GDP: MEASURING TOTAL PRODUCTION AND INCOME

Chapter 8

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Chapter Outline

- **8.1** Gross Domestic Product Measures Total Production
- **8.2** Does GDP Measure What We Want It to Measure?
- **8.3** Real GDP versus Nominal GDP
- **8.4** Other Measures of Total Production and Total Income

Recall the distinction between Microeconomics and Macroeconomics.

Some Important Macroeconomic Terms

- **Business cycle**: Alternating periods of economic expansion and economic recession.
- **Expansion**: The period of a business cycle during which the total production and total employment are increasing.
- **Recession**: The period of a business cycle during which total production and total employment are decreasing.
- **Economic growth**: The ability of an economy to produce increasing quantities of goods and services.
- **Inflation rate**: The percentage increase in the price level from one year to the next.

8.1 Gross Domestic Product Measures Total Production

- The most common measure used by economists of overall economic activity in an economy is *gross domestic product*, or GDP. Other measures of overall economic activity include *gross national product* (GNP), *net national product* (NNP), *national income* etc.
- **Gross domestic product (GDP)**: the market value of all final goods and services produced in a country during a period of time, typically one year.
- The most common method of measuring economic growth is measuring the percentage change in GDP.

Assessing the Definition of GDP

- We use **market values** because we cannot add together the number of cars, apples, chickens, haircuts, and all other goods and services without agreeing on a common way to measure them. The practical way is to value each good and service in monetary terms, and the best measure of this that we have is the price that each good or service is sold for.
- A **final good or service** is one that is bought by a final user of the good. e.g. the pack of chips that you bought from Kroger
- If we counted **intermediate goods and services** as well, ones that were inputs into another good or service, such as **the** potato used to make the chips, then we would end up *double counting*. However, if you buy a potato from Kroger, then that is still a final good because you are the final user and you don't intend to resell it.

Assessing the Definition of GDP

To measure total output in **a given year**, we measure the goods and services produced only in that given year.

- Again, this avoids double counting: if you buy a DVD in 2011, that DVD counts in 2011's GDP. If you resell it in 2012, it will not count again in 2012.
- So GDP counts only ***new*** goods and services. ***Used*** items were previously produced and counted, so don't need to be counted again.

Production or Income? Both!

- There are two main conceptual ways to measure the total economic activity in an economy: total production or total income.
- When we measure one, we are also measuring the other.
- Why? Everything that is produced and sold by someone, constitutes income for someone else; so we have the choice of measuring the value of products produced and sold, or the value of incomes, and each is a valid way of measuring economic activity.

Figure 8.1 The Circular Flow and the Measurement of GDP (1 of 4)

- In a very simple model of the economy, we could start with households and firms.
- To measure overall economic activity, we could measure the amount of money that households spend on goods and services.
- Or we could measure income to households.

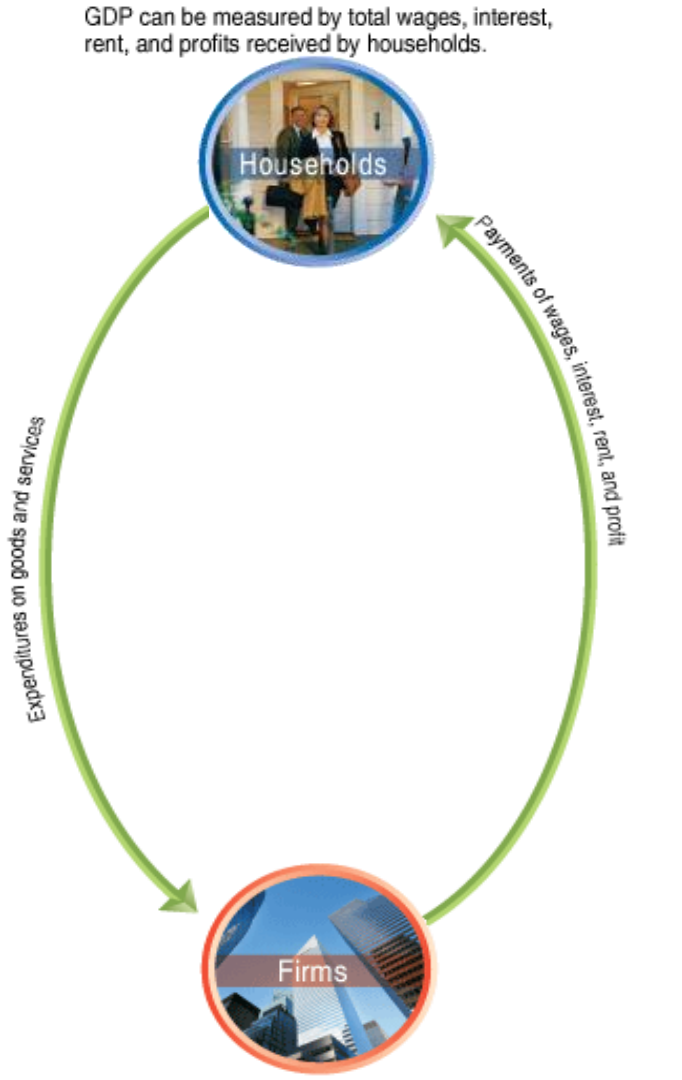
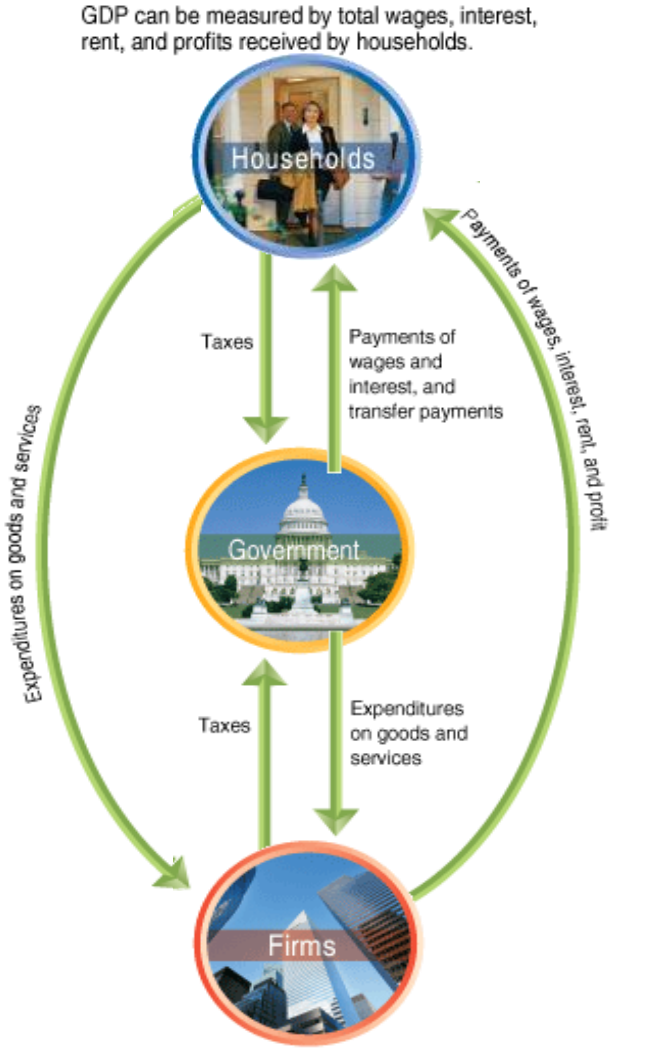


Figure 8.1 The Circular Flow and the Measurement of GDP (2 of 4)

- Let's add in some more layers. We'll start with government.
- How does the government affect economic activity?
- It takes in taxes from households and firms.
- It uses those taxes to buy goods and services, and to make **transfer payments**—payments to households for which the government does not receive a good or service in return.



GDP can be measured by total expenditures on goods and services by households, firms, government, and the rest of the world.

Figure 8.1 The Circular Flow and the Measurement of GDP (3 of 4)

- Some economic activity takes place between households, firms, and the rest of the world.
- Households buy goods and services from firms in other countries; these are known as *imports*.
- Firms sell goods and services to households in other countries; these are known as *exports*.

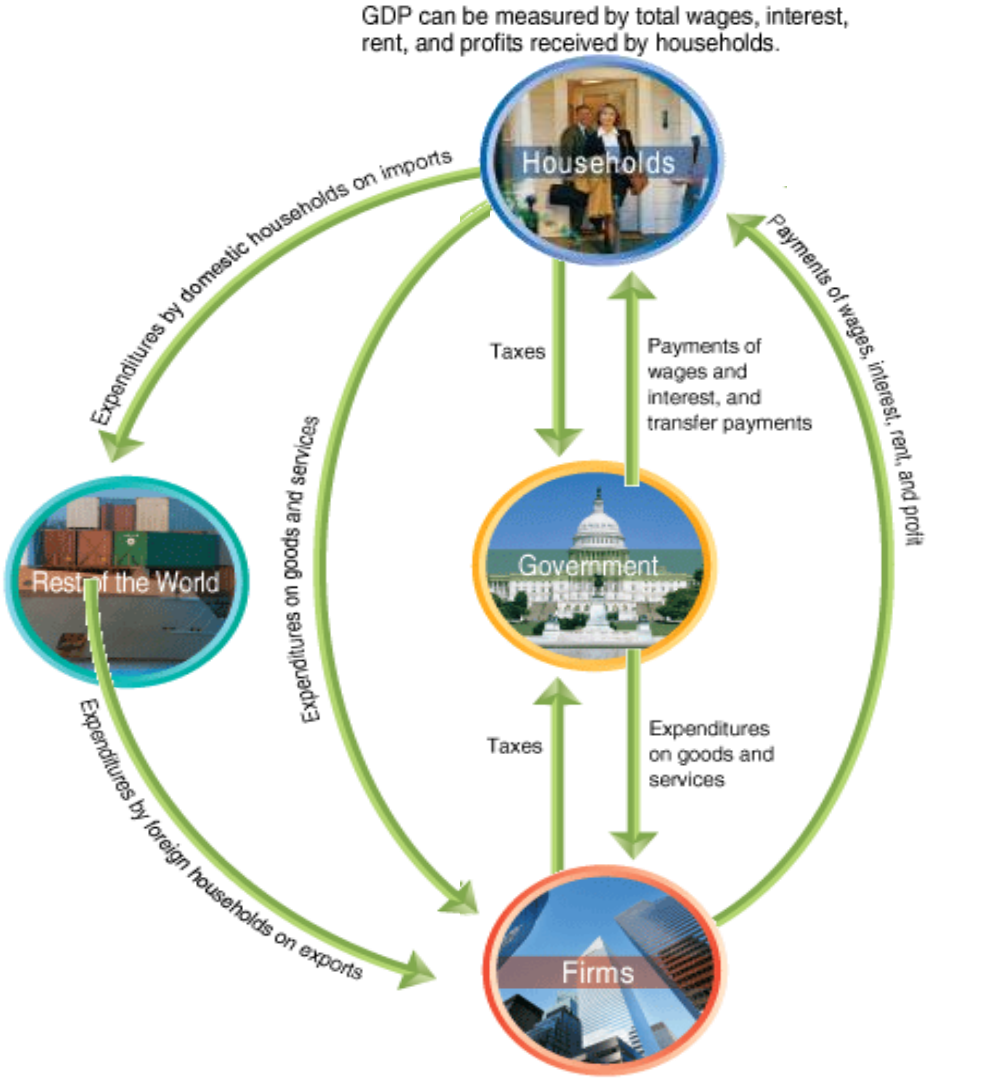
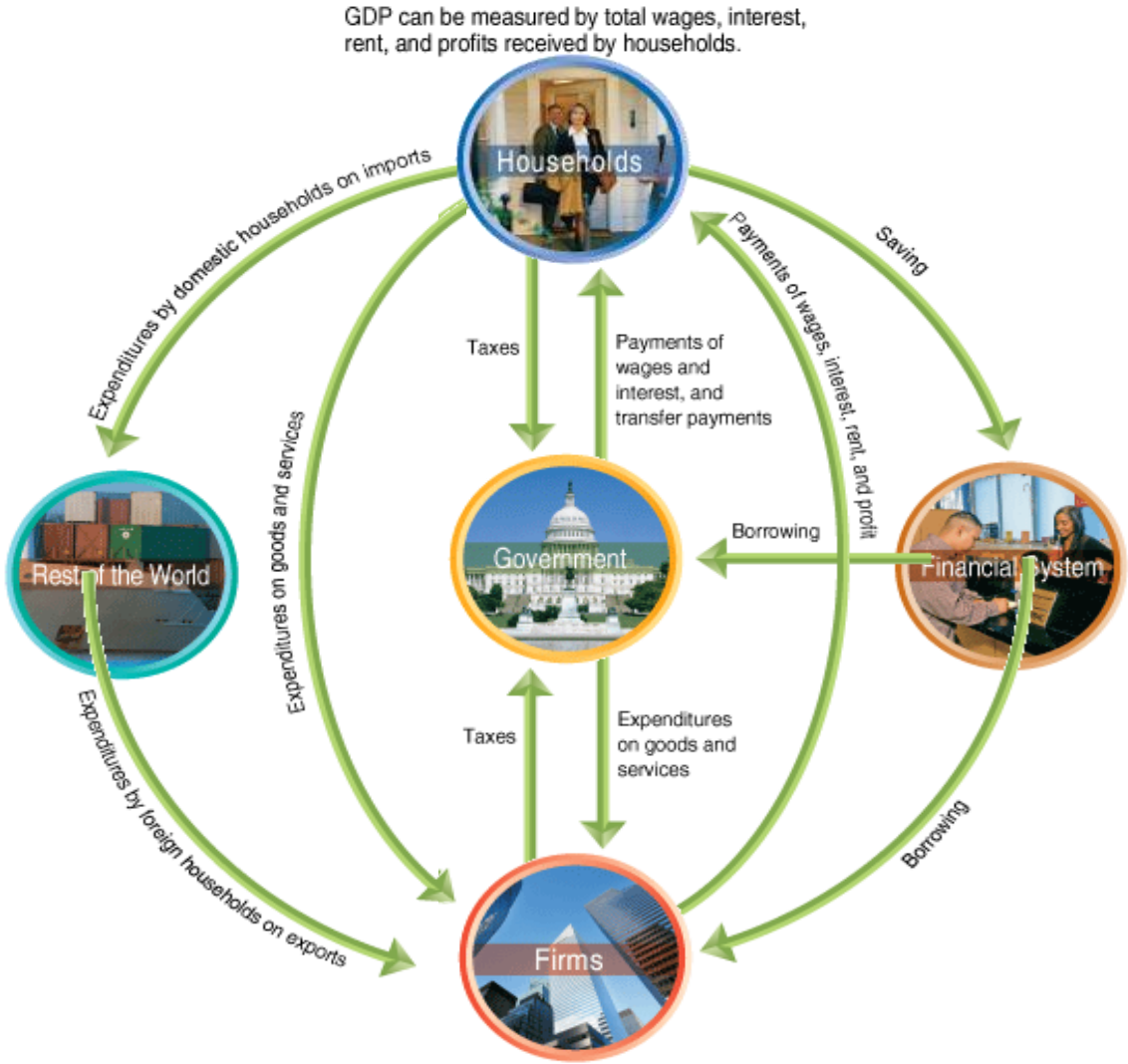


Figure 8.1 The Circular Flow and the Measurement of GDP (4 of 4)

- Finally, there are firms that deal specifically in flows of money; we label these firms the financial system.
- Households elect not to spend some of their income and instead save it with financial system firms like banks.
- These financial system firms lend money to other firms and the government.



Follow the Spending to Measure GDP

- To measure GDP, the Bureau of Economic Analysis (BEA) in the Department of Commerce measures four major categories of expenditures:
- Personal consumption expenditures, or *consumption (C)*
- Gross private domestic investment, or *investment (I)*
- Government consumption and gross investment, or government spending or *government purchases (G)*
- Net exports of goods and services, or *net exports (NX)*

  $NX = Exports - Imports = X - M$

- GDP can be expressed as the sum of these:
  - $Y = C + I + G + NX$
- We will examine each component of GDP in turn.

Consumption

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

- **Consumption** is spending by households on goods and services, not including spending on new houses (which are counted instead in investment).
- In BEA statistics, consumption is further divided into expenditure on
- *Services*, such as medical care, education, and haircuts
- *Nondurable goods*, such as food and clothing, and
- *Durable goods*, such as automobiles and furniture.

Investment

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

- **Investment** is spending by firms on new factories, office buildings, and additions to inventories, plus spending by households and firms on new houses.
- The BEA measures the following categories of investment:
- *Business fixed investment*, such as new factories, office buildings, machinery, and research and development.
- *Residential investment*, i.e. new single-family and multi-unit houses.
- *Changes in business inventories*, i.e. goods that have been produced but not yet sold.

Government Purchases

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

- **Government purchases** are spending by federal, state, and local governments on goods and services, such as teachers' salaries, highways, and aircraft carriers.
- This does *not* include transfer payments, since those do not result in immediate production of new goods and services.

Net Exports

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

- **Net exports** are the value of exports minus the value of imports.
- This difference might be positive or negative; in recent years, this has been negative in the United States.
- Since we want to count *domestic* production (production in the United States), we add up the value of the goods and services sold *to* foreigners and subtract the value of the goods and services sold to Americans *by* foreigners.

Check Figure 8.2 in the textbook to analyze the GDP composition of the United States in 2014.

Making the Connection: Adding More of Lady Gaga to GDP

- The BEA continually studies ways to improve its measurement of GDP.
- In 2013, the BEA started counting R&D (research and development) as investment, rather than an intermediate good, so as to emphasize the importance of *intellectual property*.
  - A consequence is that money spent on development of, say, entertainment products, now gets counted as investment.
  - So the money spent by Lady Gaga and her record company on writing and recording her songs is now included in the investment component of GDP.

Value Added Method of Measuring GDP

- An alternative method to measure GDP is to measure the **value added**: the market value a firm adds to a product.
- *The final selling price of a product must equal the sum of the values added to the product at each stage of production*.
- Go through Table 8.1 in the textbook. The table illustrates the value added method for a shirt sold on L.L.Bean's web site.

Does GDP Measure What We Want It to Measure?

GDP can be a useful tool to measure total output in an economy. Many people go further than this, interpreting GDP as a measure of the well-being of citizens.

However, GDP has shortcomings as both a

- *Measure of total production* and a
- *Measure of well-being*.

Shortcomings of GDP as a Measure of Total Production

- Two important types of production are omitted from the BEA's measurement of GDP:
- *Household production* such as childcare, cleaning, and cooking is not typically paid for with money. This could also include DIY jobs.
    - But such contributions are real—if they were performed by a non-household member, they *would* be paid for and counted in GDP.
- **Underground economy***:* Buying and selling of goods and services that is concealed from the government to avoid taxes or regulations, or because the goods and services are illegal. This also known as the ***informal sector***.
    - This may be 10 percent or more of the economy in America and substantially more in low-income households. In some developing countries, more than half the people in the working population may be employed in the informal sector.

How Important Are These Shortcomings?

- If we are comparing GDP from year to year, the size of household production and the underground economy is probably about the same from year to year, so *GDP growth* is a reasonable measure of the *growth in total production*.
- However over long periods of time, these shortcomings might be more serious.
- *Example: As women have entered the workforce in larger numbers, some household production has been replaced by paid childcare and restaurant meals. So increases in GDP may exaggerate the increase in actual total production.*

Making the Connection: Underground Economies in Developing Countries

- In developing countries, the underground economy is often referred to as the *informal sector*, as opposed to the *formal sector*, in which output of goods and services is officially measured.
  - In many developing countries, the informal sector is very large; often above 50 percent of total output.
- Economists studying economic development say this often reflects poor government policies: high taxes and regulations and low confidence in the security of private property from government seizure.

Shortcomings of GDP as a Measure of Well-Being

GDP per capita (i.e. GDP divided by population) is often used to represent differences in standards of living from country to country. However, even if it accurately measured total production, it would not reflect:

- *The value of leisure*
- *Pollution and other negative effects of production*
- *Crime and other social problems*
- *The degree of inequality in the distribution of income*
- *Citizens' access to healthcare, sanitation, and basic human rights, life expectancy etc.*

In fact, improvements in many of these will result in *lower* GDP per capita.

Example: Lower crime would allow lower spending on police, prisons, and private security. This would decrease GDP, but surely result in improvements in economic well-being.

8.3 Real GDP versus Nominal GDP

- Suppose GDP increases; is the increase in GDP due to production increasing, or due to prices increasing?
- To separate these effects, the BEA calculates both **Nominal GDP**—the value of final goods and services evaluated at current-year prices—and **Real GDP**—the value of final goods and services evaluated at base-year prices.
- The choice of a base-year is arbitrary; we might use any year's prices to compare real GDP. The current standard is 2009.
- Unfortunately, the *relative prices* also change from year to year, distorting real GDP calculations. Since 1996, the BEA has overcome this problem by using *chain-weighted* prices, using previous-year prices to adjust current-year production.

Calculating Real GDP

	2009		2017	
Product	**Quantity**	**Price**	**Quanitity**	**Price**
Eye examinations	80	$40	100	$50
Pizzas	90	11	80	10
Shoes	15	90	20	100

The table shows output and prices in 2009 and 2017.

- Calculating the total value of output in each year gives:

  For 2009: $3,200 + $990 + $1,350 = $5,540.

  For 2017: $5,000 + $800 + $2,000 = $7,800.

- To calculate real GDP in 2017, we use the prices from 2009.

  $4,000 + $880 + $1,800 = $6,680.

- Compare this to nominal GDP in 2017 of $7,800.

The GDP Deflator

- Economists and policy-makers are interested in the **price level**: a measure of the average prices of goods and services in the economy.
- Why? Stable prices are desirable because they allow households and firms to plan for the future appropriately.
- In order to know whether we are achieving price stability, we need to *measure* the price level.
- One way to do this is using the **GDP deflator**: a measure of the price level, calculated by dividing nominal GDP by real GDP and multiplying by 100:
- $\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$
- Since nominal and real GDP will be the same in the base year, the GDP deflator will be 100 in the base year.

Go through the GDP deflator calculations in the book.

8.4 Other Measures of Total Production and Total Income

- Each quarter, the BEA publishes the *National Income and Product Accounts* tables. These include GDP computations but also:
- *Gross national product (GNP):* Production performed by citizens of a nation, including overseas production
- *National income*: GDP minus the *consumption of fixed capital*; i.e. GDP minus depreciation
- *Personal income*: Income received by households; includes transfer payments but excludes firms' retained earnings
- *Disposable personal income*: Personal income minus personal tax payments; this measures the amount that households are able to spend or save

THE END

"The economy consists of millions of people engaged in many activities—buying, selling, working, hiring, manufacturing, and so on. To understand how the economy works, we must find some way to simplify our thinking about all these activities. In other words, we need a model that explains, in general terms, how the economy is organized and how participants in the economy interact with one another."

– N. Gregory Mankiw