CHAPTER Ca
National Income and Product

Editor: Richard Sutch

Richard Sutch

The Purposes of National Income Accounting

National product is a comprehensive measure of a nation's total annual production of commodities and services. Gross domestic product (GDP), the standard measure of national product for the United States, is defined as the market value of the goods and services produced in the United States. National income is the counterpart of national product. It represents the sum of all the incomes earned in producing national output. The two concepts – national income and national product – are equivalent, because the creation of output generates a valuable good or service that did not previously exist and the individuals whose labor or capital participated in the act of production count as their income their share of the value newly produced.

Estimates of the total output of the national economy are put to three main uses. First, when divided by estimates of the population they can be used as a rough index of the average standard of living. Calculated in this way, they can be used to compare the material standard of living in one country with that in another or the standard in one year with that in another. To make such comparisons meaningful, care must be taken to ensure that the evaluation of the myriad of goods and services that constitute national output is consistent across countries or across time. Second, time series of national output are used to study the progress of economic growth as the economy evolves and expands (or contracts) over time. Estimates of national output divided by the labor force provide estimates of labor productivity and its growth over time. Third, fluctuations in the total output are taken as indicators of booms and recessions, as the economy experiences what are often referred to as business cycles.

Economic Welfare

For the United States, GDP per capita has grown twenty-eight-fold since 1790 (series Ca13). This is the great success story of American history. J. Bradford DeLong (1998) has estimated that worldwide, GDP per capita per day in 1750 was between 50 cents and $1.80. For the world as a whole, in 2001 the average value of output per person per day was about $21. For the United States, among the countries with the highest GDP per capita, the figure was more than $90. For the poorest countries, in sub-Saharan Africa, the average was less than $2 (United Nations 2003). In 1790 the United States had a national output per capita per day of approximately $3.20 (series Ca13).

Although per capita national product is widely used as an index of the average standard of living or well-being, it is often criticized by economic historians and development economists as a poor indicator of changes, or differences between countries, in the material level of living provided by economic activity. The aggregate figures do not reflect changes in the distribution of income between the rich and the poor, in consumption needs arising from changes in the age composition of the population, or in worker-hours spent in economic activity. A significant problem in making comparisons of living standards in far distant times is that our high standard of living today derives not only from our highly productive manufacturing technology but also from our ability to manufacture whole new types of commodities. Some of the new goods do a better job of meeting our needs than the goods they replaced. It is in this sense that electric lighting is superior to whale-oil lamps. Other new goods meet wants today that no one even imagined in the distant past (e.g., personal computers, Botox injections, and air transportation). William Nordhaus (1997) has argued that the expansion in choice presented by the appearance of new goods adds enormously to our welfare. National output measures of the standard of living do not take into account this component of well-being.

There are other elements that influence our well-being that are perhaps as important as national output per capita. Frequently mentioned in this regard are reductions in infant mortality, rise in life expectancy, expanded opportunities for leisure time, reduced economic and social discrimination, and improvements in hygiene, health, education, and working conditions. These topics are dealt with in other chapters of *Historical Statistics*, so they need not delay us here. However, it is worth noting that the United Nations (2003) has produced estimates of life expectancy, school enrollment, and other indicators of welfare for many countries. All of these are highly correlated with national output per capita.

Economic Growth

Economic growth is a sustained process that expands national output over a significant period of time. When real output grows faster than the population, per capita output expands, reflecting the productive achievements of the economy. Because of the interest in long-term economic growth, considerable effort has gone into making estimates of national output for the United States extending back to 1790. Table Ca9–19 summarizes the work of many researchers by presenting estimates of national output for 1789–2002 (both in current and constant dollars, as well as in per capita terms). Figure Ca-A graphs the trend in real GDP over more than two centuries. The exponential expansion of per capita output is evident. However, it is more useful to plot these data on a logarithmic scale, which is displayed in Figure Ca-B. On such a graph a constant rate of economic growth will appear as a straight line. The steeper the slope is, the faster the rate of growth. The second graph also makes the annual fluctuations in output in the earlier
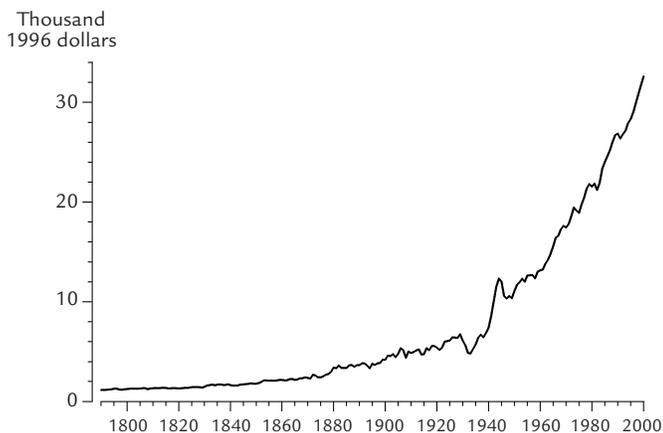

FIGURE Ca-A   Real gross domestic product per capita: 1790–2000
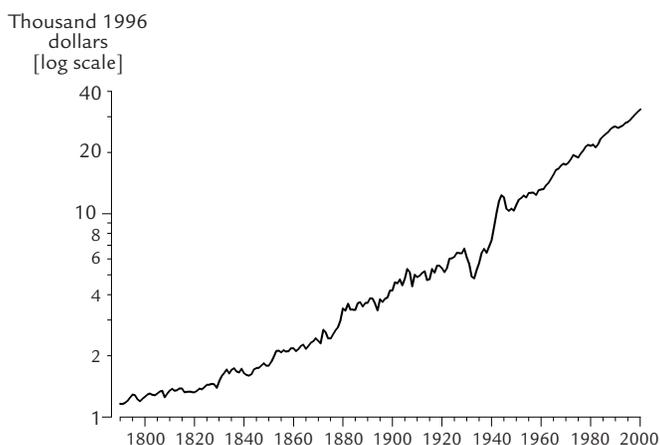
Source
Series Ca13.

FIGURE Ca-B   Real gross domestic product per capita – log scale: 1790–2000

Source
Series Ca13.

years more apparent, but the predominant feature is still the strong and continuous expansion of the economy.

As may be evident from an inspection of Figure Ca-B, the rate of growth was substantially lower before 1820 than after. Table Ca-C enables us to specify the change more precisely. This type of table is called a growth triangle. In the table one can find the annual rate of growth between any two census benchmark dates. For example, the number 1.6 in the lower left corner of the triangle tells us that the rate of growth over the entire period 1790–2000 has been 1.6 percent.

The only negative number in the table is for the decade 1810–1820 (–0.2 percent), and it is followed by a substantial rebound in the 1830s (1.3 percent). If we believe the annual numbers in series Ca13, a sharp change in the rate of growth occurred in the mid-1820s. As an illustration, the rate of growth before 1828 was only 0.6 percent whereas the rate between 1828 and 1860 was more than twice this value. Following the Civil War, the decadal rates of growth have averaged 2.0 percent (between 1870 and 2000), and only infrequently have they fallen below 1.3 percent. This remarkable record of sustained economic growth has been an object of intense interest to both economic theorists (for an introduction see Solow 2000) and quantitative economic historians (Gallman 2000; Abramovitz and David 2000). However, many objections raised to using real GDP per capita as a measure of welfare carry over as objections to using the growth of real GDP per capita as a measure of economic progress. It measures only marketed output, leaving out household work, the increased enjoyment of leisure time activity, improvements in health and longevity, and many intangible elements of economic progress (Fogel 1999).

Economic Fluctuations

The long-term trends displayed in the figures are punctuated by recurrent fluctuations in output per capita. There are several bursts of very rapid growth and a number of setbacks, most of them brief. However, the Great Depression of the 1930s followed by the wartime boom of the 1940s stand out as a particularly sharp roller-coaster movement. These recurrent, but not periodic, fluctuations are often called business cycles. They have long been a major preoccupation of macroeconomists, and those investigating the cause and consequences of these fluctuations closely scrutinize data on national output. Yet the annual time series presented in this chapter (particularly those that apply to the period before 1929) are not well suited for this purpose. Chapter Cb, on business fluctuations and cycles, presents national output data (and many other series) on a quarterly and monthly basis. This higher frequency of reporting is important for studying economic fluctuations.

For GDP to serve all three purposes passably well means that it serves none of them perfectly. Yet despite misgivings about this measure of national output, it has become the standard index of the size of the economic system. Although rival estimates have been proposed for addressing various difficulties associated with GDP, none have succeeded in replacing aggregate national output as the universally understood and universally cited measure of economic activity. There are several explanations for the wide acceptance of these figures. First, the U.S. government has designated measures of national output as the "official" measure of economic activity, and the United Nations extended this official approval to all other

TABLE Ca-C   Real gross domestic product per capita – average annual growth rates: 1790–2000

Terminal year	Initial year																				
	1790	1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
1800	0.8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1810	0.7	0.7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1820	0.4	0.2	−0.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1830	0.6	0.6	0.5	1.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1840	0.7	0.7	0.7	1.1	0.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1850	0.7	0.7	0.7	1.0	0.9	0.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1860	0.9	0.9	1.0	1.3	1.2	1.4	1.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1870	0.9	0.9	0.9	1.2	1.2	1.2	1.4	0.9	—	—	—	—	—	—	—	—	—	—	—	—	—
1880	1.2	1.3	1.3	1.6	1.7	1.9	2.2	2.3	3.8	—	—	—	—	—	—	—	—	—	—	—	—
1890	1.2	1.2	1.3	1.5	1.5	1.6	1.8	1.7	2.2	0.6	—	—	—	—	—	—	—	—	—	—	—
1900	1.2	1.2	1.3	1.5	1.5	1.6	1.7	1.7	1.9	1.0	1.4	—	—	—	—	—	—	—	—	—	—
1910	1.2	1.2	1.3	1.5	1.5	1.6	1.7	1.6	1.8	1.2	1.5	1.5	—	—	—	—	—	—	—	—	—
1920	1.2	1.2	1.3	1.4	1.4	1.5	1.6	1.5	1.7	1.1	1.3	1.3	1.0	—	—	—	—	—	—	—	—
1930	1.2	1.2	1.3	1.4	1.4	1.5	1.5	1.5	1.6	1.2	1.3	1.3	1.1	1.2	—	—	—	—	—	—	—
1940	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.5	1.6	1.3	1.4	1.4	1.4	1.6	1.9	—	—	—	—	—	—
1950	1.4	1.5	1.5	1.6	1.7	1.8	1.8	1.8	1.9	1.7	1.9	2.0	2.1	2.4	3.0	4.1	—	—	—	—	—
1960	1.4	1.5	1.5	1.7	1.7	1.7	1.8	1.8	1.9	1.7	1.8	1.9	2.0	2.3	2.6	2.9	1.7	—	—	—	—
1970	1.5	1.6	1.6	1.7	1.8	1.8	1.9	1.9	2.0	1.8	2.0	2.1	2.1	2.4	2.7	2.9	2.3	2.9	—	—	—
1980	1.5	1.6	1.6	1.8	1.8	1.9	1.9	1.9	2.0	1.9	2.0	2.1	2.1	2.3	2.6	2.7	2.2	2.5	2.1	—	—
1990	1.6	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.0	1.9	2.0	2.1	2.2	2.3	2.5	2.6	2.2	2.4	2.2	2.2	—
2000	1.6	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.0	1.9	2.0	2.1	2.1	2.3	2.4	2.5	2.2	2.3	2.1	2.1	1.9

Source
Computed from series Ca13.

Documentation
To find the growth rate (in percentage points) between any two years shown, select the initial year at the top of the table and the terminal year at the left. The growth rate is found at the intersection of the column and the row selected.

member nations. Second, there is wide agreement on the proper means of defining, constructing, and interpreting GDP. Moreover, once GDP had been defined, collecting the required information to measure aggregate output became, if not easy, at least a transparent accounting task. Devising a superior measure for any of the three purposes mentioned earlier typically would require incorporating aspects of human welfare, economic progress, or economic dynamics that are not so precisely defined or readily measured. Third, despite the inadequacies of the existing measures, economists generally believe that the official estimates are close to conceptually superior indexes and, even if one wished to depart from the official estimates, they would typically be the starting place for any more sophisticated analysis.

The detailed series that record the components of national output are as important as the bottom-line measurement of the level of the total. The definition of the various components is partly the result of the bureaucratic origins of much of the underlying data, but, more significantly, these components are deemed to be significant by the prevailing theories of macroeconomic dynamics. John Maynard Keynes, in *The General Theory of Employment, Interest and Money* (1936), used the components of national product and expenditure organized by economic sector and controlled by distinct classes of economic agents as the basis for his theory of the determination of income, output, and employment. Thus, national income and product accounts are the core of our macroeconomic information. They are critical in the formulation of the federal budget, they provide Congress and the White House with the vital signs of the economy's health, they guide business decisions, and they are the evidence evoked in most empirical analyses in macroeconomics since the mid-twentieth century.

The History of National Income Accounting

The conceptualization and implementation of a consistent scheme of national income and product accounts for producing a reliable, impartial, and accurate series of statistics has been called "one of the major achievements of economics in the twentieth century" (Ruggles 1983, p. 15; Daley 2000). In recognition of this achievement, Simon Kuznets, the economist most responsible for developing the concepts underlying the system of national income accounting used in the United States, received the Nobel Prize in Economic Science in 1971 in part for his contribution to their invention and implementation (Langley 1999, p. 58). The economics prize awarded to Richard Stone in 1984 for "fundamental contributions to the development of systems of national accounts" (which he made in England under Keynes's guidance) simply reemphasized the importance of national accounting systems for the systematic study of the social sciences.

The conceptualization and estimation of national output was initiated during the early 1930s when lack of comprehensive data hindered the government's efforts to combat the Great Depression. In response to the need for better data (and at the request of the Senate in 1932), the Department of Commerce commissioned Kuznets, of the National Bureau of Economic Research, to develop a system of accounts and to make estimates of national output. Kuznets presented the national income and product accounts system in a report to the Senate in 1934 with annual estimates for 1929–1932 (Kuznets 1934). He later extended his estimates back to 1919 and forward to 1938 (Kuznets 1941). The entry of the United States into World War II accelerated efforts to collect and summarize national economic data (Kuznets 1945). After the war,

Kuznets (1946) pushed his estimates back to 1869 and forward to 1943. At that point, the task of maintaining and continuing the national accounts was assigned to the Department of Commerce's Office of Business Economics (OBE, later to become the U.S. Bureau of Economic Analysis, BEA). The first report published by the OBE appeared in 1947 with annual estimates going back to 1929. Ever since, the OBE and its successor, the BEA, have been the keepers of the national accounts (Carson 1975). The BEA periodically revises and updates the entire historical record of accounts. The figures reported here reflect the 1996 comprehensive revision (U.S. Bureau of Economic Analysis 1998a, 1998b).

References

See the references at the conclusion of the essay on estimates of national product before 1929, in this chapter.

NATIONAL INCOME AND PRODUCT ACCOUNTS: OFFICIAL ESTIMATES

Richard Sutch

The NIPA Accounts

The national income and product accounts (NIPA) of the United States measure the total value of output produced by the American economy (gross domestic product, or GDP; see Table Ca1–8). Behind this statistical report is a precise double-entry accounting system that is used to keep track of the entire economy and that yields the GDP, a broad measure of the health of the economy, as its bottom line. Even more important, the accounts provide a wealth of underlying detail on the components of GDP so that systematic interrelationships may be investigated and structural features of the economy may be discerned.

The components of GDP are summarized in five basic accounts:

Account 1: National income and product
Account 2: Personal income and outlay
Account 3: Government receipts and expenditures
Account 4: Foreign transactions
Account 5: Gross saving and investment

Each account in the system is presented in Table Ca-D as a traditional T account with sources of funds (credits) recorded on the right-hand side and uses of funds (debits) recorded on the left-hand side. Of course, whether a particular item is a "source" or a "use" of funds is a matter of perspective. For this reason, each of the five accounts takes a different perspective. Each item that appears on the right of one account as a source will appear on the left of another account as a use. The two sides of each account sum to precisely the same total. Table Ca-D presents a simplified view of these five accounts with data for 1996, which is the base year for reporting GDP in constant prices (series Ca6).

Account 1 in Table Ca-D takes the "income approach" to calculating the national product on the left and the "expenditure approach" on the right. The right-hand side of account 1 defines GDP from the perspective of output (also see Tables Ca1–8, Ca20–63, and Ca74–148) and calculates it by assembling data on expenditures. All of the goods and services purchased are allocated into one of the following four broad categories: consumption (line 33), investment (line 37), government purchases (line 47), and net exports to the rest of the world (ROW) (line 44). The production of the goods enumerated on the right-hand side is the source of the incomes distributed on the left-hand side of account 1.

The left-hand side of account 1 totals the incomes earned by the producers of output (also see Tables Ca20–34). These income flows are categorized as labor income (line 1), owners' profits (line 6), rents received (line 7), corporate profits (line 8), and net interest received (line 17). These total to national income (line 18), which does not include depreciation (line 22), indirect taxes (such as sales taxes, line 20), and several other items (lines 19 and 21). To move from the national income concept to the domestic income concept, the net income paid to the ROW must be added (lines 28 and 29). In principle, gross domestic income (GDI) should exactly equal gross domestic product (GDP). However, in practice the match is not exact. The U.S. Bureau of Economic Analysis (BEA) believes that the product side of the account is more accurately measured, so GDP is defined by the expenditure approach. To close the gap between GDI and GDP, a statistical discrepancy, calculated as the difference between GDP and GDI, is added to the left-hand side to balance the account. In recent years the discrepancy has generally been less than 1 percent of GDP.

The double-entry accounting system used in national income accounting recognizes the two-sided nature of every transaction. For each purchase, there is a sale; for each payment, there is a receipt. Unlike business accounting, which takes the perspective of an individual firm, the NIPA are examples of social accounting that assume the perspective of the entire society. Each entry in the accounts has an equal counterentry. Again, take the right-hand side of account 1 as an example. Personal consumption expenditures (line 33) are also entered on the left-hand side of account 2 (line 3), where consumption appears as one of the uses to which personal income is put. In Table Ca-D the counterentries are given in parentheses following the designation of the entry; thus, in account 1 "33 personal consumption expenditures (2-3)" indicates that line 33 of account 1 records personal consumption and that the counterentry can be found in account 2 on line 3.

Account 2 presents the sources of personal income (on the right side) and the uses (or outlays) of that income (on the left). Note that personal saving (line 6) is calculated as a residual by subtracting taxes and personal outlays from personal income. Thus, the two sides of account 2 are in balance by construction.

Account 3 presents the sources of government revenue (on the right side) and government expenditures (on the left). All governments (federal, state, and local) are aggregated together in this simplified version; however, separate accountings at each level of government are available in the original source. In this account the balancing item, which is calculated as a residual, is the "current surplus or deficit" and is entered on the left-hand side. Note that the government surplus here is somewhat different in concept than that presented in government budgets and is distinguished from the latter by the notation "NIPA" in line 10.

Account 4 balances the country's receipts of money from the ROW with payments to the ROW. Thus, U.S. exports (line 1) generate receipts. Payments are made to the ROW in exchange for imports (line 4). In this account net foreign investment (line 10)