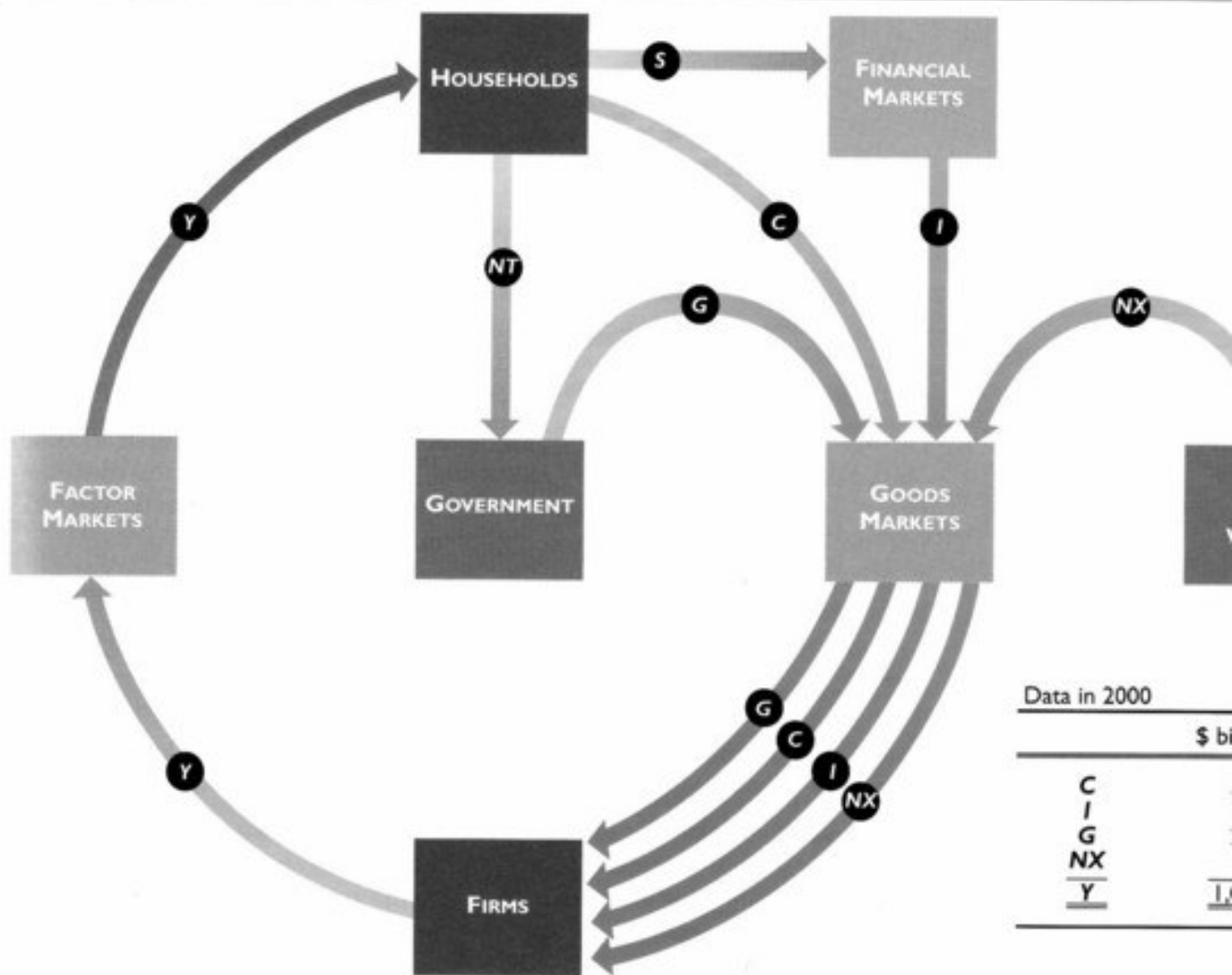
Net exports of goods and services; exports minus imports. $(X-M)$ or NX

Total expenditure = $Y = C + I + G + (X-M)$

Expenditure equals income

The Circular Flow of Income and Expenditure

eFoundat



In the circular flow, the blue flow (Y) is income and the red flows (C, I, G, and NX) are expenditures on goods and services. The green flows are flows of money: Households pay net taxes (NT) to the

government and save some of their income (S). Firms sell goods to households (C) and to financial markets to buy goods (I) from other firms. Net exports (NX) equals income and equals the value of production.

Because firms pay out everything they receive as incomes to the factors of production, total expenditure equals total income.

From the view point of firms, the value of production is the cost of production, which equals income. From the viewpoint of purchasers of goods and services, the value of production is the cost of buying it, which equals expenditure.

Practice problem

1. Classify each of the following items as a final good or service or an intermediate good or service:
 - a. Banking services bought by a student.
 - b. New cars bought by Hertz, the car rental firm.
 - c. Newsprint bought by *The Globe and Mail* from Abitibi Paper.
 - d. Ice cream bought by a diner and used to produce sundaes.

2. During 2001 on Lotus Island, net taxes were \$10 billion; consumption expenditure was \$30 billion; government expenditure was \$12 billion; investment was \$15 billion; and net exports were \$3 billion. Calculate:
 - a. Total expenditure.
 - b. Total income.
 - c. GDP.

Measuring Canada's GDP

Statistics Canada measures GDP, using two different approaches.

Expenditure approach

GDP: The Expenditure Approach

eFoundations 5.2 

Item	Symbol	Amount in 2000 (billions of dollars)	Percentage of GDP
Consumption expenditure	C	593	56
Investment	I	192	18
Government expenditure	G	218	21
Net exports	NX	53	5
GDP	Y	<u>1,056</u>	<u>100</u>

The expenditure approach measures GDP by adding together consumption expenditures (C), investment (I), government expenditure (G), and net exports (NX). In 2000, GDP measured by the expenditure approach was \$1,056 billion.

SOURCE: Statistics Canada.

Income approach

The incomes that firms pay households for the services of factors of production they hire—wages for labour, interest for the use of capital, rent for the use of land, and profits for entrepreneurship.

GDP: The Income Approach

eFoundations 5.2

The sum of all incomes equals net domestic product at factor cost. GDP equals net domestic product at factor cost plus indirect taxes less subsidies plus capital consumption (depreciation). In 2000, GDP measured by the income approach was \$1,056 billion. Wages, salaries, and supplementary labour income was by far the largest part of aggregate income.

Item	Amount in 2000 (billions of dollars)	Percentage of GDP
Wages, salaries, and supplementary labour income	537	50.9
Interest and investment income	54	5.1
Profits of corporations and government enterprises	140	13.2
Income from farms and unincorporated businesses	65	7.9
Net domestic product at factor cost	796	75.4
Indirect taxes less subsidies*	126	11.9
Capital consumption	134	12.7
GDP	1,056	100.0

*Includes adjustments and statistical discrepancy.

SOURCE: Statistics Canada.

Net domestic product at factor cost: the sum of the four factor incomes—wages, interest, rent, and profit.

From factor cost to market price.

The expenditure approach values goods and services at market prices, and the income approach values them at factor cost. Indirect taxes and subsidies make these two values differ. So to get GDP at market prices, we must add indirect taxes less subsidies to GDP at factor cost.

From net to gross

The expenditure approach measures gross product and the income approach measures net product. The difference is depreciation, the decrease in the value of capital that results from its use and from obsolescence—also called capital consumption.

Practice problem

TABLE 1

Item	Amount (billions of dollars)
Wages, salaries, and supplementary labour income	475
Consumption expenditure	534
Indirect taxes less subsidies	120
Interest and investment income	48
Profits of corporations and government enterprises	93
Capital consumption	122
Investment	167
Net exports	17
Income from farms and unincorporated businesses	60

Table 1 gives some of the items in Canada's national accounts in 1998.

- Calculate Canada's GDP in 1998.
- Did you use the expenditure approach or the income approach to make this calculation?
- How much did Canadian governments spend on goods and services in 1998?
- By how much did capital in the Canadian economy depreciate in 1998?

Nominal GDP versus real GDP

You've seen that GDP measures total expenditure on final goods and services in a given period. In 1999, GDP was \$975 billion. In 2000, GDP was \$1,056 billion. Because GDP in 2000 was greater than in 1999, we know that one or two things must have happened during that period:

- We produced more goods and services.
- We paid higher prices for our goods and services.

Producing more goods and services contributes to an improvement in our standard of living. Paying higher prices means that our cost of living has increased but our standard of living has not. So it matters a great deal why GDP has increased.

You're going to learn how economists at Statistics Canada split the increase in GDP into two parts: one part that tells us the change in production and the other that tells us the change in prices. The method Statistics Canada uses has changed recently, and we will describe the new method.

We measure the increase in production by a number called real GDP. **Real GDP** is the value of the final goods and services produced in a given year when valued at constant prices. By comparing real GDP in two years, we can measure the increase in production.

Eye On The CANADIAN ECONOMY

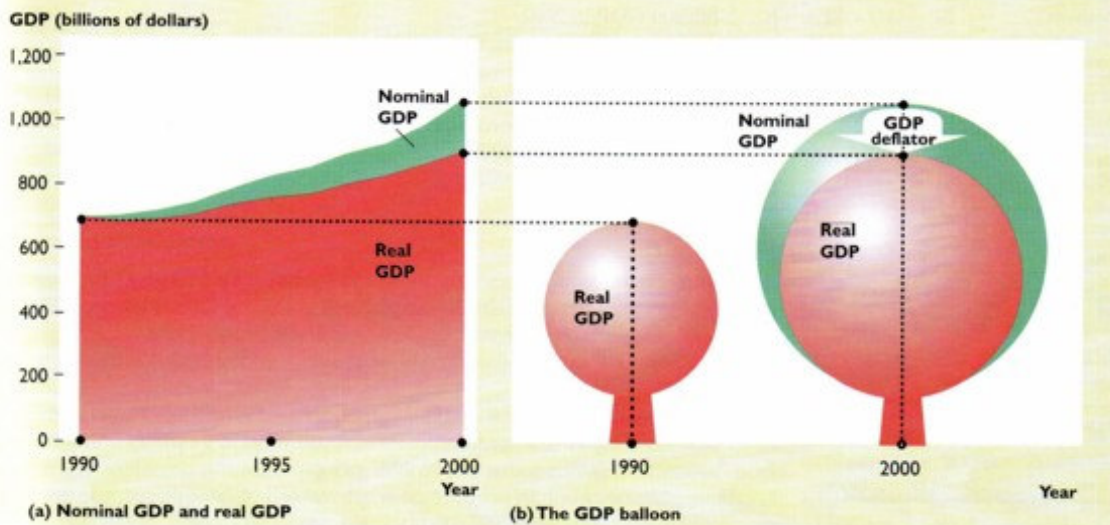
Deflating the GDP Balloon

Nominal GDP has increased every year during the 1990s. Part of the increase reflects increased production, and part of it reflects rising prices.

You can think of GDP as a balloon that is blown up by growing production and rising prices. In the figure, the GDP deflator lets the inflation air—the contribution of rising prices—out of the nominal GDP balloon so that we can see what has happened to real GDP. The red balloon for 1990 shows real GDP in that year. The green balloon shows nominal GDP in 2000. The red balloon for 2000 shows real GDP for that year. To see real GDP in 2000, we use the GDP deflator to deflate

nominal GDP.

With the inflation air removed, real GDP shows how the total value of production has changed. Over the long term, real GDP has grown by less than 3 percent a year. The 1990s began with a recession in which real GDP shrank by 1.9 percent. Recovery from the recession was slow, but in the four years after 1996, real GDP grew by 4.2 percent per year. By the end of the decade (2000), real GDP was 25 percent higher than in 1990.



SOURCE: Statistics Canada.



Calculating Nominal and Real GDP

To see what is involved in calculating nominal GDP, real GDP, and the implicit GDP deflator, an example may be helpful. Consider a simple hypothetical economy that produces only two commodities, wheat and steel. Table 1 gives the basic data for output and prices in the economy for two years.

TABLE 1 Data for a Hypothetical Economy

	Quantity produced		Prices	
	Wheat (bushels)	Steel (ton)	Wheat (\$/bushel)	Steel (\$/ton)
Year 1	100	20	10	50
Year 2	110	16	12	55

Table 2 shows nominal GDP, calculated by adding the money values of wheat output and of steel output for each year. In year 1, the value of both wheat and steel production was \$1000, so nominal GDP was \$2000. In year 2, wheat output rose to \$1320, and steel output fell to \$880. Since the rise in value of wheat was greater than the fall in value of steel, nominal GDP rose by \$200.

TABLE 2 Calculation of Nominal GDP

Year 1: $(100 \times \$10) + (20 \times \$50) = \$2000$
Year 2: $(110 \times \$12) + (16 \times \$55) = \$2200$

Table 3 shows real GDP, calculated by valuing output in each year at year 2 prices; that is, year 2 is used as the base year. In year 2, wheat output rose, but steel output fell. If we use year 2 prices, the value of the fall in steel output between years 1 and 2 exceeded the value of the rise in wheat output, and so real GDP fell.

TABLE 3 Calculation of Real GDP Using Year 2 Prices

Year 1: $(100 \times \$12) + (20 \times \$55) = \$2300$
Year 2: $(110 \times \$12) + (16 \times \$55) = \$2200$

In Table 4, the ratio of nominal to real GDP is calculated for each year and multiplied by 100. This ratio implicitly measures the change in prices over the period in question and is called the *implicit GDP deflator*. The implicit deflator shows that the price level increased by 15 percent between year 1 and year 2.

TABLE 4 Calculation of the Implicit GDP Deflator

Year 1: $(2000/2300) \times 100 = 86.96$
Year 2: $(2200/2200) \times 100 = 100.00$

Throughout this box we have used year 2 as the base year. But we could just as easily have used year 1. The changes we would have computed in real GDP and the implicit deflator would have been very similar—but not identical—to the ones we did compute using year 2 as the base year. The choice of base year matters because of different *relative* prices in the different years (note that the price of steel relative to the price of wheat is lower in year 2 than in year 1). Put simply, with different relative prices in different years, the various output changes get weighted differently depending on which prices we use, and thus the *aggregate* measure of real GDP changes by different amounts. (If you want to understand this point in more detail, try doing Study Exercise #6 at the end of the chapter.)

But if it matters which year we choose as the base year, how do we choose the “right” base year? As with many other elements of national income accounting, there is some arbitrariness in the choice. There is no “right” year. The important thing is not which year to use—the important thing is to be clear about which year you are using and then, for a given set of comparisons, to be sure that you are consistent in your choice.

Practice problem

TABLE 1

In 2001: Item	Quantity	Price
Bananas	100	\$10 a bunch
Coconuts	50	\$12 a bag

TABLE 2

In 2002: Item	Quantity	Price
Bananas	110	\$15 a bunch
Coconuts	60	\$10 a bag

An island economy produces only bananas and coconuts. Table 1 gives the quantities produced and prices in 2001, and Table 2 gives the quantities produced and prices in 2002. The base year is 2001. Calculate:

- a. Nominal GDP in 2001.
- b. Nominal GDP in 2002.
- c. The value of 2002 production in 2001 prices.
- d. Percentage increase in production when valued at 2001 prices.
- e. The value of 2001 production in 2002 prices.
- f. Percentage increase in production when valued at 2002 prices.
- g. Real GDP in 2001 and 2002.
- h. The GDP deflator in 2002.

Real GDP and the standard of living

Does an expansion of real GDP provide a full and accurate measure of the change in our standard of living?

It does not for two reasons:

The standard depends on all goods and services, not only on those included in GDP.

The standard of living depends on factors other than the goods and services produced.

Goods and services omitted from GDP
(not brought in markets)

household production

underground production

leisure time

environment quality

Other influences on the standard of living

Health and life expectancy

Political freedom and social justice.



LESSONS FROM HISTORY 20-1

GDP and Economic Growth

GDP is not a very good indicator of the growth in well-being that accompanies long-term economic growth. The reason is that so many of the major benefits that growth provides are imperfectly measured or not measured at all by GDP. This can be dramatically illustrated by looking at some of the most important changes that accompanied the first Industrial Revolution (1784–1870).

1. In early eighteenth-century Europe, average life expectancy was around 30 years; in France, one in five children were dead by the end of the first year of life, and 50 percent of registered children were dead by age 10. Life expectancy rose dramatically during the Industrial Revolution.
2. Industrialization reduced famine and hunger. Not only did the average food intake rise, its year-to-year variation fell. It is of little consolation to a peasant that the average food consumption is above the subsistence level over the decades if fluctuations in harvests periodically drive it below the subsistence level, thus causing starvation.
3. Technological changes that accompanied the Industrial Revolution virtually eliminated many terrible diseases that had been common until that time, such as plague, tuberculosis, cholera, dysentery, smallpox, and leprosy.
4. The urbanization that accompanied industrialization increased literacy and education and broadened experience. Before then, poverty and a rural, peasant

existence, with little or no communication between the village and the outside world, tended to be associated with superstition and very narrow experience.

5. Privacy became possible when people moved from the peasant dwelling, where the entire family lived, ate, and slept in one room, to multiroom urban sites.
6. The introduction of a market economy greatly increased the mobility of persons among jobs. In the rural societies, there were few options for employment, and customary behaviour—doing what one's parents did—dominated job selection.
7. The Industrial Revolution was based on mass production of goods sold mainly to low- and middle-income people. These changed the quality of consumption. For example, instead of wooden clogs, people adopted leather shoes; instead of rough, homespun cloth, people had factory-made shirts and skirts; instead of mud floors and thatched roofs, people had wooden floors and rain-proof roofs; instead of all living in one room, parents had a room separate from their children. These things may seem trivial to us today, but they changed the way of life of ordinary people.

Throughout the late eighteenth century and all of the nineteenth century, a succession of new products continued to alter the way ordinary people lived until, by the mid-twentieth century, the ordinary working person had a structurally different way of life from his or her counterpart in the mid-eighteenth century. Statistics, however, are the same if a doubling of GDP takes the form of twice as much of the same, or of new things that enhance the quality of life. The effect on living standards is, however, much greater when new commodities replace older ones rather than just more of the same becoming available.

This box draws on material in: J. Blum, *Our Forgotten Past: Seven Centuries of Life on the Land* (London: Thames and Hudson, 1982); F. Braudel, *Structures of Everyday Life, 15th–18th Century* (New York: Harper and Row, 1981); and N. Rosenberg and L. E. Birdzell, Jr., *How the West Grew Rich* (New York: Basic Books, 1986).

Practice problem

The International Monetary Fund reports the following data for real GDP per person in 1999: China, \$3,762; Russia, \$6,803; Canada, \$28,346; United States, \$34,530. Other information suggests that household production is similar in Canada and the United States and smaller in these two countries than in the other two. The underground economy is largest in Russia and China and a similar proportion of the economy in these two cases. Canadians and Americans enjoy more leisure hours than do the Chinese and Russians. Canada and the United States spend significantly more to protect the environment, so air, water, and land pollution is less in those countries than in China and Russia. Given this information and ignoring any other influences on the standard of living:

- a. In which pair (or pairs) of these four countries is it easier to compare the standard of living? Why?
- b. In which pair (or pairs) of these four countries is it more difficult to compare the standard of living? Why?
- c. What more detailed information would we need to be able to make an accurate assessment of the relative standard of living in these four countries?
- d. Do you think that the differences in real GDP per person correctly rank the standard of living in these four countries?