CHAPTER 5: MEASURING GDP AND ECONOMIC GROWTH

Learning Goals for this Chapter:

- To know what we mean by GDP and to use the circular flow model to explain why GDP equals aggregate expenditure and aggregate income
- To know the two ways of measuring GDP
- To know the difference between nominal and real GDP
- To know how to measure real GDP and the GDP deflator
- To know how to use real GDP to measure economic growth and to know the limitations of our measure

I. Gross Domestic Product

A. GDP or Gross domestic product, is the market value of all final goods and services produced in a country in a given time period

1. GDP is a market value.

2. GDP is the value of the final goods and services produced.
   - final good vs. intermediate good
   - excluding intermediate goods and services avoids double counting.

3. GDP measures domestic production.

4. GDP measures production normally during a year or a quarter of a year.

Example:
B. **GDP and the Circular Flow of Expenditure and Income**

1. GDP measures the value of production, which also equals total expenditure on final goods and total income.

2. The **circular flow diagram** in *Fig. 5.1* illustrates the equality of income, expenditure, and the value of production.

   a) It shows the transactions among four economic agents
   - households
   - firms
   - governments
   - rest of the world

   b) Transactions in three aggregate markets
   - goods markets
   - factor markets
   - financial markets

3. Households and firms interact in two markets:

   a) In **factor markets** households receive income from selling the services of resources to firms. The total income received is *aggregate income*.

   b) In **goods markets** households buy, and firms sell goods and services that firms produce. Household spending is **consumption expenditure**, \( C \).

   c) Some firms sell, and others buy, capital goods in the goods market. Output produced but not sold is added to inventory. **Investment**, \( I \), are purchases of capital goods plus inventories.

4. Governments buy goods and services from firms:

   a) Total purchases of goods and services by governments are **government purchases**, \( G \).

   b) Government purchases are financed by taxes.
**Net taxes** = taxes paid to governments
   – transfer payments made by government
   – interest paid by governments on their debts.

c) Transfer payments are payments by government to firms and households.

5. Firms also interact with the rest of the world:
   a) Goods and services sold to the rest of the world are **exports, X**
   b) Goods and services bought from the rest of the world are **imports, M**
   c) **Net exports** are exports minus imports \( (\text{Net exports} = X - M) \).

6. GDP equals expenditure equals income:
   a) The circular flow model demonstrates how GDP can be measured in two ways.
   b) Aggregate expenditure \( = C + I + G + (X - M) \)
      (the value of output of final goods and services, which is GDP).
   c) Aggregate income earned from production of final goods, \( Y \), equals the total paid out for the use of resources. Firms pay out all their receipts from the sale of final goods, so income equals expenditure, \( Y = C + I + G + (X - M) \).
   d) The national income accounts are built on the foundation of the circular flow model.

C. **Financial Flows**

1. Financial markets finance deficits and investment.

2. Household saving, \( S \), flows to the financial markets.
Savings is what is left over from aggregate income after paying for consumption expenditures and taxes. In other words, we can write $S$ as:

$$ S = Y - C - T $$

or,

$$ Y = C + S + T $$

3. If government purchases exceed net taxes, the deficit $(G - T)$ is borrowed from the financial markets.

If $T$ exceeds $G$, the government surplus flows to the markets.

4. If imports exceed exports, the deficit with the rest of the world $(M - X)$ is borrowing from the rest of the world.

D. How Investment Is Financed

1. Investment is financed from three sources: private saving, $S$; the government budget surplus, $(T - G)$; and borrowing from the rest of the world $(M - X)$.

2. To see this:
   Start with the fact that aggregate expenditure equals aggregate income.
   $$ Y = C + S + T = C + I + G + (X - M). $$

   Then rearrange to obtain
   $$ I = S + (T - G) + (M - X) $$

3. Private saving, $S$, plus government saving, $(T - G)$, is called national saving.

E. Gross and Net Domestic Product

1. “Gross” means before accounting for the depreciation of capital. The opposite of gross is net.
2. To understand this distinction, we need to distinguish between flows and stocks in macroeconomics.
a) A flow is a quantity per unit of time; a stock is the quantity that exists at a point in time.

Examples:
   i. Wealth vs. savings
   ii. Capital vs. Investment
   iii. Wealth vs. Income

b) Figure 5.2 illustrates the relationships among capital, gross investment, depreciation, and net investment.

3. Gross profits, and GDP, include depreciation.

4. Increases in capital are one source of growth in potential real GDP; fluctuations in investment are one source of fluctuations in real GDP.

II. Measuring U.S. GDP

A. The Expenditure Approach is the sum of consumption expenditure, investment, government purchases of goods and services, and net exports.

B. The Income Approach measures GDP by first adding all the incomes paid to households by firms for the use of resources that those firms employ.

   1. The National Income and Product Accounts divide incomes into five categories:

      a) Compensation of employees
      b) Net interest
      c) Rental income
      d) Corporate profits.
      e) Proprietors’ income.

   2. The sum of these five income components is net domestic income at factor cost (NI). Two adjustments must be made to get GDP:
a) NI + Indirect taxes - subsidies = *Net domestic product at market prices (NDP)*

b) NDP + Depreciation (or capital consumption) = *Gross domestic product (GDP)*.

### III. Real GDP and the Price Level

#### A. Calculating Real GDP

1. **Real GDP** is the value of final goods and services produced in a given year when valued at constant prices.

2. The first step in calculating real GDP is to calculate **nominal GDP**, which is the value of goods and services produced during a given year valued at the prices that prevailed in that same year.
   - The old method of calculating real GDP was to value each year’s output at the prices of a base year—**the base year prices method**.

3. The new method of calculating real GDP, which is called the **chainweighted output index** method, uses the prices of two adjacent years to calculate the real GDP growth rate.

4. Example (using the base year price method).
B. Calculating the Price Level

1. The average level of prices is called the **price level**.

2. One measure of the price level is the **GDP deflator**, which is an average of the prices of the goods in GDP in the current year expressed as a percentage of the base year prices.

   a) The GDP deflator is calculated as

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

   From the previous example we have:

3. Nominal GDP is calculated using the current year prices, so the goods and services produced are valued at current year prices.

C. Deflating the GDP Balloon

1. Nominal GDP increases because production increases *and* because prices rise.

2. Using the GDP deflator we **deflate** nominal GDP to get real GDP—see Figure 5.3

IV. Measuring Economic Growth

A. We use real GDP to calculate the economic growth rate.
1. The **economic growth rate** is the *percentage change* in the quantity of goods and services produced from one year to the next.

\[
\text{Economic growth rate} = \frac{\text{Real GDP}_{\text{current year}} - \text{Real GDP}_{\text{previous year}}}{\text{Real GDP}_{\text{previous year}}} \times 100
\]

2. We measure economic growth so that we can make:
   a) economic welfare comparisons
   b) business cycle forecasts
   c) international welfare comparisons

**B. Economic Welfare Comparisons**

1. **Economic welfare** measures the nation’s overall state of economic wellbeing.

2. Real GDP is **not a perfect measure** of economic welfare for seven reasons:
   a) *Quality improvements* tend to be neglected in calculating real GDP.
   b) Real GDP does not include *household production*.
   c) Real GDP, as measured, omits the *underground economy*.
   d) *Health* and *life expectancy* are not directly included in real GDP.
   e) *Leisure time*, a valuable component of an individual’s welfare, is not included in real GDP.
   f) *Environmental damage* is not deducted from real GDP.
   g) *Political freedom* and *social justice* are not included in real GDP.

**C. Business Cycle Forecasts**

1. Real GDP is used to measure business cycle fluctuations.

2. These fluctuations are probably accurately timed but the changes in real
GDP probably overstate the changes in total production and people’s welfare caused by business cycles.

D. **International Comparisons**

1. Real GDP is used to compare economic welfare in one country with that in another.

2. Two special problems arise in making these comparisons.
   a) Real GDP of one country must be converted into the same currency units as the real GDP of the other country, so an exchange rate must be used.
   b) The same prices should be used to value the goods and services in the countries being compared, but often are not.