

Mid-Decade Strategic Review of BEA's Economic Accounts: Maintaining and Improving Their Performance

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A comprehensive review of BEA's economic accounts—national, international, and regional—is underway. The purpose of this Review is similar to that of reviews in earlier decades, but some other important features differ. Rather than being conducted by a “blue-ribbon” panel of outside experts, this Review is being conducted by BEA, and the outside perspective that is vitally important to such a review is being obtained in a different way and at a different step in the process.

For this Review, the outside perspective is being obtained, as the third and final step, by comment and discussion of the draft strategic plan that BEA is presenting in this article. Did BEA correctly identify the priority issues for maintaining and improving the accounts? Are the actions that BEA proposes to address the problems the best ones? Your answers to these questions and your comments on other aspects of the draft plan are invited. Please send your comments, by April 14, by mail to Bureau of Economic Analysis, U.S. Department of Commerce, Washington, DC 20230; by fax to (202) 606-5311; or to carol.carson@bea.doc.gov on Internet.

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A COMPREHENSIVE REVIEW of the U.S. economic accounts produced by the Bureau of Economic Analysis (BEA) was put in motion in mid-1994. Its purpose is to evaluate the performance of the economic accounts and to develop a plan to maintain and improve that performance. The Review is one of three initiatives that will be used to guide BEA's work over the next decade. The other two are a benchmarking of BEA's information technology system to guide the reengineering of BEA's data collection, processing, and dissemination and a customer survey to guide a program of improved customer service at BEA. The resulting overall plan is meant to help BEA achieve its goal: Providing its customers with the right numbers at the right time in the right way.

The Review consists of three steps. The first step was the preparation of a series of background papers to evaluate the state of the economic accounts—their strengths, problems, and

prospects for improvement. These papers, which were made available in January 1995, identify needs and conclude with a “menu” of recommendations for addressing these needs. The second step is to transform this menu into a prioritized agenda, or strategic plan, to maintain and improve the economic accounts over the next decade. This article presents a draft plan to users of the accounts and others interested in their future. As a third step, the plan will be discussed and refined in a process that includes public comment, comment from the Federal agencies whose assistance will be needed to implement some of the improvements, and a meeting in March 1995 of users of the accounts. With the refined plan in hand, BEA will be in a position to work with others to develop detailed implementation plans.

As indicated in the table of contents, the draft plan is presented in part 4, structured around the three priority issues it is designed to address. The first three parts provide summary background and may be read at several levels of detail. Executive summaries, shown in italics at the beginning of each part, allow readers who wish to do so to proceed to the plan with minimal detail. The main text in parts 1–3 introduce economic accounting and BEA’s economic accounts, describe the source data and estimating methods used to prepare them, and summarize the background papers that identified issues to be addressed in the draft plan. Boxes in each part support the main text by providing examples and further explanations.

Part 1. Economic Accounts

Economic accounts provide statistical pictures of the economy. BEA’s economic accounts—national, regional, and international—serve as tools for tracking and projecting economic activity, for macroeconomic analysis of the economy’s workings, and for operational decisions in which the economy plays a major role. For these uses, accuracy, reliability, and relevance are the interrelated characteristics that are required of the accounts.

Economic accounting

Economic accounting—now in its sixth decade as a specialty at the intersection of economics and statistics—organizes economic information

about transactions and stocks, or holdings, to provide complete and consistent statistical pictures of the economy. These pictures include summary measures, component detail, and a framework that defines the interrelationships among the summary measures and their components.

Economic accounting, and thus the economic accounts themselves, are guided by theoretically based or empirically useful concepts. These include—to name just a few—income, consumption, and investment. The accounts resemble, at a macroeconomic level, the income and balance sheet accounts that describe the operations and gauge the performance of a business enterprise.

As statistical pictures, the accounts are designed to be complete in the sense that they count all economic transactions or stocks, but they do not double count. The estimates in the accounts are designed to be consistent with respect to when the transactions and stocks are recorded and how they are valued.

BEA’s economic accounts and their uses

The best known of BEA’s accounts are the national income and product accounts (NIPA’s), the balance of payments accounts (also called the international transactions accounts), and the regional accounts. The NIPA’s show the Nation’s production, distribution, consumption, and saving. The keystone of the NIPA’s is their summary measure—gross domestic product (GDP). The balance of payments accounts are known by their summary measures—the goods and services balance and the broader current-account balance. The regional accounts provide estimates of personal income for States and local areas and of gross state product, the counterpart of GDP for States. In addition to these systems of accounts, BEA maintains input-output accounts, which detail the interaction of industries, and wealth accounts, which provide estimates of the Nation’s reproducible capital stock.^{1 2}

The NIPA’s, the balance of payments accounts, the regional accounts, and the other accounts and statistics prepared by BEA are used by a wide range of individuals and organizations, both public and private. Business economists and Federal

1. This Review of the economic accounts does not include BEA’s system of cyclical indicators, best known for its composite index of leading indicators.

2. The Board of Governors of the Federal Reserve System maintains another set of economic accounts, the flow of funds accounts. The flow of funds accounts show the acquisition of physical and financial assets throughout the U.S. economy and the sources of funds used to acquire the assets. An associated set of balance sheets shows holdings of physical and financial assets.

Questions That BEA's Economic Accounts Help To Answer

National income and product accounts (NIPA's)

The keystone of the NIPA's—gross domestic product (GDP)—measures the market value of the goods and services produced in the United States. From the product side, GDP is the total of final sales plus the change in business inventories (goods that have been produced but not yet sold). From the income side, it is the sum of costs, including compensation of employees and profits associated with producing GDP. The usefulness of GDP stems in part from providing answers about the output of the economy—its size, its composition, and its use.

This system of accounts also traces the principal economic flows among the major sectors of the economy. In this way, the system helps to answer questions about the process by which output is produced and distributed.

The NIPA's, sometimes described as the mainstay of macroeconomic analysis, are presented in a set of 132 quarterly and annual tables. They help to answer questions such as these:

- How much has the Nation's production, as measured by GDP, grown in the last quarter? the last year? the last decade?
- How much have prices—of goods and services produced in the United States, or of goods and services purchased in the United States irrespective of where produced—increased over the same periods?
- How much have standards of living, as measured by real personal income per capita, grown in the last decade?
- How much of GDP goes for investment? How does the U.S. investment rate compare with that of other nations?
- How much of personal income goes to purchase goods and services? to pay taxes? for saving?

Balance of payments accounts

The balance of payments accounts provide information on international flows of goods, services, investment income, international assistance, and capital. This system of accounts also provides integrated balance-sheet information on the U.S. international investment position. The accounts help to answer questions such as these:

- How large is the U.S. deficit in trade in goods? the surplus in trade in services? the surplus or deficit in investment income?
- How do the rates of return to foreign-owned companies in the United States compare with the rates of return to U.S.-owned companies abroad?
- How much have foreigners invested in the United States? How much has the United States invested abroad?

Regional economic accounts

BEA's regional accounts provide estimates of gross state product and of total and per capita personal income by region, State, metropolitan area, and county. They help to answer questions such as these:

- Which regions had the fastest growth in per capita income in the last decade? The slowest growth?

- In which States is the share of residents' income from wages and salaries the highest? from dividends, interest, and rent? from transfer payments such as social security?
- Is gross state product from manufacturing becoming less concentrated geographically? In which States are "high-tech" industries growing the fastest?

Other accounts and data

BEA also produces the following sets of statistics that are related to its best-known accounts.

Input-output accounts: These national accounts detail the interaction of industries. They allow users to track the effects of changes in resource costs, or changes in final demand, on specific industries, on the users of these industries' products, and on suppliers of labor and other products to these industries.

- How much of manufacturing industries' inputs are from other manufacturing industries? are from domestic industries? are labor inputs?
- What are the effects on industry output of a general increase in exports? an increase in industrial chemical exports? a decrease in agricultural exports?

Wealth accounts: BEA produces estimates of the Nation's reproducible tangible wealth in the form of nonresidential structures and equipment, residential structures, consumer durable goods, and inventories. These accounts detail the U.S. capital stock by industry and by legal form of ownership.

- Over the last decade, how much has the Nation's infrastructure, as measured by its stock of fixed capital, grown? How does this compare with past rates of capital formation?
- What portion of the capital stock is owned by persons? by corporations? by others?

U.S. direct investment abroad and foreign direct investment in the United States: This detailed data set on the operations of foreign-owned companies is used to estimate investment income and capital flows for the balance of payments accounts and holdings for the international investment position. By itself, it helps to answer questions such as these:

- What percentage of the U.S. workforce is employed in foreign-owned companies?
- Which countries account for the largest share of foreign direct investment in the United States?
- In what countries do U.S. companies invest? What share of U.S. exports and imports are accounted for by trade between U.S. companies and their foreign subsidiaries?

economic policy analysts use estimates from the NIPA's to track business cycles, trends in overall economic activity, and the contributions of the various sectors. (See the box, "Questions That BEA's Economic Accounts Help To Answer," on page 38.) Economic forecasting is largely directed toward explaining and predicting NIPA measures, and the behavioral equations in econometric models—consumption function, investment function, profits equation—use variables defined by the NIPA's. For example, the "Economic Assumptions" section of the *Budget of the United States Government* is framed largely in terms of NIPA measures. Academic and other researchers use various combinations of NIPA estimates in econometric and other studies of such topics as economic growth, productivity, and saving.

Estimates from the balance of payments accounts are used by policy analysts to track the flows of goods and services needed to assess the U.S. competitive position in world trade and by the Federal Reserve, the Treasury Department, and financial market analysts to monitor capital flows and exchange-rate developments. The U.S. Government reports its balance of payments accounts to the International Monetary Fund in support of the Fund's roles in monitoring countries' economic policies and in providing financial assistance to help correct balance-of-payments disequilibria.

Estimates from the regional accounts are used by State Government offices to project tax revenue and to prepare State economic development policies, by Federal agencies in allocation formulas for over \$90 billion in Federal funds annually, and by private industry for market analysis and plant location studies.

Public interest in BEA's estimates is widespread, and its monthly and quarterly news releases are reported in the general, as well as the business, press. This wide coverage indicates both the degree of public interest in the state of the economy as depicted in the accounts and the trust the public places in the objectivity of BEA's estimates.

Characteristics required of BEA's accounts

The uses made of the estimates in the accounts determine the characteristics required of them. Some characteristics that may be required, such as for comparability with the estimates prepared in other countries or for long time series, reflect specific uses. More generally, users require three interrelated characteristics that may

be summarized in terms of accuracy, reliability, and relevance.

Accuracy.—In an abstract sense, accuracy may be thought of as referring to the level of an estimate. For example, an estimate of GDP, which is a measure of the goods and services produced, is accurate when it captures all production but does not double count. Thus, GDP would be inaccurate to the extent that it did not fully capture the production of, for example, a new service such as the "online" services now available to households. GDP is also inaccurate to the extent that production is not correctly allocated between final purchases, which can be added up as one of the ways to measure GDP, and intermediate purchases, which should be excluded from this total. For example, one difficult allocation that is made by BEA is for spending at restaurants; spending by households should enter GDP, but spending by business should not.

However, users often focus on the change in levels—for example, the change from quarter to quarter in real GDP, or the change over a decade in State per capita personal income. Thus, miscounted flows of goods and services, of income, or of other components that are subject to cyclical fluctuations or that grow or decline over time are of particular concern because they affect the change in levels.

Reliability.—Reliability refers to the size and frequency of revisions to BEA's estimates. It is a characteristic that arises because additional information used in preparing an estimate—information that is more complete, more detailed, or otherwise better—is incorporated into the estimate as it becomes available over a period of time. (See also the discussion of timeliness as part of **relevance**.) Revisions, then, are indicative of measurement error in estimates that do not incorporate all the information that will eventually become available.

Users express continuing concern about reliability and the impact of revisions on their analysis, but on occasion they have been particularly vocal. For example, for 1990 and 1991, the first annual revised estimates of real GDP showed a different picture than did the earlier estimates. According to the annual revision released in July 1992, the cyclical peak in real GDP occurred one quarter earlier than was initially estimated, and the contraction was deeper than previously estimated. In their annual report for 1993, the Council of Economic Advisers noted that the reliability of such estimates is critical to policymakers

and the public and made the comment, "Policy might have been conducted in a different fashion if the true severity of the recession had been known earlier."³

BEA'S most accurate estimates presumably are the ones for which there will be no further revisions—that is, the ones in which all the information that will become available has been incorporated. Even for these estimates, there remains some unknown amount of inaccuracy. Measures of this error cannot be determined for economic accounting estimates even to the extent that they can for statistical surveys for several reasons: Not all information used in the accounts is from surveys, the relevant measures of error from data based on surveys are not always available, and even if they are, they cannot meaningfully be added together.

In practical terms, estimates that undergo little revision as additional information is incorporated may accordingly be viewed as reliable; however, they may or may not be accurate. For example, if the information from which estimates are prepared has no gaps in its intended coverage, the estimates are both reliable and accurate. If, however, the information has gaps in coverage, the estimates may be viewed—strange as it may seem—as reliable but inaccurate.

Relevance.—Relevance has at least two dimensions. One, timeliness, refers to the length of time between the close of the period to which the estimates refer and the release of the estimates for that period. Timeliness can be viewed as a dimension of relevance because estimates that are not available soon enough for a particular intended use are, in fact, irrelevant for that use. In this sense, relevance is often thought of in the context of a tradeoff with accuracy and reliability, and the preferred tradeoff depends on the use to be made of the estimates. For estimates used in tracking cyclical and other short-term developments, there is a premium on timeliness; for estimates that show detailed interrelationships, such as input-output accounts, there is more of a premium on accuracy.

The second dimension of relevance refers to the ability of the accounts to provide summary measures, the kind and amount of detail, and the analytical frameworks that answer the questions about the economy that are being asked. Issues of relevance change as the economy changes, as policy concerns evolve, and as economic theory

advances. For example, in the mid-1950's, relevance was the attribute at issue when users sought the development of constant-dollar quarterly estimates of GNP to supplement the current-dollar measures, and it was the attribute at issue when, as international services grew in importance in world trade, users sought to focus on a trade balance that included both goods and services.

Part 2. Source Data and Methods Used to Prepare the Accounts

Source data are the information BEA uses to prepare estimates, and estimating methods are the steps BEA takes to transform these data into estimates. The accounts are built up as a mosaic from a wide range of source data using a variety of estimating methods to adjust the available source data to the concepts needed, to fill in gaps in coverage, and to obtain the time of recording and valuation needed for the accounts. The interaction of source data and estimating methods determines the accuracy and reliability of the accounts and sets the statistical limits for estimating relevant measures. Source data also determine the initial release and revision schedules for the estimates.

The interaction of source data and estimating methods

In an ideal world, source data for each detailed component of the accounts would map exactly to the concept specified by the accounting framework. Further, the source data would be accurate, would have the needed coverage, would have the needed time of recording and valuation, and would be available quickly.

Of course, source data do not fit this description, nor are they ever likely to do so. Individuals and businesses do not keep their records in a way that would make it easy to provide what BEA needs. Most individuals do not keep records of what they spend at the level of detail needed for the accounts. Many businesses—for example, restaurants and gasoline service stations—do not keep records that distinguish sales to a business from sales to a household, and many businesses do not keep records on the commodity composition of their inventories or on the geographic breakdown of their profits. Many businesses—especially small businesses—do their accounting

³ *Economic Report of the President* (Washington, DC: U.S. Government Printing Office, January 1993): 61.

annually and cannot provide monthly, or even quarterly, data. As a result, to provide BEA with everything needed to prepare the accounts would impose an unacceptably high reporting burden on respondents and would greatly increase the cost to the government of collecting statistics. Thus, the source data that BEA uses are collected from a variety of sources and, with few exceptions, for purposes other than the preparation of BEA's estimates.

Data collected by Federal Government agencies provide the backbone of the estimates; these data are supplemented by data from trade associations, businesses, international organizations, and other sources. The Government data are from a number of agencies, mainly the Commerce Department's Bureau of the Census, the Labor Department's Bureau of Labor Statistics, the Internal Revenue Service and other agencies of the Treasury Department, the Office of Management and Budget, and the Agriculture Department. Some of the Government-collected data, referred to as "administrative" data, are byproducts of government functions such as education programs, tax collection, defense, and regulation. Nonadministrative data, sometimes referred to as "general purpose" or "statistical" data, include the periodic economic and population censuses and a wide range of sample surveys, such as those that collect data on manufacturing and farm activity, prices, and corporate profits. Of the relatively few data items that BEA collects, most refer to international transactions. These include international trade in services and direct investment (both by foreign residents in the United States and by U.S. residents in foreign countries).

Because the source data available are not ideal from the point of view of preparing the economic accounts, BEA must "make do." To continue the mosaic metaphor for the accounts, the source data are the small pieces of colored stone, and BEA must develop estimating methods to shape the stones to fit and hold them together according to the artist's design. The estimating methods adjust the best available data to the concepts needed for the accounts, fill gaps in coverage of the source data, and make adjustments to the source data to obtain the needed time of recording and valuation. Some examples of these estimating methods follow.

Adjustments to needed concepts:

- Internal Revenue Service *Corporate Returns* data include gains (net of losses) from the

sale of property in corporate profits. BEA subtracts these gains to arrive at a measure of profits consistent with the concept of income from current production underlying the income side of GDP.

- Wages and salaries reported in the State employment security agencies' tabulations of payroll data are on a place-of-work basis. BEA makes a residence adjustment to put them on the needed place-of-residence basis for personal income by State.

Filling gaps in coverage:

- Census Bureau censuses and surveys of trade do not include inventories of nonmerchant wholesalers. BEA estimates the change in the inventories of these wholesalers—of petroleum bulk stations, using physical quantities and a price index, and of manufacturing sales branches, using changes in the corresponding manufacturing industries—to provide full coverage of wholesalers for the change in business inventories component of GDP.
- The monthly survey of establishments conducted for the Bureau of Labor Statistics includes data on employment and on average weekly hours and average hourly earnings of production and nonsupervisory workers, which are used by BEA to estimate wages and salaries. The data do not include bonus payments, such as are common in the securities industry. BEA makes estimates of these bonus payments, often on the basis of fragmentary information, to provide fuller coverage of wage and salary disbursements for the initial monthly and quarterly estimates of NIPA personal income and for the preliminary quarterly estimates of State personal income.

Adjustments to needed time of recording and valuation:

- Financial statements for State and local governments, compiled and published by the Census Bureau in *Census of Governments* and *Government Finances*, report receipts and expenditures data on a fiscal year basis that is not uniform for all governments. For example, in estimating the government purchases component of GDP, BEA makes adjustments to put the data on a calendar year basis.
- Depreciation charges used by business in tax accounting—which are compiled and published by the Internal Revenue Service in

Corporate Returns, Partnership Returns, and Sole Proprietorship Returns—reflect several depreciation patterns and service lives. BEA adjusts profits and other business incomes to put the depreciation charges on a consistent accounting basis (based on straight-line depreciation and uniform service lives).

- Data on imports from Canada, as received by the Census Bureau in a data exchange with Canada, value certain goods at the point of manufacture. BEA adds the cost of inland transport to provide the valuation at point of foreign export to be consistent with other trade data and approximate the market price used throughout the accounts.

The source data BEA uses represent a variety of different economic statistics—wages and salaries, premiums, interest rates, mortgage and other debt outstanding, tax collections, employment, unit sales, and average prices, to name a few. In most cases, the source data are “value data”; that is, they embody both the quantity and price dimensions that are required for current-dollar estimates. (Most of the estimating methods just sampled are adjustments to value data.) When value data are not used, data with separate quantity and price dimensions are combined to derive the required value estimates (along with any needed adjustments). For example, the estimate for purchases of new autos is prepared by multiplying unit sales by average price.

For estimates of GDP, gross state product, trade in the balance of payments accounts, and other series that measure goods and services, BEA uses additional source data for the preparation of price-adjusted, or real, estimates. The estimating method used for most of these series is deflation. In deflation, real estimates are obtained by dividing the most detailed current-dollar components by appropriate prices indexes, with the base period—at present, the year 1987—equal to 100. Components of the Consumer Price Index, the Producer Price Index, and the International Price Index prepared by the Bureau of Labor Statistics are the source data used to deflate many components.

Source data as determinants of initial release and revision schedules

Because source data are the colored stones—the essential material—in BEA’s mosaics, they largely determine the schedules for the initial release of the estimates and the schedules on which they

are revised. One factor is the speed with which the source data first become available. A second is whether or not the source data are part of a program that, over time, provides more complete or otherwise better coverage—for example, if the sample is larger for annual than quarterly surveys or if the amount of detail is larger for annual surveys.

For the first, or advance, quarterly estimate of GDP, the availability of the monthly series on sales, shipments, and trade in goods from the Census Bureau (along with the time it takes BEA to process it) determines the release date. Once these data become available, the initial estimate of each major component of GDP can be based on at least 2 months of source data or on reliable BEA projections. For the quarterly balance of payments estimates, the availability of monthly series on exports and imports of goods determines the release schedule. For the quarterly State personal income estimates, the availability of wage and salary data from the States plays a similar role.

The estimating schedule for GDP illustrates the link with source data that are part of a program that, over time, provides better coverage. In general, the most comprehensive source data for the product components of GDP are available at the 5-year intervals associated with the economic censuses conducted by the Census Bureau. The economic census data are used to “benchmark” BEA’s estimates for the quinquennial census years—for example, 1987, 1982, and 1977. The related annual surveys are drawn from a sample of establishments covered in the census and provide less detailed data than the census. A smaller sample provides monthly data for most of the annual surveys. These monthly data are used to produce the monthly and quarterly estimates of several product components. These estimates are revised when more reports become available from the monthly samples, when data from the annual surveys become available, and when data from the census become available; thus, a given estimate of a GDP product component may be revised as many as six times over a 5-year period.

Source data and methods: Examples, special requirements, and publications

An accompanying box, “[Examples of Source Data and Methods Used To Prepare the Economic Accounts](#),” demonstrates several of these points: The variety of source data BEA uses, the methods BEA has developed to provide estimates that fit the concepts, coverage, and other needs of the accounts, and the incorporation by BEA of more

Examples of Source Data and Methods Used To Prepare the Economic Accounts

Example estimate from the NIPA's: Personal consumption expenditures on goods

Personal consumption expenditures (PCE) makes up about two-thirds of GDP, and durable and nondurable goods account for over two-fifths of that (services account for the remainder). The table below shows the methodology for the advance quarterly and annual current-dollar estimates for goods (with estimates for 1993).

In the context of the discussion of sources and methods, there are several points of interest:

- *Diverse source data:* Among the source data are the Census Bureau's sequence of a monthly survey, an annual survey, and a census for retail trade; the Bureau of Labor Statistics Consumer Price Indexes; data from several trade sources; administrative data from several Federal agencies; and data from BEA's balance of payments accounts.

- *Sequence of revisions:* The "most goods" category undergoes a sequence of revisions as the source data become more complete.

Census Bureau retail sales data are available for all 3 months of the quarter at the time of the advance quarterly estimate; data for the third month are preliminary and subject to revision. The retail sales data are further revised with the release of the annual survey, and these are incorporated into the PCE estimates in the second annual revision. The data are further revised with the release of the economic census, and these are incorporated into the PCE estimates in the NIPA comprehensive revision.

- *Role of estimating methods:* The retail control method mentioned in the "most goods" description provides both an indicator series used in interpolating and extrapolating and a total to which the categories in the group must sum. This method makes it possible to use retail sales by type of business to obtain type-of-goods detail (assuming that the types of goods purchased at various kinds of stores do not change rapidly).

Source: SURVEY OF CURRENT BUSINESS, July 1994.

| Subcomponent (billions of dollars) of PCE, which was \$4,378.2 billion | Annual estimates: Source data and methods used to determine level for benchmark and other final years or, for other years, used to prepare an extrapolator or interpolator | Advance quarterly estimates: Source data and methods used to prepare an extrapolator |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Durable and nondurable goods: (\$1,877.2)¹ Most goods (goods except subcomponents listed separately) (\$1,562.0). | Benchmark years—Commodity-flow method, starting with manufacturers' shipments from Census Bureau quinquennial census and including an adjustment for exports and imports from Census Bureau merchandise trade. | Same as annual for most recent year. |
| New autos (\$93.4) | Other years—Retail-control method, using retail trade sales from Census Bureau annual survey or, for most recent year, monthly survey of retail trade. | Same as annual. |
| Net purchases of used autos (\$45.9) | Physical quantity purchased times average retail price: Unit sales, information with which to allocate sales among consumers and other purchasers, and average list prices, all from trade sources. | Same as annual. |
| | Benchmark years—For net transactions, change in the consumer stock of autos from trade sources. For dealers' margin, retail sales from Census Bureau quinquennial census and margin rate from Census Bureau annual survey of retail trade. | For net transactions, residual based on net sales by other sectors. For dealers' margin, unit sales of franchised dealers from trade source and sales price from Bureau of Labor Statistics consumer price index for used cars. |
| | Other years except most recent—For net transactions, same as benchmark. For dealers' margin, franchised dealers' unit sales times sales price, both from trade sources, times margin rate for independent dealers from Census Bureau annual survey; independent dealers' margin from Census Bureau annual survey. | |
| | Most recent year—For net transactions, same as benchmark. For dealers' margin, for franchised dealers, unit sales and sales price from trade sources; for independent dealers, sales from Census Bureau monthly survey of retail trade. | |
| New trucks (\$52.3) | Benchmark years—Commodity-flow method, starting with manufacturers' shipments from Census Bureau quinquennial census and including an adjustment for exports and imports from Census Bureau merchandise trade. | Same as annual for most recent year. |
| | Other years except most recent—Abbreviated commodity-flow method, starting with manufacturers' shipments from Census Bureau annual survey and including an adjustment for exports and imports from Census Bureau merchandise trade. | |
| | Most recent year—Physical quantity purchased times average retail price: Unit sales and information with which to allocate sales among consumers and other purchasers from trade sources and average price based on Bureau of Labor Statistics consumer price index for new trucks. | |
| Gasoline and oil ² (\$105.6) | Benchmark years—Physical quantity purchased times average retail price: Gallons consumed from the Department of Transportation, information with which to allocate that total among consumers and other purchasers from Federal agencies and trade sources, and average retail price from Census Bureau quinquennial census. | Same as annual for most recent year. |
| | Years except most recent—Same as benchmark years, except average retail price from the Energy Information Administration. | |
| | Most recent year—Physical quantity purchased times average retail price: Gallons consumed and average price both from the Energy Information Administration. | |
| Food furnished to employees (including military) (\$12.0). | Benchmark years—For commercial employees, number of employees of appropriate industries from Bureau of Labor Statistics tabulations times BEA estimate of per capita expenditures for food; for military personnel, outlays from the Budget of the United States prepared by the Office of Management and Budget. | For commercial employees, same as annual for years other than benchmark years; for military personnel, judgmental trend. |
| Expenditures abroad by U.S. residents (\$3.2) less personal remittances in kind to nonresidents (\$0.8). | Years other than benchmark years—Same as benchmark years, except per capita expenditures for food based on Bureau of Labor Statistics consumer price index for food. | |
| | Estimated as part of the balance of payments; see the entry for service exports and imports, net, under net exports of goods and services. | Judgmental trend. |

1. Includes \$3.6 billion for food produced and consumed on farms, standard clothing issued to military personnel, and used trucks.
2. The retail-control method cited under PCE for most goods is based on retail trade sales data that include

sales of gasoline service stations. Estimates of PCE for gasoline and oil are derived separately and are deducted from the retail-control totals (that include goods sold by gasoline service stations) to derive the estimates for PCE for most goods.

complete and more consistent source data as they become available. (The box begins on page 43 and continues on pages 45 and 47.)

All of BEA's accounts are built up from source data in a similar way, but each system of accounts has special requirements according to the dimensions of the economy on which it focuses. For the regional accounts, data must be found that either are available by State or county and add up to a reliable national total, as do the wage and salary data, or that can be used to allocate a national total to the States and counties. Of particular concern is the distinction between data that are on a place-of-residence basis (such as receipts of dividends, interest, and rental income) and data that are on a place-of-work basis (such as wages and salaries and other labor income). For the international accounts, data must be found that distinguish between transactions and holdings of residents and nonresidents, with a particular focus on the geography of the nonresidents.

BEA publishes papers that describe in detail the methodologies it uses—that is, its source data and methods.⁴ Changes in methodologies—for example, when a source is discontinued or when new source data are introduced—are typically described in the SURVEY OF CURRENT BUSINESS. For example, the source data for each component of GDP are published in the SURVEY articles on the annual revisions of the accounts. Publishing these methodologies provides users with information to evaluate the estimates and their suitability for actual and intended applications.

The effect of source data and methods on the performance of the accounts

The interaction of source data and estimating methods determines the accuracy and reliability of the accounts and sets the statistical limits for implementing relevant measures. This section uses examples to make this point.

Accuracy.—As explained in part 1, accuracy deals with the possibility of error in the level of, and

change in, the estimates. One of the two examples that follow focuses on gaps in coverage of the source data that affected both the level and rate of change in the estimates. The other focuses on the effect of an estimating method on the rate of change in the estimates.

International portfolio capital flows.—During the 1980's, major advances in computer and communications technology, combined with deregulation in financial services industries, sparked dynamic changes in global financial markets. These changes opened new financing channels and inspired the introduction of new financial instruments. These developments, in turn, led to gaps in BEA's coverage of international transactions, particularly international flows of portfolio capital. Inaccurate portfolio capital measures also had implications for the current account because the capital positions are used in estimating income flows.

To meet the need for improved coverage of these transactions, BEA launched a multiyear effort starting early in the 1990's. First, BEA greatly expanded the use of counterparty data—that is, data from the country in which the foreign transactor is resident—in the June 1994 revision of the balance of payments accounts, which covered 1984–93. Use of these data added nearly \$100 billion in capital outflows and nearly \$116 billion in capital inflows that were previously not recorded.

Second, BEA has supported expansion in the coverage of the Treasury Department's surveys of portfolio investment to capture direct transactions between large U.S. pension funds and investment managers, on the one hand, and foreign residents, on the other. Previously, these transactions had bypassed the survey system, which was based on data provided by U.S. financial intermediaries. Third, the Treasury Department is currently processing a benchmark survey of U.S. portfolio investment abroad for BEA, the first in more than 50 years.

Although the use of counterparty data has helped fill gaps in coverage of international capital flows, increased use of such data to capture direct financial transactions will require further work in establishing standardized definitions and data collection systems across countries. In addition, counterparty data are unlikely to be available to provide measures of new financial instruments, one of the largest and most rapidly widening gaps in coverage. According to data collected by the Bank for International Settlements from its reporting banks alone, the notional principal value on interest rate swaps—

4. A complete list of BEA's methodologies is in *User's Guide to BEA Information*, which is updated annually (most recently in the January 1995 SURVEY OF CURRENT BUSINESS). The NIPA methodology is being described in a series of papers; see the listing in *User's Guide to BEA Information*. See also U.S. Department of Commerce, Bureau of Economic Analysis, *Benchmark Input-Output Accounts of the United States, 1987* (Washington, DC: U.S. Government Printing Office, November 1994). The methodologies for personal income in the regional accounts are in U.S. Department of Commerce, Bureau of Economic Analysis, *State Personal Income, 1929–93* (Washington, DC: U.S. Government Printing Office, forthcoming) and in U.S. Department of Commerce, Bureau of Economic Analysis, *Local Area Personal Income, 1969–92* (Washington, DC: U.S. Government Printing Office, September 1994). The methodology for the balance of payments is in U.S. Department of Commerce, Bureau of Economic Analysis, *The Balance of Payments of the United States: Concepts, Data Sources, and Estimating Procedures* (Washington, DC: U.S. Government Printing Office, May 1990).

one of the new derivative instruments—grew from \$1.5 trillion in 1989 to \$3.9 trillion in 1992, and the value of currency swaps grew from \$0.9 trillion in 1989 to \$1.7 trillion in 1992. Consistent data on U.S. transactions in derivatives, or

the market value of U.S. exposure to foreign risk through derivative instruments, are not available.

Fixed-weighted real GDP.—Rapid change in the composition of output and in relative prices has

Examples of Source Data and Methods Used To Prepare the Economic Accounts—Continued

Example estimate from the balance of payments accounts: Transactions in securities other than U.S. Treasury securities

Portfolio investment—that is, securities transactions between U.S. and unaffiliated foreign residents other than foreign official agencies—is measured in two capital accounts: “U.S. securities—net foreign purchases,” which was \$80.1 billion in 1993, and “foreign securities—net U.S. purchases,” which was \$120.0 billion.

The securities covered are stocks and bonds with an original maturity of more than 1 year. The accounts cover new issues in the United States and abroad as well as trading in, and redemptions of, outstanding U.S. and foreign securities.

The primary source data are from the U.S. Department of the Treasury’s International Capital reporting system—specifically, the monthly S form, “Purchases and Sales of Long-Term Securities by Foreigners.” Filing of S forms is required for all securities brokers, dealers, and other persons in the United States who, on their own behalf or on behalf of customers, engage in transactions in long-term securities with foreigners.

The methodology described in the table below (which follows the order of the standard quarterly balance of payments tables) is for “foreign securities—net U.S. purchases”; the methodology for “U.S. securities—net foreign purchases” is similar.

In the context of the discussion of sources and methods, there are several points of interest:

- *Source data coverage:* The S form covers mainly intermediated transactions; however, direct transactions for large pension and investment managers are covered.

- *Role of estimating methods:* BEA makes numerous adjustments, some from fragmentary data, to arrive at the needed coverage (for example, with respect to coverage of commissions, taxes, and other charges) and timing (for example, transactions not yet recorded in S-form data).

- *Relations among the estimates:* Positions—that is, outstanding holdings—that correspond to these capital flows are shown in the net international investment position; the positions are estimated by cumulating the capital flows from periodic benchmark survey-based levels and adjusting for price change. (The positions, along with an estimated representative yield, are used to estimate income flows for the current account of the balance of payments.)

Net U.S. purchases of foreign stocks (line 2): BEA estimates net transactions in outstanding stocks (line 4) as follows:

- (1) Data on gross sales and gross purchases of foreign stocks in the United States by foreigners are based on the monthly S reports. BEA adjusts the data to exclude estimates of commissions, taxes, and other charges from reported gross foreign purchases; to include estimates of commissions, taxes, and other charges from reported gross foreign purchases; and to include estimates of charges in reported gross foreign sales.
- (2) The value of stocks representing U.S. direct investment abroad is deducted from the net figure.
- (3) The value of stocks exchanged as part of a foreign direct investment in the United States is added.
- (4) Other adjustments include additions or subtractions for transactions that have not yet been incorporated into the Treasury data and additions for transactions that have been omitted, but that have been verified from other sources.

BEA estimates new foreign issues (line 3) on the basis of financial market information.

Net U.S. purchases of foreign bonds (line 5): BEA estimates net transactions in outstanding bonds other than redemptions (line 8) as follows:

- (1) Data on gross sales and gross purchases in the United States by foreigners of foreign corporate bonds are based on the monthly S reports. BEA adjusts the data to include estimates of commissions, taxes, and other charges from reported gross foreign purchases and to include estimates of underwriting fees on new issues, other fees, taxes, and other charges in reported gross foreign sales.
- (2) Adjustments are made to the data covering U.S. purchases of Canadian bonds to account for additional redemptions of Canadian-issued bonds that are held by U.S. residents.
- (3) Other adjustments include additions or subtractions for transactions that have not been incorporated into the Treasury data; additions for transactions that have been omitted from the S form, but that have been verified from other sources; and additions for acquisitions of foreign debt securities by U.S. residents through the exchange of securities with foreign residents, including those resulting in foreign direct investment in the United States.

BEA estimates new foreign issues (line 6) on the basis of financial market information, with separate estimates by type of issuer.

BEA estimates bond redemptions (line 7) from information on scheduled retirements.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, *The Balance of Payments of the United States: Concepts, Data Sources, and Estimating Procedures* (Washington, DC: U.S. Government Printing Office, May 1990) as updated in the June issues of the SURVEY OF CURRENT BUSINESS, 1991–94.

| Line | Foreign securities, net U.S. purchases (-) | 1993 (Billions of dollars) |
|------|----------------------------------------------------|-------------------------------|
| 1 | Total | -120.0 |
| 2 | Stocks | -60.6 |
| 3 | New issues in the United States | -13.8 |
| 4 | Transactions in outstanding stocks, net | -46.8 |
| 5 | Bonds | -59.4 |
| 6 | New issues in the United States | -46.8 |
| 7 | Redemptions of U.S.-held foreign bonds | 8.9 |
| 8 | Other transactions in outstanding bonds, net | -21.5 |

brought into question the longstanding methods that underlie constant-dollar GDP and other estimates. Constant-dollar estimates are the familiar kind of “real” estimates, the ones that are currently denominated in 1987 dollars because they value each component in the price of a base year that is currently 1987. This method is the equivalent of output measures that have fixed price weights—those of the base year. (Similarly, the fixed-weighted price indexes have fixed output weights—those of the base year.) Use of the same (fixed) price weights over all time periods provides a set of estimates in which the components add up to the totals. BEA has featured such measures partly because many users consider this additive property to be useful—for example, it facilitates analysis of contributions to growth and changes in shares of economic activity.

The professional literature has long recognized that output measures that have fixed price weights tend to overstate current-period growth as one moves further from the base period. This tendency, often called “substitution bias,” reflects the fact that the commodities for which output grows rapidly tend to be those that register declines, or the smallest increases, in prices.

Two developments contributed to the need to investigate alternatives that did not exhibit the substitution bias found in the fixed-weighted index. First, beginning in the 1970’s, changes in the prices and quantities of the energy and food components of GDP were large enough in certain periods for the choice of price weights to affect the measurement of change in real GDP. Second, computers provided a classic, but extreme, case of the source of the bias: Computer prices have declined rapidly, while computer output has grown rapidly.

Recognizing the important effect of changes in relative prices on real GDP growth rates, BEA initiated a research program to investigate alternative measures. In April 1992, BEA published two alternative measures of annual change in real GDP for the period 1959–90, and in March 1993, BEA began publishing them for quarterly changes. The two alternative measures are not based on the price weights of a single base year. Rather, they are indexes that account for changes in relative prices over the periods for which growth rates are computed. In the chain-type annual-weighted quantity index, the weights are from adjacent years. In the benchmark-years-weighted quantity

index, the weights are from adjacent benchmark years—about 5-year intervals.⁵

Further work in this area will involve examination of other methods that attempt to combine the advantages of fixed-weighted measures with the more up-to-date weights embodied in the alternative measures.

Reliability.—As explained in part 1, reliability is gauged by the size and frequency of revisions. It should be noted that filling gaps, such as those just described for international capital flows, and making other improvements give rise to revisions. Thus, in these cases, revisions are a symptom that improvements *have been made*. In other cases, revisions are a symptom that there is potential for improvement.

Among the major sources of revision are the following: Incorporation of source data with more complete reporting, replacement of judgmental projections with source data, incorporation of source data that more closely match economic accounting concepts and other needs, and incorporation of updated seasonal adjustments. These sources of revision, reflecting the interaction of source data and estimating methods, are explained by referring to the results of BEA studies of NIPA revisions.

Incorporation of source data with more complete reporting.—Some revisions are due to the incorporation of revisions in monthly source data that embody more complete reporting. Among the larger sources of revision from the advance to the preliminary current quarterly estimates of GDP are the incorporation of revised Census Bureau data on retail sales, manufacturing and trade inventories, manufacturers’ shipments, and new construction put in place. Revisions from the preliminary to the final current estimates, and from the final current estimates to the annual and comprehensive revision estimates, are often due to the introduction of annual and benchmark surveys that are progressively more comprehensive in coverage than the quarterly and monthly data. For example, large revisions in personal consumption expenditures for goods in the 1993 annual revision were mainly due to revisions that reflected the incorporation in the data of the large and growing number of discount “clubs,” which had not been fully covered in the monthly and annual retail trade surveys.

5. Both of the alternatives are what are known in the economic literature as “Fisher” or “superlative” price indexes.

Examples of Source Data and Methods Used To Prepare the Economic Accounts—Continued

Example estimate from the regional accounts: Wage and salary disbursements

Wage and salary disbursements makes up about 57 percent of personal income. The estimates are prepared by industry. As shown in the table that follows, there are two major sources of data: (1) The monthly survey of more than 400,000 nonagricultural establishments conducted by the State employment security agencies and coordinated by the Bureau of Labor Statistics (the BLS-790 series) and (2) the tabulations (sometimes called the ES-202 series) of the wages and salaries reported by employers on their quarterly unemployment insurance (UI) tax returns to the State employment security agencies.

The State-level BLS-790 series is used as the extrapolator for the preliminary quarterly estimates. The State-level UI series is used as the extrapolator for the second quarterly estimates, as the principal basis for the revised annual State estimates (which incorporate more detailed and more reliable data), and as the interpolator of the annual estimates used to prepare the revised quarterly State estimates.

The preliminary, second, and revised quarterly State estimates and the revised annual State estimates of wages and salaries are all controlled to the totals in the NIPA's. The quarterly and monthly national estimates of wages and salaries are based mainly on the

BLS-790 series; the annual estimates are based mainly on the UI series.

In the context of the discussion of sources and methods, there are several points of interest.

- *Sequence of revisions:* The UI data, which become available only in time for the second quarterly estimates (7 months after the quarter to which the data refer), include the wages and salaries of all employees, whereas the BLS-790 wage data for States are confined to the wages of production and nonsupervisory workers in the manufacturing industries. The UI wage data include bonus payments, which are not reflected in the BLS-790 data.

- *Relation of State and national estimates:* Until the preliminary annual State estimates for 1989 (published in April 1990), BEA had automatically controlled the annual estimates for the most current year to the BLS-790-based U.S. totals for wages and salaries in the NIPA's. Now, if the national total of the UI wage data for the first three quarters of a year differs substantially from the BLS-790-based estimates for those quarters, the U.S. total for wages and salaries that is used for the preliminary annual State estimates is based on the UI wage data. This change reduces the revisions between the preliminary and final annual State estimates of wages and salaries and personal income.

Source: Table H in the methodology text in *State Personal Income, 1929-93* (forthcoming).

| Industry: ¹ (Billions of dollars in 1993; U.S. total: \$3,072.3) | Preliminary quarterly estimates (4 months after the close of quarter) | Second quarterly estimates (7 months after the close of quarter) | Revised annual estimates (8 months after the close of the year) |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| Farm (\$11.9) | Trend extrapolation ² | Trend extrapolation ² | USDA estimates of farm labor expenses |
| Agricultural services, forestry, fisheries, and other (\$16.2) | Trend extrapolation | Quarterly UI data for wages and salaries. | Annual UI data for wages and salaries and USDA estimates of farm labor expenses |
| Mining (\$25.8) | BLS-790 monthly employment data | Quarterly UI wage data | Annual UI wage data |
| Construction (\$132.8) | BLS-790 monthly employment data | Quarterly UI wage data | Annual UI wage data |
| Manufacturing: | | | |
| Nondurable goods (\$235.0) | BLS-790 monthly data for employment and average weekly hours and average hourly earnings for production and nonsupervisory workers. | Quarterly UI wage data | Annual UI wage data |
| Durable goods (\$353.5) | BLS-790 monthly data for employment and average weekly hours and average hourly earnings for production and nonsupervisory workers. | Quarterly UI wage data | Annual UI wage data |
| Transportation and public utilities: | | | |
| Excluding railroads (\$188.6) | BLS-790 monthly employment data | Quarterly UI wage data | Annual UI wage data |
| Railroads (\$12.9) | Monthly ICC payroll data and AAR State employment data for Class I railroads. | Monthly ICC payroll data and AAR State employment data. | Annual ICC payroll data and AAR State employment data |
| Wholesale trade (\$204.8); retail trade (\$295.4); finance, insurance, and real estate (\$250.7). | BLS-790 monthly employment data | Quarterly UI wage data | Annual UI wage data |
| Services (770.8) | BLS-790 monthly employment data | Quarterly UI wage data | Annual UI wage data, data from Census Bureau <i>County Business Patterns</i> and Census Bureau population data |
| Federal civilian (\$115.0) | BLS-790 monthly employment data | BLS-790 monthly employment data | Annual UI wage data |
| Federal military: | | | |
| Active duty (\$42.0) | DOD number of personnel and average pay by service and Coast Guard payroll data. | DOD number of personnel and average pay and Coast Guard payroll data. | DOD and Coast Guard data |
| Reserves (\$7.5) | Trend extrapolation | Trend extrapolation | DOD payroll outlay data |
| State and local government (\$409.5) | BLS-790 monthly employment data | Quarterly UI wage data | Annual UI wage data |

1. The quarterly estimates of wages and salaries are prepared at the standard industrial classification (SIC) division level, and the annual estimates are prepared at the SIC two-digit level.

2. The trend extrapolation is based on a regression that estimates a State's share of the Nation historically by industry.

AAR Association of American Railroads
DOD Department of Defense
ICC Interstate Commerce Commission
UI Unemployment insurance
USDA U.S. Department of Agriculture

Replacement of projections with source data.—Some other revisions are due to the replacement of BEA's judgmental projections for the quarters and the year with newly available annual and economic census data. Some of the largest revisions to GDP have come from annual services survey data and from annual State and local government finances data. Data such as State and local government purchases other than structures and employee compensation are available only annually; quarterly estimates must be extrapolated and interpolated.

Incorporation of source data that more closely match the needs of the accounts.—Revisions to the quarterly and annual estimates can come from the introduction of more comprehensive source data or alternative source data that are more consistent with the concepts, coverage, time of recording, and valuation needed for the economic accounts. For example, revisions to corporate profits are often sizable when tabulations of tax-return data replace tabulations of publicly available shareholder reports. The tax-return data provide coverage of all firms and all industries, and they are based on accounting guidelines that are closer to NIPA concepts than are the shareholder reports.

Seasonal adjustment.—Another of the sources of revision to the quarterly estimates, and one that affects many components, is seasonal adjustment. For some series, particularly volatile series (such as merchandise trade, inventories, and structures), the effect of revisions in seasonal adjustments may account for a large part of the revision between the final current estimate and the first annual revision estimate. In most of these cases, however, the revisions shift growth between adjacent quarters and have little effect on the general picture of economic growth.

Relevance.—In the mid-1990's, there is probably more concern about the ability of the accounts to provide answers about the economy to policymakers, analysts, and others than about their timeliness, the other aspect of relevance. (The major exceptions to this statement are concerns about the timeliness of BEA's input-output tables and about some of the regional estimates.)

Within the existing structure of the accounts, the source data and estimating methods set the statistical limits for implementing some relevant measures. For example, there is considerable interest in identifying purchases of computer software and in making more consistent use of

quality-adjusted prices for preparing real estimates of "high-tech" goods and services, but both improvements would require new source data and estimating methods.

Looking further, changes in the economy, the evolution of policy concerns, and advances in theory suggest changes in the structure of the accounts and the definitions embodied in them that would enhance the relevance of the estimates. One longstanding set of questions involves the definition of investment. Investment in the NIPA's consists of purchases of structures, durable equipment, and inventories by the private business sector. Should other sectors—notably government—be viewed as making investment when structures and durable equipment are purchased? Should some purchases of intangibles, such as research and development, be treated as investment? Once economic theory, experience in economic accounting, interest in international comparability, and other elements are brought to bear in deciding on a change in definition to enhance relevance, the implementation would again require new source data and estimating methods.

In addition, satellite accounts may be developed, as described in the newly revised international guidelines in the *System of National Accounts 1993*, to expand the analytical capacity of the accounts. BEA has prepared prototypes of two satellite accounts—one to show the interaction of the economy and the environment and the other to identify research and development expenditures within the NIPA's and to show the capital stock that results from treating them as investment. Both efforts pointed to source data and methodological improvements needed to strengthen and extend the estimates. Additional satellite accounts, such as those pioneered in other countries for health and education, are likely to point in the same direction.

Part 3. A Comprehensive Review of BEA's Economic Accounts

For the Mid-Decade Strategic Review, BEA undertook to replicate the scope and approaches of the "blue ribbon" panels and other comprehensive evaluations that have helped shape the economic accounts in the past. As part of this process, BEA prepared background papers that looked at the accounts from five perspectives: Past experience in adapting the economic accounts to changes in

the economy, outside evaluations of the accounts, changes in source data available to BEA (resulting, for example, from deregulation) and in estimating methods, the newly revised international guidelines for an integrated system of national accounts and for the balance of payments, and the size and sources of revisions in key components of the accounts as suggesting an agenda for future work.

BEA identified three priority issues for maintaining and improving the accounts:

- *Change in the nature of output and the organization of production: The need for new and improved output measures,*
- *Investment: The need for better measures of investment, saving, and wealth, and*
- *Internationalization: The need for measures to fill gaps in the coverage in international transactions.*

A comprehensive review: Scope and approaches

In past decades, a series of reviews have evaluated the performance of the economic accounts in terms of their ability to provide a relevant picture of the changing economy and to adapt to changes in source data, estimating methods, and economic accounting. These reviews also evaluated the accuracy of the accounts through some combination of revision and other statistical studies. (See the box, “[Earlier Reviews of the Economic Accounts](#),” below.) The reviews provided guidance, in most cases confirming BEA’s own directions, for expanding and updating the accounts. The last review was in the early 1980’s.

Given the pace of change in the economy, a comprehensive review seemed overdue. Earlier experience suggests that such a review should cover methodological and statistical issues as well as concepts and accounting structure. Further,

Earlier Reviews of the Economic Accounts

In the 1950’s, there were two major reviews of the accounts. The first, *National Economic Accounts of the United States: Review, Appraisal, and Prospects*, was prepared in 1957 by the National Accounts Review Committee of the National Bureau of Economic Research at the request of the Bureau of the Budget (predecessor of the Office of Management and Budget). The Committee was chaired by Raymond Goldsmith, and the members included Richard Easterlin, Joseph Pechman, and Richard Ruggles. The report was presented at a hearing of the Subcommittee on Economic Statistics of the Joint Economic Committee. The second review, *Critique of the United States Income and Product Accounts*, from 1958, was the result of a symposium on the accounts held by the Conference on Research in Income and Wealth, which functions as a research forum for work on economic measurement. These reviews dealt with emerging issues of the time, many of which related to the expansion in the complexity and scope of the accounts that was necessary to accurately portray the U.S. economy. They also dealt with conceptual issues, such as the treatment of capital gains and the coverage of nonmarket production and consumption, and they discussed the need for better integration of the income and product, flow of funds, and other components of the existing accounts.

In 1971, BEA published *The Economic Accounts of the United States: Retrospect and Prospect*. This volume, on the occasion of the 50th anniversary of the SURVEY OF CURRENT BUSINESS, was a series of 43 papers contributed by some of the country’s most prominent economists, including past and future Federal Reserve Board chairpersons (Arthur Burns and Alan Greenspan), Nobel laureates (Wassily Leontief, Simon Kuznets, Lawrence Klein, and Paul Samuelson), Council of Economic Advisers chairpersons (Arthur Okun and Raymond Saulnier), and American Economic Association presidents (Robert

Eisner, Robert Gordon, and Charles Kindleberger). BEA catalogued and prioritized the suggestions from these papers, and BEA’s Director at that time, George Jaszi, responded.

In 1977, the *Gross National Product Data Improvement Project Report* was released. This report was prepared by the Advisory Committee on Gross National Product Data Improvement under the auspices of the Office of Management and Budget. The committee was chaired by Daniel Creamer, and the members were Rosanne Cole, Edward Denison, Raymond Goldsmith, Alan Greenspan, and John Kendrick. The report, referred to as the Creamer Report, was undertaken as a result of concerns over relatively large revisions in the GNP accounts in the early 1970’s and focused on needed improvements in the source data, rather than on needed extensions and conceptual modifications.

In 1979, the Conference on Research in Income and Wealth addressed several aspects of the national income and product accounts pertaining to their role as a system of information about the behavior of the economy. Topics included the concepts and structure of the accounts, the issues involved in deflation and the treatment of quality change in price indexes, and source data. The last topic included an evaluation of major parts of the Creamer Report.

In 1982, the General Accounting Office published *The Bureau of Economic Analysis Should Lead Efforts to Improve GNP Estimates*. This study was intended to evaluate revisions to GNP estimates and to assign different priorities to the Creamer Report’s 155 recommendations, made to 24 Federal agencies, for improving the accounts. It, too, focused more on statistical than on conceptual issues and—as the title indicates—urged BEA to take a more proactive role in obtaining the source data needed to improve the accounts.

it should look at the accounts from at least five perspectives:

- The changes in the economy in the 1980's and 1990's and BEA's responses to these changes, to serve both as an agenda for future work and as a guide to success in the future.
- Recommendations by outside experts.
- Updated international guidelines in economic accounting, mainly the *System of National Accounts 1993* and the *Balance of Payments Manual*.
- Changes in source data available to BEA (reflecting changes such as those due to

deregulation and those in data collection technology) and changes in estimating methods.

- Revisions in key components of GDP and the other accounts, examining the size and sources of revisions as an agenda for future work.

Background papers

As the first step in the Mid-Decade Review, BEA prepared a set of background papers that cover the five perspectives just described. Papers II–VI

Table 1.—Selected Changes in the Economy and Changes in the Economic Accounts

| Economic development | Issue | Action ¹ |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Structural change: | | |
| Constant-dollar gross product originating | Estimates were not capturing changes; needed better picture of growth in services and imports and the role of information processing equipment. | Revised the gross product by industry series (1991) |
| Input-output accounts | Incomplete picture of industries; needed more timely detail on industry interaction. | Improved the benchmark input-output accounts (1994) |
| Gross state product | Incomplete picture of industries; needed more frequent information on changing industry structure. | Published annual input-output tables (1987) |
| Other structural developments | Incomplete picture of regional activity; needed detail on State contributions to GDP to understand changes in economy's regional structure. | Introduced gross state product by industry (1988) |
| | Changing nature of Federal deposit insurance; needed to reflect the exposure due to savings and loan crisis. | Developed a new classification of federal deposit insurance (1991) |
| | Changing nature of health care programs; needed consistent picture. | Reclassified medicaid outlays (to conform its treatment with medicare) (1985) |
| Price change | | |
| | Substitution bias of fixed-weighted index | Published new alternative measures of real GDP change that reflect changing relative prices (1992) |
| | Changing relative prices and/or unique products | Introduced new index for deflation of computers based on hedonic techniques (1985) |
| | | Introduced a new price index for deflation of multifamily structures based on hedonic techniques (1991) |
| | | Used BLS import price indexes for deflation of imported producers' equipment (1988) |
| | | Improved the deflation of Federal defense purchases (1980) |
| Internationalization: | | |
| Trade in services | Gap in coverage; as trade (especially in financial services) increased, gap became larger. | Conducted new surveys of 30 services (1989) |
| | | Improved the foreign travel survey (1989) |
| | | Developed new benchmark survey of financial services(1994) |
| | Incomplete monthly picture of trade | Presented new monthly estimates of international services (1994) |
| International investment | Position: Valuation at historical cost and therefore understated and inconsistent. | Revalued direct investment and used market values for U.S. gold reserves (1991) |
| | Direct investment in the United States: Needed establishment detail for analysis of specific industries. | Linked BEA database of foreign-owned companies with Census database of U.S. establishments (1992) |
| International capital transactions | Gap in coverage; needed to capture new channels and new financial instruments. | Expanded use of partner-country data (1994) |
| | | Supported improvements in Treasury surveys of portfolio investment |
| Other international developments | Increased interest in multinational firms; needed more detail on ownership. | Developed supplemental balance-of-payments accounting frameworks and estimates (1994) |
| | Other | Improved end-use classifications and deflation for trade (1988) |
| Other developments | | |
| | Increased concern about the impact of economic growth on the use of natural resources and environmental quality. | Developed integrated economic and environmental satellite accounts (1994) |
| | Growth of the underground economy | Improved the adjustments for the underground economy (1984) |

1. Years in parentheses are the years in which the change was introduced.

are summarized in this section. (Paper I is an introduction and executive summary to the set.)

Economic change and the economic accounts.—Paper II considers BEA's experience of the last 50 years in adapting the accounts to the changing economy. The bulk of the paper is about the period beginning in the late 1970's. A table in the paper that highlighted many of these changes is summarized in table 1 in this article. The first group of changes in table 1 deals with the structure of the economy, ranging from broad changes such as the growth of imports and services to changes in regional patterns and to changes in specific government programs. The second group deals with changes in price structure. The third group deals with the international aspects of the economy, focusing on trade in services, capital flows, and international investment. The actions listed as BEA's responses to the changes include some that deal with methodology, some that modify and extend surveys, and two that deal with new surveys. In some cases, even though an action is indicated, the issue has not been completely resolved.

Recommendations from outside experts.—Paper III summarizes a number of external reviews of the accounts during the last two decades. This sample of 13 wide-ranging reviews and of 10 that are more subject-specific includes the following: Several administration-sponsored reviews, from the comprehensive Gross National Product Data Improvement Report of the 1970's through the Economic Statistics ("Boskin") Initiative of the early 1990's; several volumes by the Conference on Research in Income and Wealth; two studies by the International Monetary Fund; two presidential addresses at the American Economic Association; papers by other individual researchers; and a continuing effort by a trade group.

The recommendations of outside experts have a "living" nature. As the economy changes, new concerns arise and generate new recommendations so that the accounts are under evolving pressures. As well, users are persistent in their efforts to influence economic accounting; concerns are expressed repeatedly if left unaddressed. For example, the adequacy of services estimates has been questioned by many groups over the last two decades. Similarly, the coverage of government purchases, particularly of State and local government purchases, has been a concern for many years.

National accounts.—The reviews provided a substantial number of recommendations about concepts (such as the scope of investment), source data, and estimating methods for the major components of GDP. (See the next section for recommendations about net exports.)

- Within consumer spending, by far the largest number of recommendations focus on improvements in services.
- Among the components of investment, the largest number of recommendations deal with improvements in inventories, followed by nonresidential fixed investment (mainly construction).
- Among the components of government purchases, by far the largest number of recommendations deal with State and local government purchases.

A number of comments call directly for better constant-dollar estimates or do so indirectly by calling for better price indexes to use in deflation. Many of these recommendations address the demands that a rapidly changing economy puts on price measures. Rapid changes in the nature of goods and services require that price indexes be able to separate price change from quality change, and shifts in the pattern of demand require that the product samples underlying price indexes be kept up to date.

Other recommendations classified as "national accounts recommendations" include those on input-output accounts, GDP by industry, and saving and wealth.

International accounts.—The largest number of recommendations about the balance of payments are for improvements to the capital account, followed by the current account and by prices used for deflation of exports and imports. Within the capital account, the largest number of recommendations are for improved estimates of portfolio investment, followed by direct investment. Within the current account, most of the recommendations are for improved estimates of trade in services.

Other recommendations.—A number of the recommendations address generic issues. Several recommendations, especially those from the 1980's, focus on the need for better documentation of BEA's methodology, and several suggest ways, such as an advisory committee, to formalize contact with users of the accounts. A number of recommendations focus on increased funding,

both for BEA and for source data agencies. Others deal with improving coordination and tapping possible efficiencies across the Federal statistical agencies; these include recommendations for data sharing and revised industry classification systems.

Changes in data sources and estimating methods as they affect the economic accounts.—Paper IV focuses on the developments that have caused, or that call for, changes in source data and methods. It also notes BEA's assessment of the additional steps that should be taken to deal with these developments.

The supply of administrative data used in the accounts has been adversely affected by factors that are not primarily statistical in origin. Perhaps the most important of these is the deregulation of the transportation, telecommunications, and finance industries in the late 1970's and early 1980's, which has resulted in the disappearance of some of the data once used to monitor and regulate them. BEA is currently working with the Census Bureau to expand the coverage of the services annual survey to all services, including transportation and communications, to recover the lost data. In addition, changes in tax laws have caused discontinuities in the tax-based data used in the accounts. In the 1980's, these included changes in the pass-through of income to shareholders, limitations on business entertainment expenses, capitalization of interest, and the uniform capitalization of inventories. More generally, reductions in government budgets have caused nonstatistical agencies to eliminate, or place a lower priority on, those statistics not critical to their central mission. Continued reductions in the availability of tax and other administrative data raise questions about reliance on these data sources. It is clear that there are large efficiencies in the dual use of such data, but certain generic questions—for example, about the funding of such data—need to be resolved.

Many of the changes in the economy noted in paper II appear in paper IV as reasons to change data collection, data processing, and estimating methodology. For example, rapid changes in the nature of retail outlets call for more frequent updating of sample frames, and sharp changes in relative prices call for less reliance on fixed-weighted GDP measures. For the national estimates, progress includes the introduction of alternative output and price indexes that use more frequently updated weights, use of hedonic price indexes to capture increased quality, and

improved adjustments to tax-based data to account for the underground economy. For the international estimates, progress in adapting to the effects of changes in the economy include the use of counterparty data to fill gaps in coverage and the use of data sharing. BEA's recent link of its data on foreign-owned companies with Census Bureau and Bureau of Labor Statistics data on U.S. establishments resulted in a significant increase in the amount of information available on foreign-owned companies—without an increase in respondent burden. However, further work is required in improving real output and price indexes, in updating sample frames, in measuring new services, in revamping data collection systems for international capital flows, and in updating industry classification systems.

The adverse effects on the accounts of these changes in data sources have been partly offset by changes in data collection technology and statistical methods. Electronic data collection and transfer methods are beginning to improve the collection and editing of data. One of the most important improvements that BEA can make to address the problems discussed in this paper is the reengineering of its information technology system.

The newly revised international guidelines for economic accounting.—International standards, or guidelines, in statistics are designed to guide country statistical offices in the development of their own statistics and, in the interests of international comparability, to serve as a framework in which countries report their statistics to international organizations. Globalization of trade and financial markets has made international policy coordination, supported by consistency in the underlying statistics that guide policy, increasingly important.

In the last decade, the United States took a lead role in the development of newly revised international economic accounting guidelines found in the *System of National Accounts 1993 (SNA 1993)* and the *Balance of Payments Manual (BPM)*. The revised guidelines reflect efforts to bring them up to date with changes in economies around the world—including many of the same changes affecting the U.S. economy described in other background papers—and with developments in economic accounting, such as those that reflect longer experience in compiling balance sheets.

As discussed in paper V, modernizing and extending the existing U.S. accounts to make them compatible with the *SNA 1993* and the *BPM* will require work in several areas. Compatibility with

the *SNA 1993* would mean developing accounts for sectors as well as for the entire economy; improving the statistical picture of government's role in the economy; improving the treatment of financial and insurance services; and better integrating the *NIPA's*, financial accounts, and balance sheets. Further, the *SNA 1993* encourages the development of satellite accounts to increase the flexibility of the accounting system.

Compatibility with the revised *BPM* would mean changes in the treatment of goods, particularly intellectual property, investment goods, and goods acquired in ports. Changes would also be necessary to the treatment of services, such as affiliated services, rental services, and financial services, to name a few. Other changes would be required in the treatment of income, unilateral transfers, the coverage of the capital accounts, and the coverage of the international investment position.

Revisions in the economic accounts: Implications for improvements.—Paper VI focuses on revisions and other statistical studies of national estimates—specifically, the *NIPA* estimates. Many of the implications of these studies hold, however, for the international and regional estimates as well. First, a large component of national estimates—net exports—comes from the balance of payments accounts. Second, regional estimates are, in many cases, extensions of national estimates and thus exhibit similar characteristics.

Studies of revisions are often used as a basis for recommendations for improvements, although revisions can be quite misleading for such purposes. Revisions in series do not necessarily reflect errors, nor does a lack of revisions reflect the absence of errors. Revisions due to the replacement of initial estimates with those based on more complete source data can reflect errors associated with *BEA* projections or with the small sample frame or other features of the source data used for the early estimates. However, revisions can also reflect changes in accounting structure, such as definitional changes to provide more up-to-date or otherwise more relevant measures, that should not be regarded as the correction of errors.

Revisions in GDP.—*BEA* has made a number of studies of revisions in the *NIPA's*. Many of these studies featured estimates of dispersion and bias of estimates of *GDP* (or of *GNP*) and its major components. (Dispersion is the average, or mean, of the absolute values of the revisions, typically calculated using percent change from quarter to

quarter at annual rates. Bias is the average, or mean, of the values of the revisions.)

The studies indicate that the current estimates of *GDP*—advance, preliminary, and final—are generally able to tell us whether the economy is expanding or contracting, whether growth is accelerating or decelerating, and whether the growth rate is high or low relative to trend. However, their ability to do so is least when economic growth is hovering near zero and—although the evidence is less clear on this point—at turning points in the economy. The following paragraphs summarize results of the studies for the period 1978–91:

- The current estimates correctly indicated the direction of change in real *GDP* between 88 and 89 percent of the time. If quarters in which growth is 1 percent or less are excluded, the percentage correct rises to between 92 and 94 percent.
- The current estimates correctly indicated whether real *GDP* was accelerating or decelerating between 75 and 78 percent of the time. If quarters in which growth was 1 percent or less are excluded, the percentage correct rises to between 81 and 86 percent.
- The estimates also correctly indicated high growth (above 4 percent) versus low growth (below 1 percent) between 66 and 75 percent of the time.
- Dispersion in the current estimates of real *GDP* was 1.3 percentage points, or between 37 and 40 percent of average real *GDP* growth of 3.5 percent during this period. Bias was small and averaged between 0 and 0.1 percentage point, or between 1 and 4 percent of average real *GDP* growth.

The revisions of *GDP* for the United States compare quite favorably with those of other countries. Using estimates from the mid-1960's to the mid-1970's, one study found that revisions in quarterly *GDP* growth in Canada, Japan, Australia, West Germany, and the United Kingdom were all distinctly larger than those in the United States, even though U.S. estimates are released more quickly than their counterparts. Later, but less comprehensive, studies suggest some convergence, but that the U.S. estimates are still among the most reliable and timely.

Revisions in *NIPA* components.—The *BEA* revision studies also provided information about the size and sources of revisions in the *NIPA* components. Among the relevant points about the revisions for

1983–91 for the product components and selected income components are the following:

- *Personal consumption expenditures (PCE)*: Dispersion in the quarterly estimates is roughly equal to that in GDP; revisions, measured in dollars, are about three-quarters of the size of the revisions in GDP. Among the PCE components, the largest revisions in percentage points are to durable goods; the largest dollar revisions are to services. For services, revisions to the initial current estimates are mainly due to the replacement of judgmental projections with partial source data. Revisions from the final current estimates to the first annual revision were largely due to the incorporation of a large and diverse volume of annual source data from a variety of government agencies and trade sources, quarterly survey data, and monthly data on residential energy use.
- *Investment*: The largest single source of revisions between the successive current quarterly estimates of GDP growth is from inventory investment. The first revisions occur between the advance and preliminary estimates of inventories, as judgmental estimates for the third month of the quarter are replaced with preliminary estimates based on source data from surveys of manufacturing and trade inventories and as the source data are revised. Revisions are also large between the final current quarterly estimates of inventories and the latest estimates. These revisions reflect (in addition to a conceptual change for 1983–91) the replacement of monthly survey data with annual survey data and revisions of seasonal adjustments. They also reflect the replacement of BEA projections for nonfarm inventories other than manufacturing, merchant wholesale trade, and retail trade.

Most of the revisions to fixed investment are due to a combination of past improvements in source data and methods that affected revisions for 1983–91 and of revisions in source data. Substantial revisions to the current estimates of nonresidential investment are due to revisions in the monthly data on manufacturers' shipments and in the data on the value of construction put in place that are mainly related to incomplete reporting. Large annual revisions reflect the incorporation of source data that provide more complete and up-to-date coverage.

- *Exports and imports*: Despite the relatively small size of net exports, large revisions to exports and imports cause the dispersion in their current estimates to be large relative to dispersion in the current estimates of GDP. In dollars, exports and imports are second only to inventories as a source of revisions; in percentage points, their dispersions are 4–7 times the size of the dispersion in GDP. The sources of these revisions include the replacement of judgmental projections for the last month of each quarter with source data and improvements in the estimates of international services.
- *Government purchases*: The major source of revisions (aside from a conceptual change that had an offset in inventories) is the replacement of judgmental projections with source data. For the Federal Government, detailed data from the *Monthly Treasury Statement* for the third month of each quarter and monthly data on civilian wages and salaries replace judgmental projections. For State and local governments, data on government purchases (except compensation and structures) become available and replace quarterly extrapolations of as many as 10 quarters.
- *Compensation of employees*: The largest dollar revisions in national income are to compensation of employees. A large share of the revisions to the final current estimates of wages and salaries occurs as those estimates are replaced with estimates based on data providing fuller coverage. In terms of dispersion and, in certain years, in terms of dollars, revisions to other labor income are larger than those to wages and salaries. These revisions mainly reflect the paucity of current quarterly data and the long lag before annual data are available.
- *Proprietors' income*: The dispersion for this component, especially for farm proprietors' income, is the largest of all the major components of national income. The volatility of farm output and inventories results in large revisions in source data and in seasonal adjustment factors. For nonfarm proprietors' income, current quarterly and first-annual-revision estimates are based on indicators of industry activity and judgmental trends. In the second annual revision, tabulations of noncorporate business tax returns become available.

- *Corporate profits:* In terms of dispersion, revisions to corporate profits are second in size only to proprietors' income among the components of national income. Revisions reflect more complete coverage of the source data on domestic profits and more complete reporting on BEA's surveys of multinational companies.

Other studies.—A number of studies of revisions in the NIPA's have been prepared outside BEA. The principal implication of these studies is that some improvements could be made in the early estimates. Despite several limitations, these studies have provided BEA with tools to further evaluate its revisions.

Although the evidence is mixed, revisions to GDP appear to account for a substantial share of the errors in short-term econometric forecasts used for business and macroeconomic policy purposes.

The priority areas of concern: Three cross-cutting issues

BEA has identified three priority issues that cut across the subjects of the background papers. For example, certain changes in the nature of the economy were referred to in all papers because they have led to gaps in coverage and to problems with existing source data and methods, as well as to significant revisions. These three issues are also likely to be the focus of current policy interest and the subject of outside experts' recommendations.

Change in the nature of output and the organization of production: The need for new and improved output measures.—Measuring output is fundamental to economic accounting, but an increasing share of output is in sectors in which output is difficult to define and measure. How does one define, for example, the output of a legal firm or of an economic consulting firm? If hourly billing rates for such firms rise over time, how does one determine whether there are offsetting improvements to the value of the services performed for the firms' clients? There are no easy answers to such questions, and answers are necessary in order to separate current-dollar measures into price and quantity, or real output, terms.

Similar problems also arise in some portions—the more dynamic portions—of the goods-producing sectors. For example, new products typically enter the market at very high prices;

subsequently, prices fall very rapidly, with resulting expansions in the size of the market. The pricing histories of these new products must include the periods of their sharpest price declines, even though the initial market shares of these new products are small, because otherwise overall price measures may be biased. In times of rapid introduction of new products, however, it may be very difficult to keep product samples sufficiently up to date to track the price declines of new products.

More broadly, changes in the composition of output have caused problems as newly emerging services and goods have opened gaps in the coverage of existing surveys, methods, and classification systems. For example, sample frames for retail trade become outdated as distribution channels shift, as when “wholesale” outlets began to account for an increasing share of direct sales to consumers. New and rapidly growing products, such as computer software and exports of international financial services may—for any of several reasons—escape the statistical nets, while products on their way out, such as LP records, are still fully covered.

Rapid changes in output and prices also cause problems for statistical methods. Notable among these is the use of fixed weights for output and price indexes, a method introduced when updating such indexes every 5 years was thought to be sufficient.

Finally, changes in the structure and organization of the economy threaten the relevance of some estimates in the economic accounts. For example, accounting for the changing role of government, for the interaction between the economy and the environment, and for research and development is limited.

Investment: The need for better measures of investment, saving, and wealth.—Changes in the economy have also increased the need for broader and more reliable measures of investment, saving, and capital stocks. For example, changes in technology call for broader coverage of products, such as computer software, whose investment-like properties are increasingly apparent. At the same time, integration in world financial markets and the effect of changes in wealth on consumer spending, investment, and international capital flows have increased the importance of developing integrated accounts for real and financial transactions and stocks for macroeconomic analysis.

Longstanding problems affect the measures of depreciation, capital stocks, and inventories. Al-

though BEA's straight-line depreciation and capital stocks at replacement cost were a significant improvement over tax-based estimates at historical cost when they were introduced in the 1970's, an overhaul of these estimates is overdue.

Internationalization: The need for measures to fill gaps in the coverage of international transactions.—One of the most obvious aspects of economic change affecting the accounts is the international integration of markets. The integration of world capital markets has significantly increased monetary and regulatory authorities' interest in accurate and complete information on capital flows. At the same time, the integration of markets for goods and services has increased business and trade officials' interest in newly emerging goods and services.

Unfortunately, while increased integration has increased the importance of such data, it has also increased the difficulty of measuring such transactions. Gaps have developed in the coverage of newly emerging categories of international trade in services and goods, in the coverage of derivatives and other new financial instruments, and in the coverage of security and other portfolio transactions that bypass U.S. brokers, banks, and other financial institutions. Changes in the structure of international markets have also resulted in outdated and incomplete source data for existing measures of goods and services.

Part 4. BEA's Strategic Plan for Maintaining and Improving the Economic Accounts

BEA's draft strategic plan is framed around the three priority issues identified in the background papers. Within each issue, BEA first identified the most important measurement problems in terms of the accuracy, reliability, and relevance of the accounts. BEA then screened the recommendations in the consolidated "menu" that addressed these problems to identify the most cost-effective actions in terms of both direct cost and respondent burden. The actions BEA proposes include changes in methodology and accounting structure, source data modifications and extensions, and, in a few cases, new source data. Milestones in the implementation of the actions are proposed through 1999.

BEA's draft plan for maintaining and improving the economic accounts is framed around the

three issues identified in the background papers: The need for new and improved output measures; the need for better measures of investment, saving, and wealth; and the need for measures to fill gaps in the coverage of international transactions. Within each issue, BEA assessed the practical importance and relative size of the various measurement problems and then identified the ones that were most important in terms of the accuracy, reliability, and relevance of the accounts. BEA then focused on the recommendations in the consolidated "menu" that addressed these problems. These recommendations were screened to identify the most cost-effective actions in terms of both direct cost and respondent burden. The results of this process are summarized in table 2.

Table 2 shows, in column two, some quantitative indicators of the importance of various measurement problems in the accounts. All of these indicators should be used with caution. For gaps in coverage, the indicators are no better than educated guesses; if a precise estimate were known, it would be possible to simply plug it in and fill the gap. For revisions, the quantitative indicators are based on past experience, and that experience may not hold for the future. In some cases, the indicator may only be suggestive of importance; in others, no quantitative indicator of the importance of the problem can be given.

In screening the recommendations to identify the most cost-effective actions, the choice was clear where the measurement problem is amenable to resolution by improvements in methodology and accounting structure using existing, but heretofore unexploited, source data. (See the box "A Three-Way Grouping of Actions To Improve the Accounts," on page 59.) However, many of the measurement problems exist largely because there are no reliable source data upon which to base estimates. In these cases, the least burdensome and most efficient action has been suggested. Wherever possible, the modification or extension of an existing survey has been suggested; a new survey has been suggested only as a last resort. In either case, BEA would work with the Census Bureau, the Bureau of Labor Statistics, other source data agencies, data users, and the respondent community to obtain the necessary information with the lowest possible respondent burden.

The need for new and improved output measures

Difficult-to-measure components of real GDP.—Difficulties in measuring and defining real output

and prices may have a significant effect on key components of GDP, as well as on GDP and its growth rate. Because price measures are used to deflate current-dollar expenditures to obtain real output measures, any errors in existing price measures will impart an equivalent error—but of opposite sign—to the growth rate of real GDP and of productivity. For example, if the net effect of price measurement difficulties is to overstate the

rate of inflation, then the effect is to understate the growth rate of real GDP.

Determining the magnitude of the net error, if any, imparted to real GDP growth is difficult. Some of the broader-based studies are now dated in that they do not cover the 1980's, when significant methodological improvements were made by the Bureau of Labor Statistics in the Producer Price Index and the Consumer Price Index,

Table 2.—Issues and Proposed Actions

| Issues, problems, and uses affected | Quantitative indicators (e.g., potential size of gap, size of revision, size of component treated differently or added) | Statistical source(s) of the problem | Proposed actions |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Need for new and improved output measures | | | |
| <p>Difficulties in measuring and defining certain components of real GDP. <i>Uses affected:</i> Analysis of economic growth, especially of economy's long-term, noninflationary growth potential; macroeconomic policy; forecasting; business, budget, and investment planning.</p> | <p>Possible understatement of growth, especially in fixed investment; potential for understatement in real GDP growth¹.</p> | <p>Difficulties in measuring quality changes, especially in investment goods.</p> | <p><i>Methodology and structure:</i> Extension of quality adjustment of prices used in real GDP, including hedonic work on goods amenable to such measurement: High-tech goods and nonresidential structures.</p> |
| <p>Revisions to key components of GDP and national income. <i>Uses affected:</i> Macroeconomic policy; forecasting; business, budget, and investment planning.</p> | <p>No quantitative indicator of the difficulties of defining output.</p> <p>1.4–9.4 percentage point (±) revisions to quarterly changes (SAAR) for key components of current-dollar GDP:² Change in business inventories, \$13 billion. Trade in goods and services, \$9 billion. Government purchases, \$8 billion. Consumer expenditures for services, \$6 billion. Consumer expenditures for goods, \$4–\$5 billion.</p> <p>1.4–8.5 percentage point (±) revisions to quarterly changes (SAAR) for key components of national income.</p> | <p>Difficulties in defining output</p> <p>Inability of existing source data used in the quarterly estimates to capture change in the economy.</p> | <p><i>Methodology and structure:</i> Further conceptual work on more difficult-to-measure goods and services.</p> <p><i>Data modification and extension:</i> More frequent updating of sample frames for existing surveys, including trade and manufacturing. Data extension: More frequent surveys for certain growing sectors such as international trade in services, medical care, and State and local government purchases. Data extension: Extension of existing surveys such as those for inventories, services, and employee compensation (including bonus payments) to fill gaps in coverage.</p> |
| <p>Overstatement of real GDP growth in recent years (and understatement in earlier years). <i>Uses affected:</i> Analysis of economic growth, especially of current growth relative to long-term, noninflationary growth; macroeconomic policy; forecasting; business, budget, and investment planning.</p> | <p>0–1.2 percentage point overstatement of quarterly rates of change in real GDP (average 1991:I–1994:III, 0.4 percentage point)³.</p> | <p>Difficulties in seasonal adjustment</p> <p>Errors in projections for missing source data.</p> | <p><i>Methodology and structure:</i> Improvements in seasonal adjustment for volatile components such as inventories and trade in goods and services.</p> <p><i>Methodology and structure:</i> Improvements in projections for components such as inventories, trade in goods and services, and bonus payments.</p> |
| <p>Outdated and inconsistent view of the structure and organization of production. <i>Uses affected:</i> Federal and State and local tax analysis and budget planning; business location and marketing studies; regional analysis; industrial organization studies; and cross-border analysis of trade effects.</p> | <p>For industry classifications, inconsistencies across U.S. industries and incompatibilities among North American countries, with special attention needed for new and emerging industries, service industries, and high-tech industries (for a discussion of quantitative indicators, see text).</p> | <p>Substitution bias, specifically the use of fixed weights (1987) inappropriate for the current period.</p> <p>Outdated and inconsistent industry classification system, source data, and industry accounts.</p> | <p><i>Methodology and structure:</i> Introduction of more current weights for real GDP for current estimates and more appropriate weights for historical estimates.</p> <p><i>Methodology and structure:</i> Develop a new industrial classification system. <i>Data modification and extension:</i> Implement a new industrial classification system, starting with a restructuring of surveys. <i>Methodology and structure:</i> Update and better integrate the input-output, industry, gross state product, and GDP estimates within the context of modernizing the accounts along the lines of the new international guidelines.</p> |

See footnotes at end of table.

which provide most of the detailed components for deflation of real GDP. Nevertheless, there is substantial evidence to suggest that price measurement difficulties may be severe for sectors in which rapid technological change has led to a substantial drop in the quality-adjusted price of output. For example, BEA's hedonic computer equipment price indexes, which were introduced into the accounts in 1985, have declined at an annual rate of 15–20 percent for 1959–94. Studies on some other products—including semiconductors and medical scanners—also suggest large rates of

price decline. Other studies, including studies of prescription drugs, have pointed to measurement problems that arise when the turnover of new products is quite rapid; in the case of prescription drugs, these studies have led to methodological improvements in the Producer Price Index.

On the other hand, quality-adjusted measures have been criticized for overstating the increase in output. For example, prominent macroeconomic modeling firms have reservations about the hedonic indexes for computer equipment and do

Table 2.—Issues and Proposed Actions—Continued

| Issues, problems, and uses affected | Quantitative indicators (e.g., potential size of gap, size of revision, size of component treated differently or added) | Statistical source(s) of the problem | Proposed actions |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Need for better measures of investment, savings, and wealth | | | |
| <p>Extend the concept and update the measurement of investment and wealth/capital stock. <i>Uses affected:</i> Analysis of sources of economic growth, productivity, returns to public and private investment; tax and expenditures policies.</p> | <p>Treating government spending on structures and equipment and government and business spending on computer software as fixed investment would raise investment and reproducible capital stock in national wealth by about 20 percent. Government capital, \$2.863 billion. Computer software, \$20–\$40 billion. Treating other candidates as investment in satellite accounts would raise wealth/capital stock, for example: R&D capital, \$1,050–\$1,380 billion. Natural resources, \$950–\$1,600 billion.</p> | <p>Exclusion of certain types of public and private expenditures that contribute to the nation's wealth and productive capacity.</p> | <p><i>Methodology and structure:</i> Expand the accounting for investment and wealth/capital stock by (1) inclusion of government spending on structures and equipment and government and business spending on computer software and other intangibles in investment in the national accounts and (2) inclusion of research and development and natural resources in satellite accounts, in the context of modernizing the accounts along the lines of the new international guidelines.</p> |
| <p>Need for better integration and measurement of investment, saving, and wealth/capital stocks. <i>Uses affected:</i> Analysis of sources of economic growth, productivity, returns to public and private investment, and saving; tax and expenditure policies.</p> | <p>No quantitative indicator of the need to update measurement.</p> <p>3–9 percentage point differences—conceptual and statistical—between NIPA and flow of funds measures of personal saving rates⁴. Treating government "investment" in GDP consistently with international guidelines would eliminate more than half of the apparent 5.8 percentage point shortfall in U.S. versus European investment rates⁵. For 1993, investment as a percent of GDP: NIPA rate is 13.7 percent; adding government "investment" raises the rate to 16.7 percent. Average rate for Europe is 19.5 percent.</p> | <p>Use of straight-line depreciation</p> <p>Lack of complete integration between financial and real accounts.</p> | <p><i>Methodology and structure:</i> Use of conceptually and empirically based depreciation patterns and valuation methods</p> <p><i>Methodology and structure:</i> Better integration of real and financial accounts in the context of modernizing the accounts along the lines of the new international guidelines.</p> |
| Need to fill gaps in the coverage of international transactions | | | |
| <p>Gaps in the coverage of international trade in certain goods and services, income, and capital. <i>Uses affected:</i> Analysis of trade, monetary, and regulatory policy; forecasting; business and investment planning.</p> | <p>Gaps in key components: Trade in goods and services, as much as \$10–\$20 billion⁶. Capital flows, as much as \$100, and stocks as much as \$200 billion⁶.</p> | <p>Inability of existing data collection systems to capture new markets and types of goods, services, and financial instruments and intermediaries.</p> | <p><i>Data modification and extension:</i> Extension of existing surveys to cover new products, services, and markets. <i>Methodology and structure:</i> Extension of data exchanges with other countries and central banks. <i>New data:</i> Development of new surveys such as for financial services and portfolio investment.</p> |

1. For a discussion of quantitative indicators, see text.
2. Based on BEA revision studies; see text for details.
3. Based on BEA alternative output and price indexes; see text for details.
4. Based on historical difference between BEA's NIPA measures and the Federal Reserve Board's flow-of-funds estimates; most of the difference between the two series are conceptual, with statistical

differences ranging between 0 and 2.9 percentage points over the last 10 years.
5. Calculated from *Quarterly National Accounts*, compiled by the Organisation for Economic Co-operation and Development. "Europe" includes the 13 countries for which data were published.
6. Based on indicator series and past revisions for similar components.

not use them in certain aspects of their analyses and forecasts.

The potential importance of price measurement problems in measuring investment may be illustrated as follows: For every 1-percentage-point overstatement (understatement) in the rate of quality-adjusted price change for “high-tech” equipment other than computers, the annual growth rate of real nonresidential fixed investment will be lowered (raised) by about 0.2 percentage point. For example, if quality-adjusted prices for this “high-tech” equipment over the decade 1983–93 fell at an annual rate of 5 percent rather than increased at the 2.1-percent rate measured by BEA deflators (that is, a difference of about 7 percentage points), the growth rate of real nonresidential fixed investment would have been understated by 1.4 percentage points and the growth rate of real GDP by 0.2 percentage point.

Of particular interest is the potential for misstatement of real GDP growth. In recent years, concerns have been raised that if problems in measuring output have become worse over the last several decades and have resulted in a progressively larger understatement in real GDP growth, measurement problems may be partly responsible for the reduction in the growth trend for real GDP and productivity since the early 1970’s. Understatement of the economy’s growth trend can be quite important because of its role in

analyzing the economy’s noninflationary growth potential.

However, resolution of the question of the overall impact of measurement problems on real GDP growth will have to await the development of improved price indexes for a number of key products; it is not now clear whether improvements in the deflators of the many affected products would, on balance, increase or decrease the growth rate of real GDP, nor is it clear whether measurement problems have increased or decreased over time.

Improvement of the measures of real output will require a long-term, coordinated program involving both BEA and the Bureau of Labor Statistics, because improved real output measures depend heavily upon improved price indexes for deflating current-dollar GDP. BEA’s proposed short-term priorities include working closely with the Bureau of Labor Statistics to lay the ground for improvements for components that appear to be amenable to hedonic methods and for which adequate commercial data are available to implement these methods. These components include high-tech products—such as medical scanners and semiconductor manufacturing equipment—and nonresidential construction.

Moreover, because some of these problems arise from the difficulty in defining output, BEA should undertake a long-term program to de-

A Three-Way Grouping of Actions To Improve the Accounts

Methodology and structure: These actions include advances in economic accounting structures and concepts and changes in estimating methods that improve the accuracy, reliability, and relevance of the accounts. The actions reflect empirical and conceptual research—either directly or indirectly—through reference to international guidelines in economic accounting. They build on existing—albeit heretofore un- or underexploited—source data. Such improvements have several practical advantages: They often can be undertaken within BEA and require few additional resources in comparison with the resources required to pursue a new survey; the lead and start-up times are relatively short; and perhaps most important, because they build on existing source data, they do not increase respondent burden.

Source data modification and extension: These actions feature changes that can be made to existing sources of data: Adding new questions and detail to a survey, broadening the coverage of a survey, increasing the frequency of a survey, or speeding up the processing of a survey or administrative source. In revising existing surveys, an effort is always made to see if outdated questions can be dropped or exemption levels raised by wider use of

sampling and statistical estimation. Such efforts usually involve another statistical agency and, hence, tend to be more complicated and have longer start-up periods. Revising an existing survey also involves consultation with data users and respondents and clearance of the revised form through the Office of Management and Budget; these steps—along with time for notification, collection, and processing—add significantly to the lead time before the improved source data can be incorporated in the accounts. Data extensions also usually involve some increase in respondent burden and processing cost, but these costs are still significantly lower than those involved in conducting a new survey.

New source data: New surveys are pursued only when methodological solutions are not adequate and there is no existing survey that can be modified to fill a statistical gap. As in the cases of data extension, new surveys normally involve another statistical agency. New surveys also require a more extensive development process because both the benefits to the data users and the costs to respondents and statistical agencies are higher. As a result, the start-up and lead times are significantly longer.

velop new concepts and methods for measuring output in areas such as banking, insurance, financial and legal services, and management consulting activities.

Reliability of key components of GDP.—Revisions to key components of GDP, national income, and personal income—especially the occasional large revisions—cause significant difficulties for forecasting, for budget, business, and investment planning, and for macroeconomic policy. For example, in 1990 as part of the mid-session review of the budget, the Office of Management and Budget revised upward the projected Federal Government deficit by over \$10 billion as a result of the impact of BEA's \$58 billion downward revision to wages and salaries on the Treasury Department's projections of tax receipts.

The average revisions (without regard to sign) to the quarterly changes for key components of current-dollar GDP range from 1.4 to 9.4 percentage points for 1983–91. The average revisions (without regard to sign) in the quarterly changes were \$13 billion for change in business inventories, \$9 billion for trade in goods and services, \$8 billion for government purchases, \$6 billion for consumer spending for services, and \$4–\$5 billion in consumer spending for goods. Within national income, the largest dollar revisions to quarterly changes were in compensation of employees. (These revisions also affect personal income, both the national and regional estimates.)

These revisions reflect both methodological problems and gaps in source data. Among the methodological problems, the most significant relate to seasonal adjustment and to projections for missing source data. Although past research suggests that the scope for improvements in seasonal adjustments is limited, BEA will continue to explore improvements for volatile components such as change in business inventories and trade in goods and services, because of the importance of this problem and the large potential “bang for the buck” associated with these improvements. In addition to these improvements, there may be some room, albeit limited, for improvements in BEA's methods of projecting missing months and quarters of source data for components such as inventories, trade in goods and services, and bonus payments.

These methodological improvements notwithstanding, the largest improvements in the reliability of key components are likely to come from improvements in source data. These improvements include more frequent updating of sample frames, improving response rates, and

modifying and extending existing surveys to fill gaps in coverage. One of the most important of these is more frequent updating of sample frames for the annual surveys that serve as benchmarks for the monthly surveys. The Census Bureau has already initiated several programs relevant to key source data used by BEA. For example, the annual and monthly trade surveys were recently put on a schedule that would update them more frequently using improved procedures that make more timely use of administrative records data. Similar work is underway at the Bureau of Labor Statistics to address recommendations by an American Statistical Association panel to improve reporting for the monthly survey of employment, hours, and earnings through use of a frequently updated probability sample at the State and national levels.

In addition to these and other projects to update sample frames, efforts are needed to improve reporting on existing surveys—either through restoration of cutbacks in sample size, improved followup procedures, or mandatory reporting for key indicators.

Improvements in other components of GDP will require extensions of existing surveys. For these components, revisions are due to gaps in monthly and annual survey coverage. Reducing revisions in these areas will thus largely depend on extending coverage: In construction, transportation, finance, insurance, and real estate, by extending the annual services survey to cover all service activities; in inventories, by extending the annual wholesale trade survey to cover nonmerchant wholesalers; in nonresidential construction, by extending the monthly value-put-in-place survey to better cover nonresidential reconstruction; in wages and salaries, by extending the monthly establishment survey to cover hours and earnings for all workers and to provide data on bonus payments; in profits, by extending the *Quarterly Financial Report* to cover construction, communications, utilities, and insurance.

In other components, revisions are due to the lag with which survey data become available and the difficulty in making projections for missing data. Many of these components were once sufficiently small that they could be reasonably estimated for quarters by projecting past trends from annual surveys. However, as these components have grown in size and volatility, large revisions have occurred when annual and benchmark data are finally incorporated into the estimates to replace projections. Reducing revisions of this kind will require increasing the

frequency of existing surveys: In State and local purchases by extending the existing annual survey to cover State and local government purchases on a quarterly basis; in international trade in services, by extending the existing annual selected services surveys to cover key categories on a quarterly basis.

In summary, BEA's proposed priority improvements in this area are as follows:

- Improvements in seasonal adjustments and in BEA's projections for certain key components such as inventories, merchandise trade, and bonus payments.
- Improvements of the coverage of existing surveys by more frequent and more complete updating of samples.
- Extension of existing surveys to fill gaps in coverage by more frequent surveys for volatile and growing categories and by extending the scope of surveys.

Substitution bias in real GDP.—Rapid change in the composition of output (and prices) has not only opened coverage gaps in source data, but has worsened pre-existing difficulties with some of the statistical methods used in the accounts. A bias occurs in fixed-weighted measures, such as BEA's featured measure of real GDP, because these measures do not reflect substitution by consumers and producers in response to changing relative prices. This "substitution bias" reflects the fact that the commodities for which output grows rapidly tend to be those that register declines, or the smallest increases, in prices. Thus, when real GDP is recalculated using more recent prices, the commodities with strong output growth generally receive less weight, and real GDP growth is reduced. Changes in the economy in the 1970's and 1980's exacerbated this bias, and in response BEA developed two alternative measures of real GDP that allow for changes in the relative structure of prices. Comparisons of these alternative measures with BEA's featured measure based on 1987 weights indicate the degree of substitution bias. In general, fixed weights are an accurate measure for time periods relatively close to the base year, but they begin to overstate growth the further one moves forward in time from the base period (and understate growth the further one moves back in time):

- For 1985–92, there was no evidence of significant substitution bias in BEA's fixed-1987-weighted measure of real GDP growth; the

fixed-weighted and alternative indexes increased at the same rate. However, by 1993 and 1994, real GDP growth as measured by fixed 1987 weights was overstated; the fixed-weighted index increased an average of 0.6 percentage point more than the alternative indexes.

- Since the recession trough in the first quarter of 1991, the average annual growth rate of the fixed-1987-weighted measure has been overstated by an average of 0.4 percentage point. In contrast, for the economic expansions between 1960 and 1980, the average annual growth rate of the fixed-1987-weighted measure is understated by an average of 0.6 or 0.7 percentage point, depending upon the alternative index used.

Bias of this magnitude causes significant problems for budget, investment, and business planning and for forecasting. It may pose particular problems for business cycle and policy analysts trying to assess current growth relative to long-term growth potential because the bias distorts both estimates and hence exacerbates the problems associated with quality change in measuring long-term growth potential.

The challenge for BEA will be to develop a program that provides users with featured measures of output and prices that reflect weights appropriate to each period and with information that can be used to assess the underlying sources of changes in real GDP. Later this year, BEA will present an article in the SURVEY OF CURRENT BUSINESS that lays out the plan for this program.

Outdated and inconsistent view of the structure and organization of production.—Change in the U.S. economy has affected not only the composition of output, but also the way output is produced and distributed. The rapid pace of change has highlighted the need for improved measurement systems.

The existing standard industrial classification (SIC) system presents an outdated and conceptually inconsistent picture of economic activity. It is outdated especially in that it does not adequately detail the range of services in the economy, and it is inconsistent in that it distinguishes among some industries on the basis of how they produce and among others on the basis of to whom they market.

The SIC system is focused on manufactured goods, and although for the foreseeable future, users will probably continue to want finer detail for manufacturing than for other sectors,

the focus in the existing system seems somewhat skewed. Manufacturing industries account for 46 percent of the industry codes in the SIC, yet in today's economy, manufacturing accounts for only 19 percent of GDP by industry and 17 percent of employment.

The United States, Canada, and Mexico are working together to develop a new industry classification system. This new system, the North American Industry Classification System (NAICS), will use a production-oriented economic concept that will provide the following benefits: More consistent classification of industries for use in analyses of industry performance, productivity, and employment; consistent data across the three countries; and more consistent data for new and emerging industries, for service industries, and for high-technology industries.

An updated industry classification system will provide the platform for modernizing BEA's industry-based accounting systems. It will provide more consistent source data and structure for BEA's estimates of GDP and gross state product by industry, for the input-output accounts, for estimates of pollution abatement and control by industry, and for estimates of foreign direct investment and international services by industry.

Introduction of data collected under NAICS will complement BEA's efforts to improve the timeliness and degree of integration in BEA's industry-based accounting systems. Although a quantitative indicator of these problems is not available, there is ample evidence of the need for updating and better integrating these systems. Problems with these accounts and the need for better industry data have been a continuing theme of outside experts. Affected uses include analyses of the interindustry and regional impact of Federal, State, and local policies, business location and marketing analyses, and various studies in the field of industrial organization. Indeed, the gaps in coverage, lack of integration, and lack of timeliness have contributed to a sharp decline in the use of the input-output and related accounts.

An integrated and modernized structure for economic accounts is available at the international level in the newly revised and harmonized international guidelines for national accounts—the SNA 1993 and the *Balance of Payments Manual*. These guidelines can provide the broad outlines for BEA's efforts to update concepts and to provide a more integrated accounting structure. Modernization along these lines will allow the United States to take advantage of the experience and expertise embodied in the revisions and to

make U.S. estimates more comparable with those prepared by other countries.

Completion of the several projects to update and better integrate the structure of the economic accounts is a high priority. These projects include the following:

- Completion and implementation of the new NAICS in conjunction with other statistical agencies.
- Modernization and better integration of BEA's industry accounts, especially the input-output accounts, GDP and gross state product by industry, and pollution abatement and control expenditures by industry.
- Modernization of BEA's NIPA's and balance of payments accounts in line with the newly revised international guidelines.

The need for better measures of investment, saving, and wealth

Issues about the scope of existing measures.—In the NIPA's, investment is limited to business investment in inventories, structures, and equipment, but a broader view of the Nation's wealth would include highways, dams, schools, and other public infrastructure, natural resources, and intangible assets, such as computer software and, even more broadly, training and education.

A broader definition of investment may be quite helpful in understanding the sources of economic growth and the returns to, and adequacy of, various types of public and private investment. Treatment of government capital outlays as fixed investment would add \$2,863 billion, and the inclusion of computer software in investment, between \$20 billion and \$40 billion—together about 20 percent—to the net stock of reproducible capital in the national wealth. The expansion of the definition of investment through satellite accounts can also aid in developing a more comprehensive picture of the stock of productive capital and wealth. The inclusion of research and development capital would add between \$1,050 and \$1,380 billion, or 8–10 percent, to the net stock of wealth; mineral and other marketed natural resources would add between \$950 and \$1,600 billion, or 7–12 percent.

BEA's proposed projects to address these issues largely rely on new methods and existing source data. In order of importance, they are as follows:

- Expansion of NIPA investment to include government expenditures on structures and durable equipment and pur-

chases of computer software and some other intangibles.⁶

- Extension of BEA's satellite accounts for research and development and for natural resources.

Issues in the measurement of investment, saving, and wealth.—Differences in source data, methods, and concepts result in inconsistencies among BEA's NIPA and capital stock estimates, the Federal Reserve Board's flow of funds accounts and balance sheets, and the Bureau of Labor Statistics capital services estimates. These inconsistencies present significant difficulties for integrated analysis of such issues as productivity, domestic and international capital flows, returns to investment, the adequacy of domestic saving and capital formation, and the effect of changes in financial holdings on consumer and business spending.

The importance of such integrated analysis was underscored by the depressing effect on household saving of the appreciation in the net worth of households as housing and securities prices rose in the 1980's. To researchers trying to understand the sources of the decline in the U.S. household saving rate—and the potential effect of tax incentives on raising it—the 3- to 9-percentage-point difference between the personal saving rates derived from BEA's NIPA's and those derived from the Federal Reserve Board's flow-of-funds accounts posed significant problems.

In addition to these inconsistencies between the various accounts, researchers have long been concerned with conceptual and empirical problems associated with the use of straight-line depreciation in BEA's estimates of depreciation and capital stocks.

BEA's proposed priorities in this area deal largely with methodology and structure:

- Development of measures of depreciation and capital stocks that are consistent with economic theory and with existing empirical measures of the decline in used-asset prices.
- Better integration of BEA and Federal Reserve Board real and financial accounts along the lines of the *System of National Accounts 1993*.

The need for measures to fill gaps in the coverage of international transactions

Increased integration in world markets for goods, services, and capital, in combination with major advances in computer and communications

technology, have resulted in large gaps in BEA's coverage of international transactions. These gaps pose difficulties for the analysis of trade, monetary, and regulatory policy. For example, in 1990, with the economy in the midst of what was described as a credit-crunch-induced recession, a \$73 billion statistical discrepancy in the balance of payments accounts made it difficult to tell whether or not foreign capital flows were drying up: Based on the financing implied by the current account, there was only a modest dropoff, whereas the direct measure from the capital account suggested a sharp reduction. At the same time, on the regulatory policy side, gaps in the coverage of foreign lending to U.S. nonfinancial corporations by banks in the Caribbean caused the official statistics to understate by roughly one-third the indebtedness of U.S. companies and the penetration of foreign banks into U.S. markets.

Since then, BEA has been able to close many of these gaps in coverage by data exchanges with other countries and by improvements in survey coverage through its work with the Treasury Department and the Federal Reserve. Nevertheless, gaps remain in some areas, and new gaps are emerging in others.

Two of the largest remaining gaps in the coverage of goods and services are in financial services and computer software. The proliferation of new financial services traded in international markets has left a hole in BEA's coverage of services, while the rapid growth in trade in computer software has caused a growing gap in what was once a miscellaneous category in the harmonized tariff code that was valued by the cost of the media (for example, the value of a blank diskette) rather than the market value of the software itself. The size of these and other gaps in trade in services may be as large as \$10-\$20 billion.

In the capital accounts, large gaps remain in the coverage of U.S. portfolio investments abroad and foreign portfolio investments in the United States. These gaps result from direct transactions between U.S. and foreign residents that bypass the U.S. brokers, dealers, banks, and other financial institutions that form the U.S. data collection system. In addition to these existing gaps, new gaps are emerging through growth in new financial instruments that are not separately identified or fully covered by the existing data collection system. A rough guess of the size of the omissions in U.S. international capital flows and stocks due to remaining and newly emerging gaps might be as large as \$100 billion for the flows and \$200 billion for the stocks.

6. Government purchases of capital goods is included in GDP; treating them as investment would reallocate them from government purchases to fixed investment.

Table 3.—Proposed Actions and Milestones in Implementation

| Proposed actions | Milestones in implementation | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| | 1995 | 1996 | 1997 | 1998 | 1999 |
| Need for new and improved output measures | | | | | |
| Extension of quality adjustment of prices used in real GDP. | ..... | Incorporate quality-adjusted measures for selected high-tech products. | Develop new estimates for nonresidential construction using model pricing or hedonic methods. | Continue work on extension of quality adjustments. | |
| Further conceptual work on difficult-to-measure goods and services. | ..... | Develop new concepts and methods for measuring banking and other financial services. | Publish new estimates for banking and other financial services. | Identify and develop new concepts and methods for measuring other difficult-to-measure goods and services. | Publish new estimates for other difficult-to-measure goods and services |
| More frequent updating of sample frames for existing surveys, more frequent surveys for certain sectors, and extension of existing surveys to fill gaps in coverage. | Begin work with other agencies to identify cost-effective actions. | Continue work, extending consultations to business community. | Conduct new and revised surveys using new sample frames and methods. | Incorporate data from new and revised surveys. | |
| Improvements in seasonal adjustments. | ..... | Begin work with other agencies on improving seasonal adjustment. Begin work on revised seasonal adjustment as part of reengineering. | Incorporate revised seasonal adjustment methods for categories such as inventories and merchandise trade. | Incorporate revised seasonal adjustment methods for other key components. | |
| Improvements in projections for missing source data. | ..... | Begin design work for built-in analytics and projections methods as part of reengineering. | Incorporate improved methods into current quarter projections for categories such as inventories and merchandise trade. | Incorporate improved methods into current quarter projections for other key components. | |
| Introduction of new weighting schemes. | Introduce more current weights for real GDP. | ..... | ..... | ..... | Update base-year weights for current estimates |
| Develop a new industry classification system. | Present NAICS priority categories to industry groups and data users for comment and revision. | Continue work with industry groups and data users and finalize NAICS. | Work with Census to redesign forms on the basis of NAICS. | | |
| Update and better integrate BEA's accounts within the context of new international guidelines. | ..... | ..... | Complete the 1992 benchmark input-output accounts 5 years after the reference year. | | |
| Need for better measures of investment, saving, and wealth | | | | | |
| Expand the coverage of investment along the outlines of the new international guidelines. | ..... | Publish new estimates of computer software. Update and improve estimates of research and development. Extend integrated economic and environmental satellite accounts (IEESA's) to include selected renewable resource estimates and revise nonrenewable resource estimates. | Continue long-term improvements in computer software and work on other intangibles. Expand disaggregation of existing NIPA items in the IEESA's. | | |
| Use of improved depreciation and valuation methods. | Introduce new depreciation and capital estimates. | Extend empirical work on used asset prices to other assets. | Extend empirical work on used asset prices to other assets. | | |
| Integration of real and financial accounts. | Begin work with the Federal Reserve Board to develop multiyear plan for better integration. | | | | |

BEA's proposed priorities in these areas are as follows:

- Modification and extension of existing surveys and customs documents to better capture exports and imports of computer software and of courier and other rapidly growing services.
- Completion of BEA's benchmark financial services survey and establishment of a new annual survey of financial services.
- Completion, and institutionalization, of work with the Treasury Department on their benchmark survey of U.S. portfolio investment abroad.
- Extension of data exchanges with other countries and central banks through the adoption of standard definitions and coverage and the international coordination of benchmark surveys.

- Extension of existing portfolio surveys to separately identify and better cover derivatives and other new financial instruments.

Milestones in implementing the proposed actions

Although some of the methodological improvements can be implemented in the next year or so, many of the proposed projects are multiyear efforts. The timing of these projects is naturally dependent on the availability of resources. The milestones for each of the projects included in table 3 are based on the assumption that funding is commensurate with that of similar projects in the past.

These projects have been chosen so as to focus on those with the highest relative importance at the lowest possible cost. Despite this focus on getting the largest "bang for the buck," many of the projects cannot be accomplished with exist-

Table 3.—Proposed Actions and Milestones in Implementation—Continued

| Proposed actions | Milestones in implementation | | | | |
|------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| | 1995 | 1996 | 1997 | 1998 | 1999 |
| Need to fill gaps in the coverage of international transactions | | | | | |
| Extension and revision of existing surveys and forms to cover new products, services, and financial instruments. | Revise product code and data collection to include a separate category for computer software. | Develop initial estimates of the full market value of computer software based on revised methods and source data. | Update and improve estimates of the full market value of computer software | | |
|  | ..... | Work with the business community to develop revised and extended "selected services" survey to cover new, growing, and volatile services categories. | Conduct extended services surveys. | Process and incorporate results from extended surveys into national and international accounts | |
| | Begin work with Treasury and the Federal Reserve on cost-effective means of collecting data on derivatives and new financial instruments. | Work with the business community to develop a revised survey to cover derivatives and other new financial instruments. | Conduct revised survey to capture derivatives and other new financial instruments. | Process and incorporate results from revised survey into national and international accounts | |
| Extension of data exchanges with other countries and central banks. | Continue work on internationally coordinated definitions for data exchanges. | Incorporate data, as appropriate, from countries adopting new standardized definitions. | Incorporate data, as appropriate, from countries adopting new standardized definitions. | Incorporate data, as appropriate, from countries adopting new standardized definitions. | Incorporate data, as appropriate, from countries adopting new standardized definitions |
| Development of new surveys. | ..... | Incorporate results from benchmark financial services survey and conduct annual financial services survey. | Incorporate results from annual financial services survey | | |
| | Process new benchmark survey of U.S. portfolio investment abroad. | Continue processing new benchmark survey of U.S. portfolio investment abroad. | Incorporate results from new benchmark survey of U.S. portfolio investment abroad | | |
| | Continue international coordination in development of international benchmark survey. | Continue international coordination in development of international benchmark survey. | Finalize design and collection of internationally coordinated benchmark survey. | Collect and process data from internationally coordinated benchmark survey. | Continue processing results of internationally coordinated benchmark survey |

ing resources; this time schedule and project list will clearly have to be adjusted in light of future resources. The milestones in [table 3](#), however, do provide a notion of the sequencing and timing of the returns from an integrated strategic plan to maintain and improve the accounts. Implementation of such a plan would update the accounts in a timely manner to reflect changes in the economy. Thus, the accounts could continue to provide the degrees of accuracy, reliability, and relevance that their users have come to expect.

An environment for change in the accounts

Outside experts, in commenting on BEA's work, have made at least two other recommendations that should be noted. One is that BEA should

extend and update its documentation of methodology, and the other is that BEA should form an advisory committee. Both recommendations take on increased importance in an environment of change in the accounts. BEA takes seriously its obligations to provide documentation and will be working toward a revamped system of documentation that is as up to date and readily available as its estimates. Over the years, BEA's accounts have benefited from critique and comment, ranging from formal but intermittent "blue ribbon" panels to informal day-to-day contact with users. Just as BEA is seeking advice as it puts together this plan, BEA would welcome advice—especially regularized advice from a group of users of the accounts—as it seeks to carry out the plan. 