In this chapter, look for the answers to these questions:

- What is Gross Domestic Product (GDP)?
- How is GDP related to a nation’s total income and spending?
- What are the components of GDP?
- How is GDP corrected for inflation?
- Does GDP measure society’s well-being?

Measuring a Nation’s Income

Microeconomics is the study of how individual households and firms make decisions and how they interact with one another in markets. Macroeconomics is the study of the economy as a whole. Its goal is to explain the economic changes that affect many households, firms, and markets at once. Macroeconomics answers questions like the following:

- Why is average income high in some countries and low in others?
- Why do prices rise rapidly in some time periods while they are more stable in others?
- Why do production and employment expand in some years and contract in others?

THE ECONOMY’S INCOME AND EXPENDITURE

- When judging whether the economy is doing well or poorly, it is natural to look at the total income that everyone in the economy is earning.
- For an economy as a whole, income must equal expenditure because:
  - Every transaction has a buyer and a seller.
  - Every dollar of spending by some buyer is a dollar of income for some seller.

THE MEASUREMENT OF GROSS DOMESTIC PRODUCT

- *Gross domestic product* (GDP) is a measure of the income and expenditures of an economy.
- GDP is the total market value of all final goods and services produced within a country in a given period of time.
- The equality of income and expenditure can be illustrated with the circular-flow diagram.
THE MEASUREMENT OF GROSS DOMESTIC PRODUCT

• “GDP is the Market Value . . .”
  – Output is valued at market prices.
• “. . . Of All . . .”
  – Includes all items produced in the economy and legally sold in markets
• “. . . Final . . .”
  – It records only the value of final goods, not intermediate goods (the value is counted only once).
• “. . . Goods and Services . . .”
  – It includes both tangible goods (food, clothing, cars) and intangible services (haircuts, housecleaning, doctor visits).

THE COMPONENTS OF GDP

• GDP includes all items produced in the economy and sold legally in markets.
• What Is Not Counted in GDP?
  – GDP excludes most items that are produced and consumed at home and that never enter the marketplace.
  – It excludes items produced and sold illicitly, such as illegal drugs.

GDP ($Y$) is the sum of the following:

\[ Y = C + I + G + NX \]

THE COMPONENTS OF GDP

• Consumption ($C$):
  – “The spending by households on goods and services, with the exception of purchases of new housing.
  – For renters, consumption includes rent payments.
  – For homeowners, consumption includes the imputed rental value of the house, but not the purchase price or mortgage payments.
• Investment ($I$):
  – The spending on capital equipment, inventories, and structures, including new housing.
  – Includes spending on
    • capital equipment (e.g., machines, tools)
    • structures (factories, office buildings, houses)
    • inventories (goods produced but not yet sold)
  Note: “Investment” does not mean the purchase of financial assets like stocks and bonds.

THE COMPONENTS OF GDP

• Government Purchases ($G$):
  – The spending on goods and services by local, state, and federal governments.
  – Does not include transfer payments, such as social security or unemployment insurance, because they are not made in exchange for currently produced goods or services.
• Net Exports ($NX$):
  – Exports minus imports.
  – Exports represent foreign spending on the economy’s g&s.
  – Imports are the portions of $C$, $I$, and $G$ that are spent on g&s produced abroad.
THE COMPONENTS OF GDP
Adding up all the components of GDP gives:
\[ Y = C + I + G + NX \]

Table 1 GDP and Its Components

<table>
<thead>
<tr>
<th>Total (in billions of dollars)</th>
<th>Per Person (in dollars)</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross domestic product, Y</td>
<td>$11,728</td>
<td>$39,904</td>
</tr>
<tr>
<td>Consumption, C</td>
<td>8,232</td>
<td>28,009</td>
</tr>
<tr>
<td>Investment, I</td>
<td>1,922</td>
<td>6,639</td>
</tr>
<tr>
<td>Government purchases, G</td>
<td>2,184</td>
<td>7,431</td>
</tr>
<tr>
<td>Net exports, NX</td>
<td>-609</td>
<td>-2,072</td>
</tr>
</tbody>
</table>

Source: U.S. Department of Commerce.

GDP and its components

In each of the following cases, determine how much GDP and each of its components is affected (if at all).

A. Debbie spends $200 to buy her husband dinner at the finest restaurant in Boston.
   Consumption and GDP rise by $200.

B. Sarah spends $1800 on a new laptop to use in her publishing business. The laptop was built in China.
   Investment rises by $1800, net exports fall by $1800, GDP is unchanged.

C. Jane spends $1200 on a computer to use in her editing business. She got last year’s model on sale for a great price from a local manufacturer.
   Current GDP and investment do not change, because the computer was built last year.

D. General Motors builds $500 million worth of cars, but consumers only buy $470 million worth of them.
   Consumption rises by $470 million, inventory investment rises by $30 million, and GDP rises by $500 million.

REAL VERSUS NOMINAL GDP

- Inflation can distort economic variables like GDP, so we have two versions of GDP:
  One is corrected for inflation, the other is not.
- Nominal GDP values the production of goods and services at current prices. It is not corrected for inflation.
- Real GDP values the production of goods and services at constant prices. It is corrected for inflation.
- An accurate view of the economy requires adjusting nominal to real GDP by using the GDP deflator.
The GDP Deflator

- The GDP deflator is a measure of the price level calculated as the ratio of nominal GDP to real GDP times 100.
- It tells us what portion of the rise in nominal GDP that is attributable to a rise in prices rather than a rise in the quantities produced.
- The GDP deflator is calculated as follows:

\[
\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100
\]

Table 2 Real and Nominal GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>Price of Hot dogs</th>
<th>Quantity of Hot dogs</th>
<th>Price of Hamburgers</th>
<th>Quantity of Hamburgers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>$1</td>
<td>100</td>
<td>$2</td>
<td>50</td>
</tr>
<tr>
<td>2006</td>
<td>$2</td>
<td>150</td>
<td>$3</td>
<td>100</td>
</tr>
<tr>
<td>2007</td>
<td>$3</td>
<td>200</td>
<td>$4</td>
<td>150</td>
</tr>
</tbody>
</table>

Calculating Nominal GDP

- 2005: ($1 per hot dog \times 100 hot dogs) + ($2 per hamburger \times 50 hamburgers) = $200
- 2006: ($2 per hot dog \times 150 hot dogs) + ($3 per hamburger \times 100 hamburgers) = $600
- 2007: ($3 per hot dog \times 200 hot dogs) + ($4 per hamburger \times 150 hamburgers) = $1,200

Calculating Real GDP (base year 2005)

- 2005: ($1 per hot dog \times 100 hot dogs) + ($2 per hamburger \times 50 hamburgers) = $200
- 2006: ($1 per hot dog \times 150 hot dogs) + ($3 per hamburger \times 100 hamburgers) = $500
- 2007: ($1 per hot dog \times 200 hot dogs) + ($2 per hamburger \times 150 hamburgers) = $500

The GDP Deflator

- Nominal GDP is converted to real GDP as follows:

\[
\text{Real GDP}_{2005} = \frac{\text{Nominal GDP}_{2005}}{\text{GDP deflator}_{2005}} \times 100
\]

Computing GDP

<table>
<thead>
<tr>
<th>Year</th>
<th>Prices (P)</th>
<th>Quantities (Q)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>$30</td>
<td>900</td>
</tr>
<tr>
<td>2005</td>
<td>$31</td>
<td>1,000</td>
</tr>
<tr>
<td>2006</td>
<td>$36</td>
<td>1,050</td>
</tr>
</tbody>
</table>

Use the above data to solve these problems:
- B. Compute real GDP in 2005.
- C. Compute the GDP deflator in 2006.

A. Compute nominal GDP in 2004.

\[
30 \times 900 + 100 \times 192 = $46,200
\]

B. Compute real GDP in 2005.

\[
30 \times 1,000 + 100 \times 200 = $50,000
\]
Computing GDP

<table>
<thead>
<tr>
<th></th>
<th>2004 (base yr)</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>Q</td>
<td>P</td>
<td>Q</td>
</tr>
<tr>
<td>good A</td>
<td>$30</td>
<td>$900</td>
<td>$31</td>
</tr>
<tr>
<td></td>
<td>$1,000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>good B</td>
<td>$100</td>
<td>192</td>
<td>$10</td>
</tr>
<tr>
<td></td>
<td>$200</td>
<td>200</td>
<td>$100</td>
</tr>
<tr>
<td></td>
<td>$100</td>
<td>205</td>
<td></td>
</tr>
</tbody>
</table>

C. Compute the GDP deflator in 2006.

Nom GDP = $36 x 1050 + $100 x 205 = $58,300

Real GDP = $30 x 1050 + $100 x 205 = $52,000

GDP deflator = 100 x (Nom GDP)/(Real GDP)

= 100 x ($58,300)/($52,000) = 112.1

Figure 2 Real GDP in the United States

IS GDP A GOOD MEASURE OF ECONOMIC WELL-BEING?

- GDP is the best single measure of the economic well-being of a society.
- GDP per person tells us the income and expenditure of the average person in the economy.
- Higher GDP per person indicates a higher standard of living.
- GDP is not a perfect measure of the happiness or quality of life, however.

Gross Domestic Product…

...does not allow for the health of our children, the quality of their education, or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our courage, nor our wisdom, nor our devotion to our country. It measures everything, in short, except that which makes life worthwhile, and it can tell us everything about America except why we are proud that we are Americans.”

- Senator Robert Kennedy, 1968

GDP AND ECONOMIC WELL-BEING

- Some things that contribute to well-being are not included in GDP.
  - The value of leisure.
  - The value of a clean environment.
  - The value of almost all activity that takes place outside of markets, such as the value of the time parents spend with their children and the value of volunteer work.

Then Why Do We Care About GDP?

- Having a large GDP enables a country to afford better schools, a cleaner environment, health care, etc.
- Many indicators of the quality of life are positively correlated with GDP. For example...
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$35,750</td>
<td>77 years</td>
<td>99%</td>
<td>95%</td>
</tr>
<tr>
<td>Germany</td>
<td>27,100</td>
<td>78</td>
<td>99%</td>
<td>41%</td>
</tr>
<tr>
<td>Japan</td>
<td>26,940</td>
<td>81</td>
<td>99%</td>
<td>48%</td>
</tr>
<tr>
<td>Mexico</td>
<td>8,970</td>
<td>73</td>
<td>91%</td>
<td>10%</td>
</tr>
<tr>
<td>Russia</td>
<td>8,230</td>
<td>67</td>
<td>99%</td>
<td>4%</td>
</tr>
<tr>
<td>Brazil</td>
<td>7,770</td>
<td>68</td>
<td>86%</td>
<td>8%</td>
</tr>
<tr>
<td>China</td>
<td>4,580</td>
<td>71</td>
<td>91%</td>
<td>5%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>3,250</td>
<td>67</td>
<td>88%</td>
<td>4%</td>
</tr>
<tr>
<td>India</td>
<td>2,670</td>
<td>64</td>
<td>61%</td>
<td>1%</td>
</tr>
<tr>
<td>Pakistan</td>
<td>1,940</td>
<td>61</td>
<td>42%</td>
<td>1%</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1,700</td>
<td>61</td>
<td>41%</td>
<td>&lt;0.5</td>
</tr>
<tr>
<td>Nigeria</td>
<td>860</td>
<td>52</td>
<td>67%</td>
<td>&lt;0.5</td>
</tr>
</tbody>
</table>