

Appendix A

Additional Information About the NIPA Estimates

Statistical Conventions

Changes in current-dollar GDP measure changes in the market value of goods and services produced in the economy in a particular period. For many purposes, it is necessary to decompose these changes into quantity and price components. To compute the quantity indexes, changes in the quantities of individual goods and services are weighted by their prices. (Quantity changes for GDP are often referred to as changes in “real GDP.”) For the price indexes, changes in the prices for individual goods and services are weighted by quantities produced. (In practice, the current-dollar value and price indexes for most GDP components are determined largely using data from Federal Government surveys, and the real values of these components are calculated by deflation at the most detailed level for which all the required data are available.)

The annual changes in quantities and prices are calculated using a Fisher formula that incorporates weights from 2 adjacent years. For example, the annual percent change in real GDP in 1997–98 uses prices for 1997 and 1998 as weights, and the 1997–98 annual percent change in the GDP price index uses quantities for 1997 and 1998 as weights. Because the Fisher formula allows for the effects of changes in relative prices and in the composition of output over time, the resulting 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 formula.¹ These annual changes are “chained” (multiplied) together to form time series of quantity and price; the percent changes that are calculated from these time series are not affected by the choice of reference period.

The quarterly changes in quantities and prices are calculated with weights from two adjacent quarters. As part of an annual or comprehensive revision, the quarterly indexes through the most recent complete year are adjusted to ensure that the average of the quarterly indexes conforms to the corresponding annual index.

In addition, BEA prepares measures of real GDP and its components in a dollar-denominated form, designated “chained (1996) dollar estimates.” These estimates are computed by multiplying the 1996 current-dollar value of GDP, or of a GDP component, by the corresponding quantity index number. For example, if a current-dollar GDP component equaled \$100 in 1996 and if real output for this component

increased by 10 percent in 1997, then the “chained (1996) dollar” value of this component in 1997 would be \$110 ($\100×1.10). Note that percentage changes in the chained (1996) dollar estimates and the percentage changes calculated from the quantity indexes are identical, except for small differences due to rounding.

Because of the formula used for calculating real GDP, the chained (1996) dollar estimates for detailed GDP components do not add to the chained-dollar value of GDP or to any intermediate aggregates. A “residual” line is shown as the difference between GDP and the sum of the most detailed components shown in each table. The residual generally is small close to the base period but tends to become larger as one moves further from it. Accurate measures of component contributions to the percentage changes in real GDP and its major components are shown in NIPA tables 8.2–8.6.

BEA also publishes the “implicit price deflator” (IPD), which is calculated as the ratio of current-dollar value to the corresponding chained-dollar value, multiplied by 100; the values of the IPD and of the corresponding “chain-type” price index are very close.

For quarters and months, the estimates are presented at annual rates, which show the value that would be registered if the rate of activity measured for a quarter or a month were maintained for a full year. Annual rates are used so that time periods of different lengths—for example, quarters and years—may be compared easily. These annual rates are determined simply by multiplying the estimated rate of activity by 4 (for quarterly data) or by 12 (for monthly data).

Percent changes in the estimates are also expressed at annual rates. Calculating these *changes* requires a variant of the compound interest formula:

$$r = \left[\left(\frac{x_t}{x_o} \right)^{m/n} - 1 \right] \times 100,$$

where r is the percent change at an annual rate; x_t is the level of activity in the later period; x_o is the level of activity in the earlier period; m is the yearly periodicity of the data (for example, 1 for annual data, 4 for quarterly, or 12 for monthly); and n is the number of periods between the earlier and later periods (that is, $t - o$).

Quarterly and monthly NIPA estimates are seasonally adjusted, if necessary. Seasonal adjustment removes from the time series the average impact of variations that normally occur at about the same time and in about the same magnitude each year—for example, weather, holidays, and tax payment dates. After seasonal adjustment, cyclical and other short-term changes in the economy stand out more clearly.

1. In addition, because the changes in quantities and prices calculated using these weights are symmetric, the product of a quantity index and the corresponding price index is generally equal to the current-dollar index.

Reconciliation Tables

Table 1.—Reconciliation of Changes in BEA-Derived Compensation Per Hour with BLS Average Hourly Earnings

[Percent change from preceding period]

	1998	1999	Seasonally adjusted at annual rates					
			1999			2000		
			II	III	IV	I	II	III ^p
BEA-derived compensation per hour of all persons in the nonfarm business sector (less housing) ¹	5.1	4.8	5.0	5.5	4.2	3.9	5.8	5.8
Less: Contribution of supplements to wages and salaries per hour	-5	-3	-4	-5	-4	.1	.1	-1
Plus: Contribution of wages and salaries per hour of persons in housing and in nonprofit institutions	-3	-1	-3	-5	-3	-1	-1	-1
Less: Contribution of wages and salaries per hour of persons in government enterprises, unpaid family workers, and self-employed	-1	0	-1	-1	-1	-1	-3	-1
Equals: BEA-derived wages and salaries per hour of all employees in the private nonfarm sector	5.5	5.0	5.1	5.5	4.4	3.7	5.9	5.8
Less: Contribution of wages and salaries per hour of nonproduction workers in manufacturing	-1	-1	.4	.4	0	.2	.4	.4
Less: Other differences ²	1.5	1.4	1.0	1.4	1.3	-3	1.6	1.7
Equals: BLS average hourly earnings of production or nonsupervisory workers on private nonfarm payrolls	4.1	3.6	3.7	3.7	3.1	3.8	3.9	3.8
Addendum:								
BLS estimates of compensation per hour in the nonfarm business sector ³	5.3	5.0	5.0	5.5	4.2	3.9	7.0	5.8

^p Preliminary.

1. Includes BLS data on compensation and hours of nonfarm proprietors and hours worked of unpaid family workers.

2. Includes BEA use of non-BLS data and differences in detailed weighting. Annual estimates also include differences in BEA and BLS benchmark procedures; quarterly estimates also include

differences in seasonal adjustment procedures.

3. These estimates differ from the BEA-derived estimates (first line) because the BLS estimates include compensation and hours of tenant-occupied housing.

BLS Bureau of Labor Statistics

Table 2.—Relation of Net Exports of Goods and Services and Net Receipts of Factor Income in the NIPA's to Balance on Goods, Services, and Income in the ITA's

[Billions of dollars]

	Line	1998	1999	Seasonally adjusted at annual rates					
				1999				2000	
				I	II	III	IV	I	II
Exports of goods, services, and income receipts, ITA's	1	1,191.4	1,232.4	1,174.9	1,204.0	1,252.3	1,298.4	1,347.4	1,408.3
Less: Gold, ITA's	2	5.5	5.3	3.0	3.2	6.1	8.8	9.6	3.7
Statistical differences ¹	3	0	0	0	0	0	0	8.8	8.8
Other items	4	.9	1.0	.9	.9	1.1	1.1	1.3	1.3
Plus: Adjustment for grossing of parent/affiliate interest payments	5	4.5	4.6	4.2	4.4	4.6	5.3	6.0	5.6
Adjustment for U.S. territories and Puerto Rico	6	43.3	48.9	46.3	48.0	48.6	52.8	52.7	51.3
Services furnished without payment by financial intermediaries except life insurance carriers	7	18.5	16.4	17.7	16.7	15.7	15.5	16.4	16.9
Equals: Exports of goods and services and income receipts, NIPA's	8	1,251.4	1,296.1	1,239.2	1,268.9	1,314.0	1,362.2	1,402.8	1,468.3
Imports of goods, services, and income payments, ITA's	9	1,364.5	1,515.9	1,398.1	1,473.8	1,565.3	1,626.3	1,705.3	1,783.5
Less: Gold, ITA's	10	6.5	5.8	3.3	3.2	7.4	9.3	9.6	3.0
Statistical differences ¹	11	0	0	0	0	0	0	5.5	5.6
Other items	12	0	0	0	0	0	0	0	0
Plus: Gold, NIPA's	13	-3.1	-2.7	-2.6	-2.7	-2.6	-2.7	-3.2	-3.1
Adjustment for grossing of parent/affiliate interest payments	14	4.5	4.6	4.2	4.4	4.6	5.3	6.0	5.6
Adjustment for U.S. territories and Puerto Rico	15	28.4	32.6	28.4	30.0	32.5	39.6	36.2	37.5
Imputed interest paid to rest of world	16	18.5	16.4	17.7	16.7	15.7	15.5	16.4	16.9
Equals: Imports of goods and services and income payments, NIPA's	17	1,406.4	1,561.1	1,442.5	1,519.0	1,608.1	1,674.8	1,745.7	1,832.0
Balance on goods, services, and income, ITA's (1-9)	18	-173.1	-283.5	-223.2	-269.8	-313.0	-327.9	-357.9	-375.2
Less: Gold (2-10+13)	19	-4.1	-3.2	-2.9	-2.7	-3.9	-3.2	-3.2	-2.4
Statistical differences (3-11) ¹	20	0	0	0	0	0	0	3.3	3.2
Other items (4-12)	21	.9	1.0	.9	.9	1.1	1.1	1.3	1.3
Plus: Adjustment for U.S. territories and Puerto Rico (6-15)	22	14.9	16.3	17.9	18.0	16.1	13.2	16.5	13.8
Equals: Net exports of goods and services and net receipts of income, NIPA's (8-17)	23	-155.0	-265.0	-203.3	-250.1	-294.1	-312.6	-342.9	-363.7

1. Consists of statistical revisions in the NIPA's that have not yet been incorporated into the ITA's (2000:II) and statistical revisions in the ITA's that have not yet been incorporated into the NIPA's (2000:I-2000:II).

ITA's International transactions accounts
NIPA's National income and product accounts

Appendix B

Suggested Reading

The Bureau of Economic Analysis (BEA) has published a wealth of information about the methodologies that are used to prepare its national, regional, and international accounts.

National accounts

The national accounts encompass the detailed estimates in the national income and product accounts (including gross domestic product), the estimates of wealth and related estimates, gross product by industry, the input-output accounts, and the satellite accounts.

National income and product accounts (NIPA's). This series of papers documents the conceptual framework of the NIPA's and the methodologies that have been used to prepare the estimates.

An Introduction to National Economic Accounting (1985) [also in the March 1985 SURVEY]

Corporate Profits: Profits Before Tax, Profits Tax Liability, and Dividends (1985)

Foreign Transactions (1987) [A revised version is forthcoming.]

GNP: An Overview of Source Data and Estimating Methods (1987) [Most of the information in this paper has been superseded by "A Guide to the NIPA's" (March 1998 SURVEY).]

Government Transactions (1988)

Personal Consumption Expenditures (1990)

These methodologies have been updated and improved, typically as part of the comprehensive and annual revisions of the NIPA's. The most recent revisions are described in the following SURVEY articles.

"A Preview of the 1999 Comprehensive Revision of the National Income and Product Accounts" **Definitional and Classificational Changes** (August 1999)

New and Redesigned Tables (September 1999)

Statistical Changes (October 1999)

"Improved Estimates of the National Income and Product Accounts: Results of the Comprehensive Revision"

For 1959-98 (December 1999)

For 1929-99 (April 2000)

"Annual Revision of the U.S. National Income and Product Accounts" (August 2000)

"A Guide to the NIPA's" (March 1998) provides the definitions of the major NIPA aggregates and components, discusses the measures of real output and prices, explains how production is classified and how the NIPA's are presented, describes the statistical conventions that are used, and lists the principal source data and methods that are used to prepare the estimates of gross domestic product (GDP).

Information about the sources and methods that are used to prepare the national estimates of personal income, which are the basis for the State estimates, is in *State Personal Income, 1929-97* (1999).

"BEA's Chain Indexes, Time Series, and Measures of Long-Term Economic Growth" (May 1997) is the most recent in a series of articles that describe the conceptual basis for the chain-type measures of real output and prices that are used in the NIPA's.

"Reliability of the Quarterly and Annual Estimates of GDP and Gross Domestic Income" (December 1998) evaluates these estimates by examining the record of revisions to them.

Wealth and related estimates. *Fixed Reproducible Tangible Wealth in the United States, 1925-94* (1999) discusses the concepts and statistical considerations that underlie the estimates and their derivation.

"Fixed Assets and Consumer Durable Goods for 1925-98" (April 2000) describes the definitional and statistical improvements that were incorporated in the comprehensive revision of the estimates.

Gross product by industry. "Improved Estimates of

Mission and Strategic Plan

The mission statement of the Bureau of Economic Analysis and the latest update to its strategic plan for improving the accuracy, reliability, and relevance of the national, regional, and international accounts are available on BEA's Web site at <www.bea.doc.gov>. For information about the development and the implementation of the plan, see these SURVEY articles.

"Mid-Decade Strategic Review of BEA's Economic Accounts: Maintaining and Improving Their Performance" (February 1995)

"Mid-Decade Strategic Review of BEA's Economic Accounts: An Update" (April 1995)

"BEA's Mid-Decade Strategic Plan: A Progress Report" (June 1996)

Gross Product by Industry for 1947–98” (June 2000) describes the most recent comprehensive revision of these estimates.

Input-output accounts. “Benchmark Input-Output Accounts for the U.S. Economy, 1992” (November 1997) describes the preparation of the 1992 accounts and the concepts and methods that underlie the accounts.

“Annual Input-Output Accounts of the U.S. Economy, 1996” (January 2000) presents annual tables for 1996 that update the 1992 benchmark accounts.

Satellite accounts. These accounts extend the analytical capacity of the national accounts by focusing on one aspect of economic activity.

“Integrated Economic and Environmental Satellite Accounts” and “Accounting for Mineral Resources: Issues and BEA’s Initial Estimates” (April 1994)

“A Satellite Account for Research and Development” (November 1994)

“U.S. Transportation Satellite Accounts”

For 1992 (April 1998)

For 1996 (May 2000)

“U.S. Travel and Tourism Satellite Accounts”

For 1992 (July 1998)

For 1996 and 1997 (July 2000)

International accounts

The international accounts encompass the international transactions accounts, direct investment, and international transactions in services.

International transactions accounts (ITA’s). *The Balance of Payments of the United States: Concepts, Data Sources, and Estimating Procedures* (1990) describes the methodologies used to prepare the estimates in the ITA’s and the international investment position of the United States. These methodologies are usually updated and improved as part of the annual revisions of the ITA’s.

“U.S. International Transactions, Revised Estimates” is a series of articles about the annual ITA revisions and the improvements in methodology; the latest article is published in the July 2000 issue.

Direct investment. *International Direct Investment: Studies by the Bureau of Economic Analysis* (1999) is a collection of previously published articles on U.S. direct investment abroad and foreign direct investment in the United States. It also includes the following information.

“Methodology for U.S. Direct Investment Abroad,” which is also available in *U.S. Direct Investment Abroad: 1994 Benchmark Survey, Final Results* (1998)

“A Guide to BEA Statistics on U.S. Multinational Companies,” which is also available in the March 1995 SURVEY

“Methodology for Foreign Direct Investment in the United States,” which is also available in *Foreign Direct Investment in the United States: 1992 Benchmark Survey, Final Results* (1995)

“A Guide to BEA Statistics on Foreign Direct Investment in the United States,” which is also available in the February 1990 SURVEY

International services. *U.S. International Transactions in Private Services: A Guide to the Surveys Conducted by the Bureau of Economic Analysis* (1998) describes 11 surveys. It includes classifications, definitions, release schedules, the methods used to prepare the estimates, and samples of the survey forms.

Regional accounts

The regional accounts include estimates of personal income and gross state product.

Personal income. Estimates of personal income are prepared for States and for local areas.

“Comprehensive Revision of State Personal Income for 1969–99” (June 2000) summarizes the changes in the methodology that is used to prepare the estimates. The detailed methodology is available on the CD-ROM *State Personal Income, 1969–98*.

“Comprehensive Revision of Local Area Personal Income for 1969–98” (July 2000) summarizes the changes in the methodology that is used to prepare the estimates for counties and metropolitan areas. The detailed methodology is available on the CD-ROM *Regional Economic Information System, 1969–98*.

Gross state product. “Comprehensive Revision of Gross State Product by Industry, 1977–94” (June 1997 SURVEY) summarizes the sources and the methods that are used to prepare the estimates. “Gross State Product by Industry, 1977–98” (October 2000) describes the most recent comprehensive revision of these estimates.

Availability

Most of the items listed here are available on our Web site at <www.bea.doc.gov>; in particular, look under “Methodologies.” Our online *Catalog of Products* provides descriptions of both our printed and electronic publications. The *Catalog* also includes links to compressed files of our diskette products that can be downloaded for free.

For specific information about the availability of our most recently released estimates and products, see “Getting BEA’s Estimates” on the inside back cover.