

Chapter 12

The national income and product accounts of the United States

This chapter focuses on the United States and its National Income and Product Accounts, otherwise known as NIPA. It first presents the history of NIPAs from the 1930s through to today. It looks at the NIPA summary account tables, and at other NIPA tables, and it explains how NIPAs are disseminated. Next, it considers the other sets of national, industry, regional, and international accounts produced by the Bureau of Economic Analysis (BEA) and integrated with the NIPAs, as well as programmes that provide source data used for the preparation of the NIPAs. Finally, the chapter discusses the importance of the BEA's advance quarterly GDP estimate and explains the methodology used to prepare it.

During the global economic recession, the US economy as measured by real GDP declined 4.3 percent from its peak in the fourth quarter of 2007 to its trough in the second quarter of 2009. Subsequently, real GDP began to grow again. From the second quarter of 2009 through the fourth quarter of 2013, real GDP growth averaged 2.4% per quarter (at an annual rate), and in the last quarter of 2013, real GDP reached a level that was 6.5% higher than its level six years earlier, before the recession began.

Estimates presented in this chapter reflect the official GDP estimates available on January 31, 2014. For a definition of “annual rates”, see Chapter 11.

Because real GDP increased at annual rates of 4.1% in the third quarter and 3.2% in the fourth quarter, at the end of 2013 forecasters were generally optimistic about the outlook for growth in 2014.

In its forecast published in the November 2013 *OECD Economic Outlook*, the OECD observed that fiscal contraction, low consumer and business confidence had constrained growth in 2013, but it assumed that those constraints would likely diminish during 2014 (OECD, 2013). Debt deleveraging and increases in asset prices were expected to boost growth in consumption and investment and contribute to gradual labour market recovery. These factors were reflected in the OECD forecasts of 2.9% US real GDP growth for 2014 and 3.4% for 2015. OECD forecast of real GDP growth for the four quarters ending in the fourth quarter of 2014 was 3.2%, and for the four quarters ending in the fourth quarter of 2015 was 3.5%.

This November 2013 OECD forecast was slightly more optimistic than the median forecast from a survey of US forecasters published in December 2013. In the United States, the National Association for Business Economics (NABE) has regularly published projections of economic activity since 1965 based on projections from a survey of a panel of expert forecasters.¹ According to the survey, released on December 9, 2013, annual growth for 2014 was projected to be 2.5%, and growth for the four quarters ending in the fourth quarter of 2014 was projected to be 2.8% (NABE, 2013).

Thus, in late 2013 many forecasters, both at the OECD and in the United States, predicted that the US economy will continue to grow over the next years. Forecasts are, of course, prone to error. Reading this manual after 2015,

the reader will be in a good position to judge whether the forecasts were right. In any case, all these projections are primarily based on the GDP and related measures from the US national income and product accounts, or NIPAs, which are the US non-financial national accounts. The NIPAs are used by the executive and the legislative branches of government to prepare budget estimates and projections, by the central bank (the Federal Reserve Board) to set interest and exchange rates, by international organisations and by the private sector to track and develop financial and investment strategies.

1. Background

The history of the NIPAs can be traced to the Great Depression of the 1930s, which highlighted the lack of comprehensive national economic data. To address this need, the Department of Commerce commissioned future Nobel laureate Simon Kuznets of the National Bureau of Economic Research (NBER) to develop a set of national income statistics. Kuznets co-ordinated the work of researchers at the NBER and a small staff of economists within the Commerce Department's Bureau of Foreign and Domestic Commerce. The first set of estimates was presented in a report to Congress in 1934, *National Income, 1929-32*, and beginning in 1935 the Bureau published annual updates to these series. By the late 1930s estimates were expanded to include income by state and a monthly income series.

To support World War II planning efforts, annual estimates of gross national product (GNP) by final expenditures were introduced in 1942, complementing the estimates of national income. By 1943, the main elements had been compiled for a set of accounts consisting of a consolidated production account at current and constant prices, sector income and outlay accounts, and a consolidated saving-investment account. These accounts were used for the analysis of wartime production goals and the development of anti-inflation policies. The NIPAs were formally introduced by the Office of Business Economics (OBE), an office created by the Commerce Department in 1945, with the publication of *National Income Supplement to the Survey of Current Business, 1947*.

Over the next three decades, the OBE extended the US accounts and improved their accuracy through the development of official input-output tables, capital stock estimates, more detailed and timely state and local personal income estimates, and improved measures of prices and inflation-adjusted (real) output. On the other hand, during that period the US largely chose not to adopt the emerging international standards (*System of National Accounts 1953* and *SNA 1968* – see Chapter 14) and retained the accounting structure that had been introduced in 1947.

In the 1980s, the Bureau of Economic Analysis (BEA), which was formed in 1972 as the successor agency to OBE, expanded the information on international trade in services in the International Transactions Accounts and the NIPAs. To improve the measurement of real output, BEA worked with the IBM Corporation to develop quality adjusted price and output measures for computers. BEA also dealt with rising concerns about the underground economy's impact on US economic statistics by revamping how it adjusted tax-return information used to prepare the NIPAs.

BEA actively participated in the 1993 revision of the SNA and announced that it planned to move toward the SNA.² Since the early 1990s, BEA has made many changes that have brought the NIPA measures of GDP, investment, and saving more closely in line with SNA 1993, and then SNA 2008. In 1991 BEA recognised GDP as the featured measure of US output, and in 1996 it adopted a chain-type Fisher index formula for measuring changes in real GDP and prices. In 1999 BEA recognised investment in software. In 2003, BEA adopted the reference rate approach for measuring the implicit financial services that borrowers and depositors receive from banks and renamed or revised the summary accounts to improve conformity with the SNA classification of transactions. In addition, BEA expanded the NIPA framework, as expressed in a series of summary accounts, from five to seven accounts, and made several changes to sector definitions to improve consistency with the SNA, as well as with BEA input-output (IO) accounts, the Federal Reserve Board (FRB) financial accounts, and the Bureau of Labour Statistics (BLS) productivity statistics. BEA also began to present industry estimates on the basis of the new North American industry classification system (NAICS), adopted in 1997 by the United States, Canada and Mexico.

Although these changes to the NIPAs have increased the consistency of both the NIPAs and the SNA, a few differences remain. As BEA continues to work toward improving consistency with the SNA, most of these differences are likely to eventually go away, though in a few cases special presentations of the accounts will be retained in order to address the needs of the US users. An overview of these differences is provided at the end of this chapter in section "Going further: Differences between the NIPAs and SNA". Several differences occur only in terminology and not in substance. For example, the NIPA name for household final consumption expenditures is Personal Consumption Expenditures (PCEs).

Most of the US economic accounts are prepared by BEA, a statistical agency located in the Department of Commerce. In addition to the NIPAs, BEA prepares estimates of the US International Transactions Accounts (ITAs), which provide US transactions and balances with the rest of the world and include current, capital and financial accounts, and the international investment position. The Federal Reserve Board (FRB) prepares the Financial

Accounts of the United States (FAUS), formerly known as the flow of funds accounts, which provide capital accounts, financial accounts, and balance sheets for sectors. BEA and FRB jointly prepare the Integrated Macroeconomic Accounts (IMAs), which combine NIPA, financial accounts, and balance sheet data in an SNA-style presentation. Productivity estimates are prepared by the BLS, a statistical agency located in the Department of Labour. Although both the financial accounts and the productivity estimates are prepared separately from the NIPAs, there is close co-ordination between BEA and the other agencies.

BEA describes its mission as providing timely, relevant and accurate economic accounts data in an objective and cost-effective manner. It also works to promote a better understanding of the US economy in the publication of its accounts.³

Although the NIPAs are BEA's main project, BEA has extended its estimates to cover a wide range of economic activities. In addition to the NIPAs, BEA now prepares national, regional, industry and international accounts, providing information on such key issues as economic growth, regional economic development, inter-industry relationships and the US position in the global economy.

To produce these programmes, BEA collects data from other statistical agencies as well as from businesses. These data come from over 400 surveys and other data collections sponsored by other federal statistical agencies, from aggregate tax data, administrative and regulatory sources, and private trade sources. BEA also conducts its own surveys, mostly on direct investment and on international trade in services.

To ensure that the accounts continue to provide appropriate measures for a changing economy, BEA staff engages in research and collaborates with researchers in other government agencies. BEA also participates in research conferences and workshops through organisations such as of the Conference on Research in Income and Wealth and the International Association for Research in Income and Wealth. BEA obtains more direct input through a BEA Advisory Committee and through participation with the Census Bureau and BLS in the Federal Economic Statistics Advisory Committee. Both committees, which consist of economists and statisticians from academia and business, meet regularly to provide advice and recommendations on agency policy.

2. NIPA Tables

The NIPAs consist of the NIPA summary accounts (see Tables 12.1 and 12.2) and other NIPA tables. The summary accounts provide a simplified presentation of the most important aggregates in the NIPAs and illustrate the accounting relationships among the accounts. The other nearly 300 regularly

published NIPA tables provide monthly, quarterly and annual detailed estimates, including key measures not presented in the summary accounts. NIPA estimates are regularly published on BEA website and in the *Survey of Current Business*; supplemental estimates, including underlying detail, are also made available on BEA website.⁴ As with most countries, the frequency, timeliness, coverage and presentation of the US national accounts largely reflect the availability of reliable source data and the needs of data users.

Table 12.1. **Summary national income and product accounts, 2012**
Billions of US dollars, current prices

Account 1. Domestic Income and Product Account					
Line			Line		
1	Compensation of employees, paid	8 620.0	15	Personal consumption expenditures (3-3)	11 149.6
2	Wages and salaries	6 935.1	16	Goods	3 769.7
3	Domestic (3-12)	6 920.5	17	Durable goods	1 202.7
4	Rest of the world (5-11)	14.6	18	Nondurable goods	2 567.0
5	Supplements to wages and salaries (3-14)	1 684.9	19	Services	7 379.9
6	Taxes on production and imports (4-15)	1 122.9	20	Gross private domestic investment	2 475.2
7	Less: Subsidies (4-8)	57.3	21	Fixed investment (6-2)	2 409.1
8	Net operating surplus	4 033.2	22	Non-residential	1 970.0
9	Private enterprises (2-19)	4 060.9	23	Structures	437.3
10	Current surplus of government enterprises (4-25)	-27.7	24	Equipment	907.6
11	Consumption of fixed capital (6-14)	2 542.9	25	Intellectual property products	625
			26	Residential	439.2
12	Gross domestic income	16 261.6	27	Change in private inventories (6-4)	66.1
			28	Net exports of goods and services	-547.2
13	Statistical discrepancy (6-20)	-17	29	Exports (5-1)	2 195.9
			30	Imports (5-9)	2 743.1
			31	Government consumption expenditures and gross investment (4-1 plus 6-3)	3 167.0
			32	Federal	1 295.7
			33	National defense	817.1
			34	Nondefense	478.6
			35	State and local	1 871.3
14	Gross domestic product	16 244.6	36	Gross domestic product	16 244.6
Account 2. Private Enterprise Income Account					
Line			Line		
1	Income payments on assets	2 654.2	19	Net operating surplus, private enterprises (1-9)	4 060.90
2	Interest and miscellaneous payments (2-21 and 3-20 and 4-20 and 5-13)	2 407.2	20	Income receipts on assets	2 475.80
3	Dividend payments to the rest of the world (5-14)	141.1	21	Interest (2-2 and 3-4 and 4-7 and 5-5)	1 809.90
4	Reinvested earnings on foreign direct investment in the United States (5-15)	105.9	22	Dividend receipts from the rest of the world (5-6)	297.9

Table 12.1. **Summary national income and product accounts, 2012** (cont.)

Billions of US dollars, current prices

5	Business current transfer payments (net)	106.9	23	Reinvested earnings on US direct investment abroad (5-7)	368.1
6	To persons (net) (3-24)	41.4			
7	To government (net) (4-23)	70.6			
8	To the rest of the world (net) (5-19)	-5.1			
9	Proprietors' income with inventory valuation and capital consumption adjustments (3-17)	1 224.9			
10	Rental income of persons with capital consumption adjustment (3-18)	541.2			
11	Corporate profits with inventory valuation and capital consumption adjustments	2 009.5			
12	Taxes on corporate income	434.8			
13	To government (4-16)	402.4			
14	To the rest of the world (5-19)	32.4			
15	Profits after tax with inventory valuation and capital consumption adjustments	1 574.7			
16	Net dividends (3-21 plus 4-21)	770.3			
17	Undistributed corporate profits with inventory valuation and capital consumption adjustments (6-12)	804.3			
18	Uses of private enterprises income	6 536.7	24	Sources of private enterprises income	6 536.70

Account 3. Personal Income and Outlay Account

Line			Line		
1	Personal current taxes (4-14)	1 498.0	10	Compensation of employees, received	8 611.6
2	Personal outlays	11 558.4	11	Wage and salary disbursements	6 926.8
3	Personal consumption expenditures (1-15)	11 149.6	12	Domestic (1-3)	6 920.5
4	Personal interest payments (2-21 and 3-20 and 4-20 and 5-13)	248.4	13	Rest of the world (5-3)	6.3
5	Personal current transfer payments	160.4	14	Supplements to wages and salaries (1-5)	1 684.9
6	To government (4-24)	88.5	15	Employer contributions for employee pension and insurance funds	1 170.6
7	To the rest of the world (net) (5-17)	71.9	16	Employer contributions for government social insurance	514.3
8	Personal saving (6-11)	687.4	17	Proprietors' income with inventory valuation and capital consumption adjustments (2-9)	1 224.9
			18	Rental income of persons with capital consumption adjustment (2-10)	541.2
			19	Personal income receipts on assets	1 958.5
			20	Personal interest income (2-2 plus 3-4 plus 4-7 plus 5-5 less 2-21 less 4-20 less 5-13)	1 211.6
			21	Personal dividend income (2-16 less 4-21)	746.9
			22	Personal current transfer receipts	2 358.3
			23	Government social benefits (4-4)	2 316.8
			24	From business (net) (2-6)	41.4
			25	Less: Contributions for government social insurance, domestic (4-18)	950.7
9	Personal taxes, outlays and saving	13 743.8	26	Personal income	13 743.8

Table 12.1. **Summary national income and product accounts, 2012** (cont.)

Billions of US dollars, current prices

Account 4. Government Receipts and Expenditures Account					
Line			Line		
1	Consumption expenditures (1-31)	2 548.0	13	Current tax receipts	3 041.2
2	Current transfer payments	2 384.7	14	Personal current taxes (3-1)	1 498.0
3	Government social benefits	2 334.8	15	Taxes on production and imports (1-6)	1 122.9
4	To persons (3-23)	2 316.8	16	Taxes on corporate income (2-13)	402.4
5	To the rest of the world (5-18)	18	17	Taxes from the rest of the world (5-18)	17.8
6	Other current transfer payments to the rest of the world (net) (5-18)	49.9	18	Contributions for government social insurance (3-25 and 5-18)	955.3
7	Interest payments (2-21 and 3-20 and 4-20 and 5-13)	631.6	19	Income receipts on assets	131.4
8	Subsidies (1-7)	57.3	20	Interest and miscellaneous receipts (2-2 and 3-4 and 4-7 and 5-5)	107.9
9	Net government saving (6-13)	-1 362.3	21	Dividends (2-16 less 3-21)	23.4
10	Federal	-1 109.7	22	Current transfer receipts	159.1
11	State and local	-252.7	23	From business (net) (2-7)	70.6
			24	From persons (3-6)	88.5
			25	Current surplus of government enterprises (1-10)	-27.7
12	Government current expenditures and saving	4 259.2	26	Government current receipts	4 259.2
Account 5. Foreign transaction current account					
Line			Line		
1	Exports of goods and services (1-29)	2 195.9	9	Imports of goods and services (1-30)	2 743.1
2	Income receipts from the rest of the world	818.6	10	Income payments to the rest of the world	565.7
3	Wage and salary receipts (3-13)	6.3	11	Wage and salary payments (1-4)	14.6
4	Income receipts on assets	812.3	12	Income payments on assets	551.1
5	Interest (2-21 and 3-20 and 4-20)	146.3	13	Interest (2-2 and 3-4 and 4-7)	304.1
6	Dividends (2-22)	297.9	14	Dividends (2-3)	141.1
7	Reinvested earnings on US direct investment abroad (2-23)	368.1	15	Reinvested earnings on foreign direct investment in the United States (2-4)	105.9
			16	Current taxes and transfer payments to the rest of the world (net)	144.6
			17	From persons (net)(3-7)	71.9
			18	From government (net) (3-25 plus 4-5 plus 4-6 less 4-17 less 4-18)	45.4
			19	From business (net) (2-8 plus 2-14)	27.3
			20	Balance on current account, national income and product accounts (7-1)	-439
8	Current receipts from the rest of the world	3 014.5	21	Current payments to the rest of the world and balance on current account	3 014.5
Account 6. Domestic Capital Account					
Line			Line		
1	Gross domestic investment	3 094.2	10	Net saving	129.4
2	Private fixed investment (1-21)	2 409.1	11	Personal saving (3-8)	687.4
3	Government fixed investment (1-31)	619	12	Undistributed corporate profits with inventory valuation and capital consumption adjustments (2-17)	804.3
4	Change in private inventories (1-27)	66.1	13	Net government saving (4-9)	-1 362.3

Table 12.1. **Summary national income and product accounts, 2012** (cont.)

Billions of US dollars, current prices

5	Capital account transactions (net)	-6.6	14	Plus: Consumption of fixed capital (1-11)	2 542.9
6	Transfer payments for catastrophic losses (7-3)	7.7	15	Private	2 049.3
7	Other capital account transactions (7-4)	-14.2	16	Government	493.6
8	Net lending or net borrowing (-), national income and product accounts (7-5)	-432.4	17	General government	434.2
			18	Government enterprises	59.4
			19	Equals: Gross saving	2 672.2
			20	Statistical discrepancy (1-13)	-17
9	Gross domestic investment, capital accounts transactions and net lending	2 655.2	21	Gross saving and statistical discrepancy	2 655.2

Account 7. Foreign Transactions Capital Account

Line			Line		
			2	Capital account transactions (net)	-6.6
			3	Transfer payments for catastrophic losses (6-6)	7.7
			4	Other capital account transactions (6-7)	-14.2
			5	Net lending or net borrowing (-), national income and product accounts (6-8)	-432.4
1	Balance on current account, national income and product accounts (5-20)	-439	6	Capital account transactions (net) and net lending, national income and product accounts	-439

The seven NIPA summary accounts presented above cover the transactions that are grouped in the SNA as the production account, the distribution and use of income accounts, and the capital accounts. Relative to the SNA (see Table 12.2), the NIPA domestic income and product account (Summary account 1) provides estimates of GDP by final expenditure component and is similar to the SNA production account for the total economy. NIPA Summary Account 1 also provides information about the income earned in the production of GDP; in the SNA, these items are included in the generation of income account. The NIPA personal income and outlay account (Summary account 3) and the government current receipts and expenditures account (Summary Account 4), and part of the private enterprise income account (Summary account 2) roughly correspond to the remaining SNA distribution and use of income accounts for the domestic sectors (Summary account 2 actually corresponds most closely to the SNA entrepreneurial income account). The NIPA domestic capital account (Summary account 6) corresponds to the SNA capital account for the total economy. Both the NIPAs and SNA include a current account and a capital account for the rest-of-the world sector (Summary accounts 5 and 7). The major entries in the NIPA summary accounts are described below for each account.⁵

Table 12.2. **NIPA Summary accounts**

Transactions	Domestic Accounts			Rest of the World
	Business	Economic Sectors		
		Government	Personal	
Production		Domestic income and product (Summary Account 1)		Foreign transactions current account
Income and outlay	Private enterprise income (Summary Account 2)	Government current receipts and expenditures (Summary Account 4)	Personal income and outlay (Summary Account 3)	(Summary Account 5)
Saving and investment		Domestic capital account (Summary Account 6)		Foreign transactions capital account (Summary Account 7)

“1-36” means line 36 of Summary Account 1.

Account 1, the domestic income and product account, shows the consolidated production of all sectors of the economy as the sum of goods and services sold to final users on the right side and the income generated by that production on the left side. GDP, (1-36) the featured measure of US output, is the market value of the goods and services produced by labour and property located in the United States. GDP is measured by the sum of goods and services produced in the US and sold to final users (the “expenditure” or “final demand” approach). The NIPAs use “Gross domestic income” (GDI) (1-12) to refer to the measure of GDP based on the income approach, that is, the costs incurred and the incomes earned in the production of GDP.⁶ Although, in theory, GDP should equal GDI, in practice they differ because their components are estimated using largely independent and less-than-perfect source data. In the US accounts, this difference, the “statistical discrepancy,” is not allocated among various GDP or GDI components, but is recorded as an “income” component. The section “Going further: Statistical Discrepancies in the NIPAs”, provides additional information.

Account 2, the private enterprise income account, provides additional information on the sources and uses of income by private enterprises, which explains for most of the output in the US economy. This account shows sources of private enterprise income (2-24) on the right side of the account and uses of private enterprise income (2-18) on the left side. It can be thought of as a consolidation of the accounts for non-financial corporations, financial corporations, and unincorporated businesses, including owner-occupied housing. Public (government) enterprises are not included in this account,

however, because complete estimates on sources and uses of income of public quasi-corporations are not currently available. The IMAs present separate, SNA-style accounts for non-financial corporations, financial corporations, and unincorporated businesses.

Accounts 3, 4 and 5 show the receipts and expenditures of the other major sectors of the US economy. Account 3 is the personal income and outlay account and covers the NIPA personal sector, which is made up of households and non-profit institutions serving households. It shows “personal income” (3-26) on the right side and the disposition of this income in terms of personal taxes, outlays and saving on the left side. Account 4, the government receipts and expenditures account, shows government current receipts (4-27) on the right side and government current expenditures and net saving (4-13) on the left side. Account 5, the foreign transactions current account, shows current payments to the rest of the world and balance on current account (5-21) on the right side, and current receipts from the rest of the world and balance (5-8) on the left.

Account 6 is the domestic capital account and provides information on the saving and investment of the domestic sectors of the economy. Account 7 is the foreign transactions capital account and provides information on capital transactions with the rest of the world. Account 6 shows the gross saving and the statistical discrepancy (6-20) on the right side and gross domestic investment, capital account transactions and net lending (6-7) on the left side. Net lending or net borrowing (-), national income and product accounts (6-8) is equal to the balance on current account (5-20) less capital account transactions (6-5). Account 7 shows on the right side the sum of two entries from Account 6, capital account transactions to the rest of the world (net) and net lending or net borrowing (-), national income and product accounts. Capital account transactions consist of capital transfers and acquisition less disposals of non-produced assets. The left side shows the balance on current account, national income and product accounts (7-1).

All of the NIPA tables, with the most recent estimates, are available on the BEA website. There are about 100 tables with monthly or quarterly estimates. The remaining tables either show annual estimates of additional detail than is shown quarterly, data on special topics, such as employment and hours worked, or comparisons of source data with NIPA aggregates. Several NIPA tables feature supplemental measures that have no counterparts in the seven NIPA summary accounts. Information about these measures, which also are shown in BEA news releases, is provided in Box 12.1.

Box 12.1. Featured Measures of NIPA Tables

Gross domestic purchases is the market value of goods and services purchased by US residents, regardless of where those goods and services were produced. It is GDP minus net exports of goods and services; equivalently, it is the sum of PCE, gross private domestic investment and government consumption expenditures and gross investment. The SNA refers to this aggregate as domestic final expenditures. BEA uses gross domestic purchases for its featured measure of price change because it excludes prices paid by foreigners for US exports and includes prices of imports. *Final sales to domestic purchasers* is gross domestic purchases minus the change in private inventories. Some analysts refer to this measure as “**domestic demand**” or “**final domestic demand**”. *Final sales of domestic product* is GDP minus change in private inventories; equivalently, it is the sum of PCE, gross private fixed investment, government consumption expenditures and gross investment, and net exports of goods and services. Gross national product is the market value of the goods and services produced by labour and property supplied by US residents. In the SNA, this measure is called gross national income (GNI). In the NIPAs, GNI is based on the income approach and GNP is based on the expenditure approach, so they differ by the statistical discrepancy. *Personal saving as a percentage of disposable personal income*, frequently referred to as “**the personal saving rate**”, is the ratio of personal saving to disposable personal income. *Gross saving as a percentage of gross national income*, sometimes referred to as “**the national saving rate**”, is calculated as the ratio of gross saving (the sum of gross private saving and gross government saving) to GNI.

3. Dissemination of NIPAs

Each month, BEA releases quarterly estimates of most NIPA tables and monthly estimates of personal income and outlays. The quarterly GDP estimates are released through a news release on the following schedule: “advance” estimates are released near the end of the first month after the end of the quarter; as more detailed and more comprehensive data become available, “second” and “third” estimates are released near the end of the second and third months, respectively.⁷ The three sets of quarterly GDP estimates – the advance, second and third – are referred to by BEA as the “current” estimates.⁸

For the advance release, estimates of GNI, GDI, national income, net operating surplus, corporate profits and net interest payments are not prepared. Except for fourth-quarter estimates, the initial estimates for these series are released with the second GDP estimates, and the revised estimates

are released with the third GDP estimates. For the fourth quarter, these estimates are released only with the third GDP estimates. The monthly personal income and outlays estimates are released in another news release, usually one business day following the release of the quarterly estimates and one month after the end of the reference month.

When the quarterly GDP are released, estimates for preceding quarters or months are generally not revised except as follows. At the time of the release of the second quarterly GDP estimate, revisions to the preceding quarter (and corresponding months) are made to private wages and salaries and related income components to reflect newly available comprehensive source data on wages and salaries. (See Section 5: "Compilation of quarterly gross domestic product".) Revisions to monthly personal income and outlays are made to the months of the same quarters that are revised in the quarterly GDP estimates. Each July, an annual NIPA revision is usually carried out, and revisions are made to the months and quarters of at least the three most recent years. These revisions are timed to incorporate newly available major annual source data. Lastly, at about five-year intervals, comprehensive revisions are carried out. These revisions incorporate the benchmark I-O (Input-Output) accounts that are prepared at five-year intervals, as well as conceptual changes (such as updates to SNA), other improvements in statistical methodology, and changes in the tables that present the estimates. The conceptual changes to the accounts are generally carried back as far as necessary and feasible, in some cases leading to revisions back to 1929.

News releases are prepared for the quarterly GDP and monthly personal income and outlays releases. At 8:30 in the morning of each release date, the news release is posted on BEA website and printed copies are given to representatives of the media at the Commerce Department's main office in Washington, DC. For GDP, the release is accompanied by a technical note, which provides information about BEA assumptions for key missing source data and provides information about methodologies used to prepare the newly released estimates.

Later that same morning and in the following several days, additional information is posted on BEA website. The posting usually starts with updating the 106 NIPA tables that will appear in the next issue of the *Survey of Current Business*. The tables are available as "interactive tables" that allow the user to specify options such as frequency and date ranges, as well as in several other formats, such as "pdf." Each month's *Survey* also includes an article, "GDP and the Economy," which provides an analysis of the most recent estimates.

The remaining NIPA tables mostly provide annual estimates and usually are published each year in the August issue of the *Survey* at the time of an annual or comprehensive NIPA revision.

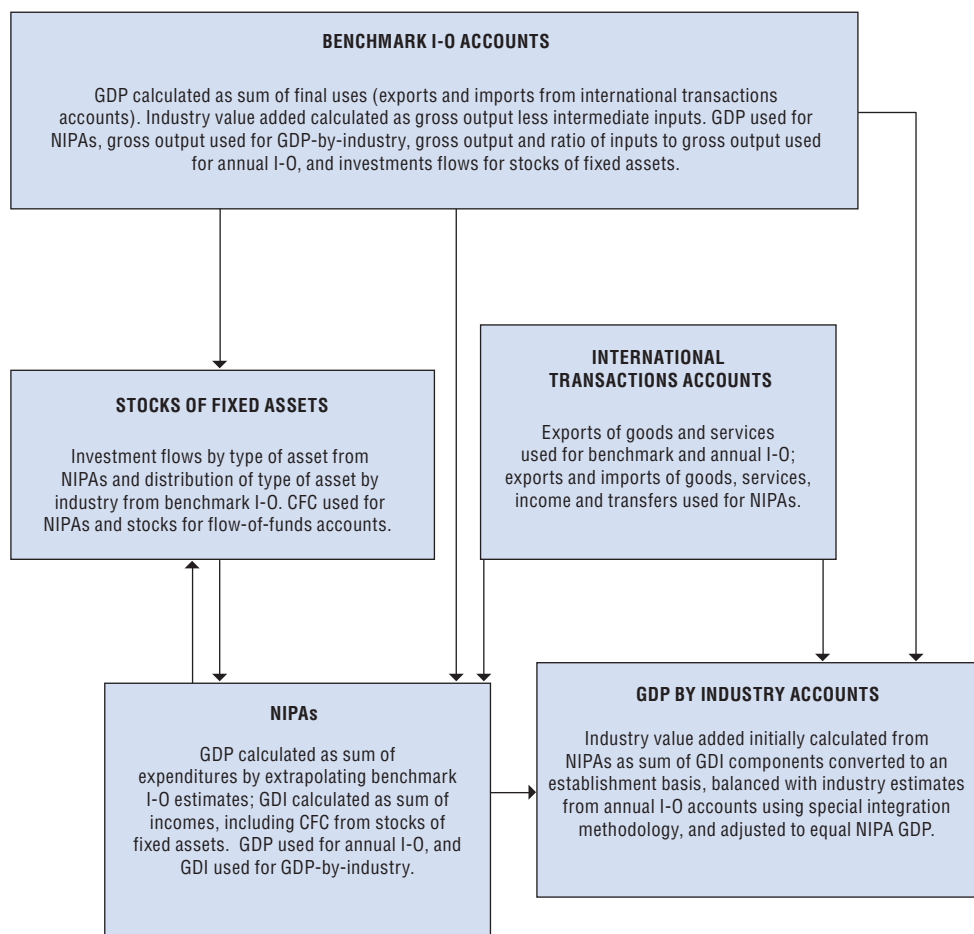
In addition, after each monthly estimate, BEA posts to its website what it calls “supplemental estimates”. These estimates include monthly and quarterly detail not included in the NIPA tables, additional information on BEA assumptions for missing source data in the latest advance GDP estimates, and SNA-related NIPA data. The additional (underlying) NIPA detail consists primarily of estimates used by BEA to prepare the monthly and quarterly NIPA estimates that BEA considers less reliable as individual series. The information on “Key source data and assumptions” for the first (advance) estimate of each quarter provides the key source data and assumptions used by BEA in preparing the quarterly estimates of GDP and its major expenditure components, including information on more monthly source data series than are provided in the technical note.

The information on SNA-related estimates consists of two entries. The first is “Estimates prepared by BEA for international comparisons based on the System of National Accounts”. These estimates are SNA-based estimates prepared annually, usually several weeks after the release of revised annual NIPA data in late July. The estimates are prepared in response to a questionnaire used by the OECD and are slightly different from the official NIPA estimates published by BEA to improve comparability with the accounts of other countries. The second set of SNA-related estimates appears as “Gross Domestic Product by final expenditure category (International Style)”. These tables present quarterly NIPA final expenditure data in a format that is more consistent with accounts and presentations used by the OECD. The estimates show final consumption expenditures (government and personal consumption expenditures) and gross domestic investment (government gross investment and gross private domestic investment).

The IMAs are posted on BEA website once each quarter, a few days after the FRB releases the FAUS. The FRB also posts the IMAs on its own website, www.federalreserve.gov.

4. Other NIPA-related programmes

In addition to the NIPAs, BEA produces other sets of national, industry, regional, and international accounts that are integrated with the NIPAs, as well as programmes that provide source data used for the preparation of the NIPAs. The following discussion, summarised in Figure 12.1, covers the programmes that produce these estimates, which are the ITAs, the benchmark I-O accounts, fixed assets and the annual industry accounts programme. Detailed information on each of the programmes is available on BEA website.

Figure 12.1. **Integration of US national accounts**

International transactions accounts (ITA)

The ITAs provide monthly estimates of international trade in goods and services (prepared jointly by BEA and the Census Bureau) and quarterly and annual estimates of the US international transactions accounts. The ITAs are revised annually, with the revised estimates published in the July issue of the *Survey*. The current account, which measures receipts and payments on goods, services, income, and unilateral current transfers, provides the basis for all foreign transactions in the NIPAs as well as in the benchmark and annual I-O accounts. NIPA Table 4.3 presents an annual reconciliation of differences between the two accounts. Quarterly, an abbreviated reconciliation

is published in the *Survey* in Appendix A, under “Additional Information About the NIPA Estimates”.

Benchmark input-output accounts

The SNA includes an integrated set of supply-and-use tables that balance industry output for each commodity with its final uses (see Chapter 10). BEA benchmark I-O accounts provide detailed “make” (supply) and “use” tables at five-year intervals corresponding with the economic census. In contrast to the SNA, which recommends the valuation of resources at basic prices and the valuation of uses at market prices, in BEA accounts both resources and uses are valued at market prices. The make and use tables provide benchmark estimates of gross output and intermediate inputs that are consistent with the annual industry accounts and benchmark estimates of final uses that are consistent with the NIPAs. Benchmark I-O accounts for 2002 were released in 2007 and the accounts for 2007 were released in 2013.

Fixed assets

BEA prepares annual estimates of the net stocks of equipment, of structures, and of intellectual property products owned by business and by government.⁹ The estimates are presented at current cost and as real estimates, expressed both as chain-type quantity indexes and chained dollars. The accounts include estimates of depreciation (that is, consumption of fixed capital) and investment, and also include estimates of historical-cost private net stocks and depreciation for making comparisons with business accounts. Detailed estimates are provided for net stocks, depreciation, and investment by industry and by asset type. The estimates of net stocks and depreciation are derived using the perpetual inventory method, which is based on investment flows and a geometric depreciation formula; the gross investment flows used for these calculations are from the NIPAs. The depreciation estimates are used for the NIPA estimates of consumption of fixed capital, which are used to derive net income, saving, and investment.

Annual industry accounts

In 2004, BEA introduced integrated annual industry accounts, which consist of GDP-by-industry and annual I-O accounts. The integration provides detailed, consistent information on the structure of the US economy, including the annual contributions of private industries and government to GDP and the annual flow of goods and services used in the production processes of industries and going to the final uses that comprise GDP.¹⁰ It should be noted that when BEA annual industry accounts are balanced, they do not provide an independent measure of GDP; they use the NIPA GDP measure that is based on the expenditure approach. Except in benchmark

years, when measures of output and final demand are fully reconciled in the benchmark I-O accounts, BEA does not use the production approach to determine GDP because the source data on intermediate inputs are not available on a timely basis and are less reliable than the source data used for the expenditure approach. As in the benchmark I-O accounts, BEA estimates of value added by industry are calculated at market prices rather than at basic prices, as called for by the SNA. The different definitions of value added by industry are discussed in the section, “Going further: Alternative methods of valuation of output and value added: Basic Prices and Market Prices”.

5. Compilation of quarterly gross domestic product

As reported in the previous section, BEA prepares a series of current estimates of GDP for each quarter. The first (advance) estimate is published at the end of the first month after the quarter ends, the second estimate is published at the end of the second month, and the third estimate is published at the end of the third month. Additional estimates of each quarter are published as part of an annual revision (usually at the end of each July) or a comprehensive revision (every five years).

Although the advance quarterly GDP estimate is based on a combination of preliminary survey results and BEA projections of missing months of survey data, both of which are revised in subsequent GDP estimates, it is the advance estimate that attracts the most attention by users. This focus reflects the timeliness of the advance estimates (one of the most timely of OECD countries), the transparency of the processes used by BEA to prepare the estimates and their history of reliability. For example, a key to the transparency of the quarterly GDP estimates is the public availability of the source data and estimating procedures used by BEA to prepare these estimates. BEA provides this transparency with the following: 1) annual publication in the *Survey* of the source data and estimating methods for the major NIPA components; 2) public announcement, preferably in advance, of any changes of source data or estimating methods, including special adjustments; 3) publication of BEA assumptions for missing source data for key indicator series at the time of the release of the advance estimate; and 4) publication of the underlying detail used to prepare the current quarterly GDP estimates.

As for the reliability of the advance and two other current quarterly GDP estimates, these estimates have a long history of reliability, defined as whether the GDP estimates present a consistent, general picture of the economy. This history, which is based on published studies of reliability, have found that the advance estimates have consistently indicated whether growth is positive or negative, accelerating or decelerating, high or low relative to the

trend and where the economy is in relation to the business cycle.¹¹ A 2011 study shows that the quarterly estimates correctly indicate the direction of change of real GDP 97% of the time, its acceleration or deceleration 72% of the time, and correctly indicate whether real GDP growth is above, near or below trend growth more than 80% of the time. Other results of these studies are summarised in a special section of the advance quarterly GDP news release as shown in the section below, “Revisions to GDP”.

Revisions to GDP

In the news release for the advance quarterly GDP estimates, BEA provides summary information on revisions by comparing successive estimates of current-dollar and real GDP. Based on data for 1983-2010, from the advance estimate to the preliminary estimate (one month later), the average revision to real GDP without regard to sign is 0.5 percentage point in terms of annual rate; from the advance estimate to the third estimate (two months later), it is 0.7 percentage point, and from the advance estimate to the latest estimate, it is 1.3 percentage points. The larger average revisions to the latest estimate reflect the fact that comprehensive revisions include major conceptual improvements to the NIPAs, such as the introduction of chain indexes and the capitalisation of software and research and development.

The current quarterly GDP estimates are developed from aggregating individual estimates of the expenditure components of GDP. These individual quarterly estimates are prepared by the extrapolation of estimates of the previous quarter using, for example, direct indicators from monthly or quarterly surveys and indirect indicators, such as past trends. Specific information on these source data is provided in the next section of this chapter. The extrapolation procedure used is designed to prepare estimates based on the “best change method” from the previous quarterly estimates. Using this method, estimates for the most recent quarter are determined by calculating the change (usually in percentage terms) in the indicator series and multiplying that change with the published value for the previous quarter.¹² This calculation means that if the level of an indicator series has been revised, the revised “best level” is not reflected in the current estimate. Instead, best levels are not reflected until the time of an annual or comprehensive revision. Incorporating the source data on a best-change basis provides accurate measures of the change in GDP although resulting in levels of the estimates that are not fully consistent with the source data. In general, BEA incorporates source data on a best-change basis in order to preserve accurate estimates of growth and consistent time series.¹³

The process for all quarterly GDP estimates starts with a group of BEA specialists who prepare estimates for specific components. This estimation process takes place over a two-week period set to coincide with the availability

of key source data. The specialists work with the standard methodologies, obtain the source data and apply the appropriate estimating methodology that, depending on the quarterly estimate that is being prepared, may include developing judgmental assumptions for missing source data. The estimates are made using seasonally adjusted values of the source data whenever available in order to ensure comparability between the source data and the GDP estimates. If seasonally adjusted source data are not available, the specialists apply seasonal adjustments to the source data before extrapolating it. The specialists also review the source data for changes that would affect consistency, such as a new survey methodology, reliability (such as a high no response rate) or relevance for estimating the GDP component for a particular period, such as a natural disaster. Based on this review, the specialist determines if any special adjustments are needed. For example, the survey for wages and salaries measures average weekly hours only for the middle week of the month. If this middle week is not representative of the entire month because of severe weather that occurred later in the month, the specialist would recommend that an adjustment is needed.

The estimates recommended by the specialists are then subject to a two-step review process. The first review is conducted by a special review team of senior economists who work with the specialists. This team reviews all of the recommended estimates to make sure that the assumptions for missing source data for all components have been made in a consistent manner, that adjustments have been made where needed, and that economic relationships between components, such as between inventory change and sales, are consistent with the state of economic activity depicted by the overall GDP estimate. Frequently, this review results in specialists revising their initial estimates. This review takes place over a three- to four-day period and ends two days before the publication of the GDP estimate. The team concludes its work by preparing a complete set of NIPA estimates for presentation for the second review step. This second review is conducted by BEA senior staff the day before the estimates are published. They conduct a high-level review of the impact of assumptions for key source data on the major aggregates and compare the proposed GDP estimates to alternative measures of output, such as hours worked, industrial production, or private sector forecasts of GDP growth. The senior staff review seldom results in changes to the estimates proposed by the review team, but the review does prepare them to respond to questions from users about the implications of the estimates.

Although the steps in the estimation process are the same for each of the three current GDP estimates, there are some important differences in the processes depending on the estimate. For the advance estimate, many of the monthly key source data series are available only for the first two months of the quarter, which are usually subject to revision in subsequent months. As a

result, the specialists and two groups that review the estimates focus on the assumptions for missing source data, based on historical information and on likely revisions to the available source data. For series for which there are data for all three months of the quarter, differences between the source data and the corresponding NIPA component are reviewed for anomalies. For example, such a review would be made of differences between the Consumer Price Index (CPI) and the PCE measures of price change.¹⁴

For the second and third estimates, more source data become available to replace the specialists' assumptions for missing data, and for the first three quarters of the year, direct estimates of corporate profits are also available. Consequently, the review of the specialists estimates shifts from the assumptions for missing source data to the revisions from the incorporation of new and revised source data. The availability of direct estimates of corporate profits also shifts the focus of the review to the specialists' assumptions for missing source data for profits of certain industries. The most important difference between the review of the advance and the second GDP estimates is that the availability of corporate profits provides an estimate of GDI and the statistical discrepancy. Because large changes in the statistical discrepancy indicate problems in the source data, when there are such changes, the review team in particular looks at the reliability of the NIPA components to determine if adjustments are needed. For the third GDP estimate, there is even less missing source data and fewer assumptions to review. In addition, the specialists and review team look at past revisions to source data to determine any patterns of future revision that might warrant additional adjustments.

As in other OECD countries, one of the major purposes of BEA release process is to insure the integrity of these estimates.¹⁵ This process consists of steps to ensure that the estimates have been prepared without any interference or influence by persons outside of BEA and that the estimates to be published are not given to anyone not authorised to have them. In particular, considering the importance given in the financial markets, for example, to the advance estimate of the US quarterly GDP, pre-release access to confidential information by people trading in the bond and stock market would give these traders an unfair advantage and infringe on the proper functioning of these and related markets. To preclude any outside influence or interference, BEA has put into place the following restrictions: 1) strict adherence to the release of data according to an announced schedule; 2) access to data prior to release is limited to certain BEA staff with a need to know; 3) under *Statistical Policy Directive 3* issued by the President's Office of Management and Budget, access by policy officials is limited to the provision of the data to the Council of Economic Advisers on the afternoon before the

data are released; and 4) physical and computer security restricts access to those with a need to know.

A key security feature of the BEA process is reflected in the conduct of the senior management review of the proposed GDP estimates. This meeting, known as the “lock-up” meeting, is conducted the day before release, has limited attendance, and is conducted in a physically secure location at BEA headquarters. Once the attendees of these meetings have been provided the proposed estimates, they may not be in contact with anyone outside BEA and are allowed only limited and monitored access to BEA staff for the duration of the meeting. Meetings usually begin shortly after noon and continue until the estimates are final and the news release and supporting materials are completed and delivered to the Council of Economic Advisers. This delivery usually is made in the late afternoon by a member of the review team.

There is no additional distribution of the news release or the estimates until the next morning. If requested by policy officials of the Department of Commerce, BEA will provide these officials with a briefing on the estimates an hour before release under the condition that these officials remain at the briefing with no contact with anyone else until release time. The news media are also provided the estimates a half hour before release in a secure room that prevents contact with anyone outside the room until release time; the room is equipped with computers for the media to prepare their stories and telephone lines for representatives of the broadcast media to record their stories at release time.

6. Methodologies for preparing quarterly GDP

BEA publishes detailed and summary methodologies – both the source data and the estimating methods – used to prepare GDP and other NIPA components. Detailed methodologies are published in *Concepts and Methods of the U.S. National Income and Product Accounts* and in separate methodology papers. Because improvements to these methodologies are regularly incorporated as part of each annual and comprehensive revision, BEA includes descriptions of changes in methodology in annual *Survey of Current Business* articles about the revisions and also publishes a separate annual article in the *Survey* that provides summary information on the methodologies for the components of GDP and GDI.¹⁶ The methodologies used for the calculation of the advance quarterly estimate is the last step of a process that begins with the incorporation of the most recent benchmark I-O account into a comprehensive revision. First, revised annual estimates are calculated by extrapolating forward the estimates of NIPA components for the newly incorporated I-O benchmark.¹⁷ Second, quarterly estimates are calculated by interpolating these new annual estimates. Third, quarterly estimates up to the

most recent period are calculated by extrapolating forward the last interpolated quarterly estimate. Finally, the advance quarterly estimate for the latest quarter is calculated by extrapolation. For annual revisions, the calculation of revised annual and quarterly estimates follows the same sequence, but only covers the years open for revision (generally, the most recent three years).

This section provides information on the methodologies used to prepare the selected components of the advance quarterly estimates of current-dollar and real GDP. In Section 2, three aspects of the NIPAs were noted: current-dollar GDP is measured using the expenditure approach; the measure based on the income approach is called GDI, which differs from GDP by the statistical discrepancy; finally estimates of value added by industry are not based on a separate production approach, but are controlled to GDP from the expenditure approach. Thus, the discussion of the methodologies used for GDP is limited to the components that are the elements of final expenditures (household final expenditures, government final consumption, gross capital formation, and exports *minus* imports).

For both quarterly and annual real GDP, the methodologies focus on the calculation of the detailed expenditures components of real GDP. These component estimates of prices and quantities are aggregated to GDP and its major components, using an index number aggregation formula. BEA uses a Fisher index formula allowing for changes effects in relative prices and in the composition of output over time. As a result, the quantity or price changes are not affected by the substitution bias that is associated with changes in quantities and prices calculated using a fixed-weighted (Laspeyres) formula. Annual changes in quantities and prices are calculated that incorporate weights from two adjacent years. Quarterly changes in quantities and prices are calculated using a Fisher formula that incorporates weights from two adjacent quarters, and quarterly indexes are adjusted for consistency to the annual indexes before percent changes are calculated.

The chained-dollar values for the detailed GDP components will not necessarily sum to the chained-dollar estimate of GDP (or to any intermediate aggregate) because the relative prices that are used as weights differ from those of the reference year. A measure of the effect of such differences is provided by a “residual” line – the difference between the chained-dollar value of the main aggregate in the table and the sum of the most detailed components in the table. For periods close to the reference year, when the relative prices that are used as weights have usually not changed much, the residuals tend to be small, but for periods further from the reference year, the residuals tend to be larger. The non-additivity of the chained-dollar estimates makes them less useful for analyses of contributions to growth (see Chapter 2); consequently, BEA provides tables of “contributions to percent

change” that can be used as exact measures of the contributions of individual components.

For the current-dollar NIPA estimates, the 14 components of final demand covered in this section have been selected as representative of the estimating methods used by BEA and of the availability of source data for the advance GDP estimate. In its annual presentation of summary methodologies, BEA shows source data and estimating method for components grouped by estimation method for the complete NIPA calculation and revision process. The presentations cover about 50 groupings of GDP components and 40 groupings of GDI components.

Availability of source data

BEA uses a wide range of monthly, quarterly and annual source data as well as indicator series to extrapolate from benchmark-year estimates. These data come from statistical agencies, federal tax returns, federal government regulatory programmes, and private trade sources, and they vary greatly in their publication and revision practices.

The timely availability of the source data determines their use in the calculation of the estimates. For most components, source data are not available for all the months of the quarter at the time of an advance GDP estimate, thus BEA calculates trend-based data for the missing source data, some of which are quarterly and some of which are monthly. For most components, these trend-based estimates are replaced by indicator series in successive revisions. For example, for an advance GDP estimate, about 46% of GDP is calculated using quarterly indicators or monthly indicators that are available for all three months of a quarter, 30% is calculated using two months of the indicator series and one month of trend-based data, and 24% is calculated using only trend-based data.¹⁸ For the third quarterly estimate of GDP, which is published two months later, about 90% of GDP is calculated from indicator series, about 9% from only trend-based data, and less than 1% from a combination of indicator series and trend-based data. A few new indicator series, such as the Census Bureau’s quarterly services survey and monthly data on electricity consumption, become available for the second and third quarterly GDP estimates.

To allow users to assess the validity of the trend-based data, which are usually based on the judgment of the BEA specialists, BEA provides users with the “assumptions for missing source data”, and publishes the most important of these assumptions at the time of the GDP news release.

Estimating methods

BEA selects the estimating method for a component depending on the availability and reliability of the source data and the extent to which these source data meet NIPA definitions. Among the estimating methods that BEA uses to calculate the current-dollar estimates are the following: the commodity-flow method; the retail control method; the perpetual inventory method; and the fiscal year analysis method. The commodity-flow method starts with estimates of domestic output, adjusts the output for imports, exports and inventory change, and allocates the result to purchases by households, business and government. The complete commodity-flow method is used for most expenditure components of the benchmark I-O accounts; an abbreviated form of this method is used to prepare annual and quarterly NIPA estimates for components for which the necessary source data are available.¹⁹ The retail control method uses retail store sales data, adjusted to reflect sales to households, to estimate annual and quarterly household purchases of specific products. The perpetual inventory method, which cumulates flows to derive stocks, is used to calculate estimates of the stock of fixed assets, which is used to estimate annual and quarterly estimates of consumption of fixed capital. The fiscal year analysis method is used to estimate annual estimates of consumption expenditures and gross investment by the federal government. The estimates of expenditures are calculated based on analysis of detailed outlays data from budget documents. BEA adjusts these budget outlays to NIPA definitions and allocates them to the appropriate NIPA component, such as consumption expenditures or transfer payments. The fiscal year analysis also provides a set of control totals for quarterly NIPA estimates.

For the estimates of real GDP, BEA uses three methods: deflation, quantity extrapolation and direct valuation. The most widely used method is the deflation method in which a quantity index is calculated by dividing the current-dollar index by an appropriate price index. In the quantity extrapolation method, quantity indexes are used to extrapolate from the base-year value. In the direct valuation method, quantity indexes are calculated by multiplying the base-year price by actual quantity data for the index period. In all three methods, quantity indexes are converted into real or chained-dollar GDP by multiplying the index number by the base year current-dollar value.

Methodologies for selected components of current-dollar GDP

Table 1 of the November 2013 *Survey of Current Business* summary methodology article shows the methodologies for about 50 groups of GDP components. The components selected below illustrate the various combinations of estimating methods and source data used for the annual

estimates, other than a benchmark year, and for the advance quarterly GDP estimates. The first 13 components are listed in sequence by the number of months of source data available for the advance estimate. For the first four components, key source data are available for the advance estimate for all three months of the quarter. For the fifth through the tenth components, key source data are available for only two months of the quarter. For components 11-13, the advance quarterly estimate is based primarily on trend-based data calculated by BEA. The last component, investment in software, illustrates the use of different source data for the quarterly and annual estimates.

1. *PCE for most durable and nondurable goods.* Both the annual and quarterly estimates of these PCE components are calculated using the retail control method. For all but the most recent year, annual estimates are based on estimates of retail store sales from the Census Bureau annual retail trade survey. For the most recent year, the annual estimate is based on the Census monthly survey of retail trade. For the advance quarterly estimate, all three months of survey results are available and subject to further revision.
2. *PCE for gasoline and oil.* Both the annual and quarterly estimates of this component are calculated as the product of physical quantities purchased and the average retail price. For the advance quarterly estimate, all three months of gallons consumed and average retail price are available and subject to further revision.
3. *New autos and light trucks (both PCE and private fixed investment).* Both the annual and quarterly estimates for these components are calculated as the product of quantity purchased and an average price. Unit sales, information on allocating sales among consumers and other purchasers, and average list price, are available from trade sources. For the advance estimate, all three months of unit sales and price data and two months of data to allocate sales among consumers and other purchasers are available.
4. *State and local government compensation of employees.* Annual estimates for wages and salaries are from BLS tabulations from the quarterly census of employment and wages (QCEW). For the other components of compensation, employer contributions for government social insurance are from federal agencies administering these programmes; employer contributions for employee pension and insurance funds are from actuarial reports from state pension plans, from trade sources, from the Centers for Medicare and Medicaid Services, and from Census annual surveys of state and local governments. For the advance estimate of wages and salaries, BEA combines three months of BLS employment data with quarterly earnings data from the BLS employment cost index. The monthly

employment data are subject to further revision. For other components, BEA calculates trend-based estimates.

5. *Fixed investment for most types of new structures.* Both annual and quarterly estimates are from monthly the Census surveys of the value of construction put in place. For advance quarterly estimates, two months of source data are available from the Census monthly construction survey and are subject to further revision.
6. *Private fixed investment in equipment except motor vehicles.* For the annual estimates for all but the most recent year, estimates are calculated using the abbreviated commodity-flow method using shipments from annual Census survey of manufactures, adjusted for exports and imports from the Census foreign-trade data. For the most recent year and the advance quarterly estimate, an abbreviated commodity flow method calculated from shipments from Census monthly survey of manufactures is used. For the advance estimate, two months of monthly shipments, exports and imports data are available and subject to further revision.
7. *Exports and imports of goods and services.* This GDP component is estimated by BEA as part of the preparation of the ITAs. For both annual and quarterly estimates of goods, estimates are calculated using monthly Census foreign trade data, with adjustments by BEA for coverage and valuation to convert the data to a balance-of-payments and NIPA basis. For the advance estimate, two months of foreign trade data are available and are subject to further revision. For services, annual estimates for government transactions are based on reports by federal agencies, and for most other services are based on annual and quarterly BEA surveys. For the advance quarterly estimates, BEA calculates trend-based estimates for both goods and services for the third month.
8. *Federal government consumption expenditures and gross investment for most types of spending.* For spending except for structures, software, R&D, consumption of fixed capital, and financial services furnished without payment (FISIM), BEA uses the fiscal year analysis method. Within a control total established by this analysis, estimates of military wages are based on data from the *Budget of the United States* and estimates of civilian wages and benefits are based on data from federal agencies. Estimates of employer contributions for social insurance programmes are from the Department of the Treasury's monthly report on outlays and receipts and from other federal agencies. Estimates of employer contributions for employee pension and insurance funds are from actuarial reports from the various federal pension plans and from other federal agencies. For the advance estimate, compensation estimates are based on three months of employment data from the Department of Defense and BLS. Other

components are based on the control totals from the fiscal year analysis and three months of data from the monthly Department of the Treasury report and reports from other federal agencies. Estimates for structures are explained above in item 5 above; software, R&D, and consumption of fixed capital are explained below.

9. *Federal and state and local government consumption of fixed capital.* Both annual and quarterly estimates are based on perpetual-inventory calculations at current cost, based on gross investment and on investment prices.
10. *Space rent for owner-occupied dwellings and rent for tenant-occupied dwellings.* For all but the most recent year, estimates are based on data on housing stock and average annual rent. The housing stock is based on data from the Census Bureau biennial housing survey and the current population survey. The average annual rent for owner-occupied dwellings reflects growth based on data from BEA fixed asset accounts and the BLS CPI for owners' equivalent rent; the average annual rent for tenant-occupied dwellings reflects data from the biennial housing survey and the BLS CPI for rent of primary residence. Estimates for the most recent year are based on the Census monthly survey number of new, private housing units completed and the BLS CPI for rent. For the advance quarterly estimate, three months of the CPI is available and the number of units is estimated using trend-based data.
11. *State and local government consumption and investment except consumption of fixed capital, compensation, intellectual property products and FISIM.* For all years except the two most recent years, final estimates are based on total expenditures from Census annual surveys of state and local governments. Estimates for the most recent two years and the advance quarterly estimate are trend-based data except for structures, which are based on Census surveys of the value of construction put in place.
12. *PCE for physicians, dentists, medical laboratories, and all other professional medical services, except home health care.* For all years, expenses of non-profit professional services and receipts for the other services adjusted for government consumption are from the Census service annual survey. Estimates for the advance and second estimates are based primarily on trend-based data, and the third estimate is based on data from Census quarterly services survey.
13. *Private and government investment in research and development.* Investment in research and development (R&D) includes both purchased and own-account investment and is estimated by measuring the production costs associated with spending on R&D. Current-dollar investment values are derived mostly from data on R&D spending from business and government surveys from the National Science Foundation (NSF). Adjustments for

coverage and scope differences are made, including accounting for imported and exported R&D; including R&D expenditures not captured in the NSF data in certain years – such as social science R&D – to align BEA measures of R&D with the SNA; converting depreciation for structures and equipment used to produce R&D to an economic cost, rather than historical cost, basis; reconciling NSF data with data from the Census Bureau’s economic censuses; removing expenditures on software R&D that BEA already includes in a separate software investment category; and in certain cases, converting measures for purchased R&D from a cost-basis to a purchase-basis. For years when NSF data is unavailable, estimates are extrapolated using data on R&D expenses from company financial statements, federal budget data, and data on wages and salaries paid by the R&D industry. The advance estimates are based on BLS current employment statistics, which are replaced by data from company financial reports for the second and third estimates.

14. *Private and government investment in software.* Investment in software is estimated in two parts: purchased software and own-account software. For years except for the most recent year, purchased software is calculated using the abbreviated commodity flow method based primarily on industry receipts from the Census service annual survey and Census foreign trade data. For the most recent year, industry receipts data are from the Census quarterly services survey. The advance and second estimates are based on receipts from company reports and the third estimate is based on the quarterly services survey. For all years, annual estimates for own-account software are based on annual production costs derived from BLS employment data from the quarterly census of employment and wages (QCEW). The advance estimates of own-account software are based on BLS monthly current employment statistics, which are available for all three months.

Methodologies for real GDP estimates

Unlike the source data used to calculate current-dollar GDP estimates, the source data used to calculate deflators for real GDP for the advance estimate are generally available all three months of the quarter, are less likely to be subject to revision, and are not replaced by annual source data. Consequently, quarterly, annual and benchmark-year estimates are almost all calculated using the same source data and estimating method.

For the deflation method, which is most widely used, price indexes are primarily available from the BLS price index programmes – the CPI, PPI and international price indexes (IPI). Elements of the CPI and PPI are used not only for components of PCE and fixed investment, but also for components of government consumption and investment where more appropriate indexes

are not available. Elements of the IPI are used for exports and imports of goods and services and for other components where explicit estimates of imports are used to calculate the corresponding current-dollar estimate. For components for which the BLS indexes do not provide complete coverage, such as investment in structures, BEA uses cost indexes from private trade sources or special quality-adjusted price indexes prepared by the Census Bureau. For the expenditures of non-profit institutions, such as educational and religious and welfare, BEA uses its own input cost indexes or cost indexes from other sources. For national defence and related non-defence consumption and investment expenditures, BEA has developed an extensive set of specially designed price indexes.²⁰ For R&D, price change is measured using an input-cost approach with a multi-factor productivity adjustment.

GDP components for which BEA uses the quantity extrapolation method include: FISIM; brokerage charges; most types of insurance; mining exploration, shafts and wells; and compensation of employees of federal and state and local government. Components for which BEA uses the direct valuation method include net purchases of used motor vehicles, inventory change for utilities, government consumption of fixed capital and some defence expenditures for goods and services.²¹

Notes

1. NABE is a professional association of more than 2 500 members who use economics in their work.
2. “New International Guidelines in Economic Accounting”, *Survey of Current Business*, February 1993, p. 42.
3. The accounts and the supporting information, including the monthly online journal the *Survey of Current Business*, are available free of charge on its website at www.bea.gov.
4. The monthly *Survey of Current Business*, BEA official journal, is no longer available in printed format, but is available for download free of charge on BEA website www.bea.gov/scb/date_guide.asp.
5. For information on the individual lines of the summary accounts see “A Guide to the National Income and Product Accounts of the United States” on BEA website.
6. In contrast, the SNA uses “real gross domestic income” to refer to the purchasing power of the total incomes generated by domestic production—that is, a measure of GDP that adjusts for trading gains and losses due to changes in the terms of trade.
7. BEA and other statistical agencies that prepare selected economic indicators, including GDP and personal income and outlays, are required each September to publish the release dates for the next year.
8. The quarterly estimates of the FAUS are released by the FRB early in the third month after the end of the quarter. Annual revisions are usually released in

September. Quarterly estimates of productivity are released by BLS a week after the advance and second GDP estimates.

9. This program also provides estimates of the net stock of durable goods purchased by households. Estimates for 2003-12 were published in “Fixed Assets and Consumer Durable Goods” in the October 2013 issue of the *Survey of Current Business*; estimates for earlier years are posted on BEA website www.bea.gov/scb/date_guide.asp.
10. For a description of the balancing program used to accomplish the integration, see Strassner and al, 2013; Rassier and al, 2007.
11. For additional details on BEA studies of reliability see Fixler and al., 2011.
12. Some other countries, such as France, use econometric methods for estimating the best change of the quarterly entry (see Chapter 11).
13. For additional information, see Chapter 4 of *Concepts and Methods of the U.S. National Income and Product Accounts*, November 2012, available on the BEA website, www.bea.gov.
14. For an explanation of the differences between the CPI and the PCE price index, see McCully and al., 2007.
15. As required by *Statistical Policy Directive Number 3*, all release dates for key economic indicators, which include quarterly GDP and several other BEA reports, are set in the fall of the preceding year and made available to the public at that time. This advance publication schedule is designed to prevent policy makers from an early release of “good” news and from delaying the release of “bad” news.
16. The most recent summary appeared in “Updated Summary of NIPA Methodologies” in the November 2013 *Survey of Current Business* (BEA, 2013).
17. Estimates for periods between benchmark I-O accounts are calculated by a similar interpolation process.
18. These percentages are from Chapter 3 of *Concepts and Methods of the U.S. National Income and Product Accounts*, November 2012, available on the BEA website, www.bea.gov.
19. See Horowitz and Planting.
20. For additional information on these special indexes, see “MP-5, Government Transactions”, on the BEA website.
21. Table 2 in the summary methodologies article in the November 2013 *Survey* (BEA, 2013) provides a detailed list of the estimating methods and source data used to prepare real GDP.

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Going further

Differences between the NIPA and SNA

For several reasons, the US has not adopted all of the guidelines for national accounting set forth in the 2008 version of the SNA, although users should not overestimate the impact of these differences. Major aggregates such as GDP are calculated in accordance with almost all SNA guidelines. Over the last 20 years BEA has taken many steps to improve consistency with the SNA while still endeavouring to retain the long, consistent time series that NIPA users have come to expect.

The remaining discrepancies with SNA guidelines are largely in the areas of the institutional sector accounts, the presentation of the accounts, and in the valuation of industry output in the industry accounts. The goal of improving NIPA consistency with the SNA remains part of BEA mission of producing “accurate, relevant and timely statistics, of responding to customers and of meeting the challenges of a changing economy.”¹

This section identifies some of the more important differences between the NIPAs and SNA 2008.² It reviews the differences that affect: 1) the level of total GDP and its expenditure components; 2) valuation; 3) definitions of the sectors; and 4) the presentation of the accounts. Of course, in addition to differences in accounting concepts and presentation, national accounts can also differ across countries because of differences in source data and methodology, such as differences in the use of quality adjusted price indexes (see Chapter 3), but this section will not discuss statistical or methodological differences.

The only major conceptual difference between the NIPA and SNA in the scope of GDP is that cultivated assets, such as orchards and dairy cattle, are treated in the SNA as investment, while in the NIPAs, they are currently treated as intermediate consumption. However, BEA has research underway to develop estimates for these assets and is likely to recognise cultivated assets in a future revision. Other differences that previously existed, such as the treatment of expenditures for military weapon systems as investment in the NIPAs, have been harmonised with the 2008 SNA update and subsequent NIPA comprehensive revisions. As in other countries, there are some also other differences from the SNA guidelines that exist because of gaps in information.

For example, illegal production, such as prostitution or the cultivation or manufacture of illegal drugs, in theory should be included according to the SNA, but currently is excluded from the NIPAs due to lack of source data. Another example is that the NIPAs do not include government inventories in its measure of the change in inventories. Because little information is available on government inventories, the NIPAs count goods acquired by governments as intermediate consumption when purchased rather than when used.

Both the NIPAs and the SNA value total GDP at market (or purchasers') prices. However, for the valuation of sector and industry output, the SNA recommends valuation at basic prices. For the NIPAs and for its I-O and the GDP-by-industry accounts, BEA uses market prices. Consequently, the NIPAs include taxes on products and exclude subsidies for calculating value added of industries; using the SNA, taxes on products are excluded and subsidies on products are included. This difference is quite important for users. It means that for the US national accounts, GDP is equal to the sum of the value added at market prices of the different industries, while for other OECD countries it is equal to the sum of the value added at basic prices *plus* taxes less subsidies on products. The use of basic prices would facilitate international comparisons because taxes vary significantly across countries. Market price valuation causes very significant additions to the output of trade industries in the US, thus rendering international comparisons of industry statistics and resulting productivity calculations difficult to determine.

Recently, BEA has been conducting research on changing from market prices to basic prices for valuing its I-O accounts.³ According to the data provided to the OECD, in 2011 taxes less subsidies on products accounted for about 7% of the published US GDP. However, there is a significantly larger impact on trade industries, where much of the taxes are allocated. If the United States were to adopt the use of basic prices, value added in both wholesale and retail trade would be reduced by about 20%, thus reducing the share of GDP accounted for by service-producing industries.

The NIPAs have two groupings for the institutional sector. For production, the NIPAs focus on three major sectors: business, households and institutions, and general government. The business sector includes all private entities that are organised for profit, including unincorporated enterprises, and other units (such as government enterprises) that are primarily engaged in producing goods and services for sale at a price that is intended to cover the costs of production. Thus, the business sector in the NIPAs differs from the corporations sector of the SNA in that it includes unincorporated enterprises that are, in principle, classified in the SNA in the household sector. The business sector in the NIPAs also excludes non-profit institutions serving households. This NIPA presentation has the advantage of providing a measure

of the output of the whole of the market production, a measure used as the numerator in the calculation of labour and multifactor productivity. Several other countries also compile such a grouping (see Chapter 7). The households and institutions sector consists of household activities that are not engaged in market production (specifically, the services of owner-occupied housing and the labour of domestic workers) and of production by NPISHs. The general government sector consists of all government agencies other than those classified as government enterprises. Also, the NIPAs do not base the distinction between market and non-market producers strictly on the 50 percent rule that is used to determine economically significant prices in many countries. In the NIPAs, government producers and non-profit institutions providing services to households that rely on a mix of donations and sales for their funding are generally treated as non-market producers, even when the value of their sales exceeds half the production costs.

For measuring income, outlays and saving in the NIPAs, the institutions are grouped into three major sectors: personal, government and corporate. The personal sector includes the income that is earned by, or transferred to, households and NPISHs as well as net income of businesses that are owned by households, including owner-occupied housing. The personal sector is thus close to the combination of the SNA household and NPISH sector, since it includes the income of unincorporated enterprises. In addition, the NIPAs include an annual table that shows NPISH income and outlays separately from household income and outlays.⁴ The NIPA government sector includes general government and government enterprises, while the SNA government sector excludes government enterprises. This treatment reflects the fact that the source data available for state and local governments in the US generally consolidates government enterprises with general government agencies. The NIPA corporate sector consists of businesses organised for profit that are legally organised as corporations and that are required to file corporate tax returns. It differs from the SNA non-financial and financial corporations sectors by not including government enterprises and unincorporated businesses that operate like corporations. Although the NIPAs do not give emphasis to the distinction between financial and non-financial corporations, data are available for both categories of corporations.

In addition to the substantive differences described above, there are also several differences in presentation between the two systems. It is important to understand that these differences in presentation can easily be overcome by reorganising the different tables. Indeed, both the IMAs as well as the annual accounts that BEA provides to the OECD are based on a more traditional SNA-style presentation. For its main NIPA presentation, BEA uses seven summary accounts to illustrate the major accounting relationships. The section of this chapter "Presentation of NIPAs and related tables" includes a discussion of the

major presentational differences between the organisation of these NIPA summary accounts and the SNA production, distribution and use of the income account, and capital accounts.

In particular, the presentation of GDP by type of expenditure in the NIPAs and the SNA slightly differ. The NIPAs show GDP as the sum of four main components: personal consumption expenditures; gross private domestic investment; net exports of goods and services; and government consumption expenditures and gross investment. The SNA groups these same components differently, as the sum of final consumption expenditures, gross capital formation (GCF), and exports of goods and services *minus* imports of goods and services. The SNA final consumption expenditures are the sum of final consumption expenditures by households, NPISHs and government. As noted above, GCF is presented as consisting of three items: gross fixed capital formation; change in inventories; and acquisitions less disposals of valuables.⁵

The NIPAs include also some differences in terminology such as “gross national product” which is the NIPA name for “gross national income” in the SNA, and also several aggregates that are not in the SNA, such as corporate profits, and personal income (Box 12.1 in the main text “Featured measures of NIPA tables” discusses several aggregates not found in the SNA). Similar measures of disposable income appear in both the NIPAs and the SNA. However, these measures – NIPA disposable personal income and SNA household disposable income – differ not only because this NIPA measure includes NPISHs but also in the way the two measures are calculated. NIPA disposable personal income includes all sources of personal income, less contributions for social insurance and personal taxes and includes interest and other transfers paid by persons. In contrast, household disposable income excludes interest and other transfers paid by households. Also, NIPA disposable personal income includes pension fund contributions but does not include pension benefits, whereas HDI excludes pension fund contributions and includes pension benefits. Despite these differences in disposable incomes, the NIPA and SNA measures of saving are comparable. The NIPAs treat interest paid by persons and personal transfer payments as a type of outlay, and the SNA includes an adjustment for pensions (called “D8 Adjustment for net equity of households in pension funds”) so that both systems’ saving figures reflect households as the owners of pension funds.

The NIPA and SNA classification systems used to present industries and types of products also differ. For example, the industry detail shown in the NIPAs is based on the North American Industry Classification System (NAICS), which is used by Canada, Mexico and the US; SNA presentations are based on the International Standard Industrial Classification of All Economic Activities (ISIC).

Another difference in the presentation of the NIPAs and some other countries' presentations relates to the use of balancing items in the two systems. As noted in the section "Going further: Statistical discrepancies in the NIPAs", GDI (gross domestic income), which is the NIPA name for what is called the "income approach of GDP" in this book (the sum of incomes), does not equal GDP, which is calculated as the sum of expenditures, because the components are measured independently. The difference between GDP and GDI in the NIPAs is called the statistical discrepancy and is shown as a type of income. Not all other OECD countries incorporate such an entry either because one or more expenditure or income types are calculated as a residual, or because they allocate such discrepancies to other components. In the US, the term GDP is strictly associated with the expenditure approach.

Finally, it is very important to remind international users of national accounts that all quarterly changes in the NIPAs are presented at an annual rate. Many other OECD countries simply use quarterly rates.

As noted elsewhere in this chapter, BEA prepares a special set of annual NIPA estimates for international organisations, such as the OECD, that are more consistent with the SNA. These estimates are included in the OECD's annual national accounts database.

Statistical discrepancies in the NIPA

In the NIPAs, the difference between gross domestic income (GDI), which is measured as the sum of incomes earned in production, and gross domestic product (GDP), which is measured as the sum of final expenditures, is called the "statistical discrepancy". This is not the only statistical discrepancy in the national accounts. There are also the statistical discrepancies for each sector between the net lending/borrowing obtained from the non-financial accounts and the financial accounts. However, this section focuses on the statistical discrepancy between GDP and GDI. In theory, GDI should equal GDP, but in practice they differ because their components are estimated using largely independent and less-than-perfect source data.

In NIPA summary account 1 (see Table 12.1), the statistical discrepancy is recorded as a type of income. This placement reflects BEA view that GDP is a more reliable measure of output than GDI and that it has not developed a satisfactory methodology for allocating the discrepancy among GDP or GDI components.⁶ Both of these views are explained below.

In the mid-1990s, there was considerable public debate about the growth of the US economy because growth measured by real GDI had increased faster than growth measured by real GDP.⁷ The debate subsided for a while, but later was rekindled when Jeremy Nalewaik and others conducted research that suggests that GDI may be more reliable than GDP.⁸

BEA view that GDP is more reliable than GDI is based on its analysis of the source data underlying the two aggregates.⁹ For the initial quarterly estimates, there are direct extrapolators for most major expenditure components. The GDP estimates are missing direct source data for several components of consumer spending for services, for residential improvements and for most state and local government spending. For GDI, direct source data are missing for most employer contributions to employee pension and insurance funds, and for most of the net operating surplus of private enterprises. In addition, past trends in these components indicate that it is more difficult to make reliable assumptions about the missing data for the components of GDI than for GDP.

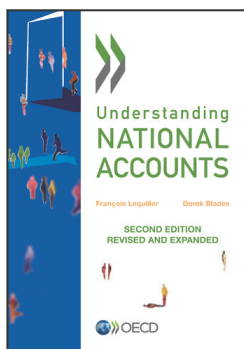
For annual estimates, more comprehensive source data are available for almost all components, albeit with a lag. Most of the annual source data used for estimating GDP are based on complete annual enumerations, such as federal government budget data, or are regularly benchmarked to complete enumerations, such as the economic censuses and census of governments done every five years and are incorporated in BEA benchmark I-O accounts. For GDI, only the annual tabulations of wages and salaries from employment tax returns and federal government budget data are complete enumerations, and for most of the remaining components of GDI, the annual source data are tabulations of samples of income tax returns. Furthermore, in using tax and administrative data to prepare annual estimates of GDI, BEA needs to make significant adjustments to account for differences in concepts and accounting practices between the national accounts and the tax or administrative data. The source data for GDP are largely collected from surveys that are designed, in part, for use in the compilation of GDP.

BEA has continued to work to reduce the size of the statistical discrepancy, but it is highly unlikely that it can be eliminated completely, largely because of sampling and non-response errors and coverage limitations in the underlying source data, as well as the need for BEA to make adjustments for NIPA definitions based on incomplete information. Many users have expressed the need to continue to publish both measures so that they can draw their own conclusions as to the accuracy of the two estimates. In response, BEA has added additional information on GDI to the news releases for quarterly GDP.

Notes

1. For additional information, see Mead and al, 2004. Since this article was published, however, the 2008 update of the SNA was completed and BEA has undertaken two comprehensive revisions, so some of the information is now out of date.

2. The differences discussed in this section are based primarily on the December 2004 *Survey* article and on a June 2003 Statistics Canada research paper, "Measurement of Output, Value Added, and GDP in Canada and the United States", posted on the Statistics Canada website.
3. See Guo and al, 2006.
4. For additional information, see Mead and al, 2003.
5. The NIPAs do not include a separate account for valuables, but do include adjustments to prevent, for example, exports and imports of nonmonetary gold that is held as a valuable from affecting GDP.
6. For the NIPA table that shows gross value added by broad sector (Table 1.3.5), BEA eliminates the discrepancy by calculating the value added of the business sector as a residual. For the data that BEA provides to the OECD on an SNA basis, BEA does not eliminate the discrepancy. For the GDP-by-industry accounts, which are based on the industry distribution of GDI, BEA allocates the discrepancy to industries so that the sum of industry value added equals GDP.
7. BEA estimates real GDI using the GDP deflator; the estimates are shown in NIPA Table 1.7.6.
8. See Nalewaik and al, 2010 and Aruoba and al, 2012.
9. See Landefeld, 2010.



From:
Understanding National Accounts
Second Edition

Access the complete publication at:
<https://doi.org/10.1787/9789264214637-en>

Please cite this chapter as:

Lequiller, François and Derek Blades (2014), “The national income and product accounts of the United States”, in *Understanding National Accounts: Second Edition*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/9789264214637-13-en>

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