MEASURING A NATION'S INCOME

Economics is divided into two branches: Microeconomics and macroeconomics. **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. The goal of macroeconomics is to explain the economic changes that affect many households, firms, and markets at once.

Various data is used by economists and policymakers to monitor the performance of the overall economy. GDP is the most closely watched economic statistic because it is thought to be the best single measure of a society's economic well-being.

THE ECONOMY'S INCOME AND EXPENDITURE

GDP measures two things at once: the total income of everyone in the economy and the total expenditure on the economy's output of goods and services. *For an economy as a whole, income must equal expenditure.* The reason that an economy's income is the same as its expenditure is simply that every transaction has two parties: a buyer and a seller. Every dollar of spending by some buyer is a dollar of income for some seller. Thus, the transaction contributes equally to the economy's income and to its expenditure.

In the economy, households buy goods and services from firms; these expenditures flow through the markets for goods and services. The firms in turn use the money they receive from sales to pay workers' wages, landowners' rent, and firm owners' profit; this income flows through the markets for the factors of production. In the economy, money continuously flows from households to firms and then back to households.

We can compute GDP for this economy in one of two ways: by adding up the total expenditure by households or by adding up the total income (wages, rent, and profit) paid by firms. Because all expenditure in the economy ends up as someone's income, GDP is the same regardless of how we compute it.

THE MEASUREMENT OF GROSS DOMESTIC PRODUCT

Gross domestic product (GDP) is the market value of all final goods and services produced within a country in a given period of time.

"GDP IS THE MARKET VALUE . . ."

Because market prices measure the amount people are willing to pay for different goods, they reflect the value of those goods. If the price of an apple is twice the price of an orange, then an apple contributes twice as much to GDP as does an orange.

"OF ALL . . ."

It includes all items produced in the economy and sold legally in markets. There are some products, however, that GDP excludes because measuring them is so difficult. GDP excludes items produced and sold illicitly, such as illegal drugs. It also excludes most items that are produced and consumed at home and, therefore, never enter the marketplace. Vegetables you buy at the grocery store are part of GDP; vegetables you grow in your garden are not.

"FINAL . . ."

GDP includes only the value of final goods. The reason is that the value of intermediate goods is already included in the prices of the final goods. Adding the market value of the paper to the market value of the card would be double counting.

An important exception to this principle arises when an intermediate good is produced and, rather than being used, is added to a firm's inventory of goods to be used or sold at a

later date. In this case, the intermediate good is taken to be "final" for the moment, and its value as inventory investment is added to GDP. When the inventory of the intermediate good is later used or sold, the firm's inventory investment is negative, and GDP for the later period is reduced accordingly.

"GOODS AND SERVICES . . ."

GDP includes both tangible goods (food, clothing, cars) and intangible services (haircuts, housecleaning, doctor visits).

"PRODUCED . . ."

GDP includes goods and services currently produced. It does not include transactions involving items produced in the past. i.e. selling used car versus new car.

"WITHIN A COUNTRY . . ."

GDP measures the value of production within the geographic confines of a country. When a Canadian citizen works temporarily in the United States, his production is part of U.S. GDP. When an American citizen owns a factory in Haiti, the production at his factory is not part of U.S. GDP. (It is part of Haiti's GDP.) Thus, items are included in a nation's GDP if they are produced domestically, regardless of the nationality of the producer.

". . . IN A GIVEN PERIOD OF TIME."

GDP measures the value of production that takes place within a specific interval of time. Usually that interval is a year or a quarter (three months). GDP measures the economy's flow of income and expenditure during that interval.

GDP for a quarter usually presents GDP "at an annual rate." i.e. quarterly GDP multiplied by 4, in order to compare quarterly and annual figures more easily.

When the government reports quarterly GDP, it presents the data after they have been modified by a statistical procedure called *seasonal adjustment.*

OTHER MEASURES OF INCOME

These other measures differ from GDP by excluding or including certain categories of income.

Gross national product (GNP) is the total income earned by a nation's permanent residents (called *nationals*). It differs from GDP by including income that our citizens earn abroad and excluding income that foreigners earn here.

Net national product (NNP) is the total income of a nation's residents (GNP) minus losses from depreciation.

Depreciation is the wear and tear on the economy's stock of equipment and structures, "consumption of fixed capital."

National income is the total income earned by a nation's residents in the production of goods and services. It differs from net national product by excluding indirect business taxes (such as sales taxes) and including business subsidies.

Personal income

Disposable personal income

When GDP is growing rapidly, these other measures of income are usually growing rapidly.

THE COMPONENTS OF GDP

To look at the composition of GDP among various types of spending, GDP (Y) is divided into four components: consumption (C), investment (I), government purchases (G), and net exports (NX):

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

This equation is an *identity*. Because each dollar of expenditure included in GDP is placed into one of the four components of GDP, the total of the four components must be equal to GDP.

Consumption is spending by households on goods and services.

Investment is the purchase of capital equipment, inventories, and structures, such as the General Motors factory. Investment also includes expenditure on new housing.

Government purchases include spending on goods and services by local, state, and federal governments.

Net exports equal the purchases of domestically produced goods by foreigners (exports) minus the domestic purchases of foreign goods (imports). A domestic firm's sale to a buyer in another country, such as the Boeing sale to British Airways, increases net exports.

Imports are subtracted from exports because imports of goods and services are included in other components of GDP. Net exports include goods and services produced abroad (with a minus sign) because these goods and services are included in consumption, investment, and government purchases (with a plus sign).

For example, suppose that a household buys a $30,000 car from Volvo, the Swedish carmaker. That transaction increases consumption by $30,000 because car purchases are part of consumer spending. It also reduces net exports by $30,000 because the car is an import.

When the government pays the salary of an Army general, that salary is part of government purchases. But what happens when the government pays a Social Security benefit to one of the elderly? Such government spending is called a *transfer payment* because it is not made in exchange for a currently produced good or service. From a macroeconomic standpoint, transfer payments are like a tax rebate. Like taxes, transfer payments alter household income, but they do not reflect the economy's production. Because GDP is intended to measure income from (and expenditure on) the production of goods and services, transfer payments are not counted as part of government purchases.

REAL VERSUS NOMINAL GDP

If total spending rises from one year to the next, one of two things must be true: (1) the economy is producing a larger output of goods and services, or (2) goods and services are being sold at higher prices. When studying changes in the economy over time, economists want to separate these two effects. In particular, they want a measure of the total quantity of goods and services the economy is producing that is not affected by changes in the prices of those goods and services. To do this, economists use a measure called *real GDP*. By evaluating current production using prices that are fixed at past levels, real GDP shows how the economy's overall production of goods and services changes over time. This amount, the production of goods and services valued at current prices, is called **nominal GDP.**

Part of the rise in GDP is attributable to the increase in the quantities of hot dogs and hamburgers, and part is attributable to the increase in the prices of hot dogs and hamburgers. To obtain a measure of the amount produced that is not affected by changes in prices, we use **real GDP,** which is the production of goods and services valued at constant prices. We calculate real GDP by first choosing one year as a *base year*. We then use the prices of hot dogs and hamburgers in the base year to compute the value of

goods and services in all of the years. In other words, the prices in the base year provide the basis for comparing quantities in different years. (Thus, for the base year, real GDP always equals nominal GDP.)

For example, to compute real GDP for 2003, we use the prices in 2001 and the quantities in 2003.

Nominal GDP uses current prices to place a value on the economy's production of goods and services. Real GDP uses constant base-year prices to place a value on the economy's production of goods and services.

Because real GDP is not affected by changes in prices, changes in real GDP reflect only changes in the amounts being produced. Thus, real GDP is a measure of the economy's production of goods and services. real GDP is a better gauge of economic well-being than is nominal GDP. We measure the growth as the percentage change in real GDP from one period to another.

THE GDP DEFLATOR

GDP deflator, reflects the prices of goods and services but not the quantities produced.

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100.$$

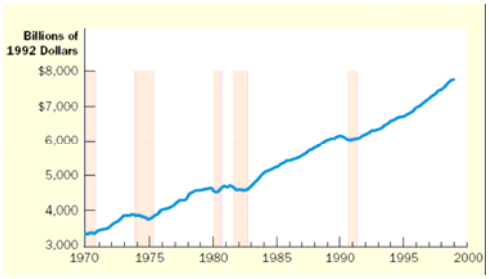
Because nominal GDP and real GDP must be the same in the base year, the GDP deflator for the base year always equals 100. The GDP deflator for subsequent years measures the rise in nominal GDP from the base year that cannot be attributable to a rise in real GDP.

The GDP deflator measures the current level of prices relative to the level of prices in the base year. Imagine that the quantities produced in the economy rise over time but prices remain the same. In this case, both nominal and real GDP rise together, so the GDP deflator is constant. Now suppose, instead, that prices rise over time but the quantities produced stay the same. In this second case, nominal GDP rises but real GDP remains the same, so the GDP deflator rises as well. Notice that, in both cases, the GDP deflator reflects what's happening to prices, not quantities.

For example, if the GDP deflator rose in year 2002 from 100 to 171, we can say that the price level increased by 71 percent.

The GDP deflator is one measure that economists use to monitor the average level of prices in the economy. Another one is the consumer price index.

CASE STUDY: REAL GDP OVER RECENT HISTORY



The most obvious feature of these data is that real GDP grows over time. A second feature of the GDP data is that growth is not steady. The upward climb of real GDP is occasionally interrupted by periods during which GDP declines, called *recessions.*

Recessions are associated not only with lower incomes but also with other forms of economic distress: rising unemployment, falling profits, increased bankruptcies, and so on.

GDP AND ECONOMIC WELL-BEING

GDP per person tells us the income and expenditure of the average person in the economy. Because most people would prefer to receive higher income and enjoy higher expenditure, GDP per person seems a natural measure of the economic well-being of the average individual.

GDP is not, however, a perfect measure of well-being. Some things that contribute to a good life are left out of GDP. It excludes the value of almost all activity that takes place outside of markets. In particular, GDP omits the value of goods and services produced at home. Volunteer work also contributes to the well-being of those in society, but GDP does not reflect these contributions. Another thing that GDP excludes is the quality of the environment such as the deterioration in the quality of air and water. GDP also says nothing about the distribution of income.

Measuring a nation's gross domestic product is never easy, but it becomes especially difficult when people have every incentive to hide their economic activities from the eyes of government.

CASE STUDY: INTERNATIONAL DIFFERENCES IN GDP AND THE QUALITY OF LIFE

We can use GDP as a measure of economic well-being is to examine international data.

Rich and poor countries have vastly different levels of GDP per person. In rich countries, such as the United States, Japan, and Germany, people can expect to live into their late seventies, and almost all of the population can read. In poor countries, such as Nigeria, Bangladesh, and Pakistan, people typically live only until their fifties or early sixties, and only about half of the population is literate.

Countries with low GDP per person tend to have more infants with low birth weight, higher rates of infant mortality, higher rates of maternal mortality, higher rates of child malnutrition, and less common access to safe drinking water. In countries with low GDP per person, fewer school-age children are actually in school, and those who are in school must learn with fewer teachers per student. These countries also tend to have fewer televisions, fewer telephones, fewer paved roads, and fewer households with electricity.

International data leave no doubt that a nation's GDP is closely associated with its citizens' standard of living.

CONCLUSION

We all get some sense of how the economy is doing as we go about our lives. But the economists who study changes in the economy and the policymakers who formulate economic policies need more than this vague sense—they need concrete data on which to base their judgments. Quantifying the behavior of the economy with statistics such as GDP is, therefore, the first step to developing a science of macroeconomics.