Measuring a Nation’s Production and Income

The methods our government uses today to measure our economy, which we will study in this chapter, were developed in the 1930s.
How can we use economic analysis to compare the size of a major corporation to the size of a country?

Using Value Added to Measure the True Size of Wal-Mart

Can we use nonmarket factors to refine our measures of GDP?

The Environment, Household Production, and GDP

Do increases in gross domestic product necessarily translate into improvements in the welfare of citizens?

The Links Between Self-Reported Happiness and GDP

**CHAPTER 5**

**MEASURING A NATION’S PRODUCTION AND INCOME**

- **Macroeconomics**
  The study of the nation’s economy as a whole; focuses on the issues of inflation, unemployment, and economic growth.

- **Inflation**
  Sustained increases in the average prices of all goods and services.

**THE “FLIP” SIDES OF MACROECONOMIC ACTIVITY: PRODUCTION AND INCOME**

The Circular Flow of Production and Income

[Diagram showing the circular flow of production and income]

**FIGURE 5.1**

The circular flow shows how the production of goods and services generates income for households and how households purchase goods and services produced by firms.
5.2 | THE PRODUCTION APPROACH: MEASURING A NATION'S MACROECONOMIC ACTIVITY USING GROSS DOMESTIC PRODUCT

- **gross domestic product (GDP)**
  The total market value of final goods and services produced within an economy in a given year.

- **intermediate goods**
  Goods used in the production process that are not final goods and services.

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5.2 | THE PRODUCTION APPROACH: MEASURING A NATION'S MACROECONOMIC ACTIVITY USING GROSS DOMESTIC PRODUCT

**REAL-NOMINAL PRINCIPLE**

What matters to people is the real value of money or income—its purchasing power—not the face value of money or income.

- **real GDP**
  A measure of GDP that controls for changes in prices.

- **nominal GDP**
  The value of GDP in current dollars.

- **economic growth**
  Sustained increases in the real GDP of an economy over a long period of time.

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5.2 | THE PRODUCTION APPROACH: MEASURING A NATION'S MACROECONOMIC ACTIVITY USING GROSS DOMESTIC PRODUCT

- **FIGURE 5.2**
  U.S. Real GDP, 1930–2007
  During the Great Depression in the 1930s, GDP initially fell and then was relatively flat. The economy was not growing much. However, the economy began growing rapidly in the 1940s during World War II and has grown substantially since then.
5.2 THE PRODUCTION APPROACH: MEASURING A NATION’S MACROECONOMIC ACTIVITY USING GROSS DOMESTIC PRODUCT

The Components of GDP

Economists divide GDP into four broad categories, each corresponding to different types of purchases represented in GDP:

1. Consumption expenditures: purchases by consumers
2. Private investment expenditures: purchases by firms
3. Government purchases: purchases by federal, state, and local governments
4. Net exports: net purchases by the foreign sector (domestic exports minus domestic imports)

### Table 5.1: Composition of U.S. GDP, First Quarter 2008 (Billions of Dollars Expressed at Annual Rates)

<table>
<thead>
<tr>
<th>GDP</th>
<th>Consumption Expenditures</th>
<th>Private Investment Expenditures</th>
<th>Government Purchases</th>
<th>Net Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>$14.796</td>
<td>$10.346</td>
<td>$2.001</td>
<td>$2.625</td>
<td>-$716</td>
</tr>
</tbody>
</table>

CONSUMPTION EXPENDITURES

- **Consumption expenditures**
  - Purchases of newly produced goods and services by households.

PRIVATE INVESTMENT EXPENDITURES

- **Private investment expenditures**
  - Purchases of newly produced goods and services by firms.

PRIVATE INVESTMENT EXPENDITURES

Private investment expenditures in GDP consist of three components:

1. First, there is spending on new plants and equipment during the year.
2. Second, newly produced housing is included in investment spending.
3. Finally, if firms add to their stock of inventories, the increase in inventories during the current year is included in GDP.
The Components of GDP

**PRIVATE INVESTMENT EXPENDITURES**

- **gross investment**
  Total new investment expenditures.

- **depreciation**
  Reduction in the value of capital goods over a one-year period due to physical wear and tear and also to obsolescence; also called capital consumption allowance.

- **net investment**
  Gross investment minus depreciation.

**GOVERNMENT PURCHASES**

- **government purchases**
  Purchases of newly produced goods and services by local, state, and federal governments.

- **transfer payments**
  Payments from governments to individuals that do not correspond to the production of goods and services.

**NET EXPORTS**

- **import**
  A good or service produced in a foreign country and purchased by residents of the home country (for example, the United States).

- **export**
  A good or service produced in the home country (for example, the United States) and sold in another country.

- **net exports**
  Exports minus imports.
5.2 THE PRODUCTION APPROACH: MEASURING A NATION'S MACROECONOMIC ACTIVITY USING GROSS DOMESTIC PRODUCT

The Components of GDP

NET EXPORTS

- trade deficit
  The excess of imports over exports.

- trade surplus
  The excess of exports over imports.

5.2 The Components of GDP

NET EXPORTS

- trade deficit
  The excess of imports over exports.

- trade surplus
  The excess of exports over imports.

**FIGURE 5.3**
In the early 1980s, the United States ran a trade surplus (when the line on the graph is above zero, this indicates a surplus). However, in other years the United States has run a trade deficit. In 2007, the trade deficit exceeded 5 percent of GDP.

5.2 Putting It All Together: The GDP Equation

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

where

- \( Y \) = GDP
- \( C \) = Consumption
- \( I \) = Investment
- \( G \) = Government purchases
- \( NX \) = net exports

In other words,

GDP = consumption + investment + government purchases + net exports
5.3 THE INCOME APPROACH: MEASURING A NATION’S MACROECONOMIC ACTIVITY USING NATIONAL INCOME

- **national income**
  - The total income earned by a nation’s residents both domestically and abroad in the production of goods and services.

**Measuring National Income**

- **gross national product**
  - GDP plus net income earned abroad.

| TABLE 5.2 FROM GDP TO NATIONAL INCOME, FIRST QUARTER 2008 (BILLIONS OF DOLLARS) |
|---------------------------------|-----------------|
| Gross domestic product          | $14,196         |
| Gross national product          | 14,351          |
| Net national product            | 12,640          |
| National income                 | 12,507          |

- **personal income**
  - Income, including transfer payments, received by households.

- **personal disposable income**
  - Personal income that households retain after paying income taxes.
5.3 THE INCOME APPROACH: MEASURING A NATION’S MACROECONOMIC ACTIVITY USING NATIONAL INCOME

Measuring National Income through Value Added

- **value added**
  The sum of all the income—wages, interest, profits, and rent—generated by an organization. For a firm, we can measure value added by the dollar value of the firm’s sales minus the dollar value of the goods and services purchased from other firms.

<table>
<thead>
<tr>
<th>TABLE 5.2 CALCULATING VALUE ADDED IN A SIMPLE ECONOMY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automobile Firm</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>Total sales</td>
</tr>
<tr>
<td>Less purchases from other firms</td>
</tr>
<tr>
<td>Equals value added: the sum of all wages, interest, profits, and rents</td>
</tr>
</tbody>
</table>

During 2008, Wal-Mart’s sales were approximately $374 billion, nearly 26 percent of U.S. GDP. Some social commentators might want to measure the impact of Wal-Mart just through its sales. But to produce those sales, Wal-Mart had to buy goods from many other companies.

- Based on Wal-Mart’s annual reports, its cost of sales was $286 billion, leaving approximately $88 billion in value added.
- If we used Wal-Mart’s sales to compare it to a country, it would have a GDP similar to that of Belgium, which ranks 28th in the world.
- However, using the more appropriate measure of value added, Wal-Mart’s size is closer to Bulgaria, ranked 56th in the world.

**APPLICATION 1**
USING VALUE ADDED TO MEASURE THE TRUE SIZE OF WAL-MART

**APPLYING THE CONCEPTS #1**: How can we use economic analysis to compare the size of a major corporation to a country?

**An Expanded Circular Flow**

**FIGURE 5.4**
The Circular Flow with Government and the Foreign Sector

The new linkages (in blue) demonstrate the role that the government and the foreign sector (imports and exports) play in the circular flow.
5.4 A CLOSER EXAMINATION OF NOMINAL AND REAL GDP

Measuring Real versus Nominal GDP

<table>
<thead>
<tr>
<th>TABLE 5.4 GDP DATA FOR A SIMPLE ECONOMY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity Produced</td>
</tr>
<tr>
<td>Year</td>
</tr>
<tr>
<td>2011</td>
</tr>
<tr>
<td>2012</td>
</tr>
</tbody>
</table>

- FIGURE 5.5
U.S. Nominal and Real GDP, 1950–2007
This figure plots both real and nominal GDP for the United States in billions of dollars. Real GDP is measured in 2000 dollars.

5.4 How to Use the GDP Deflator

- GDP deflator
An index that measures how the prices of goods and services included in GDP change over time.

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

- Chain-weighted index
A method for calculating changes in prices that uses an average of base years from neighboring years.

5.5 FLUCTUATIONS IN GDP

- FIGURE 5.6
The 1990 Recession
Recessions can be illustrated by peaks, troughs, and an expansion phase. The date at which the recession starts and output begins to fall is called the peak. The date at which the recession ends and output begins to rise is called the trough. The expansion phase begins after the trough.
5.5 | FLUCTUATIONS IN GDP

- **recession**
  Commonly defined as six consecutive months of declining real GDP.

- **peak**
  The date at which a recession starts.

- **trough**
  The date at which output stops falling in a recession.

- **expansion**
  The period after a trough in the business cycle during which the economy recovers.

5.5 | FLUCTUATIONS IN GDP

- **depression**
  The common name for a severe recession.

### TABLE 5.3: POSTWAR RECESSIONS

<table>
<thead>
<tr>
<th>Peak</th>
<th>Trough</th>
<th>Percent Decline in Real GDP</th>
<th>Length of Recession (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 1948</td>
<td>October 1949</td>
<td>-1.5</td>
<td>11</td>
</tr>
<tr>
<td>July 1953</td>
<td>May 1954</td>
<td>-3.2</td>
<td>10</td>
</tr>
<tr>
<td>August 1957</td>
<td>April 1958</td>
<td>-3.2</td>
<td>8</td>
</tr>
<tr>
<td>April 1960</td>
<td>February 1961</td>
<td>-1.2</td>
<td>10</td>
</tr>
<tr>
<td>December 1969</td>
<td>November 1970</td>
<td>-1.0</td>
<td>11</td>
</tr>
<tr>
<td>November 1973</td>
<td>March 1975</td>
<td>-4.9</td>
<td>16</td>
</tr>
<tr>
<td>January 1980</td>
<td>July 1980</td>
<td>-2.6</td>
<td>6</td>
</tr>
<tr>
<td>July 1981</td>
<td>November 1982</td>
<td>-3.0</td>
<td>16</td>
</tr>
<tr>
<td>July 1990</td>
<td>March 1991</td>
<td>-1.4</td>
<td>8</td>
</tr>
<tr>
<td>March 2001</td>
<td>November 2001</td>
<td>-0.6</td>
<td>8</td>
</tr>
<tr>
<td>December 2007</td>
<td>Not available</td>
<td>Not available</td>
<td>Not available</td>
</tr>
</tbody>
</table>

5.6 | GDP AS A MEASURE OF WELFARE

Shortcomings of GDP as a Measure of Welfare

- **HOUSEWORK AND CHILDCARE**

- **LEISURE**

- **UNDERGROUND ECONOMY**

### TABLE 5.6

<table>
<thead>
<tr>
<th>Region of the World</th>
<th>Underground Economy as Percent of Reported GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>41%</td>
</tr>
<tr>
<td>Central and South America</td>
<td>41%</td>
</tr>
<tr>
<td>Asia</td>
<td>30%</td>
</tr>
<tr>
<td>Transition Economies</td>
<td>38%</td>
</tr>
<tr>
<td>Europe, United States, and Japan</td>
<td>17%</td>
</tr>
<tr>
<td>Unweighted Average over 145 Countries</td>
<td>35%</td>
</tr>
</tbody>
</table>
Conventional measures of GDP do not include either changes to the environment or valuable production that occurs at home. Neither is measured directly in the market. In principle, we can make adjustments to try to correct for these deficiencies. In the early 1990s, the U.S. Department of Commerce undertook a study to account for environmental changes. In 1994, it released a report on the first phase of the study, which focused on the value of mineral resources such as oil, gas, and coal in the United States.

The Commerce Department was trying to determine whether the stock of proven reserves had been depleted—that is, depreciated—over time.

The Commerce Department also took a closer look at household production, such as childcare and cooking and cleaning services. In comparison to the environmental study, counting household production did have a large impact on measured GDP, which was 26 percent higher.

Economists have used a variety of methods to estimate the extent of the underground economy throughout the world. They typically find that the size of the underground economy is much larger in developing countries than in developed countries.

Both the US and the UK have experienced very large increases in per capita income over the last 30 years. But, reported levels of happiness have declined slightly in the United States and remained relatively flat in the United Kingdom.

Could it be the increased stress of everyday life has taken its toll on our happiness despite the increase in income?

Trends in the relative happiness of different groups in our society:

- While whites report higher levels of happiness than African Americans, the gap has decreased over the last 30 years, as the happiness of African Americans has risen faster than that of whites.
- Men’s happiness has risen relative to that of women over the last 30 years.
- Controlling for income, education, and other personal factors, they found that in the United States, happiness among men and women reaches a minimum at the ages of 49 and 45 respectively.

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