Appendix A
Additional Information About BEA's 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.)

Except for the most recent period, the annual and quarterly changes in real GDP and prices are "chain-type" measures that are both based on the "Fisher Ideal" formula that incorporates weights from two adjacent years. For example, the 1992–93 percent change in real GDP uses prices for 1992 and 1993 as weights, and the 1992–93 percent change in price uses quantities for 1992 and 1993 as weights. Because the quantity and price index numbers calculated in this way are symmetric, the product of the annual change in real GDP and the annual change in prices equals the annual change in current-dollar GDP.

In the most recent period, a variant of the formula is used because only 1 year's information is available for computing the index number weights. Accordingly, BEA uses a single year's weights and, as a consequence, the product of the percentage changes in the price and quantity indexes does not equal the current-dollar change during this period. For this reason, another measure, known as the "implicit price deflator," is presented in the NIPA tables. The implicit price deflator is calculated as the ratio of current-dollar value to the corresponding chained-dollar value multiplied by 100.

In addition, BEA prepares measures of real GDP and its components in a dollar-denominated form, designated "*chained (1992) dollar estimates.*" These estimates are computed by multiplying the 1992 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 1992 and if real output for this component increased by 10 percent in 1993, then the "chained (1992) dollar" value of this component in

1993 would be $110 ($100 × 1.10). Note that percentage changes in the chained (1992) 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 (1992) 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. In cases where the residual is large, the table of contributions of the major components to the change in real GDP provides a better basis for determining the composition of GDP growth than the chained-dollar estimates.

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 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.

Reconciliation Tables

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

[Percent change from preceding period]

	Seasonally adjusted annual rates							
	1993	1994	1995	1995		1996		
				III	IV	I	II	III [P]
BEA-derived compensation per hour of all persons in the nonfarm business sector (less housing)	**2.3**	**2.1**	**3.6**	**4.0**	**4.1**	**3.3**	**3.7**	**3.5**
Less: Contribution of supplements to wages and salaries per hour	.3	.1	0	–.5	–.4	–.6	–.2	–.1
Plus: Contribution of wages and salaries per hour of persons in housing and in nonprofit institutions	0	0	–.3	–.4	0	–.2	0	0
Less: Contribution of wages and salaries per hour of persons in government enterprises, unpaid family workers, and self-employed	–.1	–.1	0	.1	.3	–.4	.3	.3
Equals: **BEA-derived wages and salaries per hour of all employees in the private nonfarm sector**	**2.0**	**2.0**	**3.3**	**4.0**	**4.2**	**4.1**	**3.6**	**3.4**
Less: Contribution of wages and salaries per hour of nonproduction workers in manufacturing	0	0	0	–.1	–.1	.1	–.1	–.1
Less: Other differences [1]	–.4	–.6	.4	.7	.7	1.6	–.1	–.1
Equals: **BLS average hourly earnings of production or nonsupervisory workers on private nonfarm payrolls**	**2.5**	**2.7**	**2.9**	**3.3**	**3.5**	**2.3**	**3.8**	**3.6**
Addendum: BLS estimates of compensation per hour in the nonfarm business sector [2]	2.3	2.1	3.7	4.0	4.1	3.3	3.8	3.9

[P] Preliminary.
1. 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.

2. These estimates differ from the BEA-derived estimates (first line) because the BLS estimates include compensation and hours of tenant-occupied housing.
NOTE.—The table incorporates the annual BLS revision released in June 1996.
BLS　Bureau of Labor Statistics

Table 2.—Relation of Net Exports of Goods and Services and Net Receipts of Factor Income in the National Income and Product Accounts (NIPA's) to Balance on Goods, Services, and Income in the Balance of Payments Accounts (BPA's)

[Billions of dollars]

	Line	1994	1995	Seasonal adjusted at annual rates					
				1995			1996		
				II	III	IV	I	II	III
Exports of goods, services, and income, BPA's	1	840.0	969.2	966.0	977.9	1,000.5	1,010.6	1,028.0	1,015.3
Less: Gold, BPA's	2	5.8	5.1	7.7	3.4	3.7	6.3	12.5	5.2
Statistical differences [1]	3	0	0	0	0	0	–1.7	–6.4	–7.4
Other items	4	1.3	.9	.9	1.2	.8	.7	.8	.7
Plus: Adjustment for grossing of parent/affiliate interest payments	5	5.5	8.3	7.5	8.5	9.6	10.0	6.9	7.9
Adjustment for U.S. territories and Puerto Rico	6	30.7	30.2	30.4	30.2	30.7	30.3	31.3	31.1
Services furnished without payment by financial intermediaries except life insurance carriers and private noninsured pension plans	7	13.4	14.0	13.8	14.0	14.2	14.4	14.6	15.0
Equals: **Exports of goods and services and receipts of factor income, NIPA's**	8	882.5	1,015.6	1,009.2	1,026.1	1,050.3	1,059.9	1,073.9	1,070.7
Imports of goods, services, and income, BPA's	9	948.5	1,082.3	1,096.7	1,092.7	1,085.6	1,106.4	1,151.4	1,169.5
Less: Gold, BPA's	10	4.7	5.3	10.8	2.5	3.4	6.8	14.6	6.2
Statistical differences [1]	11	0	0	0	0	0	–4.6	–4.5	–4.8
Other items	12	0	0	0	0	0	0	0	0
Plus: Gold, NIPA's	13	–3.9	–3.7	–3.6	–3.7	–4.0	–3.4	–3.5	–3.8
Adjustment for grossing of parent/affiliate interest payments	14	5.5	8.3	7.5	8.5	9.6	10.0	6.9	7.9
Adjustment for U.S. territories and Puerto Rico	15	21.9	21.8	23.2	21.0	21.9	21.1	21.4	21.2
Imputed interest paid to rest of world	16	13.4	14.0	13.8	14.0	14.2	14.4	14.6	15.0
Equals: **Imports of goods and services and payments of factor income, NIPA's**	17	980.7	1,117.3	1,126.9	1,130.0	1,123.9	1,146.5	1,180.6	1,208.4
Balance on goods, services, and income, BPA's (1–9)	18	–108.5	–113.1	–130.7	–114.8	–85.1	–95.8	–123.4	–154.2
Less: Gold (2–10+13)	19	–2.8	–3.9	–6.7	–2.8	–3.7	–3.9	–5.6	–4.8
Statistical differences (3–11) [1]	20	0	0	0	0	0	2.9	–1.9	–2.6
Other items (4–12)	21	1.3	.9	.9	1.2	.8	.7	.8	.7
Plus: Adjustment for U.S. territories and Puerto Rico (6–15)	22	8.8	8.4	7.2	9.2	8.8	9.2	9.9	9.9
Equals: **Net exports of goods and services and net receipts of factor income, NIPA's (8–17)**	23	**–98.2**	**–101.7**	**–117.7**	**–103.9**	**–73.6**	**–86.6**	**–106.7**	**–137.7**

1. Consists of statistical revisions in the BPA's that have not yet been incorporated in the NIPA's.

Appendix B
Suggested Reading

Mid-Decade Strategic Plan

BEA has published the following articles in the SURVEY OF CURRENT BUSINESS on the development and implementation of its strategic plan for improving the accuracy, reliability, and relevance of the national, regional, and international accounts.

"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)*

Mid-Decade Strategic Review of BEA's Economic Accounts: Background Papers (1995) presents seven background papers that evaluate the state of the U.S. economic accounts and that identify the problems and the prospects for improving the accounts.

Methodology

BEA has published a wealth of information about the methodology used to prepare its national, regional, and international estimates.

National

National income and product accounts (NIPA's)

NIPA *Methodology Papers*: This series documents the conceptual framework of the NIPA's and the methodology used to prepare the estimates.

An Introduction to National Economic Accounting (NIPA Methodology Paper No. 1, 1985) [Also appeared in the March 1985 issue of the SURVEY]

Corporate Profits: Profits Before Tax, Profits Tax Liability, and Dividends (NIPA Methodology Paper No. 2, 1985)

Foreign Transactions (NIPA Methodology Paper No. 3, 1987)

GNP: An Overview of Source Data and Estimating Methods (NIPA Methodology Paper No. 4, 1987) [Also appeared in the July 1987 issue of the SURVEY]

Government Transactions (NIPA Methodology Paper No. 5, 1988)

Personal Consumption Expenditures (NIPA Methodology Paper No. 6, 1990)

The methodologies described in these papers are subject to periodic improvements that are typically introduced as part of the annual and comprehensive revisions of the NIPA's; these improvements are described in the SURVEY articles that cover these revisions.

"Annual Revision of the U.S. National Income and Product Accounts": This series of SURVEY articles, the latest of which was published in the August 1996 issue,* describes the annual NIPA revisions and the improvements in methodology.

The most recent comprehensive revision of the NIPA's is described in the following series of SURVEY articles.

"Preview of the Comprehensive Revision of the National Income and Product Accounts: BEA's New Featured Measures of Output and Prices" (July 1995)*

"Preview of the Comprehensive Revision of the National Income and Product Accounts: Recognition of Government Investment and Incorporation of a New Methodology for Calculating Depreciation" (September 1995)*

"Preview of the Comprehensive Revision of the National Income and Product Accounts: New and Redesigned Tables" (October 1995)*

"Improved Estimates of the National Income and Product Accounts for 1959–95: Results of the Comprehensive Revision" (January/February 1996)*

"Updated Summary Methodologies" (August 1996 SURVEY)* identifies the principal source data and estimating methods that are used to prepare the estimates of gross domestic product (GDP).

Information on the sources and methods used to prepare the national estimates of personal income, which provide the basis for the State estimates of personal in-

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Availability

For the availability of some of these publications, see the inside back cover of this issue. See also the *User's Guide to BEA Information*: To request a copy, write to the Public Information Office, BE–53, Bureau of Economic Analysis, U.S. Department of Commerce, Washington DC 20230, call 202–606–9900, or visit BEA's Internet site at **http://www.bea.doc.gov**.

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* These items can be found on BEA's Internet site at **http://www.bea.doc.gov**.

come, can be found in *State Personal Income, 1929–93* (1995).*

"Gross Domestic Product as a Measure of U.S. Production" (August 1991 SURVEY) briefly explains the difference between GDP and gross national product.

The conceptual basis for the chain-type measures of real output and prices used in the NIPA's are described in the following SURVEY articles.

"Alternative Measures of Change in Real Output and Prices" (April 1992)

"Economic Theory and BEA's Alternative Quantity and Price Indexes" (April 1992)

"Alternative Measures of Change in Real Output and Prices, Quarterly Estimates of 1959–92" (March 1993)

"Preview of the Comprehensive Revision of the National Income and Product Accounts: BEA's New Featured Measures of Output and Prices" (July 1995)*

"Reliability and Accuracy of the Quarterly Estimates of GDP" (October 1993 SURVEY)* evaluates GDP estimates by examining the record of revisions in the quarterly estimates.

"A Look at How BEA Presents the NIPA's" (May 1996 SURVEY)* explains how to locate the NIPA estimates and some of the conventions used in their presentation.

Gross product by industry

"Improved Estimates of Gross Product by Industry, 1959–94" (August 1996 SURVEY)* describes the most recent comprehensive revision of the estimates of gross product by industry.

Input-output accounts

Benchmark Input-Output Accounts of the United States, 1987 (1994)* describes the concepts and methods used in the generation of the benchmark input-output tables for 1987.

International

Balance of payments accounts (BPA's)

The Balance of Payments of the United States: Concepts, Data Sources, and Estimating Procedures (1990)

describes the methodologies used in preparing the estimates in the BPA's and of the international investment position of the United States. These methodologies are subject to periodic improvements that are typically introduced as part of the annual revisions of the BPA's.

"U.S. International Transactions, Revised Estimates": This series of SURVEY articles, the latest of which was published in the July 1996 issue,* describes the annual BPA revisions and the improvements in methodology.

Direct investment

The coverage, concepts, definitions, and classifications used in the benchmark surveys of U.S. direct investment abroad and of foreign direct investment in the United States are presented in the publications of the final results of the most recent benchmark surveys.

U.S. Direct Investment Abroad: 1989 Benchmark Survey, Final Results (1992)*

Foreign Direct Investment in the United States: 1992 Benchmark Survey, Final Results (1995)*

The types of data on direct investment that are collected and published by BEA and the clarifications of the differences between the data sets are presented in the following SURVEY articles.

"A Guide to BEA Statistics on U.S. Multinational Companies" (March 1995)*

"A Guide to BEA Statistics on Foreign Direct Investment in the United States" (February 1990)*

Regional

Personal income

State Personal Income, 1929–93 (1995)* includes a description of the methodology used to prepare the estimates of State personal income. [Also available on the State Personal Income 1969–95 CD-ROM]

Local Area Personal Income, 1969–92 (1994)* includes a description of the methodology used to prepare the estimates of local area personal income. [Also available on the Regional Economic Information System CD-ROM]

Gross state product

"Gross State Product, 1977–90" (December 1993 SURVEY)* summarizes the sources and methods for BEA's estimates of gross state product.