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 during 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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performed by family members are not included because no market transaction has occurred. These services would be included if they were purchased from a cleaning service or day care facility.

Keeping track of the terminology in national income accounting can be confusing. You will often see figures other than GDP reported. Some of the most common are: *national income*, *personal income*, and *disposable personal income*. These measures are all sub-categories of GDP, and they fit together in a logical order. **Table A** shows the relationships between these figures, along with the corresponding figures for the United States in 1988.

Table A
GDP and Its Components

Measure:	U.S. Figure for 1988 (billions of dollars)
Gross Domestic Product (Aggregate Income)	4,864
- depreciation	- 506
Net Domestic Product (NDP)	4,358
- indirect business taxes	- 390
National Income	3,968
- corporate profits	- 328
- contributions to social insurance	- 445
+ govt. transfer payments	+ 555
+ net adj. for interest income	+ 184
+ personal dividend income	+ 96
+ business transfer payments	+ 31
Personal Income	4,062
- personal tax and non-tax payments	- 590
Disposable Personal Income	3,472

The Components of Output

While measures of aggregate output are useful, there are many cases where we would like to examine the components that make up this aggregate. Two decompositions are common: by expenditure and by income.

Expenditure Components

The most common method of disaggregating GDP is by expenditure components. Simon Kuznets, a Nobel laureate in economics from Harvard University, first devised the system called the **national income accounts**. He divided the national economy into four categories: *personal consumption expenditure* (C), *gross private domestic investment* (I), *government purchases of goods and services* (G), and *net exports* (X-M). Together, these four groups comprise the national economy. **Exhibit 1** presents U.S. GDP and expenditure accounts for selected years.

The expenditure components of GDP are represented as follows:

$$GDP = C + I + G + (X - M) \tag{1}$$

The *personal consumption* (C) term includes the purchase of goods and services by households for their own use. It includes spending on consumer nondurables (such as toothpaste, eating at a restaurant, or vacationing at Disney World) and on consumer durables (automobiles and refrigerators). It would not include the purchase of kitchen equipment for a restaurant (see investment), government purchases of office supplies (see government), or a second mortgage obtained to finance a Florida vacation (an asset exchange which does not represent current production).

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 produce future services in the form of shelter). Investment does not include purchases of existing plants or buildings, or of financial assets such as stocks and bonds, both of which represent transfers of existing assets. The treatment of government investment expenditures varies across countries. Many countries report government investment as a component of *I*. The United States reports government investment as a component of *G*, and thus includes only private investment in the *I* term.

The third component of GDP, *government purchases of goods and services* (G), combines governmental consumption expenditures with public investment. Examples include policemen's salaries, the purchase of office supplies, and public highway construction. The category includes all levels of government (federal, state, and local) but excludes government transfers (such as social security or welfare payments). Transfer payments are excluded because they do not represent payments for currently produced goods or services. Some countries, such as the United States, include government investment in this term. Others report it as a component of *I*.

The *net exports* (X-M) term represents the difference between domestic purchases and domestic production. The first three terms represent domestic purchases, while GDP represents total production. Exports are goods produced domestically but sold abroad. Because GDP measures national output, these goods should be included. Imports are goods produced abroad but sold domestically. They appear in the consumption term, but must be netted out because they are not produced domestically.

Expenditures that produce both current and future services are often difficult to classify. The following items often cause confusion. *Consumer durables*, such as automobiles and consumer appliances, are classified as consumption. *Residential housing construction* appears in the investment term. *Business expenditures* on consumption-type goods and services are classified as intermediate consumption. Because they are not *final* sales, such expenditures are not counted in GDP. Both *advertising* and *research and development* expenditures are classified as intermediate consumption.

Note that the investment term (I) measures gross investment. It does not adjust for the fact that capital wears out. **Net domestic product** (NDP) is equal to GDP minus depreciation. NDP thus measures the net amount of goods produced within a given period (e.g., the total value of production less the amount of capital used up to produce that output). NDP is typically about 10% smaller than GDP.

Income Components

We have seen that GDP is a measure of the output produced within a country during a given period. Corresponding to this output is the income that accrues to the factors of production—land, labor, and capital. A second way to disaggregate GDP is into income components. Aggregate income (which corresponds to GDP) can be decomposed into labor income (wages, salaries, and fringe benefits), capital income (profits, interest, and rents), depreciation, and indirect business taxes.[1]

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[1]   Depreciation is a component of aggregate income (GDP) and is treated as consumption of capital for national income accounting purposes. Similarly, indirect taxes (such as sales and excise taxes) are included in aggregate income because they raise the market price of goods. They are not part of national income because they are passed on to the government (see Table A).

Our formulation neglects net factor payments from abroad, which are an additional source for households. Net factor payments from abroad (NFPFA) include the foreign earnings of domestic corporations (net of foreign corporations' earnings in the home country) and net labor income of domestic residents working in foreign countries (less the labor income of foreign workers in the home country). NFPFA is a small item in most countries' national income accounts.

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[2] (S), and taxes (TA). Because total inflows must equal expenditures, we know that:

$$Y + TR \ = \ C + S + TA \tag{2}$$

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.

$$GDP \ = \ C + S + (TA - TR) \tag{3}$$

Putting the Pieces Together

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

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

A bit more algebraic manipulation[3] 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):[4]

Gross Domestic Investment		Gross Private Savings		Gross Govt. Savings (Fiscal Surplus)		Borrowing from Abroad (Net Imports)	
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.

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[2]   This term includes both household (personal) savings and business savings.

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

[4]   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 *net 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 *expenditure* 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)[5]

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

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[5] 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

Sources

Dornbusch, Rudiger and Stanley Fischer, *Macroeconomics*. 6th ed. McGraw Hill, 1994.

Economic Report of the President, February, 1991, 1995.

Mankiw, N. Gregory, *Macroeconomics*. 2nd ed. Worth, 1994.

Ruckstad, Michael G., *Macroeconomic Decision Making in the World Economy*. 3rd ed. Dryden, 1991.