

## **CHAPTER 2: MEASUREMENT OF MACROECONOMIC VARIABLES**

### **CHAPTER OVERVIEW**

Prior to considering macroeconomic models, the real world counterparts to the variables, which appear in such models, are examined. These macroeconomic variables are defined and values for those in selected years are given.

The following variables from the national income accounts are considered, along with their interrelationships:

- *Gross domestic product*—a measure of all currently produced final goods and services evaluated at market prices.
- *National income*—the sum of all factor earnings from current production of goods and services.
- *Personal income*—the national income accounts' measure of the income received by persons from all sources.
- *Disposable personal income*—personal income minus personal tax payments equals disposable (after-tax) personal income.

The distinction between real and nominal GDP is explained and the following price indices are considered: the implicit GDP deflator, the consumer price index, and the producer price index. The final topic considered is the definition of potential income. Figure 2-3 examines the cyclical variation of actual output around the level of potential output during the 1970–2005 period.

### **ANSWERS TO QUESTIONS IN CHAPTER 2**

1. Gross domestic product (GDP) measures the flow of currently produced final goods and services evaluated at market prices. To be included in GDP, goods must be from current production; sales of existing assets would not be counted. Only final sales are counted, not sales of intermediate goods. All sales of financial assets, such as stocks and bonds, are not included in GDP.
2. Gross national product and gross domestic product differ in their treatment of international transactions. Gross national product includes earnings of U.S. corporations overseas and U.S. residents working abroad; gross domestic product does not. Conversely, gross domestic product includes earnings from current production in the United States that accrue to foreign residents or foreign-owned firms, although gross national product excludes these items.
3. National income is the sum of all factor earnings from current production of goods and services. National income falls short of gross national product because some items included in the proceeds of final sales (GNP) are not factor income. The most important of these other charges against GNP are depreciation and indirect business taxes.

4. Personal income is the national income accounts' measure of the income received by persons from all sources. When we subtract personal tax payments from personal income, we get personal disposable income. These measures differ from national income in that they include income to persons from sources other than current factor services (government transfer payments, for example) and exclude elements of national income not paid out to persons (undistributed corporate profits, for example). Personal income or personal disposable income, are useful measures because they gauge the income households can actually use for purposes of consumption or saving.
5. The GDP deflator is an implicit measure of the aggregate price level, including all elements of GDP. The consumer price index is an explicit price index that measures the retail prices of a fixed "market basket" of several thousand goods and services purchased by consumers. The producer price index measures the wholesale prices of approximately 3,000 items.
6. The percentage change in the price level was 30.6 percent between 1960 and 1970; 70.1 percent between 1973 and 1980; and 496.8 percent between 1960 and 2010.
7. Two problems arise when real GDP is measured in prices from a base year. First, every time the base year is changed the weights given to different sectors are changed and the history of the economy is rewritten. Secondly, and of a more serious nature, such a measure of real GDP ignores product substitutions that result from changes in relative prices and thus distorts the weights that should be assigned to different product categories.
8. Potential output is the level of output that would be achieved if all resources were used to their highest rates of utilization. Potential output is not directly observable but must be estimated based on what economists think is the sustainable level of resource utilization over long periods of time. This is fraught with ambiguities.
9. To convert 1960 dollars to 2010 dollars, you must multiply by the ratio of the GDP deflation in 2010 to the deflator in 1960. Thus, \$15,000 in 1960 dollars is equal to  $15,000(111/18.6) = \$89,516$  in 2010 dollars.

## CASE STUDY 2: HOUSEHOLD PRODUCTION AND THE MEASUREMENT OF OUTPUT

### Opening Discussion

Chapter 2 discusses many issues related to the measurement of output in an economy. Gross domestic product, or *GDP*, is generally considered the best measure of total output in the United States. It is not intended to be a measure of social well-being and thus the exclusion of environmental degradation from the official statistics is not considered a flaw in GDP. However, if GDP is intended to measure the total production of all goods and services in an economy, the exclusion of household production causes some serious problems.

The level of GDP is important to policy makers because it is used as a gauge for how well the economy is performing. Therefore, mismeasurement of GDP could result in misinterpretation of the economic environment.

For example, the labor force participation rate of second income earners in the United States has risen dramatically since the 1950s. Take a homemaker for example who prepared meals and maintained a well kept home. These services are similar to services provided in the marketplace. But, because they are not explicitly traded and paid for, there exists no straightforward way of measuring this production and it is thus left out of GDP calculations. What happens if this homemaker finds a job in the marketplace and cannot continue performing the previously provided household services? It is likely that increasing shares of these services are purchased on the open market where it can be measured. In other words, meals that used to be prepared at home (and not counted in GDP) are purchased at a restaurant (and counted in GDP). Household services that were formerly performed by the homemaker are now performed by a service worker. In the end, there is no change in the amount of household services being performed, only in the amount that is measured.

J. Steven Landefeld and Stephanie H. McCulla, two economists from the U.S. Bureau of Economic Analysis, have compiled adjusted GDP measures including household production.<sup>1</sup>

Year	Measured GDP	Adjusted GDP
1946	\$22.6 billion	\$333.3 billion
1997	\$8,110.9 billion	\$10,997.5 billion
Average Annual Change	7.3 percent	7.1 percent

As you can see the exclusion of household production results in the overestimation of the growth of nominal GDP in the United States by 0.2 percentage points.

### Exercises

1. Look at the following fictitious GDP numbers for a country:

Year	Measured GDP	Household Production	Household Production Traded in a Market

<sup>1</sup> Source: Landefeld, J. Steven, and Stephanie H. McCulla, "Accounting for Nonmarket Household Production within a National Accounts Framework." *Review of Income and Wealth*, Series 46, Number 3, September 2000.

1950	1,000	500	0
1960	1,200	500	50
1970	1,450	500	125
1980	1,750	500	180
1990	2,100	500	230
2000	2,500	500	300

2. Calculate the growth rate of measured GDP from 1950 to 2000.
3. Calculate the amount of unmeasured household production, which was performed in each year.
4. Calculate the growth rate of total output (measured GDP + unmeasured household production) from 1950 to 2000.

**Questions**

1. How does the exclusion of household production affect the measurement of the growth rate for total output?
2. How can the mismeasurement be alleviated?
3. Can this trend be expected to continue?
4. Can some of the growth in output measured in newly developed economies be attributed to a shift from household/subsistence production to market production?