



## National Income Accounting

Macroeconomics is the study of national economies. When undertaking such a study, we are interested in issues such as the level of (and changes in) output, trade, employment, interest rates, and prices. Just as there are certain accounting conventions for measuring the performance of a business, there are conventions for measuring and analyzing a nation's economic performance. One important system is called **national income accounting**.

A central concept in national income accounting is **gross domestic product** (GDP) which measures aggregate national output for a given period. We start with a definition and then discuss two methods of decomposing GDP—by expenditure and by income. Each decomposition provides a different view of economic performance, and both are useful tools. We then discuss several relationships between the components of GDP. Finally, we address the differences between GDP and a closely related concept, **gross national product** (GNP).

### Measuring Aggregate Output

GDP is defined as the *market value* of all *final* goods and services *produced* in a *given* time *period* within a country.

Three points should be emphasized. First, GDP includes only *final* goods and services, and not intermediate products. For example, when you purchase a hamburger at McDonald's, you have purchased a final product, so the transaction is included in GDP. The meat and the packaging that McDonald's purchased from its suppliers are intermediate products, so those transactions would not be included in GDP. If intermediate products were counted in GDP, the value of the meat and the packaging would be counted twice—once when McDonald's bought them from suppliers and again when the meal is sold to a consumer. Using only the final goods and services avoids such double counting.

Second, GDP measures only currently produced goods and services; it excludes the purchase or sale of goods that already exist. For example, an old house sold to a new owner is not counted in current GDP. The full value of the house would have been included in GDP the year the house was built. When the house is resold, only the value of the services that accompany the sale contributes to GDP (e.g., the fees paid to real estate agents and lawyers). The purchase price of the house represents an asset transfer, not current production. The services that accompany the sale do represent current production and are therefore included in GDP.

Finally, GDP measures only goods and services that are exchanged in a market transaction. Market prices are used to assign a value to this production. Housekeeping and child-rearing services

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The *gross domestic investment* (I) term represents expenditures made to increase future output of final products. It includes business purchases of capital goods (new plant and equipment), changes in business inventory (a form of business investment), and residential construction of new homes (which

The government enters the picture in two ways. It imposes taxes and it provides transfer payments. This leaves the private sector with two sources—aggregate income (Y) and government transfer payments (TR)—and three possible uses—consumption (C), savings<sup>2</sup> (S), and taxes (TA). Because total inflows must equal expenditures, we know that:

$$Y + TR = C + S + TA \quad (2)$$

If we then substitute GDP for aggregate income (Y) and subtract transfer payments from both sides of the equation, we end up with an important identity.

$$GDP = C + S + (TA - TR) \quad (3)$$

### Putting the Pieces Together

We now substitute equation (1) for the GDP term in equation (3), and see that:

$$C + I + G + (X - M) = C + S + (TA - TR) \quad (4)$$

A bit more algebraic manipulation<sup>3</sup> reveals an important relationship among gross domestic investment (I), gross private savings (S), gross government savings (alternately, the fiscal surplus,  $TA - G - TR$ ), and borrowing from abroad (alternately, net imports,  $M - X$ ):<sup>4</sup>

<u>Gross Domestic Investment</u>	=	<u>Gross Private Savings</u>	+	<u>Gross Govt. Savings (Fiscal Surplus)</u>	+	<u>Borrowing from Abroad (Net Imports)</u>	(5)
I	=	S	+	(TA - G - TR)	+	(M - X)	(5)

Equation (5) indicates that investment must be financed from one of three sources: private savings, government savings, or borrowing from abroad. This implies that several important relationships will always hold:

- a fiscal deficit (government dissavings) must be financed by lower investment, higher private savings, or increased foreign borrowing.
- an increase in private savings will lead to increased investment, an increased fiscal deficit, or a decline in net imports (increase in net exports).
- a decline in net exports (an increase in net imports) is associated with lower domestic savings, a larger fiscal deficit, or increased investment.

**Exhibit 2** presents U.S. data on these balances for selected years.

<sup>2</sup> This term includes both household (personal) savings and business savings.

<sup>3</sup> This involves subtracting private consumption (C), government consumption (G), and net exports (X - M) from both sides of equation (4).

<sup>4</sup> The word “gross” in this context is used to indicate that the amounts are not adjusted to exclude depreciation.

## GDP vs. GNP

**Gross national product (GNP)** is an alternate measure of national economic performance. GNP measures the total income earned by domestically owned factors of production (people or capital) within a given period. GDP, in contrast, measures total income earned within a country. The difference between the two measures corresponds to the *income* earned by foreigners—national factors working abroad net of foreign factors working within a country.

The following examples illustrate the differences between GDP and GNP. If a Japanese lawyer worked in Los Angeles for the U.S. branch of a Japanese firm, his services would be included in U.S. GDP (the transaction occurred in the United States) but not U.S. GNP (the services were not provided by a U.S. national). Conversely, the profits of an American-owned factory located in Tokyo increase U.S. GNP (the factory's profits are a return to U.S. capital) but would not be included in U.S. GDP.

While the conceptual distinction behind the two measures is straightforward (geography vs. nationality), measuring overseas activity by a country's nationals is extremely difficult. In practice, countries count only firms' overseas profits (the return to capital) and payments sent home by its nationals living abroad.

The United States switched from GNP to GDP as its national standard in November 1991. There were at least three reasons for the switch. First, GDP provides a better measure of domestic economic activity than does GNP. Second, most other countries used GDP, so the switch made international comparisons easier. Third, GDP is somewhat easier to measure than GNP because the net foreign earnings component (money earned by U.S. nationals and firms in foreign countries) of GNP was difficult to measure.

For the United States, the difference between GNP and GDP is small (GDP was 0.08% smaller than GNP in 1992), but the difference can be quite large in other countries. In 1992, for example, GDP was larger than GNP in Zambia and Haiti (by 18% and 16% respectively), while it was smaller in Kuwait and Luxembourg (by 21% and 27%).

## Exhibit 1

U.S. GDP and national accounts by *e e d i e* over time (in billions of 1982 dollars)

Year	Real GDP	C	I	G	(X-M)	C%	I%	G%	NX%
1929	709.6	471.4	139.2	94.2	4.7	66.4	19.6	13.3	0.7
1933	498.5	378.7	22.7	98.5	(1.4)	76.0	4.6	19.8	(0.3)
1940	772.9	502.6	111.8	150.2	8.2	65.0	14.5	19.4	1.1
1945	1,354.8	592.7	76.5	704.5	(18.9)	43.7	5.6	52.0	(1.4)
1950	1,203.7	733.2	234.9	230.8	4.7	60.9	19.5	19.2	0.4
1955	1,494.9	873.8	259.8	361.3	-	58.5	17.4	24.2	-
1960	1,665.3	1,005.1	260.5	403.7	(4.0)	60.4	15.6	24.2	(0.2)
1965	2,087.6	1,236.4	367.0	487.0	(2.7)	59.2	17.6	23.3	(0.1)
1970	2,416.2	1,492.0	381.5	572.6	(30.0)	61.7	15.8	23.7	(1.2)
1975	2,695.0	1,711.9	383.3	580.9	18.9	63.5	14.2	21.6	0.7
1980	3,187.1	2,000.4	509.3	620.5	57.0	62.8	16.0	19.5	1.8
1985	3,618.7	2,354.8	637.0	731.2	(104.3)	65.1	17.6	20.2	(2.9)
1990	4,155.8	2,682.2	690.3	820.8	(37.5)	64.5	16.6	19.8	(0.9)
1994*	4,476.8	2,998.8	800.7	773.1	(95.7)	67.0	17.9	17.3	(2.1)

Source: Economic Report of the President, 1991. Table B-2, pp. 288-289.

\* 1994 figures from Economic Report of the President, 1995. Table B-2. 1987 figures deflated to 1982 dollars.

## Exhibit 2

U.S. Balance of Savings and Investment over time (in billions of nominal dollars)<sup>5</sup>

Year	Gross Domestic Investment (I)	Gross Private Savings (S)	Gross Govt Savings (TA - G - TR)	Foreign Borrowing (Net Imports) (M - X)	Statistical Discrepancy
1960	78.8	82.1	3.6	-3.2	-3.7
1965	118.0	124.4	1.2	-6.2	-1.4
1970	150.2	164.7	-11.4	-4.9	1.9
1975	225.4	302.2	-66.6	-21.4	11.2
1980	465.9	489.5	-39.6	-12.5	28.6
1985	715.1	731.5	-134.7	116.9	1.3
1990	799.7	861.7	-156.7	78.6	16.1
1995	1,038.2	1093.1	-141.0	114.4	-28.3

<sup>5</sup> All balances except those for 1995 are from the *Economic Report of the President*, February, 1996, Table B28, pp. 312-313. Figures were calculated as follows: private investment from column 16; private savings from column 2; fiscal deficit from column 7 (times -1) less column 17; net imports (borrowing from abroad) from column 18 (times -1); and statistical discrepancy from (-1 times) column 19 plus column 14. Totals may differ slightly due to rounding errors. The balances for 1995 are taken from the *Economic Report of the President*, February 18, Table B32, pp. 318-319.

### Abbreviations

GDP	- gross domestic product
GNP	- gross national product
C	- personal consumption expenditure
I	- gross domestic investment
G	- government purchases of goods and services
X-M	- net exports
Y	- earned income
S	- gross private savings
TR	- transfer income
TA	- taxes

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