Gross National Product Data Improvement Project Report

THE ADVISORY COMMITTEE ON
PRODUCT DATA IMPROVEMENT

U.S. DEPARTMENT OF COMMERCE
ederal Statistical Policy and Standards

BEA
BUREAU OF ECONOMIC ANALYSIS

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REPORT OF THE ADVISORY COMMITTEE
ON GROSS NATIONAL PRODUCT
DATA IMPROVEMENT

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PREFACE

This report of the Advisory Committee on Gross National Product Data Improvement was prepared under the auspices of the Statistical Policy Division of the Office of Management and Budget. It is being published by the newly established Office of Federal Statistical Policy and Standards in the Department of Commerce which has assumed the statistical policy functions formerly assigned to the Office of Management and Budget.

The report is a landmark in that it provides the first comprehensive evaluation of the underlying data used to estimate the national economic accounts. It will be a valuable planning tool in developing improved programs for economic statistics in the years ahead.

The GNP Data Improvement Project was initiated under the leadership of Julius Shiskin before he became Commissioner of the Bureau of Labor Statistics. It was funded primarily from the President's Management Improvement Fund and by the Bureau of Economic Analysis. Additional support was provided by the Bureau of Labor Statistics, Council of Economic Advisers, and Department of the Treasury.

Our gratitude is extended to Daniel Creamer, Rosanne Cole, Edward Denison, Raymond Goldsmith, Alan Greenspan and John Kendrick who contributed their time and knowledge as members of the Advisory Committee.

The project staff was led by Daniel Creamer, recently retired from the Conference Board, who also chaired the Advisory Committee. In addition to the period when he served as a consultant to the Office of Management and Budget, Dr. Creamer gave freely of his private time and energies to insure that the report was completed. Norman Frumkin, Bureau of Economic Analysis, played a major role in the research, consultations with agencies, and writing of the report. Throughout the project, LaVerne Collins, Statistical Policy Division, made substantial contributions to the development of report materials. Louis Weiner, recently retired from the Federal Reserve Board, contributed his expertise on the project staff including special concentration on the price chapter. Thanks are also due to Stephen Taylor of the Federal Reserve Board for the chapter on the flow of funds accounts.

The project received administrative supervisory attention from David Hulett, now with the Department of Energy and Gaylord Worden, now Deputy Director for Economic Statistics of the Office of Federal Statistical Policy and Standards. The project team was supported by Bette Day and Elizabeth Ubbens, who attended to the many secretarial and administrative details related to the project. Emily White, recently retired from the Statistical Policy Division, assisted in the technical editing of the report.

We also appreciate the cooperation of the numerous agencies that provided information on the feasibility and estimates of the cost of the recommendations. The Committee's assessments were considerably enriched by this

feedback. Special note is made of the assistance by Shirley Kallek in responding to the many requests of the Committee because of the extensive use of Census Bureau statistics in preparing the national accounts.

The helpfulness of Allan Young and divisional staffs of the Bureau of Economic Analysis—National Income and Wealth, Interindustry, and Balance of Payments— in explaining the estimating procedures and data sources used in the accounts was important to the success of the project. Also, Edward Denison's especially careful reading of all draft chapters significantly enhanced the quality of the report.

The Advisory Committee's recommendations will be a major input to "A Framework for Planning U.S. Federal Statistics for the 1980's," which is being published in mid-1978 by the Office of Federal Statistical Policy and Standards. In fact, some recommendations are already being implemented, most notably the significantly expanded industry and item coverage of the forthcoming 1977 economic censuses. The six-year schedule of recommendations will be considered by agencies, departments, and by the Office of Management and Budget during the development of future budgets for statistical programs.

A bonus of this report to the economics profession is the insights that it provides to the analyst who wants to know more about the data base and methodology used for estimating detailed components of the GNP. I am confident it will be a long-standing reference report used by many professional economists for that purpose.

Joseph W. Duncan
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U.S. Department of Commerce
October 1977

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CHAPTER 1

SUMMARY

The Advisory Committee on GNP Data Improvement was established by the Statistical Policy Division (SPD) of the Office of Management and Budget (OMB) in 1973 to evaluate the quality and timeliness of the underlying data used in preparing the national economic accounts, and to recommend specific improvements to the data. The most widely known measure of the national accounts is the gross national product (GNP). The Committee was composed of six nongovernmental experts in the economic accounts and a four person working staff. The staff conducted the study and wrote the report. The Committee gave overall guidance to and reviewed draft chapters of the report. This report presents their findings. The major recommendations are summarized in the last part of this chapter.

Events Leading to the Formation of the Committee

The study was sparked by the concern of economic policymakers in the early 1970's about successive revisions of provisional (preliminary) figures released on the quarterly movements of the GNP. Two revisions of substantial magnitude that occurred in a period of 6 months (July 1971 and January 1972) caused uncertainty with the measures of the state of the economy.

There have been other instances of revisions in the economic accounts that gave somewhat different pictures of the state of the economy, including one after the Committee started its work in 1974. Early information is of necessity based on smaller survey samples, incomplete company records of business activity, estimates to fill data gaps, errors in tabulations, etc. Although the tentativeness of the provisional estimates is known, policymakers on occasion have claimed they were misled by the early information: "If we knew then what we know now, different fiscal, monetary, incomes, etc. policies would have been prescribed for managing the economy."

The uneasiness caused by the revisions in 1971 and 1972 led the SPD to question the content, accuracy and timeliness of the underlying data used in constructing the economic accounts. These data come mainly from survey and administrative statistics provided by a wide range of Federal agencies—Bureau of the Census, Bureau of Labor Statistics, Federal Trade Commission, Internal Revenue Service, Department of Agriculture, etc. The data are often collected for purposes other than GNP measurement, and thus do not always conform to the ideal statistical concepts or timing of the GNP estimates.

The Bureau of Economic Analysis (BEA) of the Department of Commerce processes these data—including some of its own survey information—into the GNP estimates. The secondary sources are used because they are the best available data and least costly method of obtaining the necessary information.

Although BEA has in the past identified weaknesses in the GNP data base, SPD wanted an outside evaluation of which data problems were most pressing along with a feasible program of remedies. This was the reason the Committee was formed.

Approach and Scope of the Study

In its work on the GNP Data Improvement Project (DIP), the project staff consulted BEA on identifying the major data gaps, and with the various data producing agencies on the technical feasibility and additional costs of dealing with the problem areas. Assessments of the major data gaps and feasible remedial measures initially made by the project staff were revised on the basis of the Committee's review. Drafts of the report were circulated to BEA and other agencies for comment, but the findings and recommendations reflect the independent research and assessments of the Committee.

The DIP study focused on data needs for the quarterly GNP estimates, the annual revisions made every July, the quinquennial benchmarks associated

with the input-output tables, and the preparation of constant-dollar "real" GNP estimates that adjust the dollar values for price changes. The components on both the product and income sides of the accounts were covered in this evaluation: on the product side, consumer expenditures, private investment, government purchases, and net exports; on the income side, employee compensation, proprietors' income, corporate profits, net interest, rental income, capital consumption allowances, and indirect business taxes.

Since the BEA estimating methodology is closely linked to data problems, an understanding of the basic measurement concepts and estimating techniques was necessary. The consequent review of the methodology led to recommendations concerning the preparation of the accounts as well as improvements for the underlying data.

Because the Federal Reserve Board's flow of funds accounts are integrated with the national economic accounts, the Committee included an assessment of the flow of funds data base in the DIP study. This appraisal of the flow of funds is far more summary than that for the economic accounts, and should be followed by a more comprehensive and intensive evaluation in a separate study.

Other aspects of the economic accounts—wealth estimates of capital stocks, personal income size distributions, and State and local area regional accounts—were not included in the DIP study on the pragmatic grounds of limiting the scope of the study to what the staff of four part-time persons could realistically handle.

This was the first outside review of the national economic accounts by an advisory committee in 20 years. The previous assessment was made in 1957 by the National Accounts Review Committee. It concentrated on the needs for a further conceptual development of the accounts, with a limited examination of the quality of the underlying data. By contrast, the DIP study is an intensive analysis of data needs for the existing concepts of the accounts, with limited attention to needs for supplementary analytic measures (and the associated data) of the accounts.

Multi-Year Implementation of the Committee's Recommendations

The Committee has made over 150 specific recommendations. A broad order of magnitude of their total cost (in 1976 prices) spread over 6 years is toughly $25 million.[1] This accounts for about 4 percent of the the principal statistical programs of the Federal Government in FY 1976. The recommendations cover very complex issues (e.g., survey methodology, content and reporting) which often first require research and feasibility studies, as well as problems that can be dealt with by existing capabilities (e.g., instituting a revised quarterly GNP estimate 75 days after the reference quarter). Some improvements require additional funding while others do not.

The recommended improvements can only be implemented over a period of several years. The Committee has developed a schedule for implementing the recommendations in each of the 6 years of the 1978-83 period. This schedule is intended as a longrun framework for SPD in setting priorities in the annual budget cycle and in overseeing the ongoing statistical programs. (This responsibility will now belong to the newly created Office of Federal Statistical Policy and Standards within the Department of Commerce. Therefore, all recommendations in this report designated for implementation by the Statistical Policy Division of the Office of Management and Budget now refer to OFSPS.) Although work on the improvements would be started in the coming 6 years, in some cases it would continue in later years of the 1980's. In fact, one improvement is recommended for implementation in the 1987 economic censuses.

The Committee hopes this schedule of improvements will make a substantial contribution to the planning of a broad-based program to increase the reliability of the national economic accounts. It should be updated for each year's annual budget cycle in light of the accomplishments and research findings of the previous year, newly emerging problems, etc.

Next Audit of the National Economic Accounts

Consideration should be given to the need for a periodic outside assessment of the reliability and content of the national economic accounts. Because of the their importance in economic policymaking,

[1] This total is based on very summary estimating techniques, including considerable reliance on rules of thumb. For some of the recommended improvements, no cost estimates were provided by the data producing agencies. Thus, when agencies prepare actual fiscal budgets for funding the improvements in coming years, the costs for individual programs (other than increases for inflation) could vary substantially either upward or downward. To allow for the likelihood of underestimation, the cost estimates provided to the Committee were raised by 50 percent to arrive at the figure cited in the text.

the next such review probably should take place within 10 years. That appraisal naturally would be shaped by the measurement and analytical issues of the late 1980's. It also could use as one point of departure the progress made over the decade on the recommendations of the DIP study.

Other Issues in the Committee's Work

As noted earlier, the Committee was formed in response to revisions in the accounts that disturbed economic policymakers. A Committee analysis of the revisions resulting from the quinquennial GNP benchmarks published in 1976 revealed different confidence levels, depending on the component detail at the time of the final benchmarking. The broadest aggregates in the quarterly and annual accounts (e.g., consumer expenditures, private investment) were reliable, although some of the smaller components of analytic importance were less firmly based, and many of the detailed elements were not reliable. This suggested that errors in the component detail tended to be offsetting at the higher level of aggregation.

Revisions, however, are only one indicator of data problems. For example, although revised data are considered more accurate than preliminary data, even the later information can have deficiencies of sample representativeness, reporting, item coverage and definitions, timeliness, etc. There also are series that are revised only in a very limited sense (more survey respondents are included or previous tabulating errors are corrected but no new data from the survey respondents are added.) In addition, for some series there are no preliminary data, in which case the early GNP estimates are based on historical relationships and other judgmental factors.

The Committee examined data weaknesses arising from all of these sources. That is, problems signaled by the appearance of revisions, those inherent in the data irrespective of the size or frequency of revisions, and those reflecting a lack of data were all scrutinized.

Because the study extended over 4 years, some of the recommendations that were discussed with the agencies in earlier stages of the Committee's work are now being implemented. Prominent among these are experimental work by the Census Bureau for improving some of its monthly economic surveys, concrete suggestions for planning for a substantially expanded industry and item coverage of the forthcoming 1977 economic censuses, and an agreement between BEA and the Department of Agriculture for a more flexible policy of revising the quarterly estimates of farm income during the year.

Major Recommendations

In this summary, only major recommendations of the Committee are presented. A listing of all of the recommendations is given in Chapter 10, together with an indication of the Committee's order of priority for implementing them. The principal criteria used for setting priorities are:

a. Size of the dollar transactions and effect on the level of the data item

b. Impact on the quarterly and annual movements—i.e., period-to-period changes in the dollar transactions of the data item

c. Feasibility of implementing the recommendation, including the technical difficulty and burden on survey respondents.

Generally, the most important projects are scheduled for the early part of the 1978-83 period, but modified as necessary to reflect the feasibility of implementing them. For example, those projects which are relatively easy to implement but which are not among the major problem areas are scheduled for the early part of the 6-year period.

The summary of major recommendations is organized under six categories. Recommendations concerning estimates of specific components are presented under the first five categories, distinguishing the various time frames and the constant-dollar estimates of the national economic accounts, plus the flow of funds accounts, namely:

1. Current quarterly GNP and monthly personal income estimates
2. Annual GNP revisions each July
3. Quinquennial GNP benchmarks
4. GNP in constant dollars
5. Flow of funds accounts

The sixth category deals with general recommendations without reference to specific component estimates. Within each of these categories, the recommendations are grouped by the Federal agency responsible for the statistical program forming the core of the recommendation. The recommendations are not accompanied by an explanation or rationale which is given in the subject chapters. This summary excludes programs for which significant work has begun, or those that are recommended for early implementation mainly because they are relatively easy to implement.

The nature of the data requirements changes with respect to timeliness, sample coverage, and item detail as the GNP estimates move from the current releases every quarter (15 and 45 days after the

reference quarter) to the successive revisions in following years. The emphasis in the current quarterly estimates is on obtaining very timely monthly and quarterly information for broad aggregates. As the estimates are subsequently revised annually each July and then in the quinquennial benchmarking, the focus shifts to obtaining data from larger samples of reporting units and in more item detail. The Committee's recommendations for data improvement follow this same pattern.[2]

The Committee's official assignment was to focus on the statistical shortcomings of the GNP estimates. This should not be read as denigrating the general high quality of the estimates. The objective of the recommendations is to make good estimates still better at an acceptable cost. For example, the cost of the recommended improvements is only a small fraction of the $1 billion cost of constructing an atomic submarine. Considering that the GNP accounts provide the dominant framework used by economic policymakers in making decisions that affect many billions of dollars of the Nation's output and the associated jobs, purchasing power, and allocation of resources to meet our social and defense needs, the benefits of implementing the recommendations should have a high payoff relative to their cost.

It is important to recognize the need to spend more money to develop more reliable measures of the GNP. Improvements resulting from more efficient management of statistical programs should be encouraged, but the potential from such gains in productivity cannot provide the additional resources necessary for fundamental improvements.

1. Current Quarterly GNP and Monthly Personal Income Estimates

Personal consumption expenditures

Goods:

For the monthly survey of retail sales, study the feasibility of collecting revised data on sales for the preceding month from the same group of reporting firms in 2 successive months. (Bureau of the Census)

Services:

For the monthly survey of selected services receipts, study the feasibility of collecting revised data on receipts for the preceding month from the same group of reporting firms in 2 successive months. (Bureau of the Census)

Gross private domestic investment

Structures:

1. For the monthly survey of private single-family residential construction, update every 5 years the coverage, valuation, and adjustment factors applied to building permit data and the construction progress patterns. (Bureau of the Census)
2. For the monthly survey of private nonresidential building construction, update the coverage factors of the F. W. Dodge contract award series. (Bureau of the Census)

Producers' durable equipment:

1. For the monthly survey of manufacturers' shipments, institute the following:
   a. Introduce a full probability sample covering firms of all size classes
   b. Conduct a feasibility study for collecting revised data on shipments for the previous month
   c. Collect shipments on a uniform basis for all defense-oriented industries. (Bureau of the Census)
2. For the quarterly survey of plant and equipment expenditures, conduct a comprehensive evaluation of the sampling procedures and statistical methodology, with particular emphasis on the feasibility of improving the methodologies by the following:
   a. Developing a full probability sample
   b. Updating the sample for births and deaths of firms
   c. Redrawing the complete sample periodically
   d. Collecting revised actual expenditures for the previous quarter
   e. Introducing comprehensive and systematic validation procedures. (Bureau of Economic Analysis)

Change in business inventories: Nonfarm

1. For the monthly survey of retailers' inventories, study the feasibility of using a screened sample of retail firms that report inventories from actual records. (Bureau of the Census)
2. For the monthly survey of maufacturers' inventories, introduce full probability sampling and study the feasibility of obtaining revised monthly inventory data as indicated above under producers' durable equipment for manufacturers' shipments; and

[2] This summary presents the current quarterly GNP estimates first because of the interest in these figures for economic policymaking. In the detailed discussion, the quinquennial and annual chapters appear first because the quarterly figures are extrapolations of the annual and quinquennial measures.

collect inventory data on military hardware by stage of fabrication. (Bureau of the Census)

Change in business inventories: Farm

1. In the quarterly surveys of farm crop inventories, collect data on the ownership of crops stored in off-farm facilities. (Department of Agriculture)
2. Supplement the existing semiannual livestock survey with quarterly national inventory data for cattle and calves. (Department of Agriculture)

Government purchases of goods and services

Federal:

Speed up the tabulation of data on progress payments made to companies working on Federal Government contracts to provide these figures by 60 to 65 days after the reference quarter. (Department of Defense)

State and local:

The Committee endorses the FY 1978 Budget request to Congress for funds to collect quarterly data on expenditures and nontax revenues of State and local governments. (Bureau of the Census)

Net exports of goods and services

Goods:

1. For the monthly survey of merchandise exports, study the quality of reporting on the Shippers' Export Declaration form, and based on the findings, modify the form and accompanying instructions; and establish a monitoring program to maintain and improve the coverage and quality of the reporting. (Bureau of the Census)
2. Restore the joint project between the United States and Canada for reconciling quarterly bilateral merchandise trade export and import data. (Bureau of the Census)

Services:

1. For the monthly survey of merchandise imports, tabulate monthly the value of transportation freight charges separately from insurance and other handling charges for merchandise imports by country of the operator of the transporting vessel. (Bureau of the Census)
2. Institute a research program to collect direct quarterly measures of international income transactions from portfolio and other nondirect foreign investments. (Department of the Treasury)

Compensation of employees

Wages and salaries:

For the monthly survey of establishment payrolls, conduct a broad-based research and development program for strengthening the wage and salary data, including feasibility studies for improving the methodologies in the following ways:

a. Increasing response rates of the sampled firms
b. Systematically introducing new firms starting up in business into the sample during the year
c. Collecting total wage and salary payments for the calendar month or nearest pay periods corresponding to the entire month—including pay of supervisory workers, retroactive pay, and irregular bonuses—on a revised monthly basis
d. Periodically drawing a complete new sample of reporting establishments, and implementing a full probability sample
e. Developing additional quality control methods for processing the reported data and for implementing the sample design
f. Refining the collection of data on teachers' salaries from State and local governments to develop uniform national estimates of these salaries for the school year and the summer vacation months. (Bureau of Labor Statistics)

Wages and salaries and personal tax payments:

For tabulations of quarterly employer tax returns, speed up and provide better editing of selected wage and related tax data by 70 days after the reference quarter by using a probability sample of tax returns. (Internal Revenue Service)

Supplements to wages and salaries:

In the Quarterly Financial Report, collect separate data on employer contributions to private pension, health and welfare benefit plans. (Federal Trade Commission)

Proprietors' income

Nonfarm:

For the prospective quarterly survey of household incomes, explore the collection of data on nonfarm self-employment income to provide national totals by 65 days after the reference quarter. (Department of Health, Education, and Welfare)

Farm:

1. Speed up the collection of data on the movement of crops to market for soybeans, corn, wheat, cotton, and sorghum to a system of quarterly reports available 60 to 65 days after the reference quarter. (Department of Agriculture)
2. Collect quarterly data on interstate sales and purchases of stocker and feeder cattle to be tabulated 60 to 65 days after the reference quarter. (Department of Agriculture)
3. Institute a survey to collect quarterly data on farm production expenses for major cost items to be tabulated 60 to 65 days after the reference quarter. (Department of Agriculture)

2. Annual GNP Revisions Each July

Personal consumption expenditures

Goods:

For the annual survey of retail sales, institute the following:

a. Speed up the tabulations of data on sales to provide these figures by mid-May following the reference year.
b. Collect broad product detail on the sales of new car dealers (new cars, used cars, and repair services) and department stores (e.g., apparel, furniture, appliances) to be available for use in the second July GNP estimates. (Bureau of the Census)

Gross private domestic investment

Change in business inventories:

For the annual surveys of retailers' and wholesalers' inventories, tabulate yearend data by mid-May following the reference period in order that the data be available for the first July revision. (Bureau of the Census)

Government purchases of goods and services

State and local:

For the annual survey of governmental finances, speed up the tabulations of data on State and local government fiscal transactions to provide these figures by the first July revision. (Bureau of the Census)

Net exports of goods and services

1. Institute an annual program for reconciling U.S. merchandise export and import statistics on a bilateral basis with Mexico, our major trading partners in the Common Market countries, and Japan. (Bureau of the Census)
2. Institute a program for reconciling U.S. balance of payments statistics on a bilateral basis with comparable statistics of the same countries as in 1 above for international service and income transactions. (Bureau of Economic Analysis)

Compensation of employees

Wages and salaries:

For the unemployment insurance reporting system, speed up the collection of fourth quarter (October - December) data on wage payments obtained from the State governments so that estimates are available by mid-May following the reference year. (Bureau of Labor Statistics)

Supplements to wages and salaries:

Tabulate the data collected under the Employee Retirement Income Security Act to provide national industry aggregates of income and expenditures for retirement, welfare, health, and thrift savings plans by mid-May for the plan year covering the previous July 1 - June 30 period. (Internal Revenue Service and Department of Labor)

Corporate profits

1. As a supplement to the Quarterly Financial Report, conduct an annual survey of audited corporate profits together with other selected items of the income statement and balance sheet for a representative sample of corporations in manufacturing, mining wholesale trade and retail trade to be tabulated by mid-May for data covering the preceding calendar or fiscal year. (Federal Trade Commission)
2. Tabulate Schedule M accompanying corporate tax returns that reconciles taxable profits and balance sheets with stockholder reports. (Internal Revenue Service)

Farm income

For corporations and partnerships associated with farm enterprises, specify and tabulate business expenses associated with farm business receipts comparable to that for Schedule F accompanying sole proprietor tax returns. (Internal Revenue Service)

Annual input-output tables and GNP by industry

1. For the annual survey of manufactures, tabulate industry-product shipments data to distinguish between primary and secondary products produced in each industry. (Bureau of the Census)
2. Tabulate annual data on industry sales obtained from the industrial directory program. In addition, collect through a broad-based survey program of all nonagricultural industries the following data items:

   a. Aggregate costs of goods and services purchased from other firms

   Supplements to wages and salaries

   Depreciation allowances by method of valuation

   d. Yearend inventories by method of valuation

   e. Capital expenditures separately for plant and equipment. (Bureau of the Census)

8. Collect in the censuses of manufactures, wholesale trade, and retail trade data on the commodity composition of inventories by turnover period.

New industry coverage for quinquennial economic censuses

(Bureau of the Census):

1. Expand the coverage of services to include all for-profit and not-for-profit activities.
2. Conduct a census of transportation industries.
3. Conduct a census of real estate industries.

Special studies of new construction:

In the studies on labor and materials requirements for new construction,

increase the types of construction covered and conduct the studies on a recurring 5-year cycle. (Bureau of Labor Statistics)

3. Quinquennial GNP Benchmarks

Benchmark input-output tables

Existing quinquennial economic censuses (Bureau of the Census):

1. Collect data in all economic censuses on purchased services in total and for major component items.
2. Refine the reporting in all economic censuses of wages and salaries to eliminate underreporting.
3. Collect in all economic censuses except governments, data on depreciation charges for firms of all size classes.
4. Collect in the census of construction industries data on purchases of major materials and supplies.
5. Tabulate in the commodity transportation survey the dollar value of shipments between shipping and receiving industries.
6. Collect in the census of retail trade data on gross margins and operating expenses by kind of business, comparable to those in the census of wholesale trade.
7. Conduct a feasibility study in the census of governments for collecting itemized data on purchased goods and services from a sample of State and local governments.

4. GNP in Constant Dollars

Gross private domestic investment

Structures:

Develop price indexes for the construction of multi-family housing and nonresidential buildings comparable to those for single-family housing. (Bureau of the Census)

Net exports of goods and services

1. Use partial Bureau of Labor Statistics' data on merchandise trade export and import prices before complete international price data become available. (Bureau of Economic Analysis)
2. Conduct basic research for developing more direct price measures to deflate the service and income components. (Bureau of Economic Analysis and Bureau of Labor Statistics)

Government purchases of goods and services

1. Establish the existing developmental project for preparing quarterly measures of defense purchases in constant prices as part of the regular ongoing program. (Bureau of Economic Analysis)

2. Reconsider possible introduction of productivity measures for deflating Federal Government employee compensation. (Bureau of Economic Analysis) [1]

General improvement in price data

The Committee supports the planned multi-year program to provide better wholesale, industrial, and international price data. (Bureau of Labor Statistics)

5. Flow of Funds

1. Collect quarterly data on cash and security holdings of State and local governments. (Bureau of the Census)
2. Provide quarterly measures of fixed capital outlays, stocks, and capital consumption charges by sector and by type of capital as part of the national economic accounts estimates. (Bureau of Economic Analysis)
3. Explore feasibility of tabulating the quarterly and annual reports filed by all registered large nonfinancial corporations to provide an integrated statement of income, balance sheets and sources of financing. (Securities and Exchange Commission)

6. General Recommendations

1. There is an overriding need for the preparation and publication of a handbook on the GNP accounts detailing concepts, sources of data, estimating methodology, and their limitations. An updating of the comparable effort of 1954 with a more complete coverage on the quarterly GNP estimates and deflation is long overdue. Although the BEA has been conscientious in describing major revisions and additions to accounts by articles in the *Survey of Current Business*, the practice does not fulfill its obligations to the many professional users of the GNP estimates who are now frustrated whenever they need to know the actual procedures. The provision of a handbook should be given the highest priority. (Bureau of Economic Analysis)
2. Institute the preparation of a revised quarterly GNP estimate 75 days after the reference quarter. (Bureau of Economic Analysis)
3. Provide a more complete and timely statement of the major judgments used and their economic and/or statistical rationale associated with the preparation of the GNP estimate released 15 days after the reference quarter. (Bureau of Economic Analysis)
4. Extend the presently published monthly estimates of personal income to encompass the broad aggregates of the disposition of personal income—personal taxes, consumer expenditures, and personal saving.[4] (Bureau of Economic Analysis)
5. Provide quarterly GNP estimates for the proposed 75-day release (see 2 above) unadjusted for seasonal variation for as many of the product and income components as feasible. (Bureau of Economic Analysis)
6. Expand the application of the quinquennial input-output tables to directly cross-check more of the product and income components. (Bureau of Economic Analysis)

[1] Dissenting comment by Edward F. Denison:

I dissent from the recommendation, which was not examined by the Committee as a group, that in deflating government purchases BEA should reconsider the use of productivity measures for Federal Government operations.

Government is now treated as a final consumer of the goods and services it buys. Insofar as possible, specification pricing is used to deflate government purchases—whether of goods, labor, or other services—just as it is to deflate other components of GNP. A conceptual alternative would treat government purchases as intermediate, and as a final product substitute some estimate of the value of the goods and services that flow from government to the rest of the economy. Unless it were simply valued by purchases, such an estimate would require independent measures in constant prices of the quantity of national security provided, the quantity of education provided, and quantities of a host of smaller items, many of which defy not only measurement but even definition.

No actual or prospective series for government productivity fits either of these concepts. Unless some preferable third concept into which they do fit can be stated, such series simply are not pertinent to national product measurement. A recommendation for a conceptual change is in any case outside the scope of the Committee's charge.

This note expresses no opinion as to the usefulness of BLS research in this area for other purposes.

[4] Dissenting comment by Edward F. Denison:

Annual estimates of personal saving in the most recent periods are subject to regrettably large errors and quarterly estimates to still larger ones. Monthly estimates would be much less reliable still, and probably too erratic to interpret unless they were arbitrarily smoothed. I am not convinced that a monthly series sufficiently accurate to contribute to economic analysis can be constructed.

7. Incorporate the quinquennial benchmarks into the annual and quarterly GNP time series 1 year after the relevant input-output table has been completed. (Bureau of Economic Analysis)

8. Review the detailed componets that are presently published to assess if they meet the reliability standards appropriate for publication, and for the detailed components that are published provide an indication of the recent errors of estimation. (Bureau of Economic Analysis)

9. Create a fiscal capacity in the Federal statistical system for carrying out quick surveys on short notice. This capacity is required whenever unexpected changes in the economic climate and in business behavior create the need for information that is not being collected. (Statistical Policy Division)

10. The problems of seasonal adjustment should be studied on a continuing basis, including the behavior of seasonals during different stages of the business cycle, in the major Federal statistical agencies. (Statistical Policy Division)

11. Continuing efforts should be made by the major Federal statistical agencies to prevent deterioration in the quality of existing data, such as has occurred in the samples used in some surveys. The improvements recommended in this report will not be nearly as valuable if the improved data are not maintained at a high quality.

12. Selected Federal statistical agencies should have continued access to Internal Revenue Service tax returns or tax return information for statistical purposes as enumerated in the Tax Reform Act of 1976. This reduces the reporting burden of small enterprises, provides needed crosschecks, and enables the integration of establishment and company statistics.

CHAPTER 2

COMMITTEE'S ORIGIN AND APPROACH TO DATA IMPROVEMENT

Origin of Review

Sir John R. Hicks recently reminded economists and national income statisticians:

> "...there is no doubt that the Social Product, the *measurable* Social Product, is a magnitude in which people *are* interested. There are legions of statisticians measuring it; the newspapers quote it; it is bandied about in political speeches. In that sense, it exists; it has become a part of the world in which we live.... (Emphasis in the original.)
>
> "After all, though the Social Product (or National Income, or Gross National Product) has been 'sold' to the public, it has been 'sold' by economists. We have a responsibility for it—the responsibility of the manufacturer for the quality of the good which he sells."[1]

Since in the United States the Federal Government is the supplier of these estimates, it too has a responsibility. More specifically, the official responsibility rests with the Bureau of Economic Analysis (BEA) in the Department of Commerce, which prepares the estimates, and the Statistical Policy Division (SPD) in the Office of Management and Budget (OMB), which is the official guardian of statistical standards and the coordinator and initiator of new statistical programs.

For this particular report, a result of the joint exercise of these agencies' responsibility, the focus is concentrated on recommendations for improving the data available to the estimators of the national income and product accounts (NIPA) so that the estimates can be made with greater accuracy and (perhaps) timeliness.

Although the estimation of the NIPA was initiated before the advent of the Keynesian revolution, their subsequent elaboration was significantly influenced by, and their popularity largely attributable to, the widespread acceptance, both in government and private sectors, of the Keynesian model of income generation.[2] This emphasizes shortrun income and spending flows rather than longrun equilibrium positions. The acceptance of the model, in turn, created the need for timely economic information within the framework of the NIPA for use in the formulation of national economic stabilization policy. To meet this demand, estimators were obliged to use statistics that in some instances were less than adequate. In such circumstances, revisions of preliminary estimates have become routine, but on occasion, the size of the revision has been disconcerting to the users of the NIPA.

In the three decades following the end of World War II, major revisions affecting appraisal of the overall state of the economy have occurred on seven occasions:

1. For the recession of 1948-49, the revised estimates compared with the preliminary GNP estimates showed a significantly smaller decline.
2. In the recession of 1953-54, the troublesome aspect was the uncertainty surrounding the meaning of the preliminary measures. The preliminary estimates of GNP revealed a much sharper contraction than the preliminary estimates of national income. This statistical discrepancy was narrowed substantially by the revised estimates. That is, the revised product estimate showed the more moderate decline measured by the preliminary income estimates.
3. In the recession of 1957-58, the preliminary estimates had the same deficiencies as the preliminary estimates for 1948-49—overstatement of the magnitude of the contraction.

[1] Hicks, J. R., "The Scope and Status of Welfare Economics," *Oxford Economic Papers* Vol. 27, Nov. 1975, No. 3, pp. 318-19.

[2] Gilbert, Milton, "War Expenditures and National Production," *Survey of Current Business*, March 1942; and subsequent articles in the April, May, and August 1942 issues of the Survey. For a discussion of earlier developmental work on the product accounts, see Carol S. Carson, "The History of the United States National Income and Product Accounts: The Development of An Analytical Tool," *The Review of Income and Wealth*, June 1975.

4. For 1965, the economic gains shown by the early GNP estimates were revised upward, thus indicating a stronger expansion during 1965 than had been thought initially to exist.[3]

5. In July 1971, there was a sharp downward revision in the estimates of corporate profits for 1969 and 1970. That is, the preliminary estimates were misleading in that they substantially understated the impact of the recession on business incomes.

6. In January 1972, revisions in the GNP estimates for the first three quarters of 1971—such revisions are ordinarily deferred to July of each year—showed a decidedly less buoyant recovery from the recession of 1969-70 than had previously been indicated by the preliminary estimates.[4]

7. Finally, there was a revision surprise after the initiation of this project. It occurred in mid-1974 when the annual July revisions, in contrast to the preliminary estimates, revealed (a) a significantly larger buildup of nonfarm inventories in the fourth quarter of 1973 and the first quarter of 1974 (see Chapter 5); and (b) much higher levels of farm income and increases in farm inventories all during 1973. Since this period coincided with the onset of a serious recession, the misleading clues given by the preliminary estimates were especially discomforting.

Certainly, only seven major revisions of current estimates in 30 years is a most creditable record. However, two major revisions in 6 months, or even three in 4 years, is surely sufficient to warrant official concern—especially when this coincides with the U.S. economy displaying more frequent changes in cyclical direction and undergoing deeper swings.

The impetus for the GNP Data Improvement Project came from the quick succession of the two unusually large revisions (briefly noted under 5 and 6 above). These revisions affected initial components of the quarterly and annual estimates at critical phases of the business cycle. Economic policymakers claimed that the preliminary GNP measures had misled them sufficiently to affect economic policy.

Their dissatisfaction with the state of the estimating art was communicated to the Statistical Policy Division and to the Bureau of Economic Analysis. Subsequent discussion resulted in a general agreement that the estimating art is severely constrained by weaknesses in the underlying data. It seemed sensible to identify these data deficiencies and to determine how to eliminate them and what the cost would be. Further, it was decided the required review could best be made by a task force independent of BEA. The GNP Data Improvement Project was launched in March 1973 under the joint sponsorship and financial support of OMB and BEA.

It is also worth noting that this initiative implemented a major recommendation of the President's Commission on Federal Statistics. Its second general recommendation urged that:

> "Intensive studies and evaluations, leading to recommendations for improvement, should be made from time to time of selected statistical activities throughout government.... These evaluations or 'audits' should be arranged by the Statistical Policy Division...."[5]

Another consideration in this decision undoubtedly was the awareness that the last review of the GNP accounts by an agency outside of the Department of Commerce (also sponsored by the Bureau of the Budget—the predecessor agency to the OMB) was made in 1957, 20 years ago.[6] That review committee, under the chairmanship of Raymond W. Goldsmith, had as its principal assignment the formulation of a set of recommendations for extending the then existing, more limited set of coordinated accounts so as to obtain a more fully articulated description of the working of the national economy within a consistent framework provided by the national accounting concepts. While some attention was devoted to "data problems," these were of incidental concern.

By contrast, the main focus of the present review committee is on data improvement. Refinements of concept and possibilities for further elaboration of the national accounts in the next decade are restricted to a few instances directly related to the development of better data.

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[3] Okun, Arthur M., *The Political Economy of Prosperity* (The Brookings Institution, 1970) p. 68 and Burns, Arthur F. and Samuelson, Paul A., *Full Employment Guideposts and Economic Stability* (American Enterprise Institute for Public Policy Research, 1967) p.3 as quoted in Young, see footnote 4.

[4] Young, Allan H., *Reliability of the Quarterly National Income and Product Accounts of the United States, 1947-71* (Bureau of Economic Analysis Staff Paper No. 23, July 1974) pp.4-5 and 26-28.

[5] Letter of transmittal to the President, *Federal Statistics - Report of the President's Commission* Vol. I, 1971 and discussion pp. 171-176.

[6] The report of the National Accounts Review Committee, "The National Economic Accounts of the United States: Review, Appraisal, and Recommendations," was published in the *National Economic Accounts of the United States*, hearings before the Subcommittee on Economic Statistics of the Joint Economic Committee, Congress of the United States (1957).

The Statistical Policy Division of OMB had an additional objective in mind. It foresaw the possibility of the report serving a management function. Within OMB, the Statistical Policy Division has the responsibility for reviewing and guiding the development of the statistical programs of the executive agencies of the Federal Government. In principle, the recommendations for data improvement could provide a blueprint over the intermediate term for charting the development of a significant segment of economic statistics within the Federal statistical program. The effort to fulfill this management objective affected certain aspects of our approach.

Approach to Data Improvement

The Committee's assignment dictated dealing with the grubby details of the actual data used and their statistical processing. The project staff had to acquire a knowledge of how the original data are compiled, how well they meet the conceptual requirements, and the implicit and explicit assumptions of the statistical processing that shapes the original compilation so that it better fits the concepts.

A data deficiency, not necessarily of serious proportions, may be assumed to exist whenever (1) a proxy series is used (e.g., corporate "book" profits for corporate profits defined for tax purposes in certain interim estimates; (2) continuing use is made of relationships based on data of the distant past which may no longer hold true (e.g., allocation of purchases of floor coverings between enterprise and households based on a ratio used for 1963); (3) the estimator's judgment, sometimes augmented by discussion with representatives of a handful of government agencies or companies, is used in lieu of solid data (e.g., State and local government purchases from industry and real estate commissions); (4) a separate sector estimate (the not-for-profit organizations) is not published because the available data are so limited; and (5) existing survey data known to be weak (e.g., retail trade inventories) are used. The Committee's review was designed to uncover such data gaps.

For each of the non-trivial gaps, the project staff determined in concrete, operational terms (1) the data required to eliminate the gap, (2) the feasibility of data collection and processing as a statistical operation, and (3) the approximate initial and recurring cost of obtaining the new data. The first determination was made by the Committee staff in consultation with the concerned estimator. The second and third determinations were based on substantial inputs from appropriate data collection agencies. With this information in hand, the staff initially, and later the Advisory Committee, determined which were the serious data gaps. At this stage, the relevant considerations were (1) the importance of the component in terms of analytical pertinence (change in inventories, for example), (2) an estimate of the probable size of error in the current estimate, and (3) the potential for data improvement at an acceptable cost level of additional inputs.

Some Background Considerations

The beginnings of the official national accounts in the United States go back about 40 years. This area of estimation has always had the leadership and staffing of high professional competence, continuously concerned with data improvement. As a result, many improvements have indeed been made in the data base over the decades. Primarily, this has taken the form of persuading others to tabulate data previously collected but not tabulated, or to add questions to existing surveys, or to expand coverage of ongoing data collection programs to sectors of the economy not currently surveyed.

The estimators in the BEA are obliged, with relatively few exceptions, to use statistics compiled by other agencies either for general use (such as the economic censuses conducted by the Census Bureau and the employment, payroll and price series of the Bureau of Labor Statistics) or for administrative use (such as the income tax statistics of the Internal Revenue Service) or the operating statistics of companies subject to Federal regulatory agencies. This circumstance has meant the data improvements for the most part have consisted of those that have been relatively easy, or entailed small additional costs to carry out. Data improvements also have become available as fall-out from administrative statistics of new government programs. The data deficiencies that remain may be viewed, in the main, as constituting the hard core of the data problems. The precise formulation of the required data may not be apparent. Data sought from respondents may not be easily retrieved from respondents' records, or retrieval may be a financial burden to the respondent, or may be regarded as a breach of the confidential character of the respondent's operations. Or the problem may be that the customary data-gathering agencies in the Federal information system, or congressional appropriation committees, cannot be persuaded that the required data are either of general use or serve administrative objectives. Finally, the cost to the Federal Government may appear to be excessive, especially compared to the sums usually allocated for such purposes.

If in effect we are dealing with the hard core of the data problems, we must realize that the possibility of quick fixes is the exception and not the rule. Often exploratory studies will be required to test whether promising suggestions will actually prove to be

fruitful, and budget makers must become reconciled to requesting and spending larger sums of money to buttress the statistical foundations of the GNP accounts.

A final point by way of background considerations: Most users of the national accounts need to be reminded that gains in firmly grounded statistics are not always held. That is, the quality of a particular statistical series can deteriorate and the trend may not be easily reversed. This is illustrated by the deterioration in the early 1970's of the currency of the survey sample of monthly retail trade statistics.

Staff Inputs and Scope of Review

In addition to a project director, authorized to work no more than half time, there have been three staff investigators assigned from three Federal agencies on the understanding each would devote half time to the Data Improvement Project. For good reasons, this commitment has more often been honored in the breach than in the observance. The Advisory Committee, composed of six distinguished economists with long and fruitful experience both as estimators and analysts, agreed to provide functions of guidance and review. While the members of the Advisory Committee share responsibility for the recommendations, the staff has had the sole reponsibility for drafting this report.

The limitations on staff inputs dictated the need to place a limit on the scope of this review in terms of the accounts examined. It was agreed that all accounts were to be reviewed except "wealth estimates of capital stocks", "distribution of income by size", and "State and small area distribution of income". BEA had discontinued its annual release on income by size some years before the initiation of our project and was in the process of developing a new methodology of estimation. The first estimates by the new methodology were released in June 1973. There would be little point in attempting to improve the data base required by this methodology until estimators and analysts had had time to assess the results of the new methodology. The exclusion of the State and small area distributions of income was rather arbitrary and simply reflected our feeling that the need to master the details of the data sources used to disaggregate (and build up) national aggregates by geographic units would overwhelm a small staff concentrating on the details of the national aggregates themselves. The wealth accounts were excluded for analgous considerations of workload. The exclusion of the three sets of accounts should not be construed as our placing them in a category of secondary importance. Rather it stems from the need to restrict our reach to what could reasonably be grasped by a small part-time staff.

Time Sequence of Estimates and Organization of Report

The statistics cited in this report are meant to be illustrative of the relative magnitudes and patterns of the various elements entering into the NIPA estimates. For selected tables, the most recent available data are used. The figures in other tables and in the related text were compiled earlier in the study. As they are still valid for illustrative purposes, and to avoid further delays, the statistics were not updated.

Another necessary background item is a clear understanding of the different time-frames for which the NIPA are estimated and how they are related in an ongoing program of estimates.

By definition, benchmark estimates are the most reliable and to meet this claim, such estimates must be based on comprehensive data compilations that are either literally censuses or large sample surveys of all the important sectors of the national economy. To provide such a data base is time-consuming and costly and therefore full censuses are not provided every year. Within the framework of the Federal statistical system, this comprehensive collection of economic statistics in the form of the economic censuses occurs every 5 years. These censuses and related bodies of data make possible not only the most reliable estimates but also the most detailed. Indeed, the details are such as to make possible the estimation of an input-output table specifying the value of purchases and sales among 367 industries. It is the translation of these interindustry transactions into estimates of final goods and services that provides the benchmark estimates of gross national product. Despite this wealth of information, there are shortcomings in the data base used for the benchmark estimates. These recommendations for data improvement are discussed in Chapter 3.

Annual estimates for years other than benchmark years are required if the NIPA are to provide economic intelligence on the macro operations of the economy so that policymakers can evaluate and react to the changing current outlook. Such estimates also serve the analyst of long term changes in the national economy. Major analytical advances in such important subjects as the secular rate of growth of GNP, the rate of productivity change, the sources of economic growth, structural changes in terms of growing and declining industries, to name only a few, were made possible by annual estimates of the NIPA.

The annual estimates are essentially extrapolations of the last benchmark estimates. The initial annual estimates with the full complement of detailed accounts are released in July of each year for the

preceding year. As additional information for the reference year becomes available over the following 2 years, the first July estimates are revised again as part of the next two successive July estimates. The data deficiences and recommendations relating to the annual estimates for the nonfarm domestic economy are examined in Chapter 4. In an appendix to Chapter 4 is an analysis of the size of the revision by detailed component occasioned by the benchmarking of the NIPA to the input-output tables of 1963 and 1967. The large revisions may serve as a clue to data deficiencies.

Chapter 4 also considers the GNP by industry series as well as a relatively recent addition to the accounts, the abbreviated annual input-output table. The abbreviated I-O table is designed to be an annual update of the quinquennial benchmark table. The data base is assessed to determine whether the data are adequate to accomplish the purpose of the estimate.

Even annual estimates are too infrequent for developing fiscal, monetary, and income policies associated with pursuing the employment and purchasing power goals of the Employment Act of 1946. Satisfaction of this very legitimate need led to the development of monthly estimates of personal income and quarterly estimates of NIPA with the explicit understanding that the estimates would have far less published detail than the annual estimates and were bound to be subject to larger estimating errors, a necessary consequence of trading timeliness for accuracy.

To develop timely estimates, monthly and quarterly source data are used for quarterly interpolation and for extrapolation of the annual estimates of the major components of the national income and product accounts. The data problems found in the monthly and quarterly estimates for the nonfarm domestic economy and proposals for improvement form the subjects of Chapter 5.

A similar review of the estimates for the farm sector (quarterly and annual) is presented in Chapter 6. A separate chapter seems justified because the data sources, estimating procedures, and even estimating responsibility differ from the counterparts for the nonfarm sectors. Devoting a separate chapter to the agricultural accounts also serves to underscore the renewed importance in recent years of this industry that provides food and fiber not only for the United States but also for a significant and growing fraction of world population. For this reason, the need for data improvement takes on a special importance and warrants this emphasis.

For many purposes, the analyst requires national income and product accounts expressed in constant prices—that is, the dollar magnitudes after the elimination of price changes. This leads to an investigation of the inadequacies of the price series used in the estimation of price changes. Chapter 7 details these data gaps and the proposals for eliminating them.

There are two subsidiary accounts that exist independently of the NIPA but have close interconnections with them. One is the international balance of payments whose major component, international balance of trade and services, enters into the NIPA as the rest-of-the-world account. The other is the flow of funds accounts. The estimates of the international balance of trade and services actually antedate the estimates of GNP and national income. Despite its longer history, there is still room for data improvement and these possibilities form the subject of Chapter 8.

The flow of funds accounts as well as the NIPA have an estimate of saving. Changes in the amount of saving over quarterly and annual periods figure importantly in business cycle analysis. In each set of accounts, saving is derived as a residual but by different routes. Understanding the data deficiencies of each saving estimate serves as a guide to data improvement as well as showing how well the estimate from one source may serve as a check on the estimate from the other source. Chapter 9 deals with these matters.

The final Chapter combines the data improvement recommendations in Chapters 3 through 9 into a 6-year program, specifying year by year (a) the component and/or account and the Federal agency affected by the proposed recommendations, and (b) the content of the proposed statistical program. The ordering of the specific programs by year reflects our understanding of an efficient sequence of scheduling as well as an indication of priority. The purpose, as stated at the outset, is not merely to provide a summary but to provide also a blueprint for the Office of Management and Budget in its continuing effort to strengthen the economic statistics of the Federal statistical system.

CHAPTER 3

DATA IMPROVEMENT OF THE FIVE-YEAR BENCHMARK ESTIMATES

The only measures of the Nation's output and income not subject to revision once they are released [1] are the estimates derived directly from the estimation of the full input-output (I-O) table. This elaborate matrix, owing to its dependence on an enormous supply of statistical detail that is provided only by the economic censuses, can be prepared only for the years for which the economic censuses are taken. (Currently these are taken for the years ending in 2 and 7, hence the reference to quinquennial benchmarks.)

Concerned as it is with the interindustry flow of commodities and services, (i.e., intermediate as well as final output), the resulting totals are too gross as a measure of the unduplicated total of output. However, it is this very same statistical detail that provides the firmest data base available for the derivation of an unduplicated total of output, (i.e., final output), within a well-articulated structure of component estimates. And since there is an identity between final output and income, the national income estimates for the very same year also become integrally related to the input-output benchmark estimates.

There is a danger that this wealth of detail that characterizes the input-output estimates may cause one to exaggerate the actual role of the I-O matrix in the NIPA. Although highly important, the I-O estimates are not all-encompassing.

Because of data sources and methods of estimation, the I-O table provides direct benchmarks only for the product side of the accounts and then not for all the major components. Specifically it provides the benchmarks for "personal consumption expenditures" (PCE) and "producers' durable equipment" (PDE). For the remaining components composed of gross private domestic investment other than PDE, net exports of goods and services, and Federal and State and local government purchases of goods and services, the estimates are based on revised annual data available with a delay of up to 3 years after the reference year.

In the estimating methodology, if the difference between the product and the income sides (i.e., the statistical discrepancy) is large or erratic, all of the income and product components are examined to determine the sources of the inconsistency and, if possible, adjustments are made to reduce or eliminate the inconsistency.

The principal estimating procedure used in the input-output estimates is referred to as the commodity-flow methodology. In principle, each commodity is followed in terms of increment in value as it passes from its origin in field, forest, mine, and ocean through the various processing stages and distribution channels (the input) until it is transformed into sales (the output) to final users, namely, consumers; private capital formation; government (all levels); and the net export of goods and services.

"The first step," as explained in a BEA memorandum[2] "is to compile control totals for the value of each industry's output and total purchases. For example, the census of manufactures provides statistics on the value of shipments and cost of materials and inventory change."

"The next step is to prepare preliminary estimates of the distribution of each industry's output and the composition of its inputs. These estimates are derived principally from the Census data on shipments of detailed products and information on materials consumed. The latter information is collected as part of the regular Census program as well as in supplementary inquiries by Census. However, since Census coverage is not complete, other sources of information are also used as a basis for the estimates. The amount of trade margin and transportation costs associated with these estimates of interindustry

[1] This is not literally true. Revisions are made to accommodate subsequent changes in concept that would affect the continuity of the time series.

[2] Grose, Lawrence, "Statistical Improvements Required for the U.S. National Accounts," U.S. Department of Commerce (OBE now BEA), unpublished manuscript, March 1971.

transactions are calculated and used to adjust the transactions to producer values. (This is the valuation in which the input-output data are most useful.)

"Estimates of the purchases by the final markets in the input-output product detail emerge in general from the analysis of the distribution of output by the producing industries. This is particularly true for personal consumption expenditures and investment. Export and import estimates are also based on the Census foreign trade statistics. Government purchases incorporate Census information but are derived primarily from a special OBE (now BEA) analysis of budget documents and agency records. Value added for each industry is based on the Census data and on the sources underlying OBE's (now BEA's) data on industry gross product.

"The array of independently derived estimates of transactions between producers and consumers is then reviewed and adjusted where needed to make the data within the input-output matrix consistent."

The realization of the Committee's recommendations detailed in this chapter would improve significantly the reliability of the I-O table and the derivative estimates of GNP in terms of final products and of GNP by industry. The value added component of the I-O table is derived, first, in terms of industry sales adjusted for inventory change minus purchases from other industries and, second, in terms of factor and nonfactor payments with one of the two factor payments, property type income, obtained as a residual. This use of the residual eliminates the statistical discrepancy which provides a rough measure of the relative accuracy of the two GNP totals.

To have the insight imparted by the statistical discrepancy, it is necessary to have an independent estimate of property-type income—i.e., interest and net rent received by individuals and net profit of all enterprises both corporate and noncorporate. The explicit elements, as distinct from the imputed elements in interest and rent, are based for the most part on IRS tabulations of business income tax returns, except in the case of agriculture. That is, the quinquennial economic censuses are not used as a source of data for property-type income. For this reason the improvement of the data base of property type estimates, again with the exception of agriculture, does not appropriately come under benchmark improvements but rather the improvement of the annual estimates, the subject of Chapter 4.

Perhaps the vast majority of the data gaps and estimating problems falls into one of three categories:

1. Insufficient data for allocating certain goods and services between intermediate and final use;
2. Insufficient data for allocating certain goods and services among classes of final users; and
3. Insufficient data in some cases for pricing the incremental value created in particular distribution stages.

As a generalization, to reduce the gap of the first type, more information is required on purchases of goods and services by enterprise, while the gap of the second type can be narrowed only by more detailed reporting by product line and class of customer. The third depends on fuller information on gross margins by product line, form of transportation, and type of outlet.

Errors of estimation in categories (1) and (3) can affect the level of GNP, while errors in category (2) can affect sector totals without affecting the GNP totals.

I. The Input-output Table and Benchmark Estimates of the GNP Components

We deal first with the more serious data deficiencies in the construction of the quinquennial input-output table in which the gross national product—the sum of final sales—constitutes an integral part. And within this general area of concern our initial focus centers on the more significant gaps in the economic censuses. These quinquennial censuses are the primary data source for the I-O tables.

A. The Economic Censuses

1. Purchased services

None of the economic censuses collect data on purchased services—e.g., personal, business and professional services; insurance; or maintenance construction. In the absence of such information, the I-O analyst must allocate the output of a large variety of purchased services among industry subsectors as well as between intermediate and final consumption. These allocations are made on the basis of minimal information from establishments providing the services and with a maximum of judgmental input on the part of the estimator. To compound the estimating problem, for some significant amount of services there is not even a satisfactory estimate of total output. The value of the services we are dealing with are estimated at $390 billion for 1967 on the basis of the present data base. About 45 percent is estimated to be an intermediate input.

Recommendation:

The Census Bureau should collect as an integral part of each economic census the purchases of services by establishments. The total of such expenditures should

be reported by whatever significant categories seem feasible. The total should include communications, insurance, repairs, advertising, travel and entertainment, business and professional services. Rentals already being collected in the censuses of manufactures and wholesale trade and purchases of fuel and energy collected in the censuses of manufactures and mineral industries should be collected in all the economic censuses.

2. Service industries

Problems with the for-profit personal, business, and professional service industries in the economic censuses include both the limited scope of industries surveyed and the limited data items collected for use in the I-O tables. Personal and business services (SIC 70, 72-79) are covered in the census of selected services. The weakness is that the data collected are limited to total receipts and payrolls, with no measures of intermediate purchases and customer sales. Professional services (SIC 80-84, 89) with a few exceptions—dental laboratories, and legal, engineering, architectural and land surveying services—are not surveyed at all in the economic censuses. Similarly, the data collected for those professional services that are surveyed are limited to total receipts and payrolls.

Information for these services from other sources, such as data published by the Internal Revenue Service in *Statistics of Income* and data from trade associations, are fragmentary. IRS, however, has decided to expand the Statistics of Income for 1977 to include tabulations for more detailed professional classifications. This should be a helpful addition to the estimating process (for the Committee's recommendation, see Chapter 4). Consequently, a considerable amount of estimation is required in developing the industry purchases and sales distributions. The judgments used in determining the allocations typically are based on assessments of the nature of the industry, industry employment distributions, and input and output distributions prepared for the nonservice industries. The total value of these services in 1967 was approximately $295 billion. This includes the activities of the not-for-profit as well as the for-profit organizations; the amount attributable to each component is not known.

Recommendation:

The Census Bureau should expand the census of selected services in three major areas:

a. *To all services-for-profit. The expanded coverage pertains to professional and related services not presently covered in the relevant for-profit categories (SIC 80-83 and 89).*

b. *To purchases of services as detailed above and of commodities, distinguishing those for resale (such as parts used in repairs) and those used in the operation of the business.*

c. *Extension of information on receipts to distinguish receipts from primary output (services) from secondary output (commodities) both by class of customer, differentiating to the extent feasible sales to business, government, and households.*

3. Not-for-profit organizations

Also serious is the dearth of information on the input and output of not-for-profit organizations. These are spread through a wide range of health, legal, educational, social and other professional services (SIC 80-83, 89) that also include for-profit activities. In addition, they include noncommercial economic, civic, political and religious membership organizations (SIC 86), museums, botanical and zoological gardens (SIC 84), and research organizations (SIC 892). Owing to the weak data base, these estimates have not been shown separately in the GNP accounts, with the exception of the noncommercial membership, cultural, and research organizations in the I-O table. The services of the latter group of noncommercial organizations are estimated for 1967 at $12 billion.

The output of nonprofit organizations is now combined with that for households. This is deemed a natural combination not only because the household sector is not-for-profit but also because the output of nonprofit organizations is purchased primarily by households and governments.

Recommendation:

In order to purge the highly important household sector of an obviously heterogeneous element as well as to gain an understanding of the economic dimensions and role of not-for-profit organizations, the Census Bureau should undertake a quinquennial census of not-for-profit organizations including religious organizations. This should collect information on purchased goods and services, including labor service and depreciable capital goods, as well as information on appropriate measures of outputs. Census, however, should take into account the recently renewed interest of the Internal Revenue Service in tabulating returns of tax-exempt organizations on a rotating basis by type—foundations, pension plans, farmers cooperatives, etc.

4. Construction industries

The first post World War II census of construction industries was undertaken for 1963; ever since, it has

been an integral part of the quinquennial economic censuses. The BEA, however, has not been able to use these census data in developing the benchmark estimates of either the inputs or the outputs of the construction industries, owing to the absence of relevant detail. The latter is probably explained by the caution of the Census Bureau in developing a census report for an industry with a complex organizational structure and comprised of many thousands of small operating units that can easily be formed and dissolved.

Now that this census seems well established, the Census Bureau officials should give thought to having it fulfill a longer roster of statistical needs.

a. Purchased materials and services (inputs)

With respect to benchmark input estimates, there is a major weakness in the Census data causing the BEA to use alternative data sources that, in turn, can provide at best only crude estimates.

The major weakness is the absence of figures on contractor purchases of aggregate totals for materials, services, and value added as well as the absence of itemized detail for specific materials and services purchased by the various kinds of contractors. These are basic, of course, for the I-O estimates.

For new construction the current benchmark estimates of inputs have relied on the following data sources:

	New Construction in 1967	
	$Billions	Percent
BLS studies on labor and material requirements for selected types of building and nonbuilding construction. These are representative samples of construction projects provided by type but only once every 5 or 10 years. (One-family housing; public housing; college housing; office; hospital and nursing homes; school; sewer; highway; civil works dams, dredging, etc.);	$23	29%
Department of Agriculture information in the *1955 Farmers' Expenditures*. A similar survey on an annual basis has been in effect since 1971. (Farm service buildings, irrigation and other nonresidential);	1	1
Regulatory agency annual reports of the Federal Commmunications Commission, Federal Power Commission, and Interstate Commerce Commission. (Telephone and telegraph, electric power, gas and petroleum pipelines, railroad);	7	9
McGraw-Hill series on "Where the Building Dollar Goes" in *Engineering News Record*. These project data are provided on a voluntary basis by owners and architects and are in the nature of case studies rather than representative samples. (Hotels, motels, industrial stores, banks, warehouses, religious and miscellaneous nonresidential buildings);	25	31
All other. These are based on substituting input patterns from the above four categories, data from the census of mineral industries and the American Petroleum Institute, and judgment of the I-O analyst. (Private multi-family residential, military, water supply, miscellaneous nonbuilding, oil and gas well drilling and exploration).	24	30
Total	$80	100

Note: Excludes mobile homes (estimates based on census of manufactures (producer values) and census of retail trade (margins).

Regardless of the ingenuity of the estimator, estimates based on a series of patchwork statistics that are often outmoded by 5 to 10 years and were never designed for the purpose are bound to produce an ill-fitting garment.

For maintenance and repair construction, estimated in 1967 as $22.4 billion, the input figures are based on considerably less source data than those for new construction. For example, annual data for residential maintenance ($6.6 billion in 1967), by kind of work such as painting, plumbing, roofing, etc. are provided in the Census report, *Residential Alterations and Repairs*, but detailed cost data are not provided on purchased materials and services and construction labor. For farm nonresidential structures ($400 million in 1967), the detail is limited to the total cost of painting service buildings (these buildings are approximately 45 percent of farm nonresidential) as derived from patterns in *Farmers Expenditures*.[3] There is no source information on usage patterns for the remaining categories of maintenance and repair work (nonresidential buildings, utilities, highway,

[3] This Department of Agriculture information for 1955 has been used for the 1958, 1963 and 1967 I-O estimates. New annual survey data are available as part of a USDA program starting in 1971.

sewer, water, military, conservation and development). In 1967, these totaled $15.4 billion.

Thus, there are no data on the use of specific materials and services for maintenance and repair construction. Judgment of the I-O analyst is required for estimating the itemization of goods and services detail within the more aggregate information provided on the kind of work components for residential and part of farm maintenance; and for other types of maintenance and repair, the estimates are based entirely on judgment, because there are no intermediate data components such as those by kind of work.

Recommendations:

1. *In view of the critical importance of firmly based estimates of construction inputs, the Census Bureau should expand the census of construction industries to collect, by 4-digit type of contractor, expenditures on the aggregate totals of intermediate purchases separately for materials and services, including whatever itemization of detailed construction materials that exploratory studies reveal to be feasible.* The data collection should also respect the distinction between data for new construction and repairs and maintenance.

2. *Pending the revamping of the census construction industries in keeping with the Committee's recommendation, the Committee also urges that the Bureau of Labor Statistics' studies on labor and material requirements for selected types of building and nonbuilding construction (see above) be carried out with greater frequency, (say every 5 years), and coverage be extended to additional types of construction.*

b. Source of receipts (outputs)

The BEA derives its benchmark estimates of new construction output from the Census Bureau data on value of construction put in place that in turn are based on building permits, contract awards, and company and governmental expenditures information. For maintenance and repair construction, the levels are based on quarterly surveys of residential landlords, expenditures reported by companies and governments, and estimates of a more indirect nature.

Receipts data from the census of construction industries, if the data are available in appropriate detail, can serve the useful purpose of a broadly based check by type of construction. The present detail is not sufficient for this purpose since the receipts data by type of structure do not distinguish new construction from maintenance and repair.

This possibility has a special relevancy in the case of new construction since, according to BEA estimates for 1967, contract construction accounted for approximately $60.4 billion, or 76 percent, of all new construction, but only for $9.3 billion, or 42 percent, of all maintenance and repair. The balance, of course, is force account and do-it-yourself construction.

Recommendation:

The Census Bureau should collect in the census of construction industries receipts data by type of structure and distinguish between receipts for new construction and receipts for maintenance and repairs.

5. Gross margins

a. Transportation costs

A major component of gross margins, which in turn is a key element in the commodity-flow methodology, is transportation cost. The data are inadequate despite the existence of a census of transportation. Indeed, the very title is a misnomer in that the information pertains to business shippers and household users of freight and passenger transportation rather than to the operations and structure of the transportation industries.

The present census of transportation provides information in three broad groupings: (1) the National Travel Survey; (2) the Truck Inventory and Use Survey; and (3) the Commodity Transportation Survey. The travel survey (based on a sample survey of households) depicts the origin, destination, and socioeconomic characteristics of household travel. The truck inventory survey (sample based on truck registrations) gives information on truck ownership by industrial, geographic, age and type of truck characteristics; principal products carried; and truck-miles. The commodity survey (based on a sample of manufacturers' shipping records) provides data on shipments of manufactured goods in tons and ton-miles by mode of transportation (rail, motor, air, water) among geographic areas for specific shipper groups and commodities.

Thus, the census of transportation does not provide any of the receipts and expenditures of the transportation industry. For this reason, this census contributes very little data to the benchmark I-O estimates. The estimator is obliged to rely on the data provided by a variety of Federal regulatory agencies, the Corps of Engineers, and trade associations. This results in interstitial gaps in coverage and no standardized definitions of economic and financial categories.

Recommendation:

These deficiencies are best removed by transforming the present census of transportation into a census of transportation industries with a full complement of questions on inputs and outputs by relevant subindustries. The data needs on current expenses (inputs) are for broad component totals of purchased goods, purchased services, and value added; separate detail for the purchases of major types of goods and services such as tires, fuels, office supplies, utilities (electric, gas, water), communications, advertising, and repairs (equipment, structures). The needs on revenue sources (outputs) are for: (1) revenues separately for primary and secondary activities; (2) revenues by 4-digit commodity classifications; and (3) revenues by class of customer, separately for individuals, farmers, institutions, business, Federal Government, and State and local governments.

The collection of data should be in 3-digit SIC detail on the current operations and capital outlay of the transportation industry similar to that obtained in the other economic censuses. These would encompass the freight, passenger, transportation service, and nontransportation revenues of the transportation industries in SIC 40-42, 44-47.

Some may consider this as a recommendation for an "ideal" set of data and this perhaps could not be defended if the uses were restricted to the improvement of the NIPA. The uses, however, would extend well beyond that particular use. The transportation industry, for example, is a substantial user of energy and in view of the long-term energy problem confronting the U.S. economy, a high value must be placed on a consistent, comprehensive, and current set of data on inputs and outputs of the transportation industry.

The Committee is aware that provisions of Title 13, U.S. Code, under which the Census Bureau operates, prohibits the Bureau from collecting data for means of transportation for which statistics are required by law to be filed with a designated regulatory body. For the Committee's recommendations to be implemented by a direct survey, enabling legislation would be required. As this often entails a time-consuming effort, it is advisable to have a fall-back position or recommendation. Although Title 13, U.S. code, prohibits the Census Bureau from collecting data directly from regulated transportation companies, there is no prohibition against the Census Bureau, or any other appropriate agency, compiling census-type data already being reported to regulatory agencies. Until such a compilation is attempted, it will not be known how closely the compilation comes to being a census, in effect. It surely would systematically identify inconsistencies in definitions among the various branches of transportation—a first step in persuading different regulatory bodies to strive for consistent definitions and, thereby, consistent statistics.

b. Retail trade margins

Also complicating the estimator's task in arriving at gross markups is the fact that payrolls are the only operating expense data collected in the census of retail trade. Therefore, retail margins are estimated as the product of (a) purchases by retailers of goods for resale, obtained largely as allocations from the I-O estimates for manufacturing, wholesaling and imports, multiplied by (b) retail markup rates by kind of business obtained from markup data from Internal Revenue Service records for a sample of firms that have been matched with identical firms in the Census returns. This of course is a very indirect estimating procedure. By contrast, for wholesaling, data are collected in the census of wholesale trade on gross margins (sales divided by purchases) and on major components of operating expenses by kind of business.

Recommendation:

The census of retail trade should be expanded to provide data on gross margins and operating expenses by kind of business similar to that provided in the census of wholesale trade.

c. Sales by retail and wholesale trade product lines

Another data gap affecting the reliability of markup estimates is the inadequacy of sales by retail trade merchandise lines. Under the present practice, all establishments report sales for 27 broad categories of retail sales, which encompass all goods and services. More detailed reporting is obtained for stores in their area of specialization. These categories, however, are defined on an end-use basis and typically are not congruent with the Census-SIC system for commodity-producing industries. To benefit fully from the commodity-flow methodology, this ability to match outputs at the production and distribution stages is a necessary requirement. For 1967, only about one quarter of retail sales could be identified with SIC-defined commodity grouping at the 4-digit level. Thus for 75 percent of retail sales either indirect or proxy data, such as manufacturers' sales, had to be used for the I-O estimates.

The same problem of incongruency with the SIC codes exists for the sales data on wholesale trade commodity line sales.

Recommendation:

The Census Bureau should review the merchandise and commodity line classifications in the censuses of retail and wholesale trade to see if there are areas that

could be further defined in terms of 4-digit SIC codes without undue reporting burden.

6. Force account construction and transportation

The I-O estimator attempts to account for all construction activity regardless of the industry classification of the performer of the construction. When an employer whose primary activity is not construction engages in construction for his own use, this is referred to as "force account" construction. Estimates of the total value of this force account work are included in the Census Bureau's measures of value put in place of new construction. If data comparable to that for contract construction are to be available, the data must be collected from those enterprises not classified as contractors who build for their own use. These are found primarily in agriculture, mining, manufacturing, all regulated public utilities, transportation, and government.

For 1967, force account construction is estimated at about $22 billion equally divided between new construction and repairs and maintenance.

No estimates are presently made of the force account transportation activity in nontransportation industries and governments. Contrary to the output levels of construction, which include an estimate of force account work, there are no such estimates in the transportation output levels. Thus, this important activity is subsumed in the costs of other industries without being separately identified.

Recommendation:

To improve the force account estimates significantly, the Census Bureau should collect data on force account construction and transportation payrolls in the relevant economic censuses. Because company records are not typically maintained on the total costs of force account activities, reported data on force account payrolls would serve as a surrogate for estimating the nonpayroll force account costs.

7. Sales by class of customer

Output allocations in the I-O table represent sales by producing industry to other industries and final markets. These complement and are a basic cross-check on the input estimates which show the intermediate and value added purchases by consuming industry.

The sales by class-of-customer data are among the weakest data items in the quinquennial censuses because information on the industry or market category of the customer is not generally available in company records. In addition, the customer sales data are limited to the censuses of manufactures and trade. For manufacturing, the data are collected in every other census, i.e. every 10 years. The customer categories are very broad—e.g., manufacturing, other business, households, Federal Government, exports, all other. Sampling errors in the teens and much higher are not infrequent.

Despite the knowledge that most of the sales at retail are to households and individuals as final consumers, the actual distribution among consumers, business, and government is not known. This data gap stems in part from decisions on what is tabulated rather than on what has been collected. In the 1967 Census of Retail Trade, data were collected in summary form for the purpose of classifying the responding establishment as being in retail or wholesale trade. Four classes of customers were used: (1) general public (i.e., farmers, households and individuals); (2) construction contractors; (3) other business firms, government, and institutions; and (4) all others. No tabulations by classes were required to serve the original purpose for their collection, and none were made. Thus this information was lost. On the other hand, the classifications were far from optimum for the NIPA estimates. In the 1972 Census of Retail Trade, the class-of-customer data was expanded and the data tabulated for BEA's use. Retail trade establishments reporting by class of customer accounted for 70-79 percent of total sales in 1972.

The picture that emerges confirms expectations. Sales of all retailers to the general public (household consumers and individuals) amounted to 94 percent of all retail sales in 1972. The most conspicuous and obvious exception occurs in retail stores dealing in building materials, hardware, garden supply and mobile homes whose sales to the general public came to 59 percent of the group total with as much as one third sold to builders, contractors and applicators. In no other kind of retail business, even at the 4-digit level classification, did the sales to the general public fall below 79 percent.

The Census Bureau plans for the 1977 Census of Transportation may provide an approach to securing information equivalent to sales by class of customer for the censuses of manufactures and mineral industries. The plans are to extend the Commodity Transportation Survey of the transportation census to collect shipments data in dollar values (previously only in tons) and the name and address of the receiving establishment.

This information is intended as a means of cross-checking the internal consistency of data on sales and purchases among the economic censuses. Tabulations of the data showing the shipping and receiving industry, however, also would provide class of customer information in a more comprehensive, detailed, and systematic manner than is currently available.

Recommendations:

1. *The Census Bureau should tabulate national industrywide totals of the dollar value of shipments from the Commodity Transportation Survey of the 1977 Census of Transportation. The tabulations should show the shipping and receiving industry at the 4-digit SIC level.* This will require that the Census Bureau code each commodity and receiving establishment by SIC, and perform the necessary matching of establishments between the census of transportation and other economic censuses.

   On the basis of the results from this tabulation, a decision should be made whether to collect quinquennially sales by class of customer in every census of manufactures or use the information from the Commodity Transportation Survey (CTS) for such allocations. The outcome of the CTS tabulations also would guide decisions to reduce the sampling errors and obtain separate data on sales to State and local governments and construction in the customer sales data of the census of manufactures.

2. *The tabulation of sales by class of customer should be repeated in the 1977 quinquennial Census of Retail Trade.* If there are only insignificiant changes in the percentage distribution by class of customer and by kind of store from those in 1972, this tabulation should be prepared at decennial intervals.

8. **State and local government purchases**

   a. Purchases of goods and services

In the eyes of the GNP accountant, the census of governments also suffers from insufficient relevant detail. Although this census does report expenditures by function separately for State and for local governments, these expenditures are only for broad categories of current operations, capital outlays (separately for construction, equipment, land and existing structures), and payrolls (personal service expenditures). Estimating difficulties are created by the absence of any further detail on the types of goods and services used by these governments. A secondary problem stems from these data being reported for a fiscal year which spans parts of 2 calendar years.

The present BEA procedure for estimating these inputs is based largely on an examination of the budget documents of a sample of the larger State and local governments. More precisely, 12 budget documents ranging from the State of California to the city of San Antonio were analyzed for the 1967 input-output table. These 12, however, represented only 6 percent of the universe total of $17 billion for State and local government purchases, excluding employee compensation and new construction. An additional hurdle is presented by the wide variation in the amount of detail as well as in the consistency of the reported itemized expenditures found in the budget documents of the various State and local jurisdictions. For all these reasons, considerable statistical judgments are required to use the currently reported data. (Data problems associated with varying reporting practices may be substantially reduced over the next decade as present initiatives to develop uniform reporting systems for State and local governments gather momentum at the grass roots level of governors' and mayors' groups as well as from the requirements of administering the Federal revenue sharing program.)

Ideally, to remove these estimating hurdles the census of governments should collect much more detailed data on purchases for current operations, including capital expenditures. Such detail would include materials (e.g., books, pharmaceuticals, liquor for resale); office supplies; utilities separately for electric, gas, and water; fuels separately for transportation and heating; communications; travel; repair purchases from private industry separately for structures, vehicles, and other equipment; and purchases of capital equipment (e.g., cars, trucks, furniture, office machinery).

Recommendation:

The Committee is sympathetic to the concern of the Census Bureau that State and local governments do not keep their records in the detail requested and therefore to press for the "ideal" information would severely affect the response rate. Therefore, *the Census Bureau should conduct a feasibility study to determine what itemized information on purchased goods and services might be obtained from a sample of governments to produce national estimates from a followup survey related to the 1977 Census of Governments.*

   b. Government enterprises

Also part of the census of governments and part of the GNP accounts are government enterprises. The latter are treated in most respects as their counterparts in the private sector. The determination of whether a State or local activity is general government or a government enterprise (i.e., 50 percent or more of its current operating expenses are covered by sales to the public) is based on Census data on revenues and expenditures by function. For the specific functions distinguished, the data are deemed adequate. The relatively small amounts that remain unidentified in the Census tabulations suggest that asking for additional details would not be justified in view of all the other requests of higher

priority the Committee has recommended be asked of these same respondents.

9. **Real estate industry**

The explicit estimate of the market value of output in the real estate industry is poorly grounded in data despite the existence of snippets of information from several sources. The market value is composed of brokers' commissions for the sale of real property, rental receipts of landlords, and property management fees.[4]

The current estimating methodology is such that the I-O real estate estimates are derived indirectly from the IRS Statistics of Income (corporate, partnership, and proprietorship tax returns), the decennial census of housing, quinquennial census of governments, and a variety of other sources. Despite these data contributions, the estimate of $7 billion in 1967 for property management fees is the residual after subtracting estimates of real estate commissions and rental income, determined in good part by some arbitrary decisions. Moreover, there does not now exist any direct verification of these components of the total in which the judgment of the estimator does not figure prominently.

Recommendation:

A census of the real estate industry should be conducted as part of the economic censuses. The coverage should include real estate operators for residential and nonresidential buildings; residential mobile home sites; lessors of railroad property; real estate agents and managers; title abstract offices; and cemetery subdivisions and developers. (Noncemetery subdividers and developers are covered in the census of construction industries.) All combinations of real estate, insurance, law, etc. should be considered within the scope of this census.

The information to be collected falls in much the same categories as this report has recommended for the economic censuses in general:

> **Source of receipts:** These data should specify (a) real estate commissions separately for residential and nonresidential properties; (b) rental income for structures operated for others separately from rental income derived from structures owned by the reporting establishment; (c) property management fees; (d) title search; (e) other real estate activities; and (f) secondary activities other than real estate.
>
> **Purchases of goods and services:** Entries in this category should distinguish those purchases made for the daily operations of the real estate establishment as such from those made for the management of rental properties. The specific items in each subclassification are those recommended for all the economic censuses.

10. **Inventories**

a. Valuation of inventories

The incremental investment in inventories, a component of private domestic investment, is among the most troublesome components to measure. Though not a relatively large item in dollars in the GNP total, it is one of considerable analytical importance in interpreting business cycle conditions. Moreover, the statistical adjustments made to reported inventory data have a direct effect on estimated profits of enterprise which, in turn, constitute a critical economic barometer and are, of course, the major return for entrepreneurship and capital input.

The concept of the NIPA requires that capital gains and losses be excluded since they result from revaluations owing to price changes between the time of acquisition and consumption. Such changes, therefore, neither add nor subtract from output and hence must be eliminated. As a BEA statement explains, "additions to and withdrawals from inventory are recorded at the current replacement cost of the item to agree with the NIPA concept. No problem arises for acquisitions since the actual purchase price is the current price. However, a pricing problem does arise for withdrawals, and it affects both the stock and the cost of goods sold.

"Accounting standards and IRS regulations permit companies to select their method of inventory valuation from a range of options. In fact, a single company may use more than one method. Thus, when the Bureau of the Census adds up the inventories reported by business firms, the result reflects a mixture of methods of inventory valuation. A similar result occurs when IRS tabulates business profits. Our objective is to convert the values obtained from these sources to the concept required—that is, withdrawals from inventory recorded at replacement cost. This is accomplished by the inventory valuation adjustment referred to as IVA."[5]

The estimation of the IVA, and therefore of the incremental investment in inventories, requires

[4] As a matter of convention, royalties and related fees are also included in this classification. Since these payments are for the use of assets other than real property, these receipts should be classified as secondary income of the recipient industries and the information collected in the economic censuses.

[5] Rottenberg, Irving, "Inventories and the Inventory Valuation Adjustment," *Quarterly GNP Estimates Revisited in a Double-Digit Inflationary Economy*, BEA Staff Paper No. 25, U.S. Department of Commerce, p.29.

considerable data. While data deficiencies are found in all stages of this estimating process, the most serious ones are those that characterize the book value of inventories reported by establishments or companies.

Moreover, the reporting errors become larger, the shorter the time-frame reported, i.e., on a monthly or quarterly compared with an annual basis. This is attributable to at least two causes: the infrequency of taking a physical count of inventories, especially among smaller businesses, and the brevity of the interval between the end of the period being reported on and the date on which the respondent is asked to return his schedule to the government collecting agency. For these reasons, estimates for different time-frames require collections of different types of data.

In this chapter, however, we consider only data improvements to bolster the accuracy of the quinquennial benchmark estimates. That is, once in 5 years, how close should one come to asking for the "ideal" set of data? In our view the "ideal" data would consist of the following:

1. Book values of beginning-of-year and end-of-year inventories cross-classified by (a) basis of valuation (percent distribution would serve); and (b) stage of processing for commodity-producing industries, i.e., unprocessed goods, goods in process, and finished products.
2. Commodity mix classified by turnover period, separately for unprocessed materials and finished goods. [6]

The information under the first item is required as a basis of determining how much of the withdrawals from inventory needs to be adjusted in order to express them in terms of replacement cost. Information on commodity mix provides weights for combining the appropriate price indexes in the computation of IVA while turnover data identify the number of months over which specific price indexes need to be averaged.

Recommendations:

1. *The Census Bureau should collect the book value of beginning-of-year and end-of-year inventories classified by method of valuation as well as commodity mix classified by turnover period.* Initially this extension of inventory statistics could be limited to the censuses of manufacturing, retail trade, and wholesale trade. Once these improvements have been gained, a similar set of inventory data should be collected in the censuses of agriculture, mining, and construction industries. It should be noted that the collection of these detailed inventory statistics would be adequate if restricted to industry samples large enough to provide reliable statistics at the level of national aggregation.[7]
2. *To provide a partial cross-check on the inventory valuations in (1), the Internal Revenue Service should once again ask in its business tax schedules for value of inventories by method of valuation (percent distribution would serve).* Tabulations of the responses to this question should become part of Statistics of Income.

b. Definition of inventories

The Committee also studied definitions of inventories of durable goods requiring relatively long periods of production. Current BEA practice measures output of residential and nonresidential structures and ships as "value put in place." On the other hand, aircraft are considered private investment or government purchases only when delivered to the owner and prior to completion are counted as goods in process. Heavy equipment, such as public utility generators, are also classified this way.

For analytic puposes, the desired measure is to treat these items during construction production as a buildup in inventories, and on completion as an addition to final output and reduction of inventories. Consequently, the effect of the present inconsistent treatment is to overstate fixed investment and to understate, by the same amount, change in business inventories. Thus, the total of gross private domestic investment and total GNP are not affected.

In addition, the NIPA measures of inventories, by focusing on the production process, do not provide the very useful measures of the amount of goods and structures that have been completed but not sold (delivered). For example, new vacant residential units do not appear as additions to finished inventories.

Recommendations

1. *The Bureau of Economic Analysis should refine the definitions to be used for inventories and final output by including in inventories structures and equipment during construction/production and reclassifying these items as fixed investment upon their completion.*

[6] We omit from this list appropriate price data since the economic censuses are not the source of such information. For improvement of price data see Chapter 7.

[7] This is the current practice in the collection of inventory data in the Annual Retail Trade Survey. No inventory data are collected in the census of retail trade. The justification for this inconsistency among industries is not clear.

2. *The Bureau of Economic Analysis should study the feasibility of introducing supplementary inventory measures in the GNP accounts that would indicate the amount of production started but not completed and completed but not sold or delivered.*

3. *The Census Bureau should attempt to collect monthly data on the value of structures and large equipment under construction/production and the amount that has been completed.*

B. Federal Government Purchases

In the case of the Federal Government, there is no quinquennial census of its expenditures and receipts comparable to that for State and local governments. To have such a census would appear to be sheer duplication in view of the reams of documentation emanating from the U.S. Department of the Treasury. Yet the estimates of detailed item purchases for the Federal Government sector are a very weak part of the I-O table. The data gap in the mountain of Treasury statistics is the virtual absence of statistics summarizing nondefense Federal expenditures by object of expenditures in terms of specific commodities and services—how much spent for computers, automobiles, furniture, office supplies, etc. Information in terms of these economic categories are required for I-O estimation and to obtain accurate sector estimates of GNP, not to mention the analytical and policy functions of assessing the impact of Federal expenditures on the economy's performance.

Historically the principal categories used in organizing statistics on Federal expenditures are functional ones—how much spent on defense, education, health, etc. More recently there has been increased emphasis given to reporting expenditures by specific programs. These have been the categories of most interest to Congress and therefore also the categories of most interest to executive departments and the Office of Management and Budget. These categories are obviously relevant and meaningful but so are the categories of commodities and services. In its present posture, the Federal Government does not know many of the items on which it spends its money.

A recent initiative which promises to remedy this long standing deficiency is the development of the Federal Procurement Data System (FPDS). The FPDS is a result of recommendation D-1 of the Commission on Government Procurement which called for such a system and the Office of Federal Procurement Policy (OFPP) Act (P.L. 93-400, August 1974) which designated to the OFPP Administrator the responsibility for implementing the system. The current design centers around the establishment of a quarterly reporting system that will classify each procurement action by the principal product or service and 4-digit SIC code of the producing establishment. Detailed information will be collected for each action over $10,000. A summary, collecting substantially less detailed information, will be required for procurement actions of $10,000 or less. The system should become operational during FY 1978.

The adoption of such a reporting system for the expenditures of the Federal Government would go far towards correcting the current embarrassing weaknesses in the statistical data base relating to the operations of the Federal Government. The Federal sector account in the benchmark as well as in the annual and quarterly estimates would be much strengthened by this new statistical program. This would be true for the estimates in current prices as well as for those in constant prices by providing weights for price indexes.

Recommendation:

The Committee supports the successful implementation of the Federal Procurement Data System with the data elements currently proposed.

C. Regulated Industries

1. Transportation

Industries whose rates and operations are subject to Federal regulatory agencies are excluded by Congress from being covered in periodic surveys or censuses. By and large, the data compiled and released by the regulatory agencies fulfill many of the data needs of the input output estimator. There are, however, some unmet needs.

Data from the Interstate Commerce Commission are the primary source for estimating revenues and expenditures for railroads, motor carriers, water carriers, and pipelines. In addition to the previously noted need for a census of transportation industries, the major gaps in the ICC data are: (a) no data are collected for the nonregulated carriers which in the case of motor carriers and water carriers are sizeable; and (b) generally data on freight revenue by commodities and expenses are available in much less detail for Class II and Class III carriers than for Class I carriers for which freight statistics are available at a 4-digit SIC level.

Recommendation:

As noted in the previous section on gross margins (A 5 above), the Committee recommends that the Census Bureau produce a census of transportation industries either by actual canvass or by compiling census-type data already being reported to regulatory

bodies. (The latter, of course, depends on its feasibility being established by exploratory study.) Some improvement can be accomplished immediately, without waiting for a census or census equivalent, by preparing the following tabulations of data already collected by regulatory agencies:

The Interstate Commerce Commission should tabulate the data it now collects for a sample of Class II and, where possible, Class III motor carriers as close as possible to the same level of detail as for Class I motor carriers for each quinquennial economic census year.

Further, in view of its recent practice of eliminating tabulations without advance notice, the ICC should assure its statistical users that it will continue tabulation of tonnage, expense and revenue data for the regulated water carriers (about 20 percent of all water carriers).

In the case of water carriers, the Army Corps of Engineers, which collects data on the total tonnage of domestic shipments, should tabulate these data on a 4-digit SIC basis for each quinquennial economic census year.

2. Communications, utilities, banking and insurance

No recommendations are made for expanding the coverage of the economic censuses to the communications, public utilities, banking and insurance industries because the major weaknesses in their data bases can be dealt with by other Committee recommendations.

Annual surveys, recommended in Chapter 4, would provide aggregate data for the total output, final demand, and value added border elements of the I-O table—sales, yearend inventories, capital expenditures, aggregate costs of purchased goods and services, payrolls, wage and salary supplements, and depreciation allowances. Data needs for intermediate purchases and sales are met adequately by (a) existing regulatory agencies, IRS, and trade association data sources for estimates of purchases, and (b) by this Committee's recommended improvements to the economic censuses, specifically those relating to purchases from other industries.

II. The Input-output Table and Benchmark Estimates of the National Income Components

In the preceding section we have reviewed, in effect, the major data problems in the estimation of the quinquennial input-output table and the derivative GNP in terms of final goods. The latter estimate organized according to the industries creating the product is referred to as GNP by industry. The contribution of each industry to GNP is the value of output in each industry less the value of the purchases of goods and services from other industries.

The same total is reached, however, by summing by industry the factor inputs and specified nonfactor costs associated with creation of the output. As the factor inputs are also a measure of the incomes generated by production processes, this defines GNP from the income side. The data problems on the income side in the benchmark years are the ones we examine now.

There are three major components in GNP by industry from the income side: (a) factor returns to labor (wages, salaries, and other labor income), (b) returns to capital and risk-taking (profits, interest, rent, etc.), and (c) nonfactor costs (depreciation, property, sales taxes, etc.) Where the total GNP by industry is known from the I-O table (quinquennial or annual) one of the three components may be derived as a residual. In fact, the procedure used by BEA for the quinquennial benchmark I-O table is to obtain the component for returns to capital and risk-taking as a residual. This narrows our examination to the data problems in employee compensation and the nonfactor costs.[8]

A. Wages and Salaries

There are two comprehensive sources of payroll data, the quinquennial economic censuses and estimates provided by the Bureau of Labor Statistics of the Department of Labor. The latter are based on a Federal-State cooperative reporting program (form ES202) emanating in the administration of the unemployment insurance laws of the 50 states and the District of Columbia and have broader industry coverage than the economic censuses. For comparable industry groups, the 1967 payrolls reported by BLS exceed those reported in the quinquennial censuses by $11.3 billion, or nearly 4 percent (see Table 3-1). The BLS estimate was higher in all seven industry groups with the relative excess ranging from 12.5 percent in "Selected Services" to 1 percent in "Mineral Industries". Since the Census estimates are clearly subject to a downward bias, as described later, the current practice is to use the payrolls reported by BLS, supplemented by the Census data to disaggregate the BLS measures for manufacturing and mining to the 4-digit SIC level. This is dictated by the use of Census data for the inputs and outputs of these two industries, and thus assures uniform coding of this portion of value added at the 4-digit level.

[8] Annual data needs for profits are discussed in Chapter 4.

TABLE 3-1: Wages and Salaries (Payrolls) by Industry and Data Source, 1967
(millions of dollars)

	Economic Census[b]	Dept. of Labor[c]	Difference (Census-BLS)
Retail	38,946	42,707	−3,761
Selected Services	18,212	20,482	−2,270
Manufactures	132,314	134,178	−1,864
Wholesale Trade	25,419	26,955	−1,536
Contract Construction	23,769	24,538	−769
Governments (State and local)[a]	46,724	47,415	−691
Mineral Industries	4,233	4,651	−41,884
Total	289,617	300,926	−11,309

Note: There are no Corresponding economic census data for agriculture and transportation.
a/ Census data are averages of fiscal years 1966-67 (*Census of Governments* (universe) and 1967-68 (*Governmental Finances difference between the Census and the Labor Dept. figures reflect to an unknown extent the calendar-fiscal year problem. There presently are no annual calendar year data for State and local governments.*
b/ Based on data in *Enterprise Statistics* for operating establishments, central administrative offices, auxiliaries, etc.
c/ Adjusted by BEA for uncovered firms.

The sources of downward biases in the census enumerations have been identified but the size of the biases is not always known. One source is the exclusion from census payrolls of persons who are not permanently located in one establishment of multi-establishment firms or in a central administrative office, auxiliary or sales branch—a traveling salesman, for example.

Another source of bias is the omissions from the Census canvass of new firms misclassified by the Social Security Administration in industries out-of-scope for the censuses. This problem will be eliminated once the industrial directory becomes operative since basic to its operation is interagency agreement on the coding assigned to newly formed firms and an adequate program of notification in correcting initially wrong codes.

A third source of bias may well be much more significant than the two preceding ones. There is reason for thinking that accounts maintained for company income tax reports are used in a significant number of firms in completing census schedules. For income tax reporting, many wage and salary payments are included along with other payments in functional classifications such as legal services, auditing, maintenance and repairs, advertising etc. In such accounting records, the wage and salary component of these functions is not readily apparent and therefore may not be reported in the Census survey.

The extent of this source of underreporting could be assessed by a sample matching of wage and salary payments reported on Form 941 (income tax withholding) filed with the Internal Revenue Service and the wage and salary payments of the identical firms reported on the enterprise schedule of the Bureau of the Census.

For benchmark estimates, the potential benefits inherent in the employee compensation data from the quinquennial economic censuses are greater than those that now exist in the ES202 reporting program of the BLS because, in the latter, the industry detail is more limited and indeed is inadequate. The ES202 program provides annual payroll data according to a 3-digit SIC for all industries, except manufactures which are available on a 4-digit classification for the first quarter's payroll. A 4-digit industry classification is required to match the industry detail of the full input-output table. This amount of industry detail is provided by the industries now covered in the quinquennial economic censuses and would be in the additional ones recommended for coverage.

In 1967, payrolls accounted for nearly half of "value added" on a GNP basis. For a component of this size, it is important to be able to check the level of the BLS data. This then is the second of two major reasons for improving the payroll data in the economic censuses by eliminating the downward bias that has characterized this source in the recent past.

Recommendation:

The Census Bureau should attempt to eliminate under-reporting of salaries and wages in the quinquennial economic censuses. The reporting instructions should be refined to insure that payrolls are reported as a separate data item for all activities at the company and establishment levels. In addition, research should be conducted for quantifying the factors contributing to the understatement including the matching of data reported on Internal Revenue Service form 941 with data for identical firms reported in the economic censuses. (An earlier recommendation was made for force account transportation and construction payrolls.)

B. Supplements to Wages and Salaries

Supplements to wages and salaries are comprised of two major types: (1) employer contributions for legally required social insurance programs (social security, unemployment compensation, government employee retirement systems, etc.) and (2) other labor income (employers' contributions to private pension, health, welfare and group insurance plans, profit sharing and stock purchase plans, compensation for

injuries, directors' fees, pay of the military reserve, etc.). These supplements in 1974 were estimated at approximately $111 billion, composed of $56 billion for legally required programs and $55 billion for other labor income.

For the legally required programs, the data on employer contributions are compiled and released by the governmental agencies administering the programs. Aside from insufficient industry detail to match the industry classifications of the full input-output table, the data provided by the administering agencies are adequate.

The information on the voluntary programs comes from a variety of sources, both governmental and private—IRS, Department of Labor, Institute of Life Insurance, and the Health Insurance Association of America. Here the data deficiencies are more serious. Once again one encounters the lack of congruence in industry classifications created by company-based versus establishment-based classifications. Moreover, the possibility of misclassification increases as the number of data-collecting agencies contributing data increases.

To surmount these difficulties, the Bureau of the Census initiated a series on employer contributions to supplements to wages and salaries by requesting, in its Annual Survey of Manufactures, data on total employer contributions to (a) "social security and other legally required payments" and (b) "other programs". Beginning with the economic censuses for 1972, comparable figures are being collected quinquennially for merchant wholesalers, retail trade, and selected services. Because of an oversight, these data were requested from operating establishments only, thus excluding such payments made on behalf of employees in central administrative offices, auxiliaries and sales branches. This oversight needs to be corrected and the quinquennial censuses more fully utilized in order to have the possiblity of a cross-check from an independent source once in 5 years as well as to have as comprehensive a set of data as is possible on an establishment basis.

Recommendation:

The Census Bureau should collect in all economic censuses (current and proposed) data on employer contributions to social security and other legally required programs by specific program as well as employer payments for voluntary wage supplements also subclassified by type of program. The coverage should include operating establishments, central administrative offices, auxiliaries and sales branches of the enterprises classified in each industry.

C. Depreciation Allowances

Among the nonfactor payments, benchmark estimates of capital consumption have the potential for data improvement by more effective use of the economic censuses. (The other type of nonfactor payments, indirect business taxes, presents no special estimating problem for the benchmark years. Whatever data improvement seems called for is identical for all years and will be discussed in Chapter 4.)

In the GNP accounts, capital consumption allowances are comprised of depreciation allowances (including amortization of fixed assets) and accidental damage to fixed capital. Although estimates of capital formation in the governmental sector have been prepared, they have not yet been incorporated into the GNP accounts. Thus this sector also lacks an estimate of capital consumption. Depreciation constitutes the great bulk of the total; for example, in 1967 depreciation is estimated at approximately $60 billion and accidental damage at $1 billion.

The business income tax returns filed with the Internal Revenue Service have been the principal data source for depreciation estimates. The company basis for industrial classification constitutes a data deficiency. Aside from the reports on regulated industries, other sources of depreciation statistics are *Enterprise Statistics*, an integral part of the quinquennial censuses, and the *Quarterly Financial Report* of the Federal Trade Commission. These sources suffer the same industry classification problem as the IRS tabulations in that the depreciation charge relates to the company and not the establishment. Moreover, the depreciation charge for companies employing less than 500 employees is not collected for *Enterprise Statistics*. The covered companies accounted for at most 53 percent of the sales and receipts of the covered industries in 1967.

Note also may be taken of a conceptual issue in the measurement of depreciation in the farm industries. The acquisition costs for breeder livestock and orchard trees as well as their maintenance costs until the time of production are presently treated as current expenses in the agricultural I-O and farm income estimates. The Department of Agriculture (Economic Research Service) is examining the issues raised in changing the concept so as to treat these items as capital investment.

Recommendation:

The Bureau of the Census should collect depreciation charges on an establishment basis even though the information may have to be supplied by company headquarters in the case of multi-establishment companies. In addition to operating establishments, central

administrative offices, R and D laboratories and auxiliaries should be covered. If a sample is used, small, medium and large establishments should be properly represented. With the exception of the census of governments, all economic censuses, current and proposed, should collect this information.

III. SOME GENERAL RECOMMENDATIONS

A. Improving the Timing of Benchmarks

There is widespread dissatisfaction among users with the long interval between the reference year of the quinquennial census and the completion of the I-O table. An additional, and more recent, cause for grumbling is the extended delay in making the benchmark estimates derived from the I-O table an integral part of the GNP estimates. The length of these intervals is shown in Table 3-2.

There can be little doubt that the usefulness of the I-O table and the derived technical coefficients is much reduced for analysis of current problems since the coefficients, when they first become available, describe relationships that existed 6 years earlier. For industries undergoing continuous technological change or in a period of rapid price changes, such information must be regarded as somewhat obsolete. Moreover, this obsolescence continues to worsen for the following 5 years until the next quinquennial I-O table becomes available. One purpose of the annual updating of the I-O table (discussed in Chapter 4) is to reduce this degree of obsolescence. At best, this effort is helpful only at higher levels of industry aggregation, and by the very nature of data availability and the estimating procedures, the interval between the reference year and updated estimates cannot be reduced to less than 4 years.

While the validity of this criticism cannot be gainsaid, much of the time lapse is inherent in the estimating procedures which probably cannot be shortened significantly. The economic censuses, as we have repeatedly noted, form the very heart of the input-output and the benchmark estimates. These censuses have required 2 to 3 years to complete (Table 3-2) and there is little prospect of further reducing this interval. Moreover, our recommendations, if implemented, would serve to extend the interval since the request for additional detailed information means the respondent needs more time to reply and the Census Bureau more time to edit, code, tabulate and review tabulations. Also, some of the new recommended surveys may well be done on a sample basis in the year following the taking of the quinquennial census thereby adding another year to the interval. In any case, this phase of capturing the required data, which accounts for nearly half of the total interval, is beyond the control of BEA.

The other two phases—the production of the I-O table itself and making the derived benchmarks an integral part of GNP accounts—are, of course, under BEA's control. The production of the table apparently requires as long an interval as the taking of the economic censuses. What the speed-up would be with a larger BEA staff input the Committee does not know. Nor does the Committee have a basis for judging whether this would be the best use of additional manpower, particularly when the I-O table even if prepared as summary updates would still measure interindustry relationships prevailing 3 to 4 years earlier.

Only the 1958 benchmark estimates were completed 1 year after the relevant I-O table was completed, i.e., in 1965. The next two I-O tables were incorporated as benchmark estimates into the NIPA at the same time, January 1976. This entailed an interval of 6 years in the case of the 1963 benchmark and 2 years for the 1967 benchmark. Expressed another way, the GNP estimates for the decade 1965-1975 were anchored to the benchmarks of 1958, an interval of 17 years between the benchmark date and estimates for 1975. While this sort of delay is unavoidable, it should be restricted to the shortest possible interval for estimators of quarterly and preliminary annual estimates. This can be accomplished by the prompt introduction of benchmark estimates.

TABLE 3-2: Critical Intervals in the Construction of the Quinquennial I-O Table and the Benchmarking of the GNP Estimates

	Interval[a] between Data Year and		
Data Year	Availability of Census of Manufactures[b]	Completion of I-O Table	Benchmarking GNP Estimates
1958 (prelim.)	2 to 3 yr.	5 yr. 11 mo.	
1958 (final)	2 to 3 yr.	6 yr. 9 mo.	7 yr. 8 mo.
1963	2 to 3 yr.	5 yr. 11 mo.	12 yr. 1 mo.
1967	3 to 4 yr.	6 yr. 2 mo.	8 yr. 1 mo.
1972	3 years	5 years[c]	

a/ Measured from December 31 of reference year.
b/ Censuses of trade and selected services are typically published 6 to 9 months earlier than the census of manufactures and the census of mineral industries, a few months later.
c/ As scheduled in March 1977.

Recommendation:

One year after the completion of the quinquennial input-output table, the Bureau of Economic Analysis should develop the benchmark estimates for GNP and incorporate them into the national income and product accounts.

B. Fuller Use of the I-O Table in Benchmarking the NIPA.

As we noted at the outset of this chapter, it is only the benchmark estimates of personal consumption expenditures and producers' durable equipment that are directly derived from the quinquennial I-O table. The derivation of the remaining 30 percent of the GNP benchmark estimates is only indirectly dependent on the I-O estimates. The implementation of the more substantive recommendations for data improvement of this and other chapters should not only enhance the accuracy of the PCE and PDE components implicit in the I-O table, but also should provide some cross-checks for other major components, e.g., purchases by governments. The latter may well be advanced by the accepted recommendation to collect data on the value of shipments by industry of the receiver—new information to be obtained in the 1977 Commodity Transportation Survey (see section 1A 7 of this chapter). For the purchases by the Federal Government, a potential improvement exists in the proposed program of the Federal Procurement Data System (see section IB of this chapter).

Recommendation:

The Bureau of Economic Analysis should give further thought to how the input-output table can be more fully exploited in the preparation and cross-checking of selected components of the benchmark estimates, even before major improvements in the data base have been made.

Postscript

The preceding discussion of the data inadequacies of the economic censuses as viewed by a NIPA estimator together with proposed recommendations for data improvement was the first undertaking of the Data Improvement Project (DIP). This chapter existed in draft form by the summer of 1974 and was presented to the Census Bureau at that time for its consideration in planning for the 1977 economic censuses.

Since many of the recommendations represented rather far-reaching extensions of its existing data collection, the Census Bureau conducted a survey of companies to determine whether the new information exists at the company and/or establishment levels and, if it does, the ease with which it could be retrieved and reported. This study of recordkeeping practices, shaped in large part in response to the initial DIP proposals, was the first such comprehensive review by the Census Bureau in 20 years. On the basis of the findings in the study of recordkeeping practices and in light of budgetary constraints, certain modifications and expansions in the data content and industry coverage specified in our recommendations were agreed upon.

Thus, the accidents of timing and the extended gestation period for this report have rendered numerous recommendations of this chapter superfluous. To have rewritten the chapter to remove recommendations already acted upon would have only further delayed the completion of this report. We opted to follow the path of least resistance by indicating in tabular form the information items in our recommendations that have been included in the economic censuses of 1977.

Footnotes to Table 3-3.

a Selected SIC's.

b Merchant wholesalers only except where otherwise noted.

c Does not mean goods bought for resale. (However, "goods bought for resale" are now collected for retail and for merchant wholesalers.)

d On basic census, on establishment basis.

e In addition to "retirement" item includes assets sold, scrapped, destroyed.

f We will not be able to add these new inquiries to the new expanded service areas in 1977.

g To be collected on supplemental sample survey conducted on a company/kind of business level.

h Also includes nonmerchant wholesalers (agents, brokers, sales branches, sales offices).

i Automobiles, trucks, etc. for highway use.

j Computer and peripheral data processing equipment.

k Also collects accumulated depreciation at end of 1977.

l Not reported separately but taken into consideration by respondent in deriving reported figures.

m Bus Carriers (TC 41) and Truck Carriers and Public Warehousing (TC 42).

TABLE 3-3: Field of Economic Census

Content of DIP Recommendation	Mining	Manufactures Basic Census	Manufactures Annual Survey	Construction	Wholesale Trade b/ g/	Retail Trade g/	Selected Services (Tradit. coverage) f/ g/	Transportation m/	Enterprise Statistics Company Summary (K-1)	Enterprise Statistics Central Offices & Aux. (X-6)
Employer costs for fringe benefits separately for legally required and voluntary programs	X		X	#	X	X	X	#	#	#
Salaries and wages:										
Force account transportation		#a/			#	#				#
Force account construction		#a/								
Purchased selected services:										
Communications	#		#	#	#	#	#	#	#	#
Repairs:										
Buildings and structures			#	#	#	#	#	#	#	#
Machinery and equipment			#	#	#	#	#	#	#	#
Rental payments:										
Buildings and structures	#		X	#	X	X	X	#	X	X
Machinery and equipment	#		X	X	X	X	X	#	X	X
Payment for fuels & elec.	X	X	X	#	#	#	#	#	#	#
Advertising services					#	#	#		#	
Total cost of purchased materials & supplies	X	X	X	X	Xc/	#c/	#c/			
New or expanded detail on purchased materials	#	#a/								
Inventory data	#	X	X		Xd/	Xd/			X	X
Inventory valuation methods			X		#d/h/	#d/			#	#
Additional information on capital expenditures:										
Separate rptg of purchased "used" structures & equip.	#		#							
Separate rptg of capital expenditures for "own use" & "for rent to others"		#a/					#a/o/			
Specific capital equip. categories			#i/l/	#i/	#i/l/	#i/l/	#i/l/	#i/l/	#i/l/	#i/l/
Depreciation charges during 1977	#		#	Xk/	X	#	#		Xk/	#
Capital retirements during 1977 e/	#		#	l/	X	X	X		X	
Other recommendations:										
Expansion of coverage to all SIC codes and to all nonprofit organizations (except religious)							#			
Maintenance & repair receipts by type of construction				#						
Separate reporting of primary & secondary receipts							#a/o/			
Separate reporting of nonmerchandise receipts					#d/h/	#d/h/				
Expansion of categories in distribution of sales by class of customer					#d/h/					
Royalty payments									#	
Gross value of depreciable assets	#	#		#	#	#	#		#	#

Note: # means the information item is to be added to the 1977 census inquiries.
X means this item has been included in previous census inquiries.

See p. 32 for footnotes to Table 3-3.

CHAPTER 4

IMPROVING THE NON-BENCHMARK ESTIMATES

I. ANNUAL NONFARM ESTIMATES

A. Sequence of Estimates and Its Rationale

The last chapter makes clear that the benchmark estimates are prepared and introduced retrospectively into an ongoing set of GNP estimates. However, if the latter are to serve many of the users' purposes, a preliminary set of annual estimates for the benchmark and all other years is required with the minimum of delay after the close of each year. Indeed, if these accounts are to be helpful in formulating the direction of fiscal, monetary and incomes policies, quarterly estimates of the NIPA are essential.

As explained in the BEA document on NIPA revisions, "quarterly source data are used to interpolate and to extrapolate annual estimates. The annual estimates in turn are often interpolations and extrapolations of benchmark estimates which incorporate additional data."[1]

When dealing with the ongoing estimating process, one confronts a problem that has no easy solution, namely, the terms of the trade-off between timeliness and reliability of the estimates. The solution that has emerged is best understood, perhaps, by noting the actual chronological sequence of the GNP estimates and variants in an ongoing estimating process. This should make clear the continuum of a shift from initial concentration on timeliness of a limited number of subaggregates to concentration on reliability and extensive detail culminating in the retrospective benchmarking of the entire set of accounts. We start with the shortest time frame.

1. Monthly estimates of personal income at annual rates are released 2 weeks after the close of the month.

This series extends forward month by month the last annual estimate of personal income by the relative changes between the given month and the month before in measures representative of economic activity and government transfers of income to individuals. Much reliance is placed on monthly and/or quarterly measures of wages and salaries, social security benefits and other transfer payments, and dividend disbursements. Other major components 'are trended', the national accountant's jargon for interpolation, usually straight line, between last year's total and the projected total for the current year. Thus the monthly estimates presuppose the existence of annual estimates of certain components.

2. Quarterly estimates of an abbreviated set of GNP estimates—preliminary estimates are released 2 weeks and revised estimates 6 weeks after the end of the calendar quarter.

These quarterly estimates utilize monthly series cumulated over part or all of the calendar quarter depending on data availability when the estimates are prepared. Some few series that measure quarterly activity only are also used. Here too some components are trended.

3. Annual estimates of a truncated set of accounts are released in mid-January for the immediately preceding year, hereafter referred to as the reference year.

This annual estimate is obtained by summing the revised quarterly estimates of the first three quarters and the preliminary estimates of the fourth. One month later, mid-February, the revised estimates of the fourth quarter replace the preliminary set to compose the annual estimate of the reference year. Estimates of similar character and origin also appear in March and April based on continuously firmer quarterly estimates for corporate profits and net exports. Up to this point, no annually based statistics have been directly used in the estimates.

4. The first set of estimates for a given nonbenchmark year that is as detailed and articulated as that for a benchmark year is completed by July following the reference year,

[1] Young, Allan H., *Reliability of the Quarterly National Income and Product Accounts of the United States, 1947-71*, Bureau of Economic Analysis Staff Paper no. 23, July 1974, p. 36.

except for detailed industry classifications of corporate profits and capital consumption allowances. (That is, the matching of detail and degree of articulation is comparable in terms of number and content of accounts but not in terms of quality of data.) Estimators refer to this as the first July estimate for the reference year. At the same time the annual estimates for the 2 years preceding the reference year are revised and released.

Many of the components are still based on the cumulation of monthly or quarterly extrapolations. However, "the quarterly data available at the time of the first annual July revisions usually differ from those used in the initial quarterly estimates. These differences occur for one or more of the following reasons: (1) additional months of data are available; (2) the monthly estimates were revised because of more complete response from the survey panel; (3) the series was revised due to rebenchmarking to incorporate accurate but less frequent data; and (4) new seasonal adjustment factors."[1]

In addition, the estimates of a significant number of components are now for the first time based on annual data. The meaning of 'annual data' in this context needs to be indicated. It relates essentially to the frequency of data collection as well as to the time span covered. It does not specify how the respondent or the data collection agency reaches the annual total—whether by averaging weekly measures (e.g., employment in one payroll period in each of 12 months) or cumulating daily, weekly, monthly or quarterly transactions (e.g., value of shipments), etc.

Annual data are considered to be more reliable than those for shorter time frames largely because release of data soon after the reference period is less urgent. Monthly and quarterly data suffer a sharp loss in usefulness if their release is delayed much beyond the reference period. This sort of pressure forces the respondent frequently to reply before having possession of all the relevant data (i.e., make guesses) and the collecting agency to produce tabulations often without adequate evaluation of the replies and before all respondents have filed their answers.

By contrast, in the case of annual data, the respondent usually has a longer interval for completing the response and so can wait until all the relevant internal records have been prepared. The collecting agency also operates under less urgent time constraints permitting a critical editing and evaluation of the responses and more careful tabulations. Moreover, some data for some firms are compiled only once each year, for example, inventories based on a physical count. The absence of the troublesome problems of seasonal adjustment also serves to improve the reliability of annual data.

Since speedy release of data is no longer of the essence, larger samples can be used for annual data and this in itself enhances the reliability of the results. And the larger the sample, the larger is the volume of reliable detail that can be obtained. This in turn increases the number of possible internal cross-checks of each response and thereby contributes to the production of more accurate data. For all these reasons, shifting the data base from monthly and quarterly series to annual data makes for more accurate estimates and for a more detailed set of accounts, as detailed as the published benchmark accounts themselves.

5. The second July revisions: the changes made on this occasion result from the availability of additional annual series in the form of the annual surveys of manufactures, retail trade, oil and gas (since 1973) and State and local government finances, all carried out by the Census Bureau. These data figure prominently in the product accounts. In addition, annual releases by other agencies, such as payrolls by the Bureau of Labor Statistics and farm income by the Department of Agriculture, and preliminary information on Statistics of Income for business by the Internal Revenue Service affect principally the income accounts.
6. The third July revisions: the substitution of the final releases of Statistics of Income for the preliminary releases is the major source of this revision. This version of the NIPA estimates for a given reference year remains unaltered until the new benchmarked estimates are introduced. For this reason the third July estimates, although they incorporate a second set of revisions, are still interim estimates and this is how we frequently refer to them in this chapter.

At this point it should be helpful to show how the quarterly and the several July annual estimates are joined by BEA into a continuous and seamless web. For purposes of illustration, we start the estimating process with July 1967. In that month the first July annual estimate for 1966 is completed and it is used as the controlling total for the four quarters of 1966. At the same time (July 1967) revised annual control totals are completed also for 1964 and 1965 in the form of the third July and second July estimates, respectively. These revised annual estimates together with the first July estimates for 1966 are simultaneously incorporated into the quarterly estimates. In this manner all the July estimates completed in July 1967 relating to the 3 preceding years contribute to the level of the extrapolating base

[1] *Ibid.*

for the four quarters of 1967 and the first quarter of 1968.

This estimating process is repeated in each July, moving forward one year. And neither war, change of administration, nor budget cuts have stayed the BEA estimators in their appointed annual rounds.

7. Annual input-output tables: this is a relatively new program of developing I-O tables for every year by using more summary procedures than those used in developing the quinquennial table. It is aimed at anticipating some of the revisions which are likely to occur from the subsequent benckmarks table.

8. Benchmark estimates: this is the final phase of the estimating cycle. There is no choice in the selection of the benchmark year—it must be the year for which economic censuses are taken, now at 5-year intervals ending in 2 and 7. These must be viewed as the most reliable set of estimates possible given the data base and the state of estimating arts. Typically these estimates remain unchanged unless there is a decision to introduce retrospectively changes in concept, definition or classification. Seldom, if ever, have the estimates for a benchmark year been altered later because of the discovery of better data for that year, although they have been revised based on new source data for a later year which are extrapolated backward for earlier years. For this reason the annual estimates, as noted above, are essentially an extrapolation of the estimates of the last benchmark year. The extrapolations at a later point are reviewed to ensure their consistency with the levels of the next benchmark year.

The annual estimates then serve two major purposes. The first July annual estimates, by virtue of their greater reliability, provide a set of interim control totals for the quarterly estimates of the preceding calendar year as well as more solidly grounded estimates for continuing quarterly extrapolation in the current year. In this way, the price for timeliness in terms of reduced reliability is minimized.

The other major purpose derives not only from the greater accuracy of the annual data but also from their availability in much more detail. This makes possible estimates in the same detail as in benchmark years. These more detailed annual estimates provide the analyst with indications in advance of the benchmark estimates of any structural economic changes in the economy and/or in those analytical economic relationships that can be revealed by the NIPA.

It is retrospective anchoring of the interim annual estimates to the benchmark estimates that creates the possibility of assessing the relative accuracy of the interim annual estimates. That is, for a given benchmark year a revision—the difference between an interim and benchmark estimate for the same year—of a given size, say plus or minus 7.5 percent, signifies a deficiency of data in the interim annual estimates. Or, more precisely, revisions of this magnitude have a high probability of resulting from the use of weak data in the interim estimates.

Relatively small revisions do not necessarily signify the absence of weak data for two reasons. The revisions are bound to be negligible when both sets of estimates are based on virtually the same data base, thus both sharing the same strengths and weaknesses. This is especially the case in the income accounts.

The other reason applies when a slight revision characterizes a component known to be grounded on a weak data base in the benchmark estimate. However, many of the latter are known from the discussion of data improvements in the benchmarks in Chapter 3. Despite these reservations, the size of the revisions serves as a helpful basis for tracking down many instances of data deficiencies in the interim annual estimates.

B. Annual Interim and Benchmark Estimates Compared

The various interim annual estimates start with the sum of the estimates for the four calendar quarters released at various dates in the first calendar quarter following the reference year and conclude with the third July estimate published 30 months after the close of the year. "Reliability" is measured by the closeness of the interim estimates to the benchmark estimate for the same year. The smaller the difference, the greater the "reliability" in this context. However, there still is the need to specify what minimum deviation from the benchmark (sign disregarded) places an interim estimate in the category of being an unacceptably weak estimate. Any specification is bound to be arbitrary to some degree even when it is logically derived from a widely accepted assumption.

Based on a comparison of the preliminary and benchmark data for both 1963 and 1967, a deviation of 7.5 percent appeared as a convenient cutoff point for identifying those components having larger revisions.[3] This also reflects a recognition that a high degree of accuracy cannot realistically be attained for many component estimates of the national accounts. In addition, we assume that the direction and relative change from one period to another is the most important use to which the annual estimates are put. Because revisions in the benchmark-year levels are

applied to the levels for other years on a graduated basis and because of the strong interrelationships built into the year-to-year movements by the estimating procedures, the effect of the revisions on the direction and relative change in the year-to-year movements is moderated. On these pragmatic grounds, for our purposes an interim estimate that deviates from its benchmark by 7.5 percent or more is considered as being unreliable and presumably in need of a stronger data base. It should also be noted that to the extent better data have since become available, such deviations are not likely to occur in subsequent benchmarks (e.g., the improved data for multi-family residential construction which became available in the early 1970's.)

As noted, the most recent benchmark year for which estimates have been prepared is 1967. For this reason our point of departure is a comparison of the interim estimates for 1967 with the benchmark estimates for the same year. The first annual estimate of GNP, derived by summing the GNP quarterly estimates of the year, appears in the January issue of the *Survey of Current Business*. The quarterly estimates used are those labelled "revised" for the first three quarters, i.e., those released 45 days after the close of each quarter, and the preliminary estimate for the fourth quarter; i.e., released 15 days after the quarter. In the very next month, the revised quarterly estimate for the fourth quarter replaces the preliminary one. It is the February annual estimate that is taken as the first firm estimate for the preceding year.

The February annual estimate is compared initially with the first July estimate for 1967, which is the first estimate for that year making use of some annual data, and each in turn is compared with the benchmark estimate for the same year. The deviations of the February estimates from the benchmarks are a measure, in a certain but limited sense, of the reliability of the quarterly estimates as well as of an early annual estimate. This is so since the February estimates are the sum of the four calendar quarters. If this sum deviates significantly from the benchmarks, there is a strong suspicion that the level of one or more of the quarterly estimates is not reliable. This measure, however, provides only a rough clue as to the reliability of the direction and amplitude of the quarter-to-quarter change within the year or of the change from the same quarter of the preceding year.

C. Summary of Benchmark Revisions and Inferences for Data Improvement

The purpose in analyzing the size of revisions in the interim annual estimates is to identify particular estimates in need of data improvement. At best, the number of estimates identified as unreliable by this approach must be an understatement for reasons given above. Although some weak estimates will escape notice, surely identifying those that are shown to be weak will advance the inquiry.

To fulfill this purpose, a summary of findings on revision changes should be sufficient. The detailed analysis is presented as an appendix to this chapter.

Of the four interim estimates the examination has shown that the first two, the February and the first July estimates, are of special interest. The February estimate, derived by summing the estimates for each of the four calendar quarters of the reference year, tells whether the quarterly estimates have been reliably estimated, at least as to level. (Unfortunately, the benchmarking process provides only the roughest indication of the accuracy of the quarterly estimates in measuring the relative change from quarter to quarter because the resultant revisions of the quarterly estimate reflect the statistical procedure of smoothing these movements to conform to the revised annual levels and the introduction of new seasonal adjustment factors rather than the incorporation of new quarterly data.)

The first July estimates provide the first annual estimates of the detailed components of the NIPA and form the extrapolation base for the next four quarterly estimates. When the first July estimates are not reliable, the level of the quarterly estimates has a low probability of being reliable.

It should be reassuring to the analyst of the current business outlook that the February and first July estimates provide reliable estimates for the grand totals, such as GNP, national income, and personal income, and for most (but not all) of the major components or subaggregates published quarterly. These have coverage so broad the errors of individual estimates are offsetting. On the other hand, it is unsettling to learn that unreliable estimates are more often the rule for the components that are absolutely small (but analytically important) and typically derived as residuals, such as changes in business

[1] While the single number of 7.5% may be a convenient rule of thumb, it represents a more stringent standard for those series undergoing large year-to-year percent changes than for those series showing small ones. An alternative rule which takes account of the volatility of each series and the time between benchmark revisions is that the data may be presumed unreliable if the benchmark revision of the level divided by the number of years between benchmarks exceeds the average yearly change (without regard to sign) in the series between benchmarks. Application of this rule would somewhat alter the results in Table 4-1. For example, the February estimates of personal saving and net exports would be considered reliable. On the other hand, the three July estimates of consumer durable goods would be added to the table and deemed unreliable. Because of the time constraints and limited resources, the Committee was not able to pursue this approach.

inventories (CBI), inventory valuation adjustment (IVA), and net exports. In these categories the possibility of errors being offsetting is much reduced and being residuals, even small estimating errors of both terms can accumulate significantly in the residual. The unreliability of the estimate of the output of structures, however, especially residential on and off farms, cannot be explained either by being small or being a residual. These construction estimates had unacceptable errors both in the February and first July estimates.

The BEA prepares annual estimates in considerable detail for producers' durable equipment (PDE), personal consumption expenditures (PCE), and national income by minor industries. These detailed estimates were tested for reliability against their benchmark estimates.

Annual estimates of 22 types of PDE are prepared. Nearly two-thirds (64 percent) had unacceptable errors in the first and second July estimates for 1967. Even among the third July estimates, 45 percent were still unreliable.

The record of unreliability among the 82 components of PCE is not as poor as the record for PDE components but it is not a good one either—46 percent of the first July estimates differed from their benchmarks by 7.5 percent or more and among the second and third July estimates, 36 components, or 44 percent, had unacceptable errors. The persistence of unacceptable errors is best shown by noting that 35 of these 36 components had unreliable estimates in each of the three July estimates.

These results suggest that BEA has been publishing too many estimates of annual expenditures for particular types of PDE as well as too many estimates of particular categories of PCE. In any case, the evidence of widespread weakness among the detailed product estimates calls for a serious review of the BEA publication policy. Once before BEA responded to this need. In its last comprehensive report, *Income and Output, 1958*, BEA noted:

"Other lessons derived from this comprehensive statistical effort may be commented upon briefly. One such lesson serves simply to affirm the advisability of the step taken 4 years ago in reducing the amount of detail shown for personal consumption expenditures, net income of unincorporated businesses, and several other series. A primary reason for this move was the fact that the basic data situation had not improved in line with our expectations in 1947 at the time the original system of tables was established.

"How much detail to publish or release is, of course, a problem of long standing. We have reexamined this problem in connection with the expansion of statistical tables for this report, and have attempted to strike a balance between the needs of analysis, on the one hand, and the undesirability of issuing weak estimates, on the other. The material which has been added is believed to be sufficiently reliable when used appropriately."[4]

Recommendations:

The Bureau of Economic Analysis should improve its policy of publishing detailed components of the national economic accounts in the following ways:

1. *Review the detailed components that are published to assess if they meet the reliability standards appropriate for publication. The assessment should be based on an analysis of the revisions in the annual interim estimates occurring with the quinquennial benchmarks.*
2. *For the detailed components that are published, provide an indication of the recent errors of estimation.* (Such measures of reliability presently are provided for major GNP aggregates in the quarterly GNP press releases.)

In the case of the detailed components of national income—for example, national income originating in 64 industries—the record on reliability is somewhat better than that on the product side. In the first July estimates for 1967 25 percent had unacceptable errors. This was reduced to 17 percent by the third July estimates. This improved showing, nevertheless, must be attributable in large part to the virtual absence of an independent data base for the benchmark estimates of national income.

The analysis of benchmark revisions support several other conclusions or recommendations:

1. The widespread presence of unreliable estimates in 1963 undercuts the rationale of BEA in deferring the incorporation of the 1963 input-output table into the NIPA for some 5 years. The official explanation for the postponement was the small difference between the 1963 benchmarks and the third July estimates for the same year. While the explanation was valid for the broader aggregates, it was far from being valid for the published detail. There is fairly strong evidence that estimating errors present in the 1963 interim estimates were continued and in some cases enlarged in the 1967 estimates. *Error, therefore, should be minimized by implementing the recommendation in Chapter 3 that benchmark estimates be developed 1 year*

[4] *Income and Output, 1958*, A Supplement to *Survey of Current Business*, p. 72.

after the completion of the quinquennial I-O table.

2. The successive July revisions of the detailed components for a given year lowered as often as they raised their reliability. That is, in about half of the components, the third July estimate was closer to the benchmark than the first July estimate and in about half, the first was closer than the third. This was the case for the producers' durable equipment and personal consumption expenditures components as well as for the industry estimates of national income. For the latter, the successive July revisions typically were negligible in amount but they were somewhat larger for the PDE and PCE estimates. *These results suggest the need for a more probing analysis to determine why the reliability of certain components is lowered by successive revisions and whether much the same components are affected this way in each recent benchmark year.*

In view of the presence of many unreliable interim estimates among the detailed components of PDE and PCE, the Committee concludes also that their change over the intermediate or longer term of years is best gauged by measuring the change between benchmark years and ignoring, if the analyses in which these data are used do not require current measures of the year-to-year movements, the change based on interim estimates.

3. *The Committee considers the analysis of the size of revisions occasioned by benchmark estimates has sufficient merit that it recommends to BEA that the publication of each set of benchmark estimates in the future be accompanied by an analysis of revision changes comparable in coverage and objective, if not in methodology, to the one presented in this chapter.*

By way of summary, Table 4-1 brings together in one place all the estimates from the major accounts found to have estimates with unacceptable errors. To qualify for this list, an interim component had to differ from its benchmark counterpart by 7.5 percent or more either in the February or the first July estimates or in the second as well as the third July estimates.

D. Specific Recommendations for Data Improvement of Annual Estimates

1. The first July estimates—a case for separate recommendations

Since the principal uses of the first July estimates differ from the principal uses of the second and third July estimates, different criteria apply to the selection of practical recommendations for data improvement. The primary purposes served by the first July estimates, as we have frequently mentioned, is to provide a check on the relative accuracy of the four quarterly estimates composing the previous year and to provide a more firmly based set of estimates for extrapolation into the four quarters of the current year. To fulfill this purpose, this estimate must be timely, say, available within 6 or 7 months after the close of the given year. This, of course, is the timing of the first July estimate. To meet this schedule, the bulk of the data must be in the hands of BEA estimators no later than mid-May. Serving this main purpose, however, does not require estimates of detailed components since there are no such estimates in the quarterly NIPA. According to this approach, recommendations for the first July estimates to qualify as practical must provide improved data on a timely basis for the aggregates and major subcomponents used in the quarterly accounts.

By contrast, the second and third July estimates have as their principal objectives the year-to-year extrapolation of the detailed components of the benchmark estimates; and to a lesser extent estimates for selected aggregates may also be improved in these revisions. These provide grist for the mills that grind more slowly—those studying structural changes in the economy and developing analytical relationships that may elucidate cyclical and secular changes. The contribution of these estimates to the knowledge of the current business outlook is only indirect and therefore lacking in urgency. For this reason recommendations that yield improved data 17 and 29 months after the close of the reference year may nonetheless still qualify as being practical, particularly if improvement encompasses the estimates of the detailed components. Better detailed data also contribute to more reliable estimates of the aggregates, including those in constant dollars. However, the major revisions of the aggregates affecting the short-term business outlook, as discussed in Chapter 5, result from other types of problems such as inadequate survey samples and deficiencies in company reporting as well as the absence of monthly or quarterly data for some items.

This rationale guides our recommendations for improving the data for the first July annual estimate, successive revisions of annual estimates, and for two major variants in the form of annual estimates of gross national product by industry and the annual update of the five-year input-output table.

2. Data improvement for the first July estimates

Our analysis of the size of benchmark revisions has shown that of the first July estimates for 1967 roughly half of the detailed components of PDE and PCE and about one-quarter of the estimates of national

TABLE 4-1: Specific Estimates in Need of Data Improvement as Identified by Size of Benchmark Revisions for 1967

	Differing from Benchmark Estimates by 7.5 percent or more			
	February	1st July	2nd July	3rd July
GNP COMPONENTS				
Major aggregates				
Nonresidential structures	X			
Residential structures	X	X		
Nonfarm	X	X		
Farm	X	X	X	X
Change in business inventories	X	X	X	X
Nonfarm	X	X	X	X
Farm	X	X	X	
Net exports of goods and services	X	X	X	X
Detailed components				
Producers' durable equipment a/				
Furniture and fixtures			X	X
Fabricated metal products		X	X	X
Engines and turbines		X	X	X
Tractors		X		
Agricultural machinery except tractors		X	X	
Construction machinery		X	X	X
Mining and oil field machinery		X	X	X
Special industry machinery (n.e.c.)			X	X
General industrial machinery, incl. matls handling equip.		X		
Office computing and accounting machinery		X	X	X
Service industry machines		X	X	X
Communication equipment		X	X	X
Other electrical equipment		X	X	X
Ships and boats		X	X	
Railroad equipment		X	X	
Miscellaneous equipment		X	X	
Personal consumption expenditures a/				
Clothing, accessories and jewelry				
Shoe cleaning and repair		X	X	X
Clothing and accessories except footwear				
Women's and children's		X	X	X
Men's and boys'		X	X	X
Cleaning, dyeing, repairs of garments etc. and laundering		X	X	X
Other		X	X	X
Personal care				
Toilet articles and preparations		X	X	X
Housing				
Tenant-occupied nonfarm dwellings		X	X	X
Household operations				
Kitchen and other household appliances		X	X	X
Cleaning and polishing preparations, etc.		X	X	X
Semidurable house furnishings		X	X	X
Stationery and writing supplies		X		
Household utilities				
Water & other sanitary services		X	X	X
Other fuel and ice		X	X	X
Domestic service		X		
Other		X	X	X
Medical expenses				
Ophthalmic products & orthopedic appliances		X	X	X
Medical care and hosp.		n.a.	X	X
Personal business				
Services furnished without payment by fin. intermediaries		X	X	X
Expenses of handling life insurance		X	X	X

TABLE 4-1: Specific Estimates in Need of Data Improvement as Identified by Size of Benchmark Revisions for 1967—Continued

	Differing from Benchmark Estimates by 7.5 percent or more			
	February	1st July	2nd July	3rd July
Transportation				
New cars and net purchases of used cars		X	X	X
Auto repairs, greasing, washing, storage & rentals		X	X	X
Bridge, tunnel, ferry, and road tolls		X	X	X
Automobile insurance premiums less claims		X		
Purchased intercity transportation				
Railway (excluding commutation)		X	X	X
Intercity bus		X	X	X
Other		X	X	X
Recreation				
Books and maps		X	X	X
Wheel goods, durable toys, sports equip. etc.		X	X	X
Radio and TV repairs		X	X	X
Flowers, seeds, and potted plants		X	X	X
Admissions to specified spectator amusements				
Motion picture theaters		X	X	X
Legitimate theaters, opera, entertainments of nonprofit institutions		X	X	X
Spectator sports		X	X	X
Commercial participant amusements		X	X	X
Pari-mutuel net receipts		X	X	X
Other		X	X	X
Private education and research				
Higher education		X	X	X
Elementary and secondary schools		X	X	X
Foreign travel and other, net				
Personal remittances in kind to foreigners		X	X	X
NATIONAL INCOME COMPONENTS				
Major aggregates				
Type of income				
Proprietors' income, farm	X	X	X	X
Rental income of persons	X	X	X	X
Inventory valuation adjustment	X	X	X	X
Net interest		X	X	X
Broad industry groups				
Agricultural, forestry and fisheries	X	X	X	X
Rest of the world	X	X	X	X
Detailed industries a/				
Farm		X	X	X
Agricultural services, forestry and fisheries		X	X	X
Metal mining		X		X
Crude petroleum & natural gas		X		
Tobacco manufactures		X		
Motor vehicles and motor vehicle equipment		X	X	X
Air transportation		X		
Credit agencies, holding & other investment companies		X	X	X
Security and commodity brokers		X		
Insurance carriers		X	X	X
Insurance agents, brokers & service		X	X	X
Hotels and other lodging places		X	X	X
Motion pictures		X		
Nonprofit membership organizations		X	X	X
Private households		X		
Government enterprises, State and local		X	X	X
Rest of the world		X	X	X
Other major aggregates				
Personal saving	X			

a/ Quarterly estimates, and therefore annual February estimates, are not prepared at this level of disaggregation.

income by industry had unacceptable errors. It is also our view that these unacceptable errors could be reduced to acceptable errors only by relying on larger samples, allowing respondents more time to complete more detailed questionnaires, and by more careful editing, coding and tabulating of the responses. Since all of these essential modifications of present practices could not be carried out by mid-May following the calendar year, they are deemed to be impractical and accordingly not advanced.

The major subaggregates having first July estimates with unacceptable error are:

1. residential structures, nonfarm as well as farm
2. change in business inventories, again nonfarm as well as farm
3. net exports of goods and services
4. proprietors' income, farm
5. rental income of persons
6. inventory valuation adjustment
7. net interest

The data used for the unreliable first July estimates are briefly described, their inadequacy indicated, and a practical recommendation proposed. The first three are major aggregates on the product side and the next four on the income side of the accounts.

a. Residential construction, nonfarm

The Census Bureau has the responsibility for preparing monthly estimates of value put in place for private nonfarm residential structures. The methodology relies essentially on indirect measurement. A monthly survey obtains data on the number of new starts and building permits issued. The latter provide data on the expected value of the construction from which average value per residential unit is computed. This average is adjusted for understatement of values and for the cost of architectural and engineering fees. The basis of the adjustment factors rests on studies made in 1956.

The total cost of construction is calculated by multiplying housing starts by the adjusted average cost. This calculation is carried out separately for one unit buildings, and until recent years also for two or more unit buildings. Each category has value adjustment factors specific to the category. The total cost of units started is then distributed into monthly value put in place by applying fixed monthly rates of progress. The latter until recently were based on studies completed in the mid-50's, but now represent progress patterns for the 1971-73 period.

In the 1970's the direct measurement of multifamily housing construction was initiated by the monthly collection of data on the actual amount of construction work done. This should result in a more reliable estimate for total nonfarm residential construction than the first July estimate for 1967 released in July 1968.

To the value put in place is added an estimate of (1) residential alterations and repairs based on a quarterly survey conducted by the Census Bureau, and (2) commissions on housing sales, new and secondhand. The estimate of commissions on sales of secondhand houses is simply an extrapolation of the benchmark estimates by the value of sales of newly constructed houses.

In short, the methodology and data for the first July estimate of this component are essentially those used in the quarterly estimate. The recommendations for data improvement therefore are virtually those that should also improve the quarterly estimates. These recommendations are developed in Chapter 5.

Recommendation:

An additional recommendation is made to improve the estimate of real estate sales commissions:

After the recommended quinquennial census of real estate industries is successfully implemented, *the Census Bureau should institute an annual sample survey of real estate companies to collect data on sales commissions with a breakdown of commissions for the sales of residential and nonresidential structures.*

b. Residential structures, farm

Here also we defer to the much fuller discussion in Chapters 5 and 6 dealing with the agricultural estimates included in the GNP accounts, both on a quarterly and an annual basis.

c. Change in business inventories, nonfarm

For this component, the estimating objective is to determine the current value of the physical change in inventories between the beginning and end of the year. Since business inventories in terms of physical counts are seldom available, resort to indirect measurement is necessary. This requires the use of complex pricing procedures discussed in Chapter 5.

The first July estimates are based essentially on the same data sources as the quarterly estimates. The former, however, usually have the advantage of a fuller response from the survey panels. The principal sources are the Census Bureau monthly surveys of inventories of manufacturers, merchant wholesalers, and retail establishments. The survey results for retail trade are not deemed of good enough quality by the Census Bureau to warrant publication. On the assumption some data are more helpful than none at all, the BEA makes use of these data. The inventories for all other nonfarm industries are extrapolated by

the inventory data reported by regulatory agencies, especially by the Securities and Exchange Commission for nonfinancial corporations.

The inadequacies of the inventory data are legion and are described at considerable length in Chapter 5. Here we note only the basic deficiency that many enterprises are unable to report monthly inventories even in book values, not to mention in replacement costs, based on solid accounting records. Confronted with this imposing blank wall and realizing the analytic importance of this component in evaluating the current business outlook, the Census Bureau contracted with the National Bureau of Economic Research to undertake a research project that would develop recommendations resulting in significant improvement in the reliability of reported inventory data and related estimates of this component in the NIPA. This concentrated effort is bound to be much more probing than any we could muster as it represents for us only one of many components. While recommendations will be forthcoming from the NBER study, we have indicated in Chapters 5 and 6 some basic directions for improving the inventory figures.

Recommendation:

Although most recommendations for improving the nonfarm inventory estimates appear in Chapter 5, two improvements are related to annual data needs.

1. *The Census Bureau should speed up the year-end estimates of retail inventories in the Annual Retail Trade Survey to be available by May 31 following the reference year.* This is elaborated below under Detailed Components of Personal Consumption Expenditures.
2. *As part of its newly instituted annual survey of wholesale trade, the Census Bureau should provide year-end estimates of wholesale trade inventories by May 31 following the reference year.*

d. Change in business inventories, farm

Considerable data on harvested grains are collected quarterly from a sample of farms. There are monthly, semiannual or annual surveys of other harvested crops. A major informational gap in the matter of crops, however, is the absence of data on inventories owned by farmers but stored in off-farm elevators and warehouses. A survey of farmers' inventories placed in off-farm elevators and warehouses is the obvious recommendation.

In parallel fashion there are sample surveys of the important categories of livestock holdings. (A fuller description of the farm inventory data, their inadequacies, and recommendations for improvement is presented in Chapter 6.)

e. Net exports of goods and services

The goods subcomponent in the annual estimates has the same data base as the quarterly estimates, namely, the Census Bureau's monthly tabulations of commodities exported and imported. These, in turn, are based on the shipping documents submitted by exporters and importers. Since the data base, its shortcomings and corrective recommendations are discussed fully in Chapter 8, no further discussion is required here. Moreover, the errors in the goods component probably is responsible only for a minor part of the total unreliability. Much of the larger source of unreliability must come from the more elusive flows of services and investment income. The estimates of many of these components are based on a variety of sample surveys carried out by BEA. The details and related recommendations are spelled out in Chapter 8.

f. Net income of farm proprietors

This estimate is the primary responsibility of the Economic Research Service of the U.S. Department of Agriculture and is deemed of sufficient importance to be accorded a separate chapter, number 6. The full discussion there is the reason for the briefest of mention here. The net income of farm proprietors is based on subtracting estimates of production expenses from estimates of gross farm receipts. The latter, in turn, is built up by estimates of the disposition of crop and livestock output. While much information of a specific character is obtained from sample surveys, often involving farm operators, it is nonetheless an indirect method in that it is not based on enterprise data from farm operators directly for their net income by way of their broadly itemized receipts and production expenses.

The current use of income and cost estimates from different data sources accentuates the problem of having relatively small errors in either of these components transformed into larger errors in the residual net income estimates. Our major recommendation in this context is a shift to a direct measure of annual data on gross sales, expenses, and net income from the same source, the farm operator. These data are collected now in the Economic Survey of Agriculture, but their use for preparing the farm income estimates will require exploratory studies and would be fully operative only after several years.

g. Rental income of persons

This component—one type of factor return on capital—is composed mainly of actual or monetary rents received for tenant-occupied dwellings and imputed rent accruing to owner-occupiers of dwellings, and also rent and royalties received by individuals from business property. The residential rental estimates essentially are the product of housing units

and unit rental value. The latter in effect is a price and therefore the shortcomings of the unit rental value data and recommendations for improvement are discussed in Chapter 7 which deals with prices in NIPA. The estimates of rent and royalties from business property are trended because of the lack of current data.

The benchmark figures for the stock of housing units and their distribution among rental and owner-occupied units are provided by the decennial census of housing. This is now updated annually by information obtained in the Annual Housing Survey. With this latter improvement, the much more important source of unreliability is the equivalent unit rental value for owner-occupied housing. Here too some strengthening of the data has recently occurred in the Consumer Price Index rental component in the revised CPI scheduled for release early in calendar 1978. Additional improvement could be accomplished by separate tabulations of CPI rents for multi-unit dwellings and for single-unit dwellings. The latter is the more relevant unit rental value to use in estimating the imputed rent of owner-occupied dwellings.

h. Inventory valuation adjustment (IVA)

By definition, the measure of output excludes capital gains or losses that may accrue to an enterprise according to its books of accounts. Data for measuring the change in business inventories and enterprise profits in the nonfarm sector come from the accounting records of enterprises. But company profits as reported may include capital gains or losses originating in the holding of inventories. The IVA is the measure of any such capital gain or loss. If the amount is positive, it is subtracted from reported profits and from the change in inventories, and if it is negative, it is added. The IVA is a by-product of the measure of change in business inventories and suffers from the same data inadequacies. The first July estimate uses the same data sources as the quarterly estimates. Thus the recommendations for improving the quarterly estimates, described in Chapter 5, would also serve to improve the data for the first July estimates.

Since the estimates of farm inventories are not based on books of accounts, the IVA is not required for the farm sector.

i. Net interest

As in the case of rental income, the net interest item also has a monetary component and an imputed component. By virtue of the limited data that have been available, an indirect method of estimation has been required for monetary interest received by individuals. The most comprehensive data on interest payments refer to interest paid and received by enterprise including financial intermediaries. For the entire economy the difference between interest paid and interest received by enterprise is received by individuals, nonprofit organizations, and governments. Monetary interest itself is arrived at by summarizing three subcomponents—corporate sector, noncorporate businesses and rest of the world.

In the corporate sector, the data base for the estimates of interest paid varies by industry: for commercial and mutual savings banks, data from call reports of Federal banking agencies are used; for savings and loan associations, credit unions, and other financial institutions, timely reports are available from various Federal agencies; and for other sectors, interest paid is derived as the product of average of corporate debt by type outstanding for the year multiplied by interest rates appropriate for each type of debt. For interest received, a historical ratio of interest received to interest paid, based on IRS Statistics of Income, is used, except for selected nonfinancial regulated industries where actual data are available. The comparable estimate for the nonfarm noncorporate sector is obtained by extrapolating the estimate of the previous year by the relative change in net interest payments of the corporate sector. This is done industry by industry. For the farm segment, the estimate is now prepared from data compiled in the annual Economic Survey of Agriculture.

The third item in monetary interest, net interest flows between U.S. and foreign countries, is the sum of the four quarterly estimates of this item in BEA's quarterly estimates of the international balance of payments. These same quarterly estimates are also used in the quarterly NIPA. Hence any data improvement for the quarterly estimates automatically improves the first July estimates. Our recommendations on the net international flow of interest are presented in Chapter 8.

Despite the brevity of this account of the data base for the first July estimate of monetary interest, it should be clear why it has been an unreliable estimate—it is the need to rely on relevant but remote proxies. Moreover, we are unable to offer a practical recommendation to redeem the situation fully. There is a promise of some improvement in the recommendation that the Federal Trade Commission carry out an annual survey of annual audited company financial reports using its current Quarterly Financial Reports as a general prototype. A minor modification in one question would be required. The items requesting nonoperating receipts and nonoperating expenditures should have a subentry for interest received and interest paid. This survey covers mining, manufacturing, and retail and wholesale trade, a significant fraction of the total.

The results of such a survey, to be useful in preparing the first July estimate, must be available to BEA by mid-May following the close of the year. (We shall return to this general recommendation in the later section on corporate profits).

The cost of financial services received in kind by individuals is accounted for as imputed interest on the income side and appears on the product side as an item under personal consumption expenditures. Imputed interest for financial intermediaries is measured as the excess of property income received from personal funds entrusted to them over property income returned in monetary form to persons. There is a major problem with the data base for the imputations because survey information provided by the Federal banking agencies consolidates the domestic and foreign operations of banking firms. Chapter 5 includes a recommendation to obtain separate data in these surveys for the domestic banking operations. Perhaps somewhat less adequate, yet viable, is the basis for determining the share of the excess that accrues to persons. For banks, the allocation is based on the ownership of deposits and invested assets based on ownership data from the Federal banking agencies and other sources. The ownership categories specified are financial business, nonfinancial business, consumer, foreign, and all others. This survey had been a candidate for elimination in 1976 but the Federal Reserve Board decided to extend the survey for another 2 years pending additional evaluation of the usefulness of the results.

Recommendation:

The demand deposit ownership survey results are a key requirement for the estimate of imputed interest and the Committee urges the Federal Reserve Board to make this a major consideration in its eventual decision on whether to continue this quarterly survey, or at a minimum to conduct the survey once every year.

Our final recommendations for the first July estimates of the broad aggregates are not prompted by our measure of reliability.

j. Personal saving

Personal saving is that part of the personal income stream used neither to defray personal tax and nontax payments to government nor for personal outlays. Personal income payments less personal tax and nontax payments is referred to as 'disposable income.' The latter after the deduction of personal outlays, composed of personal consumption expenditures, interest paid by consumers to business, and net personal transfers to individuals abroad, leaves a residual that is a measure of personal saving. This also serves as a general description of the method of estimation. Obviously, it is not a direct measure.

It is worth noting that estimates of personal income, payments to governments, and personal outlays all appear to be reliably estimated. Yet the difference representing personal saving is shown to have a revision error of unacceptable size in the February estimates. To the estimator this is an all too familiar result.

There is still another discrepancy of significant proportions between the estimation of personal saving derived within the flow of funds framework and the estimate derived within the framework of the NIPA. The approach in the former framework is by way of change in assets by type held by individuals. But here too, the change in each type of asset held by individuals is derived by the residual method. Since personal saving is a sum of various residuals, it is possible that some of the errors are offsetting. A fuller discussion and a possible explanation of the discrepancy is given in Chapter 9.

Recommendations:

In view of its derivation, the reliability of the personal saving estimate presumably would be enhanced by improving the data base of any of the three key elements.

Personal Income

Virtually all the recommendations made throughout this report that relate to factor returns and transfer payments could contribute to the improved reliability of the personal income estimate. These are too numerous to be repeated here. In addition, we recommend the following ways of improving the first July estimates of personal income:

1. *The Bureau of Labor Statistics should speed up the schedule for State governments to submit the October-December quarterly data on wage payments under the unemployment insurance reporting system (form 202) by 15 days to May 15 following the reference year to ensure their use in the first July estimates.*
2. *The Internal Revenue Service and/or Department of Labor should tabulate the data collected under the Employment Retirement Income Security Act to provide national industry aggregates of income and expenditures for retirement, welfare, health, and thrift savings plans by mid-May for the plan year covering the previous July 1 to June 30 period.*

Consumer Expenditures

Personal consumption expenditures (PCE) account for most of personal outlays. Some improvement in the goods component of PCE would result from more data for sales by class of customer and related items. To improve this type of information an additional customer category has been added to the 1977 Census of Wholesale Trade. Another new

source of information relating to the allocation of goods is being developed as part of the Transportation Census of 1977. Reference is made again to the survey of the movement of manufactures by industry of shipper and by industry of purchaser (industry classification at the 4-digit level is to be used). The tabulation of these data has the Committee's full endorsement (Chapter 3). By serving as a cross-check on allocations of manufactured output, more accurate levels of PCE should be one of the end results. *If these quinquennial tabulations are successfully implemented, the Committee also recommends that the Census Bureau provide similar transportation data annually (see detailed components of producer's durable equipment below).*

For the services component of PCE, the estimates should become more accurate as to level by the expanded coverage of the quinquennial census of selected services planned to begin with the 1977 economic censuses. Another source of improvement for the services estimates would come from the Committee's recommendation for annual surveys of all nonagricultural industries to obtain data on major statistical aggregates for use in the annual input-output tables.

Personal Taxes

Greater accuracy in the estimate of personal tax and nontax payments to governments, the third key element, would result from the proposal in the FY 1978 Budget submitted to Congress (Chapter 5) that the Census Bureau carry out a quarterly sample survey of the receipts and expenditures of State and local governments. The quarterly feature eliminates the troublesome fiscal year problem and tabulations for the four quarters of the calendar year would be available by mid-May in time for use in the first July estimate. This recommended innovation has the potential of making a significant improvement in the accuracy of the estimate of personal nontax payments. (Adequate data on personal tax payments now are available.)

k. Corporate profits

With present procedures, well grounded data on corporate profits from domestic operations first become available only for the second July estimate in the form of preliminary tabulations of IRS corporate tax returns.

For the nonregulated sector of the economy, the first July estimates of corporate profits are based on the *unaudited* records of the FTC's Quarterly Financial Reports for manufacturing, mining and trade corporations, BEA's own sample of corporate reports published in the financial press, and reports of various trade associations. These include adjustments by BEA to transform a profit report designed for stockholder use into a profit report for use in the NIPA.

The benchmark estimates of corporate profits are based on corporate profits reported to the Internal Revenue Service on the corporate income tax return. For most corporations net profit as recorded in the return differs from net profit as recorded in the books of accounts. The IRS requires each corporation to reconcile net profit per return with net profit per books. Schedule M is provided for this purpose.

Since these IRS data on corporate profits become available in final form with a lag of about three years, estimators of interim corporate profits are obliged to rely on reports of net profit per books as prepared for stockholders. This creates the need to translate net profit per books into net profit per return. This translation could be accomplished with greater accuracy if the details of the reconciliation reported in Schedule M were tabulated each year instead of sporadically with long intervals between tabulations, which is the current practice.

Recommendations:

1. *The Federal Trade Commission should carry out a survey of annual profits (audited by public accounting firms) based on the domestic operations of corporations in its sample of Quarterly Financial Reports. The tabulations of survey results should be completed in time for use in the first July GNP estimates.*
2. *The Internal Revenue Service should tabulate the data in Schedule M of corporate tax returns each year, and the Bureau of Economic Analysis should make a disciplined analysis of these tabulations.*

l. State and local government expenditures and receipts

Our final recommendation is directed to obtaining more timely and consistent measures of the State and local government sector. Annual fiscal year data on detailed expenditures and receipts by State and local governments are provided in the Census Bureau's Governmental Finances. These data cover governmental budgets with fiscal years ending during the July 1-June 30 period. Approximately 75 percent of the expenditures of all State and local governments are accounted for by governments with fiscal year ending dates of June 30; the remainder is spread among the other months with most occurring for governments with year-ending dates of December 31.

These fiscal year data are available approximately 15 months after the year ending June 30. On this schedule their first use as complete tabulations in the NIPA estimates is for the second July revision. Preliminary tabulations of a smaller sample of governments are provided to BEA for use in the first

July revisions. In addition to the problem of timeliness, the fiscal year information is not fully consistent with the calendar year NIPA estimates.

Recommendations:

The recommendation in support of a new quarterly survey of State and local government expenditure and nontax revenue in Chapter 5 would provide timely current information for major components of these governmental budgets and also would deal with the calendar-fiscal year problem. This new survey would be based on a smaller sample of governments and would provide less detailed data items than the annual *Governmental Finances*.

In addition, we recommend the following way of improving the annual NIPA estimates of State and local governments:

The Census Bureau should speed up the processing of Governmental Finances to provide these figures as complete tabulations by May 31 following the previous fiscal year for use in the first annual GNP revision.

3. **Second and third July estimates of broad aggregates**

The seven components from the framework of quarterly estimates that were unreliably estimated in the first July revision continued to show up as unreliable in the second and third July revisions, 18 and 30 months, respectively, after the close of the reference year. This occurred despite the availability of substantial additional data. By the second July revision, the Census Bureau has released its annual surveys for manufactures, wholesale trade, retail trade, and State and local government finance, and the Internal Revenue Service, its preliminary tabulations for Statistics of Income. The final tabulations of the latter in much greater industry and operational detail are the major additional data contributed to the data base for the third July revision. Concurrent with the release of these two major additional bodies of data, numerous but less comprehensive information becomes available from regulatory agencies, trade associations, and large companies that may dominate a particular industry in terms of market share.

Despite a continuous expansion in data over these 30 months, why did these seven components continue to differ by 7.5 percent or more from their benchmark estimates? It is mainly because the two major new sources of data do not pertain at all to residential structures, net exports of goods and services, or farm proprietors' income; figure only in a minor way in rental income of persons; and provide only incomplete or otherwise deficient data on inventories (which affects two other components). The net interest estimate is dependent on the new data sources directly and substantially but not completely.

The answer obviously also must depend on the character of data available for the 1967 benchmark estimates compared with the data for the second and third July revisions for the same year. The availability of the results of the 1970 Census of Housing is a clear data advantage for the 1967 benchmarks. It provided not only a cross-check on the stock of housing by owner-occupier and tenant-occupier and thereby a check on annual increments to the stock, but also on the estimates of residential construction and rental income. The economic censuses compared to the annual surveys are another source of strength for the benchmarks. Their broader industry coverage and greater detail make possible more accurate allocations of commodities and services as between intermediate and final expenditures and for the latter, as between households and government. Data on wage and salary supplements on an establishment basis from the economic censuses also make for a more accurate industry classification of income and product.

Aside from the use of periodic census data, the making of benchmark estimates is also the occasion for introducing new estimating methodologies and for incorporating new information from special studies that may or may not become recurring or refer specifically to the benchmark year, but in any case are more current or relevant than the data used in the pre-benchmark estimates. The IRS release of the results of newly audited corporate income tax results or the initiation of a new survey of the ownership of demand deposits are illustrative of these new sources of information. The additional data of this sort frequently result in changing the level of a component estimate.

In short, the incremental gains in information available to the estimator for the second and third July revisions are not sufficiently vigorous to overcome weaknesses in the first July estimates for selected broad aggregates, some of which are analytically important. Only the robust data for the benchmarks restore these particular aggregates to more accurate levels.

Recommendation:

The Bureau of Economic Analysis should review the present procedure for deferring the use of information in the form of special reports until the preparation of benchmark estimates. An alternative procedure—and the one followed in the flow of funds estimates (see Chapter 9)—is to incorporate new information of significance at each annual revision, even if these revisions should affect the estimates previous to those of the last 3 years.

E. Detailed Components of Personal Consumption Expenditures

1. Goods

Detailed items for the goods component of PCE (except cars, trucks, gasoline and oil) for the first July estimate are based on monthly sales data from the Census Bureau's Monthly Retail Trade Survey. This is the same data source used for the current quarterly estimates. The level of the annual revision is adjusted for undercoverage to include births of new firms, underreporting of sales taxes, and reporting bias in the monthly data.

For the second and third July revisions, data from the Census Bureau's *Annual Retail Trade Survey* (ARTS) with the same automotive exceptions are used as supplementary information to the monthly survey data. The ARTS data, which are based on larger survey samples and revised sales figures, generally are not available until September for the preceding calendar year. The lag is due to late reporting by some of the survey respondents. The annual revisions also are cross-checked by estimates prepared from commodity flow procedures using manufacturing shipments data in the *Annual Survey of Manufactures*, and receipts data of retail firms tabulated from tax returns in *Statistics of Income*.

The ARTS data are reported by type of store (e.g., food, apparel, general merchandise, new car dealers). The stores are classified by the major type of product sold. The sales data are reported as a single total of all products (including services)—i.e., there is no product detail on the products sold in each type of store. The ARTS data are used to extrapolate product sales which are provided quinquennially in the census of retail trade (merchandise lines).

The estimates for all three July revisions for cars and trucks are based on monthly and quarterly unit sales, price, and registration data primarily from trade sources. These permit adjustments for nameplate, model, option and ownership (household or business) as described in Chapter 5. Similarly, annual estimates of gasoline and oil purchases are based on monthly trade source information on gasoline quantities sold at retail and the consumer price index for gasoline as in the current quarterly estimates.

2. Services

The annual PCE estimates of services come from a number of data sources. The larger components are described here.

For hotel, personal and recreational services, monthly survey data from the Census Bureau's Monthly Selected Services Receipts Survey are used as in the current quarterly estimates for all three July estimates. This monthly survey recently was expanded to cover medical and legal services, resulting in the first July estimates for these services now being based on these new survey data. For the second and third July estimates, medical, dental, and legal services are based on business receipts data from *Statistics of Income*. Hospital expenditures for the three July estimates are based on hospital financial data from the American Hospital Association and the Department of Health, Education, and Welfare. Statistics of Income for 1977 will provide receipts data for the first time for an expanded list of service firms including architects, engineering, accounting and bookkeeping, hospitals, etc. These data should provide control totals at a level of professional detail not previously available. This additional source will be helpful not only to BEA but also will contribute to the broader coverage of service industries by the Census Bureau in the economic censuses for 1977.

Rentals for housing (tenant and imputed owner-occupied) for the first July revision are based on the BEA perpetual inventory estimates of the housing stock and average rentals from the decennial census of housing updated by the consumer price index for rent. The housing stock estimates are developed from cumulative construction expenditures for new residential buildings less estimates of depreciation and actual retirements from stock. [5] For the second and third annual revisions, the housing stock estimates are based on the number of tenant and owner-occupied housing units in the Census Bureau/Department of Housing and Urban Development *Annual Housing Survey*.

Estimates for auto repairs for all three July estimates (as well as the quarterly estimates) are based on extrapolations of the quinquennial benchmarks using trade source data on the number of car registrations and the consumer price index for auto repairs.

For telephone expenditures, all three July estimates include explicit data for residential and long distance telephone calls from the American Telephone and Telegraph Company. (The quarterly estimates data are limited to AT&T data for local calls for the combined total of residential and business usage.)

For electric utilities, all three July estimates include explicit measures of usage by apartment dwellers whose electricity is included in the rental payments (i.e., for buildings that do not have individually metered apartments). They are based on perpetual inventory estimates of the stock of housing units from Census data, revenue per kilowatt hour figures

[5] Young, Allan H., Musgrave, John C., and Harkins, Claudia, "Residential Capital in the United States, 1925-70," *Survey of Current Business*, November 1971.

from the Edison Electric Institute, and judgments regarding the relative usage of electricity in multi-metered compared with individual-metered residences. (The quarterly estimates are based on sales to individually metered residences only.)

For gas utilities, the first July estimate is based on the sum of quarterly American Gas Association data on revenues by customer class for a sample of gas companies. The second and third July estimates are based on virtual universe data for the gas industry.

Private education expenditures for all three July estimates are based on Office of Education figures on enrollments and tuition costs.

For operating expenses of not-for-profit organizations, including social welfare, religious, civic, cultural, educational and medical activities, the three July estimates are based on figures from the Department of Health, Education and Welfare, American Association of Fund Raising Council, National Council of the Churches of Christ in the USA, American National Red Cross, Scouting USA, The Foundation Center, etc. The data base of the not-for-profit sector has severe limitations in terms of the coverage and detail required for the NIPA. In fact, as noted in Chapter 3, the estimates of not-for-profit organizations are merged with the personal sector of the NIPA because of weaknesses in the underlying data.

Recommendation:

1. *The Census Bureau should speed up the tabulations of the Annual Retail Trade Survey to be available by May 31 following the reference year. Additional efforts should be made to have the responding firms report on schedule, and if necessary preliminary tabulations raised to national totals should be made of those company reports that have been received in time to meet the May 31 date.*
2. *The Census Bureau should collect in the Annual Retail Trade Survey broad product detail for the categories of new cars, used cars, and repair services for new car dealers; and apparel, furniture, appliances, and perhaps a few others for department stores.* The data should be tabulated in time for the second July GNP revision.
3. *After the quinquennial census of not-for-profit organizations recommended in Chapter 3 is implemented, the Census Bureau should conduct annual surveys of these organizations.* These annual surveys should provide information on income and expenditures, including component detail on the major sources of income and types of expenditures.
4. *If the planned tabulations for more detailed professional classifications in the 1977 Statistics of Income prove to be useful, the Internal Revenue Service should continue them as standard tabulations in each succeeding annual issue.* Should this be too costly, they should be done once in 5 years at a minimum, the year to coincide with the year of the economic censuses.

F. Detailed Components of Producers' Durable Equipment

The underlying data for the detailed estimates of PDE are based primarily on value of shipments information from the Census Bureau's Annual Survey of Manufactures (ASM) at the 5-digit SIC level. The ASM is first available for the second July estimates. The main exceptions are the estimates of passenger cars and trucks which are developed from trade source data as discussed in the previous section on PCE. The allocation of passenger cars to business to account for the reimbursement of employees by business for the job-related use of their cars is based on Census Bureau Current Population Survey data on mileage driven for personal as distinct from business use.

The first July estimates are an average of a commodity flow measure of equipment manufacturers' industry shipments from the Census Bureau's monthly Survey of Manufacturers' Shipments, Inventories, and Orders, and the annual BEA Plant and Equipment Expenditure (P&E) Survey. This procedure is similar to that used for the second and third July estimates but far more summary in that the monthly shipments data are aggregated by industry rather than by detailed products and less information is available on government purchases.

For the second and third July estimates, the annual P&E data and a commodity flow measure of the ASM data are averaged. The shipments data in the ASM are adjusted to the PDE commodity flow estimates in a series of steps: (1) Government purchases are subtracted, with the Federal component based on Census Bureau annual shipments data for defense-oriented industries and Department of Defense annual military contract awards data, and State and local purchases based on expenditure data from the Census Bureau's annual Governmental Finances; (2) exports of goods are subtracted and imports added based on Census Bureau monthly foreign trade data; and (3) BEA's benchmark input-output (I-O) estimates of shipments allocations to intermediate and final markets and trade and transportation margins are applied. In all three July estimates, definitional adjustments are made to the P&E survey data to make them conceptually consistent with the commodity flow PDE figures.

The revisions in the detailed components between the interim and the benchmark estimates were attributable to changes in the I-O commodity flow allocations to final demand markets as well as to changes in trade and transportation margins between 1958 and 1967, and to BEA clerical errors that occurred in the first July estimates for 1967 and were not detected in the succeeding interim estimates. The new allocation and margin information tended to affect the annual levels rather than the year-to-year movements because they were introduced on a graduated basis between quinquennial benchmark years. The clerical errors affected the movement between 1966 and 1967 and the 1967 level. BEA has since instituted procedural changes that are aimed at preventing similar errors from occurring or being perpetuated in succeeding estimates.

In addition to the weaknesses revealed by the revisions, there are possible problems associated with the timing of the PDE estimates and the definitional adjustments made to the P & E survey. With regard to the timing aspects, the investment measure conceptually should represent the period when the new equipment is added to productive capacity or when it enters company books as a depreciable asset. The commodity flow estimates, which largely reflect the timing of shipments by equipment manufacturers, tend to be earlier while the plant and equipment expenditures, which record company payments for capital purchases, tend to be later than conceptually desirable. The BEA methodology of averaging the two series reduces these timing biases, but the extent to which this procedure achieves the desirable timing is not known.

The more important definitional adjustments to the P&E survey data to make them conceptually consistent with PDE include additions for the uncovered service and farm industries and the separation of plant from equipment. These particular adjustments are now based on much firmer information than was available when the interim estimates were made for the 1963 and 1967 benchmark years. The major expansion of the P&E survey, which will be introduced with the 1978 benchmark revision, has resulted in improved coverage of services and expenditure data on plants separate from equipment. The Economic Survey of Agriculture which was initiated in the 1970's has supplied direct measures of farm capital investment.

Recommendations:

Some improvements in the data base and BEA methodology have or are being made which should raise the quality of the detailed PDE estimates. Also, the recommendation in Chapter 5 to collect monthly data on manufacturers' shipments to all governments for selected nondefense equipment industries (shipments data for defense-oriented industries now are available), as well as the speedy implementation of the Federal Procurement Data System as recommended in Chapter 3, would strengthen the commodity flow allocations to final markets. In addition, we recommend the following way of improving the PDE figures:

If the recommendation in Chapter 3 and earlier in this chapter to expand the quinquennial Commodity Transportation Survey to provide measures of the value of manufacturers' shipments between 4-digit SIC producing and purchasing industries is successfully implemented, the Census Bureau should provide these transportation data annually.

G. Data Improvements for Annual Input-Output Tables

A new program of annual input-output (I-O) tables (constructed by more summary procedures than the quinquennial tables) recently was instituted to accomplish at least two objectives.[4] One is to have another set of estimates on the product side as tentative cross-checks between the annual July revision and the ultimate benchmarking based on the quinquennial I-O tables. The benchmarking process, as we have noted in Chapter 3, generally occurs 7 or 8 years after the reference year. The second, and probably more important purpose is to update tentatively the technical coefficients. This is desired because the lag in the quinquennial estimates may render many of the technical coefficients obsolete. The 1967 I-O table, for example, was published early in 1974. Thus, the technical coefficients related to a period that had existed almost 6 years earlier. With annual updating, the lag from the reference year would be about 4 years. In principle, this reduction in the built-in obsolescence of the coefficients should enhance their analytical usefulness.

1. Methodology for annual updating of quinquennial input-output table

The preparation of the annual tables is based broadly on updating the previous quinquennial I-O table. This is done by applying the detailed base year relationships of industry purchases, sales, primary and secondary activity, and final demand bills of

[4] Annual I-O tables have been developed for the 1961 and 1966 data years as single-year updates of the 1958 and 1963 quinquennial benchmarks respectively. The emphasis in the 1961 and 1966 tables was on developing an estimating methodology for updating the benchmark I-O figures; thus, they were not used as a check on the published GNP levels. The new program provides for I-O tables for all intercensal years. These tables have been prepared for the years 1968-71. A summary I-O table for 1972 is planned for completion later in 1977. The quinquennial benchmark I-O table for 1972 is expected to be completed early in 1978.

goods, to current year data on the border components of the table—i.e., industry output levels and sectoral totals of the final demand markets.[7] It includes a comprehensive repricing of current year industry outputs to the base year prices for using the quinquennial relationships to generate transactions initially in constant prices. These derived transactions are then converted to current year prices, and the table is balanced in current price transactions.

The process for balancing the table is as follows. Detailed industry purchases of the final demand sectors (bills of goods) are based in large part on current information on the industry composition of purchases by each final demand sector, supplemented by the patterns of the previous quinquennial I-O benchmark. Initially, the expenditure levels of the final demand sectors are the figures carried in the most recent GNP estimates. The input coefficients of the previous quinquennial benchmark are used as factors to generate the dollar transactions of the intermediate part of the table as applied to actual industry output levels for the current years. These derived transactions plus the previously estimated final demand figures are summed across each industry row to arrive at interim industry output totals. Differences between the interim total and the actual output level are examined for each industry to determine judgmentally how much of the variance may reasonably be allocated to the final demand sectors. The remaining difference is then distributed to the intermediate part of the table, using mathematical statistical procedures to balance the row and column totals. This also yields a derived set of I-O coefficients for the reference year.

The estimates for new construction, inventory change, net exports, and government purchases are the same as in the annual GNP estimates, other than for known later statistical revisions in the underlying data that have not yet been incorporated in the published GNP figures. Thus, for these final demand sectors, the annual I-O estimating technique is not considered to yield figures significantly better than the existing ones.

By contrast, the data bases for consumer expenditures and producers' durable equipment in the annual GNP estimates are considered to be less reliable measures.[8] Hence, the estimates for these categories may be modified in preparing the annual I-O table. It is then left up to the judgment of BEA whether to incorporate the GNP revisions for these components implied by the I-O estimates.

a. Data base of the annual input-output tables

The data base for the industry output totals is derived largely from the Annual Survey of Manufactures, *Minerals Yearbook*, *Agricultural Statistics*, *Statistics of Income*, and regulatory agency reports. These sources provide measures of industry output at the product, establishment and company levels, as well as directly in dollar values and indirectly as the product of physical units and unit prices. Prices for deflation and unit valuation are obtained largely from the various BLS industry, wholesale and consumer price series, supplemented by agricultural, mineral and transportation information from the sources noted above.

The figures used for the final demand sectors are in large part those carried in the GNP estimates, and thus reflect the quality of the wide-ranging existing data base used in the accounts. Beyond the statistical controls of these border elements, the relationships of the most recent quinquennial I-O benchmark table are used to adjust the industry output totals for primary and secondary activities, distribute a portion of the final demand expenditure categories into detailed industry bills of goods, and derive the interim intermediate transactions.

As in the case of the quinquennial benchmark, the annual I-O update has the most direct bearing on the final demand sectors, i.e., the product side of the accounts. Its impact on the income side of the accounts is indirect and is made by virtue of the conceptual equality between GNP and charges against final product.[9]

b. Derivation of estimates of primary and secondary products in manufacturing

One of the more important statistical operations for estimating the border components of annual I-O tables for intercensal years is the adjustment of industry output levels for secondary products and services. As a result of this adjustment, the primary producing industry of any product or service includes the entire output of those items.

There are no published data to make this adjustment directly in the intercensal years. The lack

[7] The table is *balanced* only at the aggregate 80 industry level because of inadequacies in the data base and heavy reliance on mechanical estimating procedures which use base year relationships. The *initial* pricing and transactions estimates are prepared in the greater detail of approximately 350 industries (largely 4-digit SIC for manufacturing and 2- to 3-digit SIC for nonmanufacturing) in order to eliminate a source of instability in the coefficients due to changes in product mix. Improvements in the data base for the annual table as recommended in this chapter and further experience with the estimating procedures might in the future permit the preparation of balanced tables at the more detailed level.

[8] This procedure of concentrating on consumer expenditures and producers' durable equipment also is followed in the quinquennial benchmarking. See Chapter 3.

[9] See Chapter 3.

of this information is particularly troublesome in the crucial manufacturing group, both for secondary products and miscellaneous receipts.

Thus, the *Annual Survey of Manufactures* (ASM) provides no information on secondary products as such during the intercensal years. The ASM schedule does request data on secondary products and miscellaneous receipts (contract work, installation and repair, resales of goods without further processing, scrap and refuse sales) but these data have not been tabulated. (In 1967, secondary products amounted to $58 billion and miscellaneous receipts amounted to $35 billion.) Consequently, estimates of secondary product and miscellaneous receipts for the annual I-O tables are based largely on patterns of the previous benchmark year.

The base year pattern for estimating total secondary product and miscellaneous receipts can be used in either of two ways. First, the relationship of primary products, secondary products, and miscellaneous receipts can be applied to the industry value of shipments in the updated year to derive the individual controls. This technique utilizes the base year "specialization" ratio.[10] The second approach is to use the relationship of the primary products produced in the primary industry to the total value of primary products produced in all industries. This technique employs the base year "coverage" ratio.[10] At present, BEA is using the second approach in the development of control totals for the annual updates because neither one is technically superior and the one used is easier to implement. In both methods the base year distribution of secondary product shipments and the base year composition of miscellaneous receipts by industry are used to distribute the derived control totals.

Either of the techniques described requires that the base year relationships for the composition of primary products, secondary products, and miscellaneous receipts within an industry have remained stable. It also assumes a stability in the composition of the products and items within the secondary products and miscellaneous receipts. As part of the work on annual I-O estimates, BEA evaluations of Census specialization and coverage ratios for past censuses indicate that these relationships are not stable. In fact, work on the 1968 update table indicates that these relationships did not remain stable even from 1967 to 1968. For example, the initial industrial distribution of miscellaneous receipts for 1968 based on 1967 relationships resulted in a *negative* total of $2.5 billion for 35 industries. This result was adjusted to eliminate the negative receipts.

Recommendation:

The next section of this chapter deals with estimates of GNP by industry. The annual I-O tables and GNP by industry series both have the same basic data requirements. Consequently, the following recommendations for improving the data base for the annual I-O tables also apply to the GNP by industry series.

In addition, there is a considerable amount of price deflation employed in both the annual I-O and GNP by industry estimating methodologies. The associated needs for improving this price information are covered in Chapter 7.

The usefulness of the annual I-O tables as an indicator of problem areas in the annual GNP figures between quinquennial benchmarks hinges on (a) the quality of the reference year data underlying the border elements of the table, and (b) the stability of the most recent quinquennial I-O coefficients and other relationships. The recommendations are addressed to strengthening the underlying industry data for output levels, value added aggregates and selected components, and final demand investment figures.

1. *For the Annual Survey of Manufactures, Census should tabulate the industry-product shipments data as is done in the Industry Product Analyses Tables (Tables 5B and 5C) of the census of manufactures.*

Table 5B data, which are the basis of the specialization and coverage ratios, would provide the bridge between the product and establishment shipments data needed to distinguish primary products, secondary products, and miscellaneous receipts at the 4-digit SIC level. Table 5C would provide information on the industry distribution of secondary products and the composition of miscellaneous receipts for further refining the border controls of the annual input-output table.

The figures for the recommended tabulations are collected as basic data on ASM survey forms. At present, these data are prepared as preliminary tabulations by Census for its own use in updating the industrial classification codes. As in the case of the quinquennial industry-product data, complete tabulations of this information in final form on an annual basis will require extensive editing and cross-checking with other industry and product data for maintaining statistically correct balances and for dealing with problems of disclosure.

[10] The *specialization* ratio measures the extent to which plants classified in the industry specialize in making products regarded as primary to the industry. The *coverage* ratio measures the extent to which *all shipments* of primary products of an industry are made by plants classified in the industry, as distinguished from secondary producers elsewhere.

2. *The Census Bureau should tabulate the industry sales data that are collected now as part of the industrial directory program (the analogous payroll data are tabulated). In addition, the Census should collect, through a broad-based program of annual surveys of nonagricultural industries, the five items listed below.*

a. *Aggregate costs for goods and services purchased from others.*

b. *Supplements to wages and salaries.* Collect these supplemental nonpayroll labor costs separately for the two broad categories of (1) legally required social insurance, and (2) employer payments to non-legislated pension, health, welfare, stock purchase etc. programs (other labor income).

c. *Depreciation allowances (including amortization of fixed assets) by method of valuation and accidental damage to fixed capital.*

d. *Yearend value of inventories by method of valuation*

e. *Capital expenditures, separately for plant and equipment, that are depreciated or amortized.*

All information should be obtained at the company and establishment levels by legal form of business for the U.S. domestic operations of the nonfarm organizations covered by the industrial directory.

The information should be provided for national aggregates in the SIC detail variously at the 2-, 3-, and 4-digit level as indicated in the listing below. The number of digits shown in the SIC column is the level of detail required. The list covers all private for-profit and not-for-profit industries, except household employers. Data for government enterprises on sales, payrolls and employment which ultimately will be collected routinely in the industrial directory data program should be preserved separately, regardless of any reclassification to the counterpart private industry. It is recognized that the Census Bureau may require additional legislative authority to obtain information from regulated industries already reporting to other Federal agencies—transportation, electric utilities, natural gas, and banking. On the other hand, there is no statutory prohibition against the Census Bureau's compiling this information from the regulatory agencies.

These data could be collected as annual information as part of the directory program, or as supplemental surveys conducted from samples selected from the directory list, or as additions to ongoing surveys in selected industries—e.g., the ASM.

Recommended Industry Coverage for Annual Data on Purchased Goods and Services, Wage Supplements, Depreciation, Inventories, and Capital Expenditures

	SIC a/
Mining, excluding Oil & Gas	10-12,14 (3-digit)
Oil and Gas Mining	13 (4-digit)
Construction	15-17
Manufacturing	20-39 (4-digit)
Transportation	40-42,44-47
Telephone & Telegraph	481,482,489
Radio and Television	483
Electric Utilities	491, part 493
Gas Utilities	492, part 493
Water, Sanitary, Steam & Irrigation Services	(494-497) (aggregate)
Wholesale Trade	50, 51
Retail Trade	52-59
Finance	60-62,67
Insurance	63,64
Real Estate	65, 661
Personal & Business Services	70,72,75,78,79; 73, 76 (3-digit)
Professional & Not For-Profit Services	80 (3-digit) 81,84,86,89

a/ Two-digit SIC detail unless otherwise noted.

H. Annual Estimates of GNP by Major Industry Group

In October 1962, BEA initiated another annual classification of the GNP total—by industries in which the GNP originates. This series covers the years following World War II. Before 1962 and since, there have been estimates of national income by industry of origin. The latter estimates are measures of "value added" in terms of factor returns measured in current factor prices and are published for about 60 industry classifications. Thus, it has been, and still is, possible to observe structural changes in terms of the changing industry mix of national income (i.e., factor returns) since 1929 based on official and comparable estimates.

A principal analytical shortcoming of the national income by industry series has been the difficulty of

transforming these value added measures in current factor prices into measures in constant prices. Without a constant-price series, the analyst is unable to determine how much of a given change in industry totals is attributable to differential rates of change among industries in prices and how much to differential rates of change in the quantity of output.

This shortcoming does not apply to industry "value added" in terms of GNP at market prices (gross product). This gain by shifting to GNP by industry has been accomplished at a considerable loss in industry detail. The GNP by industry series is published for 22 industries compared with 64 in the national income by industry series. (In the estimating process, GNP by industry estimates are prepared for all of the industries in the national income series, but doubts as to the quality of these more disaggregated estimates preclude their publication. Unpublished estimates for the remaining industries, however, are made available on a "user beware" basis.)

Aside from making it possible to factor out price and real output change by industry, the GNP by industry series in constant prices also provides the numerator for a productivity ratio by industry. A critique of this use of the estimates will be made presumably in the course of the current inquiry on productivity statistics initiated by the Committee on National Statistics of the National Academy of Sciences. For our part, we venture only one comment, viz., the lack of industry detail greatly limits its uses in productivity analysis.

The estimating methodology for the GNP industry series has been described in the *Survey of Current Business*, October 1962, and in a 19-page statement by BEA in April 1966. The latter is available on request. The brief description that follows is taken from the second source. There have been relatively minor modifications in the methodologies since 1966.

Gross product can be adjusted indirectly for price changes by deflating output and intermediate purchases separately. Both the output and the purchases consist of specifiable goods and services that can be translated into quantity and price. The differences between the two deflated figures is gross product in constant dollars. This is known as the "double deflation" method and is the one preferred by BEA. This method in principle was used to derive the real product measures for farms, construction, manufacturing, gas and electric utilities, and railroads. These industries have accounted for about 45 percent of total GNP in current prices.

The data required for double deflation are not adequate for other industries generally because the estimates of intermediate purchases are not based on firm data. In many of these industries, however, such purchases typically comprise a relatively small fraction of total output (e.g., services). In these cases, an index of the quantity of total output is used to extrapolate the base year estimate of GNP by industry in constant prices. There are, in turn, two different approaches for the derivation of the indicator index and both are used, depending on the data available for a given industry. One is the construction of an index of physical output and the other is an implicit price deflator for gross product.

Regardless of the particular approach used, the starting point is the current price measure of industry gross product. This is obtained by adding to the national income originating in each industry its share of indirect business taxes, capital consumption allowances, and the other few nonfactor payments that reconcile national income and gross product concepts. There is, however, a prior adjustment to the estimates of national income by industry to place the estimates of corporate profits by industry on an establishment basis. This is also done for capital consumption. The basic source for these adjustments in the initial estimates is the Census Bureau publication, *Enterprise Statistics*—in particular those tabulations providing a link of Census establishment and IRS corporation data. To achieve the same adjustments for the petroleum industry, annual analyses of the industry by the Chase Manhattan Bank are used.

In manufacturing, for which data are relatively abundant, a direct extrapolator procedure is not followed because it is not possible to calculate measures of total output and intermediate purchases that would yield the exact industry gross product included in the GNP accounts. The series of total output and purchases that could be calculated on the basis of Census Bureau sources only approximate the industry GNP. Consequently, constant-dollar and current-dollar proxy series are used for calculating an implicit deflator to convert the current-dollar measures of gross product derived from the national income and nonfactor payments to constant dollars.

This description of data needs and methodology, despite its brevity, makes possible the identification of major problem areas. These include the estimates of GNP by industry in current and constant prices.

To place the national income originating in manufacturing and other industries on an establishment basis, use is made of the link table in *Enterprise Statistics*. This effort is partially limited by the inability to identify industries not within the scope of the quinquennial economic censuses. This information gap also can be eliminated by the Committee's recommendations for annual surveys of all nonfarm industries by the Census Bureau. Use of the link table provides a broad measure of this

adjustment because it assumes that profits and depreciation per employee are the same for all establishments in a given industry regardless of the industry classification of the company owning the establishment.

The data on prices suffer from two types of inadequacies. One concerns the output weights used with the wholesale price indexes of the Bureau of Labor Statistics and the other the quality of the WPI themselves. Shipments of a given manufacturing industry as reported in the annual Survey of Manufactures include secondary products classifiable in other industries while output of other industries include as secondary output shipments that are properly classifiable in the given industry. The appropriate adjustments can be made in the years of the quinquennial censuses (but not in the interim years). This deficiency is also present in the updating of the annual input-output table (see previous section of this chapter) and the solution proposed there would solve this particular program in the GNP by the industry estimates. The solution calls for the Bureau of the Census to compile in its Annual Survey of Manufactures the data that enables it to compute coverage and specialization ratios, as well as industry tabulations of secondary products.

As to the wholesale prices in the context of the GNP by industry estimates, the problem has been expressed in rather general terms. For example, a recent National Bureau of Economic Research study prepared for the Council on Wage and Price Stability noted that "As presently collected, however, the wholesale price data are not sufficiently broad or comprehensive to fully meet this need (to obtain a double-deflated GNP by industry), and their adaptation to this use is often inappropriate and unsatisfactory." [11]

Even without identification of the specific deficiencies of the WPI for these estimates, it is clear that the development of industry price indexes in contradistinction to product price indexes would significantly improve the quality of the price data for this purpose. The BLS has been engaged in such a program for a number of years but its progress has been slow owing to too little funding for the effort. The Committee recommends that substantially more funding be made available to speed the completion of this effort (Chapter 7). The uses for such indexes are many and are by no means restricted to improving the quality of the estimates of GNP by industry. The BEA would use the price data developed for this program to prepare current-weighted price deflators. The BLS industry price series are based on fixed weights.

Another weakness in the estimates of GNP by industry is the necessity to assume under the present procedures that the technical coefficients do not change significantly from one quinquennial I-O table to another and therefore from one year to the next. This assumption is contrary to fact as analysis by BEA has established. [12]

Recommendation:

The Committee's recommendations in the preceding section on annual input-output tables for the Census Bureau to collect annually selected data aggregates for sales and costs for all nonfarm industries would provide considerable additional data for substantially expanding the industry detail and for dealing with the problem of industrial classification in the GNP by industry series. Our recommendations in Chapter 7 for adequate funding of the industry price program of the Bureau of Labor Statistics, and for more systematic reconciliations of the GNP by industry and industrial production indexes jointly by the Bureau of Economic Analysis and the Federal Reserve Board, would strengthen the constant-dollar estimates of GNP by industry. In addition, we recommend the following way of improving the constant-dollar estimates of GNP by industry.

> *The Bureau of Economic Analysis should examine methods of updating the quinquennial input-output coefficients for use in preparing the subsequent year estimates of GNP by industry.* The updates would be for the period between the most recent benchmark year and the year of the current estimates. The annual input-output tables are one source of information for updating the coefficients. The present program is aimed at completing these tables approximately 4 years after the reference year.

[11] Council on Wage and Price Stability, Executive Office of the President, *The Wholesale Price Index: Review and Evaluation*, June 1977, pp. 1-9. This report was prepared by Richard Ruggles of the National Bureau of Economic Research for the Council on Wage and Price Stability.

[12] Bezdek, Roger H., and Wendling, Robert M., "Changes in Direct Input-Output Coefficients: 1947-58 and 1958-63," Bureau of Economic Analysis, mimeographed, September 1974.

APPENDIX

An Analysis of Revisions in Selected Components of the National Income and Product Accounts

The first several pages of this chapter are essentially a background preface for the analysis that follows.

A. Reliability of the Abbreviated NIPA

The reliability analysis is directed first to the overall measures of economic activity, such as the gross national product and national income, together with their major aggregative components. It is basically the set of abbreviated accounts available in the quarterly estimates and, therefore, the ones that figure prominently in the analysis of the short-term outlook. (Later in this appendix the reliability of the more detailed estimates and accounts in the various July and benchmark estimates are examined.)

1. Gross national product

In Table 4A-1, the various interim annual estimates for 1967 are shown as a percent of the benchmark estimates for 1967. The GNP total in all four interim estimates (the highest level of aggregation and therefore providing the widest scope for offsetting errors) was very close to the benchmark. The largest deviation was only 1.0 percent and this was for the February estimate. At the next lower level of aggregation—the four major components (personal consumption expenditures, private domestic investment, net exports of goods and services, and government purchases of goods and services)—only net exports meets our criterion of unreliability, i.e., a deviation from the benchmark of 7.5 percent or more. If the entries that either are a grand total or a subtotal are excluded, there are 14 entries or subcomponents, a somewhat lower level of aggregation. Of these 14, one, nonfarm residential construction , first hovered below the reliability point in the February and 1st July estimates of 1968 and then above in the 2nd and 3rd July estimates. Three, however, appear as unmistakably unreliable—residential farm structures, investment in nonfarm inventories, and investment in farm inventories. These three plus the major component of net exports are each small amounts, none amounting to as much as $10 billion out of a GNP total of nearly $800 billion. Thus small absolute deviations easily show up as large relative differences. Not unrelated, these unreliable components, with the exception of residential farm structures, are obtained as differences.

The fact that the four unreliable components are quantitatively small—the four accounting for only 1.9 percent of GNP in 1967—does not necessarily mean their unreliability is of little or no concern to the user, most of whom are primarily interested in cyclical analysis. Period-to-period changes in three of the four (the estimate of residential farm structures is the exception) are of more than considerable importance for their clues to near-term business fluctuations. Accordingly, these three estimates—change in nonfarm inventories, change in farm inventories, and net exports—must be listed as in need of data improvement. This applies to the annual estimates as well as to the quarterly because either the first July estimate for 1966 (the base for quarterly extrapolations) was unreliable or the quarterly extrapolations were not reliable, or both.

A similar analysis of the ongoing GNP estimates for 1963 and the benchmarks for the same year confirms the unreliability of the early estimates of the same four components shown to have been unreliable for 1967 (Table 4A-2). Also, with respect to 1963, several additional components proved to be unreliable, e.g., the February (1964) and/or first July (1964) estimates of producers' durable goods, nonfarm residential construction, and Federal Government purchases of goods and services, military as well as nonmilitary. All of these unreliable early estimates except residential construction were brought well within the zone of reliability by the second July (1965) estimates[13] but this was too late to improve the quality of the ongoing quarterly estimates for 1963 and 1964. For the annual estimates the needed correction came 18 months after the close of the reference year.

2. National income

Even in the February estimates, national income is shown in two ways—by type of income and by broad industry of origin. Our assesment begins with the former.

a. By type of income

Here also at the highest level of aggregation the interim totals of the 1967 national income are seen to

[13] The second and third July estimates for 1963 as published are not comparable with the first July estimates. This results from incorporating the 1958 benchmarks into the NIPA in the summer of 1965. This date coincided with the second July estimates. As with estimates for all benchmark years, these estimates incorporate definitional changes as well as statistical revisions. Therefore, part of the change between the first and second July estimates is definitional. See *Survey of Current Business*, August 1965, p 11.

TABLE 4A-1: Differences Between Annual Benchmark and Interim Estimates of GNP and its Major Components for 1967a/

Type of Expenditure	Interim Annual Estimates: Sum of 4 Quarters Feb. 1968	1st July (1968)	2nd July (1969)	3rd July (1970)	Benchmark
	(as percent of benchmark)				(billion $)
Gross National Product	99.0	99.6	100.1	100.1	792.8
Personal consumption expenditures	100.1	100.3	100.3	100.3	490.8
Durable goods	103.9	104.6	105.2	105.3	69.4
Nondurable goods	101.1	100.3	100.0	100.0	215.1
Services	98.0	98.8	99.0	98.9	206.3
Gross private domestic investment	94.3	96.1	98.7	99.6	118.9
Fixed investment	98.3	98.1	99.8	99.6	108.8
Nonresidential	100.7	98.8	98.9	98.5	82.0
Structures	91.2	94.9	94.9	95.2	29.4
Producers' dur. equip.	105.7	105.7	105.7	104.9	52.7
Residential structures	91.4	92.1	93.6	94.0	26.7
Nonfarm	91.9	92.3	93.8	94.2	26.0
Farm	85.7	85.7	85.7	85.7	0.7
Change in business inventories	51.5	60.4	73.3	81.2	10.1
Nonfarm	51.1	59.6	72.3	79.8	9.4
Farm	57.1	71.4	85.7	100.0	0.7
Net exports of goods and services	109.1	109.1	118.2	118.2	4.4
Exports	99.6	100.7	101.5	101.5	45.5
Imports	98.8	99.8	99.8	99.8	41.1
Government purchases of goods and services	98.7	99.9	100.8	100.8	178.7
Federal	99.2	100.0	100.1	100.1	90.6
National defense	100.0	99.9	99.9	99.9	72.5
Other	96.1	100.6	101.7	100.1	18.1
State and local	98.2	99.8	101.5	101.5	88.0

a/ Benchmark estimates used in this table exclude definitional and classificational revisions; i.e., differences are restricted to those attributable to statistical revisions of underlying data.

Note: Underscoring marks a total or subtotal which does not always equal sum of components owing to rounding.

Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by the Bureau of Economic Analysis.

TABLE 4A-2: Differences Between Annual Benchmark and Interim Estimates of GNP and its Major Components for 1963 a/

Type of Expenditure	Interim Annual Estimates: Sum of 4 Quarters Feb. 1964	1st July (1964)	2nd July (1965)	3nd July (1966)	Benchmark
	(as Percent of Benchmark)				(billion $)
Gross National Product	98.7	98.5	99.4	99.6	592.6
Personal consumption expenditures	99.5	100.0	99.7	100.0	375.0
Durable goods	100.6	101.8	104.3	105.3	51.2
Nondurable goods	99.1	99.3	99.6	100.0	168.6
Services	99.6	100.1	98.2	98.3	155.1
Gross private domestic investment	92.6	92.2	97.8	98.0	88.9
Fixed investment	93.4	93.5	97.8	98.0	83.0
Nonresidential	96.5	96.3	101.3	101.3	53.6
Structures	106.7	105.6	101.0	100.0	19.5
Producers' durable equip.	90.6	90.9	101.4	102.1	34.1
Residential structures	87.8	88.4	91.5	91.8	29.4
Nonfarm	87.1	87.8	91.6	92.0	28.7
Farm	114.3	114.3	85.7	85.7	0.7
Change in business inventories	78.3	73.3	95.0	98.3	6.0
Nonfarm	80.7	75.0	94.2	98.1	5.2
Farm	62.5	62.5	100.0	100.0	0.8
Net exports of goods and services	76.3	74.6	94.9	100.0	5.9
Exports	94.2	94.2	97.9	99.1	32.6
Imports	98.1	98.5	98.5	98.9	26.7
Government purchases of goods and services	102.0	99.9	99.9	99.8	122.7
Federal	102.8	100.3	99.8	99.5	64.5
National defense	111.2	106.7	99.6	99.4	51.0
Other	70.4	76.3	100.7	100.0	13.5
State & Local	101.0	99.5	100.2	100.0	58.2

a/ Benchmark estimates used in this table exclude definitional and classificational revisions; i.e., differences are restricted to those attributable to statistical revisions of underlying data, except for inclusion of definitional changes between first and second July estimates. See footnote 13.

Note: Underscoring marks a total or subtotal which does not always equal sum of components owing to rounding.

Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by BEA.

be highly reliable judged by their slight differences from the benchmark total (Table 4A-3). However, at a somewhat lower level of aggregation represented by the 13 types of income, three types of income appear unreliable in the February version. These are farm income, rental income of persons, and the inventory valuation adjustment; two others are at the borderline of unreliability—income of self-employed business and professional persons and corporate dividends paid to persons. This finding suggests that these same subcomponents were not reliably estimated in the quarterly estimates for 1967.

The dividend estimate remains at the borderline in the first July estimate (July 1968) while the estimate of net interest passed from the reliable to the unreliable category. The three estimates unreliable as of February continue to show up as unreliable in the first July estimate. Thus the quarterly estimates of these subcomponents in the subsequent four quarters are probably poorly estimated since the first July estimate is the base for the quarterly extrapolations.

It is worth noting that the estimates of questionable accuracy all relate to the factor returns to capital input. By contrast, the factor returns to labor input are reliably estimated by our test even in these earlier versions.

Unlike the unreliable components in the GNP account, those questionable in the national income accounts are not quantitatively negligible. They amount to about 12 percent of the national income benchmark for 1967, but their analytical importance is probably less. Subsequent revisions of these subcomponents in the second and third efforts failed (except in the case of dividends) to make a reduction in the amount of error sufficient to have them classified as reliable estimates even 30 months after the reference year.

The record centered on the 1963 benchmarking of the national income account confirms the findings for 1967 (Table 4A-4). The very same components designated as unreliable in 1967 also appear to have been unreliable in 1963, namely, farm income, rental income of persons, IVA and net interest. Their unreliability also persists through all the interim estimates. In addition, corporate profits and its components and other labor income also show up as unreliable in the two earliest estimates for 1963; but in the second and third July estimates these subcomponents are estimated with acceptable accuracy.[14] This record also supports the judgment that in the quarterly estimates for 1963 six of the 13 independent entries in the national income account were unreliable as to level and as many as seven of the quarterly estimates in 1964 were unreliable.

b. By industry of origin

Twelve industries are distinguished in the reduced February format compared with about 60 in the most detailed industry presentation in the July estimates. Of the 12, only two—agriculture, forestry and fisheries, and rest of the world—differ from their respective benchmarks by much more than 7.5 percent. The percentage difference is especially large in the case of the rest of the world (Table 4A-5), which measures the net flow of factor income from abroad. This is true not only for the first interim estimates in February but also for each of the three July estimates. Once again, it is safe to infer that the quarterly estimates for those two categories in 1967 were unreliable, at least as to level.

The comparable analysis for 1963 confirms the unreliability of the interim estimates of the rest of the world entry but fails to confirm the error of unacceptable size in the interim estimates of agriculture (Table 4A-6). However, two other industries—finance, insurance and real estate (FIRE) and services—were found to be unreliable in the first two interim estimates when reliability counts most in the current quarterly estimates. The interim estimates for the FIRE group were underestimated by 13 to 14 percent and these were partially offset by overestimates of 9 to 10 percent for the service group.

By way of summary, at the level of aggregation used in the system of quarterly accounts, typically the grand totals of GNP and national income are reliably estimated in the earliest as well as in subsequent interim annual estimates and this is equally true of the larger subaggregates. The degree of reliability of the February annual estimates, the sum of the four calendar quarters, supports the presumption that these same items are also estimated reliably on a quarterly basis, at least as to level. With respect to relative change from quarter to quarter, this evidence suggests a somewhat weaker presumption that these probably have an error term that is acceptable, although errors in level do not necessarily lead to errors in change. When attention is centered on the components in the system of quarterly accounts, our measures indicate that unreliability is more apt to characterize components that (1) are of relatively small size (inventory valuation adjustment, rest of the world account, and residential farm structures); (2) are derived as residuals (net exports and change in inventories, both farm and nonfarm); and (3) measure a return to capital input (farm income, rental income of persons, and net interest). More importantly, as we shall show later on, each of these components has a weak data base.

[14] *Ibid.*

TABLE 4A-3: Comparisons of Annual Benchmark and Interim Estimates of National Income by Type of Income for 1967 a/

Type of Income	Interim Annual Estimates: Sum of 4 Quarters Feb. 1968	1st July (1968)	2nd July (1969)	3rd July (1970)	Benchmark
	(as Percent of Benchmark)				(billion $)
National Income	99.6	100.1	100.2	100.2	652.4
Compensation of employees	99.7	99.4	99.2	99.2	471.1
Wages and salaries	99.3	99.2	99.3	99.2	426.7
Private	99.0	98.9	98.9	98.9	341.0
Military	100.6	100.0	99.4	99.4	16.3
Government civilian	100.6	100.9	100.7	100.1	69.4
Supplements to wages and salaries	103.4	100.9	98.9	99.5	44.4
Employer contributions for social ins.	102.3	97.3	98.6	99.1	22.1
Other labor income	104.0	104.5	99.1	100.0	22.3
Proprietors' income	98.3	102.2	104.2	104.5	59.4
Business and professional	92.6	98.3	100.2	100.4	47.1
Farm	120.3	117.1	119.5	120.3	12.3
Rental income of persons	84.5	85.3	87.4	88.7	23.8
Corporate profits and IVA	102.9	104.7	103.1	102.5	76.8
Profits before tax	102.2	102.7	102.3	101.7	78.5
Profits tax liability	104.4	106.0	104.4	105.1	31.6
Profits after tax	100.6	102.6	100.8	99.3	46.9
Dividends	107.0	107.5	100.9	100.5	21.3
Undistributed profits	95.3	98.4	101.2	98.8	25.6
Inventory valuation adjustment	70.6	70.6	64.7	64.7	-1.7
Net interest	103.7	107.8	114.4	113.0	21.6

a/ Benchmark estimates used in this table exclude definitional and classificational revisions; i.e., differences are restricted to those attributable to statistical revisions of underlying data.

Note: Underscoring marks a total or subtotal which does not always equal sum of components owing to rounding.
Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special BEA tabulations.

TABLE 4A-4: Differences Between Annual Benchmark and Interim Estimates of National Income by Type of Income for 1963 a/

Type of Income	Interim Annual Estimates: Sum of 4 Quarters Feb. 1964	1st July (1964)	2nd July (1965)	3rd July (1966)	Bench-Mark
	(as Percent of Benchmark)				(billion $)
National Income	99.1	99.1	99.7	99.8	482.2
Compensation of employees	99.4	99.4	99.6	99.6	342.4
Wages and salaries	99.8	99.8	99.5	99.5	312.8
Private	99.8	99.8	99.3	99.3	253.4
Military	100.0	99.1	98.2	99.1	11.0
Government civilian	99.6	99.6	100.6	100.2	48.5
Supplements to wages and salaries	94.6	95.3	100.7	101.0	29.6
Employer contributions for soc. ins.	102.7	100.7	100.0	100.0	15.2
Other labor income	86.3	89.7	101.4	102.1	14.4
Proprietors' income	103.1	103.3	103.7	104.1	49.0
Business and professional	101.6	101.3	101.9	102.2	37.1
Farm	108.4	110.2	110.2	111.0	11.8
Rental income of persons	60.2	61.2	87.6	85.1	20.1
Corporate profits and IVA	88.1	87.1	99.7	101.2	58.2
Profits before tax	88.5	87.8	100.3	101.7	58.4
Profits tax liability	93.5	93.9	99.2	100.4	26.2
Profits after tax	84.5	82.9	101.2	102.8	32.2
Dividends	109.9	111.1	97.5	101.9	16.2
Undistributed profits	58.7	54.4	105.0	103.8	16.0
Inventory valuation adjustment	200.0	300.0	300.0	250.0	- 0.2
Net interest	191.3	193.6	107.9	109.5	12.6

a/ Benchmark estimates used in this table exclude definitional and classificational revisions; i.e., differences restricted to those attributable to statistical revisions of underlying data, except for inclusion of definitional changes between first and second July estimates. See footnote 13.

NOTE: Underscoring marks a total or subtotal which does not always equal sum of components owing to rounding.

SOURCE: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by BEA.

TABLE 4A-5: Differences Between Annual Benchmark and Interim Estimates of National Income by Industry Group for 1967a/

Industry Group	Interim Annual Estimates: Sum of 4 Quarters Feb. 1968	1st July (1968)	2nd July (1969)	3rd July (1970)	Bench-mark
	(as Percent of Benchmark)				(billion $)
All industries, total	99.6	100.1	100.2	100.2	652.4
Agri., forestry, and fisheries	112.9	110.9	111.4	111.9	19.3
Mining & construction	100.2	98.8	98.1	98.5	40.2
Manufacturing	101.8	101.9	101.4	101.2	192.9
Nondurable goods	102.3	101.7	101.6	101.3	74.5
Durable goods	101.4	102.0	101.3	101.1	118.4
Transportation	104.0	104.0	100.0	100.4	25.1
Communication	97.0	97.8	97.8	97.8	13.4
Electricity, gas, and sanitary services	100.8	101.6	99.2	99.2	12.7
Wholesale & retail trade	98.3	99.2	99.9	99.9	97.6
Finance, insurance & real estate	95.0	95.7	97.6	97.0	74.1
Services	94.4	97.3	99.0	99.2	79.1
Government and government enterprises	99.6	99.9	99.5	99.5	94.3
Rest of the World	118.4	121.1	118.4	118.4	3.8

a/ Benchmark estimates used in this table exclude definitional and classificational revisions; i.e., differences are restricted to those attributable to statistical revisions of underlying data.

Note: Underscoring marks a total or subtotal which does not always equal sum of components owing to rounding.

Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by BEA.

TABLE 4A-6: Differences Between Annual Benchmark and Interim Estimates of National Income by Industry Group for 1963 a/

Industry Group	Interim Annual Estimates: Sum of 4 Quarters Feb. 1964	1st July (1964)	2nd July (1965)	3rd July (1966)	Benchmark
	(as Percent of Benchmark)				(Billion $)
All industries total	99.1	99.1	99.7	99.8	481.7
Agri., forestry and fisheries	102.2	103.8	103.8	103.8	17.3
Mining & construction	na b/	99.7	99.3	99.7	30.3
Manufacturing	96.1	96.0	100.5	100.5	143.1
Nondurable goods	94.8	95.1	100.9	100.5	57.2
Durable goods	97.0	96.6	100.2	100.5	85.9
Transportation	96.5	98.0	100.0	100.5	19.9
Communication	96.5	93.9	99.0	99.0	9.9
Electricity, gas, and sanitary services	96.5	97.1	99.0	100.0	10.3
Wholesale & retail trade	106.6	106.0	100.4	100.5	73.0
Finance, insurance & real estate	86.4	87.0	95.0	95.7	56.0
Services	109.0	109.8	99.8	99.8	54.2
Government & government enterprises	99.8	99.7	100.2	100.0	64.7
Rest of the world	na c/	106.7	110.0	113.3	3.0

a/Benchmark estimates used in this table exclude definitional and classification revisions; i.e., differences restricted to those attributable to statistical revisions of underlying data, except for inclusion of definitional changes between first and second July estimates. See footnote 13.

b/Amount omitted owing to inclusion of "Rest of the World".

c/Included in mining and construction.

Note: Underscoring marks a total or subtotal which does not always equal sum of components owing to rounding.

Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmarks estimates are based on special tabulations prepared by BEA.

B. Reliability of Component Estimates of Special Interest

Do the foregoing results satisfy the needs of the analyst, particularly the analyst concerned with the current economic situation and the near term future outlook? To answer this, it is not sufficient to be familiar only with the reliability of the grand totals of the NIPA or even the reliability of the typical component. It is also necessary to be aware of the reliability of particular components that are especially relevant to an assessment of the current state of the economy. Among these components certainly would be the following: the flow of personal income (distinguishing earned income from income transfers); how personal income is being used (personal consumption expenditures—showing expenditures on durables separately—saving, and taxes and nontax payments); the strength of the incentive to expand private output, namely, profits; and the strength of the demand for saving in the form of fixed investments—construction, producers' durable goods, and change in inventories. The latter is especially helpful as a guide to whether liquidation of inventories is grinding to a halt when the economy is in a recession phase or whether they are accumulating too rapidly when the economy is in the later stages of an expansion.

To be most helpful, all these particular components need to be measured monthly or quarterly or both and, indeed, personal income is in fact estimated monthly and all the other components in Tables 4A-7 and 4A-8, quarterly. Since the monthly and quarterly estimates of a given year, as previously explained, are extensions of the initial annual estimates for the preceding year, the reliability of the former estimates are therefore partly dependent on the reliability of the first annual estimates. Accordingly, as clues for components in need of data improvement, we look for two sets of differences: (1) those components of analytical importance whose annual estimate derived as the sum of the four calendar quarters differs from the benchmark for the same year by 7.5 percent or more; and (2) those components whose first July estimate differs from the benchmark for the same year by 7.5 percent or more. In the former instance, such a difference indicates the quarterly estimates are not reliable at least as to level and if the difference is large, probably unreliable also as to relative change quarter to quarter. In the latter comparison, such a difference means that the earlier interim annual estimates are not reliable and that the extrapolating base for the quarterly estimates for the following year also has not been reliable.

Most of the analytically important components for 1967 had interim estimates beginning with the earliest in February that were within the range of acceptable error (Table 4A-7). The latter may be read also as a high probability that these same components were reliably estimated on a quarterly basis. Change in inventories is a prominent exception, as noted earlier. The earliest estimate was barely half of the benchmark and although this estimate was gradually increased, the third July estimate was still only about 80 percent of the benchmark. This was also true of the nonfarm component. In view of the very large divergence on an annual basis between interim and benchmark, the quarterly estimates are also highly suspect.

Other components whose estimates had unacceptable error are personal saving in the February estimate and nonfarm residential construction in the February and first July estimates. In the succeeding revisions, estimates of both components had errors of 5 to 6 percent, i.e., close to the unacceptable margin.

A comparison of the first two interim estimates for 1963 and the benchmarks for that year reveals that the same components that were not reliably estimated in February or the first July for 1967 were also not reliable in 1963—personal saving, nonfarm residential construction, and change in inventories. More seriously, three additional components of analytical importance were shown to have been estimated with an error that is not acceptable—other saving, corporate profits, and producers' durable equipment. In all six components, the size of the error indicates that the current quarterly estimates for 1963 were unreliable as to level and probably also as to quarter-to-quarter change. The same must also be true of the quarterly estimates for 1964 in view of the large error in the first July estimates of these components which provide the extrapolation bases for the 1964 quarterly estimates.

This exercise in comparing ongoing annual estimates with benchmark estimates does more than confirm what most estimators and professional users of the NIPA have known for some time, namely, the first interim estimates on an annual basis—the February or first July estimates—of personal saving, residential nonfarm construction, and change in inventories typically are not reliable estimates and this lack of reliability probably carries over into the ongoing quarterly estimates of these same components. That these components are important in economic analysis is sufficient justification to improve the data for the first interim annual estimates. Even when these components are reliably estimated by the second or third July revisions, it is too late for their use by the analyst in assessing the current economic outlook.

TABLE 4A-7: Differences Between Annual Benchmark and Interim Estimates of Selected NIPA Components for 1967 a/

Selected Components	Interim Annual Estimates: Sum of 4 Quarters Feb. 1968	1st July (1968)	2nd July (1969)	3rd July (1970)	Benchmark
	(as Percent of Benchmark)				(billion $)
Personal Income	99.4	99.8	99.8	99.9	629.9
Factor returns	99.4	99.9	99.9	99.9	577.9
Transfer payments	99.8	99.4	100.0	99.6	52.0
Personal consumption expenditures	100.5	100.6	100.7	100.6	490.9
Durable goods	105.4	106.1	106.7	106.9	69.4
Personal taxes and nontax payments	99.0	100.0	100.5	100.6	82.5
Total Saving	95.6	99.0	99.3	99.0	134.4
Personal saving	90.4	93.9	94.4	94.4	42.8
Other saving	98.0	101.4	101.6	101.3	91.6
Corporate profits after income tax and after IVA	101.8	103.8	102.2	100.7	45.2
Fixed investment	98.3	99.4	98.8	99.6	108.8
Structures, private	91.3	93.6	94.3	94.7	56.1
Nonfarm residential	91.9	92.3	93.8	94.2	26.0
Producers' durable equipment	105.7	105.7	105.7	104.9	52.7
Change in inventories	51.5	60.4	73.3	81.2	10.1
Nonfarm	51.1	59.6	72.3	79.8	9.4
Farm	57.1	71.4	85.7	100.0	0.7

a/ Benchmark estimates used in this table exclude definitional and classificational revisions; i.e., differences restricted to those attributable to statistical revisions of underlying data.

Note: Underscoring marks a total or subtotal which does not always equal sum of components owing to rounding.
Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by BEA.

TABLE 4A-8: Differences Between Annual Benchmark and Interim Estimates of Selected NIPA Components for 1963 a/

Selected Components	Interim Annual Estimates: Sum of 4 Quarters Feb. 1964	1st July (1964)	3rd July b/ (1966)	Benchmark
	(As Percent of Benchmark)			(Billion $)
Personal income	99.7	99.5	99.8	466.6
Factor returns	99.0	99.3	100.0	430.2
Transfer payments	101.4	100.8	97.0	36.4
Personal consumption expenditures	99.8	100.3	100.3	375.0
Durable goods	101.6	102.8	106.3	51.2
Personal tax and nontax payments	99.7	101.5	101.3	60.7
Total saving	102.6	98.9	101.0	87.6
Personal saving	140.2	131.6	95.2	20.9
Other saving	91.0	88.7	103.0	66.6
Corporate profits after income tax & after IVA	83.7	84.7	101.8	32.0
Fixed investment	93.4	93.5	98.0	83.0
Structures, private	95.3	95.3	95.1	48.9
Nonfarm residential	87.1	87.8	92.0	28.7
Producers' dur. equip.	90.6	90.9	102.1	34.1
Change in inventories	78.3	73.3	98.3	6.0
Nonfarm	80.7	75.0	98.1	5.2
Farm	62.5	62.5	100.0	0.8

a/ Benchmark estimates used in this table exclude definitional and classificational revisions; i.e., differences are restricted to those attributable to statistical revisions of underlying data, except for inclusion of definitional changes between first and second July estimates. See footnote 13.
b/ The customary second July (1965) estimates for all components were not prepared by BEA.

Note: Underscoring marks a total or subtotal which does not always equal sum of components owing to rounding.
Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by the Bureau of Economic Analysis.

Perhaps less well known is the extent to which reliable quarterly estimates are dependent on having reliable annual estimates. Or expressed the other way around, improvement of the data base for the annual estimates of components that seem unreliable is bound to reduce significantly the unreliability of the quarterly estimates.

C. Reliability of Interim Annual Estimates for Detailed Accounts

The benchmark revisions as a clue to data gaps are most informative at the more disaggregative level of estimation. Accordingly, we turn now to the revision changes between the interim annual (July estimates) and benchmark estimates of specific components of two major subaggregates, in the product account—personal consumption expenditures (PCE) and producers' durable equipment (PDE)—and one in the income account—national income by 60 industry classifications. The two accounts on the product side amount to about 70 percent of total GNP and trace their benchmark estimates directly to the quinquennial input-output table.

1. Benchmark revisions in producers' durable equipment

In both 1963 and 1967, the best interim estimates (third July) of the total of private purchases of PDE differed from the benchmark estimates by 2 to 5 percent. This largest component of private investment is itself broken down into 22 equipment types and only in 5 in 1963 and another 7 in 1967 were the interim estimates off target by as little as 2 to 5 percent. In other words, the close approximation of total PDE results from the offsetting of very much larger differences of the individual components. How much larger is shown by the distribution of the relative size of the difference between interim and benchmark estimates in Table 4A-9. (This series begins with the completion of the 1958 input-output table which was incorporated into the NIPA in the summer of 1965. This makes possible only a third July estimate for 1963.)

If an interim estimate that differs from its benchmark by 7.5 percent or more is deemed to be unreliable, then as many as 64 percent of third July estimates of the 22 components of PDE were unreliable in 1963 and about the same percentage for the first and second July estimates for 1967, decreasing to 50 percent with the third estimate. Indeed, more than one-fourth of the PDE components had differences between all interim and benchmark estimates of as much as 20 percent or more in both years.

To what extent are the equipment types with large revisions (7.5 percent or more) in 1963 also characterized by large revisions in 1967 and, similarly, those with small revisions? A distribution for equipment types is given in Table 4A-10. In 1963, of the 14 types with large revisions, 6 were also subject to large revisions in 1967. Of the 8 types with small revisions in the earlier benchmark year, 3 continued to undergo small revisions in the later benchmark year. The combined comparison indicates that in about 40 percent of the 22 types of equipment the size of the revision bias has been constant in terms of being over or under 10 percent. Although not shown in Table 4A-10, the consistency of bias in terms of direction of revision is even stronger involving nearly 80 percent of the equipment types. That is, in 10 types the interim estimates exceeded the benchmark estimates in both years and in 7, the reverse happened.

Another way of judging the reliability or unreliability of the interim estimates is to determine in how many equipment types would the analyst have been misled as to the growth of output between 1963 and 1967 based on the interim estimates (third July) compared to the "true" change based on the two sets of benchmark estimates. The two sets of relative change by equipment category are shown in Table 4A-11. In only 2 of the 22—service industry machines and instruments—were the percentage changes between 1963 and 1967 much the same whether based on the interim estimates or the benchmarks. In 3 components—mining and oilfield machinery, other electrical equipment, and miscellaneous equipment—the interim estimates pointed to gains of one-quarter, one-third, and one-half whereas the benchmark estimates registered a much more modest expansion of 5, 13, and 19 percent. In the case of electrical transmission, distribution, and industrial apparatus, the interim figure shows a modest gain of 10 percent compared with 56 percent based on the benchmark estimates. These are the more glaring cases in which the analyst would have been grossly misled by the interim estimates. In some of the remaining 16 equipment types, the consistency of direction and size of bias scales down the differences in relative growth but even so the size of the remaining difference is such as to raise legitimate doubts about the reliability, and therefore usefulness, of these estimates by detailed equipment classifications, except when they are based on benchmark data.

A final observation relates to the degree of improvement achieved by the two successive revisions that each original annual interim estimate undergoes. More specifically, is the second July estimate closer to the benchmark estimates than the first July estimate and the third July closer than the second? The information summarized in Table 4A-12 makes

TABLE 4A-9: Distribution of Specific Equipment Types in Producers' Durable Equipment by Percent Deviation of Interim (July) Estimates from Benchmark Estimates,a/ 1967 and 1963

Percent Deviation of Interim from Benchmark Estimates (sign disregarded)	1967			1963b/
	1st July	2nd July	3rd July	3rd July
	Number of Equipment Types			
Less than 7.5	8	7	11	8
7.5 to 9.9	0	4	1	5
10.0 to 19.9	7	5	2	3
20.0 to 29.9	2	4	6	5
30.0 and over	5	2	2	1
Total number	22	22	22	22

a/ Benchmark estimates used in this table exclude definitional and classificational revisions; i.e., differences are restricted to those attributable to statistical revisions of underlying data.

b/ First and second July estimates for these 22 components were not prepared by BEA for 1963.

Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by BEA.

TABLE 4A-10: Equipment Types in the PDE Total by Differences Between Interim and Benchmark Estimates 1963 and 1967.

A. 7.5% or more Difference

1963	1967
Furniture & fixtures	Furniture & fixtures
Fabricated metal products	Fabricated metal products
Engines & turbines	Engines & turbines
Tractors	
	Construction machinery
Agricultural machinery (except tractors)	
	Mining & oilfield machinery
General industrial, incl. materials handling equipment	

TABLE 4A-10: Equipment Types in the PDE Total by Differences Between Interim and Benchmark Estimates 1963 and 1967.
Continued

A. 7.5% or more Difference

1963	1967
	Special industry machinery (n.e.c.)
Office computing & accounting mach.	Office computing & accounting mach.
Service industry machinery	Service industry machinery
	Electrical transmission, distribution and industrial apparatus
Communication equipment	Communication equipment
Trucks, buses and truck trailers	
	Other electrical equipment
Passenger cars	
Aircraft	
Railroad equipment	
Miscellaneous equipment	

B. Less than 7.5% Difference

1963	1967
	Tractors
	Agricultural mach. (except tractors)
Construction machinery	
Mining & oilfield machinery	
Metal working machinery	Metal working machinery
Special industry mach. (n.e.c.)	
	General industrial, incl. materials handling, equip.
Electrical transmission, distribution and industrial apparatus	
Other electrical equipment	
	Trucks, buses & truck trailers
	Passenger cars
	Aircraft
Ships and boats	Ships and boats
	Railroad equipment
Instruments & photographic equipment	Instruments & photographic equipment
	Miscellaneous equipment

Table 4A-11: Percent Change in Producers' Durable Equipment by Type of Equipment, 1963 to 1967, Based on 3rd July and Benchmark Estimates[a]

Type of Equipment	Producers' Durable Equipment 1963 Estimates 3rd July	1963 Estimates Benchmark	1967 Estimates 3rd July	1967 Estimates Benchmark	Percent Change 1963-67 Based on 3rd July Estimate	Percent Change 1963-67 Based on Benchmark Estimate
	(in millions of dollars)				3+1	4÷2
	(1)	(2)	(3)	(4)	(5)	(6)
Producers' durable equipment, total [b]	34,878	35,202	55,371	54,784	58.8	55.6
Furniture and fixtures	1,910	1,609	2,602	2,298	36.2	42.8
Fabricated metal products	1,026	877	1,736	1,405	69.2	60.2
Engines and turbines	529	423	988	760	86.8	79.7
Tractors	1,013	1,117	1,870	1,749	84.6	56.6
Agricultural machinery (except tractors)	1,365	1,483	2,374	2,233	73.9	50.6
Construction machinery	1,239	1,252	1,748	1,935	41.1	54.6
Mining and oil field machinery	575	538	728	564	26.6	4.8
Metal working machinery	1,872	1,784	3,718	3,669	98.6	105.7
Special industry machinery, n.e.c.	2,185	2,200	3,101	3,502	41.9	59.2
General industrial, including materials handling, equipment	2,086	2,291	3,160	3,264	51.5	42.5
Office computing and accounting machinery	2,246	1,962	5,051	3,728	124.9	90.0
Service industry machinery	1,693	1,360	2,653	2,088	56.7	53.5
Electric machinery	4,630	5,361	6,297	7,898	36.0	47.3
Electrical transmission, distribution and industrial apparatus	2,099	2,034	2,302	3,165	9.7	55.6
Communication equip.	2,047	2,868	3,341	4,214	63.2	46.9
Other electrical equipment	484	459	654	519	35.1	13.1
Trucks, buses & truck trailers	4,766	4,361	5,835	6,101	22.4	39.9
Passenger cars	3,643	4,008	4,396	4,589	20.7	14.5
Aircraft	630	488	2,645	2,489	319.8	410.0
Ships and boats	348	362	583	556	67.5	53.6
Railroad equipment	602	977	1,649	1,774	173.9	81.6
Instruments	1,473	1,402	2,659	2,582	80.5	84.2
Miscellaneous equip.	1,047	1,347	1,578	1,601	50.7	18.9

[a] Benchmark estimates used in this table exclude definitional and classificational revisions, i.e., differences are restricted to those attributable solely to statistical revisions of underlying data.

[b] Total excluding scrap deduction.

Note: Underscoring marks a subtotal.

Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by BEA.

such a comparison possible for 1967. The numbers, (1, 2, and 3) in the table refer to first July, second July and third July estimates, respectively. The availability of additional data in each of the 2 years following the original estimate is the reason for the revisions. If the incorporation of additional data results in improved estimates, the entries in each row of Table 4A-12 would read 3, 2, and 1. This occurred in only 8 of the 22 categories. In 6 categories, the reverse is found; that is, the initial estimate is closest to the benchmark and the third July estimate is the least close. If the sequence in the row is disregarded, the third July estimate is closest in 10 types but this is also true of the first July estimate in 8. Moreover, the frequency of the third July estimate being the least close is much the same as for the first July estimate, 7 and 10 respectively. Thus, if the results for 1967 are typical of other benchmark dates, the ongoing revision process of the interim estimates succeeds in improving only about half of the components of producers' durable equipment and in about half the revised interim estimates are inferior to the initial estimates.

2. Benchmark revisions in personal consumption expenditures

Unlike the quarterly estimates of PDE for which no subcomponents are shown, the quarterly estimates of PCE are presented with 11 components grouped under the three headings of durable goods, nondurable goods, and services. This provides an opportunity to judge the reliability of the quarterly estimates, at least as to level. Accordingly, we examine first the differences between the February annual estimates—sum of the four calendar quarters—and the benchmarks.

From a table shown earlier (4A-1) the total PCE on a quarterly basis appeared reliably estimated together with the component of durable consumer goods both in 1967 and 1963. Based on data in Table 4A-13 the same occurs for the total of nondurable goods and total services. At this level of aggregation, there is sufficient scope for the rule of offsetting errors among the underlying components to be operative. The smallness of the differences between the February annual totals and the benchmark estimates suggests that the quarter-to-quarter changes in 1967 and 1963 were probably reliable as well as the annual level.

The 11 subcomponents of the February PCE total represent a still lower level of aggregation and here the offsetting of errors does not always occur in each of the 11 classifications. In 1967, for example, 4 of the 11 personal consumption categories must be characterized as unreliable by our criterion—a difference, plus or minus, of 7.5 percent or more between February and the benchmark estimates. The 4 are furniture and household equipment, clothing and shoes, household operation, and transportation. Three other consumption classifications with still larger differences were found to be unreliable in 1963 (Table 4A-14). Thus, on the showing of the revisions for these 2 benchmark years, only 4 subcomponents of the 11 had reliable annual estimates based on the quarterly estimates in 1963 and 1967. The 4 are automobiles and parts, food and beverages, gasoline and oil, and other nondurable goods. Except for these 4 components, the analyst of the current outlook should recognize the tentativeness of the quarterly estimates of PCE components.

The successive annual July revisions of the components did not consistently improve the reliability of the February estimates. As often as not the difference between the third July estimate and benchmark was larger than the difference between the February annual estimate and the benchmark. However,it should be noted that in most cases the absolute as well as the relative differences have been small in both years.

3. Reliability of detailed listing of PCE

The estimates of the detailed items of personal consumption—82 items are published—for any given year are first released as part of the first July estimates for that year, i.e., 6 months after the end of the year. As with other components, these undergo revision when the second and third July estimates for that year are prepared and eventually are either replaced by or anchored to the benchmarks, depending on whether the given year is or is not a benchmark year. The high reliability of the estimate of total PCE and most of the major subcomponents has already been noted not only for estimates on an annual basis but also, by inference, for those on a quarterly basis. An examination of the estimates of the detailed items makes it readily apparent that the reliability of the interim estimates of the broad-based aggregates results frequently from the offsetting of large deviations, plus or minus, of the detailed interim estimates from their benchmark estimates.

a. Household operations

The subaggregate of "household operations," composed of 14 detailed entries, may be taken as fairly typical. For 1963, the first July estimate for this category was below the benchmark only by 1.7 percent. However, 7 of the 14 published entries had deviations of 7.5 percent or more, ranging from -21.6 to +29.9 percent. That is, by our measure half of the items were unreliably estimated. The comparable

TABLE 4A-12: Successive Revisions of Interim Estimates of Producers' Durable Equipment by Types and Their Relation to Benchmarks, 1967

Types of Equipment	Interim Estimates in Relation to Benchmarks		
	Closest	2nd Closest	Least Close
Furniture and fixtures	1	2	3
Fabricated metal products	1	2	3
Engines and turbines	2	3	1
Tractors	3	2	1
Agricultural machinery (except) tractors)	3	2	1
Construction machinery	3	1	2
Mining and oilfield machinery	2	3	1
Metal working machinery	3	2	1
Special industrial machinery	1	3	2
General industrial machinery including materials handling equipment	3	2	1
Office computing and accounting machinery	3	1	2
Service industry machinery	2	1	3
Electrical transmission and distribution & industrial apparatus	1	2	3
Communication equipment	3	2	1
Other electrical equipment	2	3	1
Trucks, buses and truck trailers	1	2	3
Passenger cars	1 & 2		3
Aircraft	1	2	3
Ships and boats	3	2	1
Railroad equipment	3	1 & 2	
Instruments and photographic equipment	1	3	2
Miscellaneous equipment	3	2	1

Note: 1 = First July estimate; 2 = Second July estimate; 3 = Third July estimate.

TABLE 4A-13: Interim Estimates of Personal Consumption Expenditures as Percent of Benchmark Estimates for 1967 a/

Major components of PCE	Sum of 4 Quarters Feb. 1968	1st July (1968)	2nd July (1969)	3rd July (1970)	Bench-mark
	(as percent of benchmark)				(billion $)
Personal consumption expenditures	100.1	100.3	100.3	100.3	490.8
Durable goods	103.9	104.6	105.2	105.3	69.4
Automobiles & parts	102.8	106.7	107.0	107.0	28.5
Furniture & household equip.	108.4	106.1	106.1	106.4	29.5
Other	95.6	95.6	98.2	98.2	11.4
Nondurable goods	101.1	100.3	100.0	100.0	215.1
Food and beverages	100.9	99.8	98.6	99.0	109.6
Clothing and shoes	112.0	110.2	111.3	110.7	38.2
Gasoline and oil	102.9	106.5	104.1	103.5	17.0
Other	92.6	91.8	93.0	92.8	50.3
Services	98.0	98.8	99.0	98.9	206.3
Housing	96.2	95.7	96.9	96.9	74.1
Household operation	92.2	94.8	95.1	95.1	30.6
Transportation	90.7	92.6	90.7	89.5	16.2
Other	102.8	104.1	103.7	103.7	85.4

a/ Benchmark estimates used in this table exclude definitional and classificational revisions; i.e., differences are restricted to those attributable to statistical revisions of underlying data.

Note: Underscoring marks a total or subtotal which does not always equal sum of components owing to rounding.
Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by BEA.

TABLE 4A-14: Interim Estimates of Personal Consumption Expenditures as Percent of Benchmark Estimates for 1963 a/

Major Components of PCE	Interim Annual Estimates: Sum of 4 Quarters Feb. 1964	1st July (1964)	3rd July (1966)	Benchmark
	(as Percent of Benchmark)			(Billion $)
Personal consumption expenditures	99.5	100.0	100.0	375.0
Durable goods	100.6	101.8	105.2	51.2
Automobiles and parts	94.1	95.8	102.5	23.7
Furniture & household equipment	104.9	105.4	109.4	20.3
Other	109.7	111.1	102.8	7.2
Nondurable goods	99.1	99.3	100.0	168.6
Food and beverages	98.7	99.2	100.5	87.8
Clothing and shoes	102.7	104.1	103.7	29.5
Gasoline and oil	100.8	99.2	104.7	12.9
Other	100.5	100.0	98.4	38.4
Services	99.6	100.1	98.3	155.1
Housing	84.8	84.3	95.5	58.0
Household operation	97.8	98.3	97.8	23.4
Transportation	99.2	95.9	97.8	12.2
Other	114.2	116.5	101.9	61.5

a/ Benchmark estimates used in this table exclude definitional and classificational revisions; i.e., differences restricted to those attributable to statistical revisions of underlying data, except for inclusion of definitional changes between first and second July estimates. See footnote 13.

Note: Underscoring marks a total or subtotal which does always equal sum of components owing to rounding.

Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by BEA.

measures for 1967 are much the same—the group total understated the benchmark by 5.2 percent but 8 of the 14 differed from the benchmarks by 7.5 percent or more, the range being wider—from -29.7 to +30.6 percent. Thus, as the classification of expenditure is narrowed, there is a much smaller probability of the errors being offsetting.

b. Detailed expenditure estimates

That the detailed estimates under "household operations" are not unrepreseantative is amply supported by some summary figures relating to the 81 or 82 classifications of personal consumption expenditures. For example, in the first July estimates for 1963 more than half of the 81 consumption items, about 57 percent, differed from their benchmark estimates by 7.5 percent or more—that is, had estimating errors that are unacceptable (Table 4A-15). For as many as one-fifth of the items, the difference was as much as 20 percent. Since the first July estimates are prepared before the results of the annual survey of manufactures and trade are available, it might be considered that this record of unreliability in matter of details is to be expected. On the other hand, in the subsequent annual revisions, and surely by the third July estimate when the annual survey data are at hand, most of the detailed estimates would be within the range of reliability. This pattern, however, is not supported by actual estimating results. To be sure, the share of reliable estimates increased from 43 to 59 percent but two-fifths of the entries were still unreliably estimated 2 1/2 years after the reference year. Moreover, users had to make do with these poor estimates for about another 10 years until the 1963 benchmarks were incorporated into the NIPA in January 1976.

TABLE 4A-15: Estimates of Detailed Components of Personal Consumption Expenditures Classified by Percent Deviation of Interim Estimates from Benchmark Estimates, 1963 and 1967

Percent Deviation of Interim from Benchmark Estimates (sign disregarded)	Detailed Components of PCE			
	1963		1967	
	1st July Estimates	3rd July Estimates	1st July Estimates	3rd July Estimates
	A. Number of Components			
0	0	8	0	2
0.1 - 3.4	15	20	28	28
3.5 - 7.4	20	20	16	14
7.5 - 9.9	6	9	6	8
10.0 - 14.9	12	9	9	9
15.0 - 19.9	11	8	7	5
20.0 - 29.9	9	4	10	10
30 and over	8	3	6	6
All Components	81	81	82	82
	B. Percent of All Components			
0	0	9.9	0	2.4
0.1 - 3.4	18.5	24.7	34.2	34.2
3.5 - 7.4	24.7	24.7	19.5	17.1
7.5 - 9.9	7.4	11.1	7.3	9.7
10.0 - 14.9	14.8	11.1	11.0	11.0
15.0 - 19.9	13.6	9.9	8.5	6.1
20.0 - 29.9	11.1	4.9	12.2	12.2
30 and over	9.9	3.7	7.3	7.3
All Components	100.0	100.0	100.0	100.0

Much of this improvement in reliability between the first and third July estimates for 1963 must be attributed to the incorporation of the 1958 benchmarks into the NIPA in the summer of 1965, at about the time of the second July estimate for 1963. This is equivalent to a mid-course correction. At any rate, when there was no such correction, as in the case of the third July estimates for 1967, the third July estimates showed virtually no improvement over the first July estimates (see Table 4A-15). In fact, only two unreliable estimates as of the first July estimates were rendered reliable by the third July revisions. In other respects, the record of the 1967 estimates is essentially the same as the record for the 1963 estimates. Slightly more than one-half of the detailed estimates are classified as reliable by our measure and slightly less than half as unreliable. For 1967 also these detailed estimates, half acceptable and half unacceptable, were not replaced by (presumably) better estimates, i.e., the benchmarks, until about 5 1/2 years after the release of the third July estimates.

In this context it is worth remembering an earlier point, namely, it is the first July estimates that serve as the base for quarterly extrapolations for the current year. These detailed estimates provide weights for the price indexes used in estimating real PCE. Therefore the presence of large errors in many of the detailed annual interim estimates could cause some minor distortions in the quarterly estimates in constant prices.

c. Persistence and identity of unreliable estimates

How many of the estimated detailed items of personal consumption shown as unreliable in the first July round for 1963 were also unreliable in the same round of estimates for 1967? (These are the only years for which this count can be made at this time.) By our rule, 46 estimates of detailed items were unreliable among the first July estimates for 1963 and 30 of these, or 65 percent, also had first July estimates for 1967 with unacceptably large errors. Put another way, of the first July estimates for 1967, 38 were deemed to be unreliable and as many as 30 of these, or nearly four-fifths, had also been classified as unreliable in the first July estimates of 1963. There is another count that seems relevant—of the 82 items composing the total of PCE, 54, or nearly two-thirds, were unreliably estimated in either 1963 or 1967 judged by their first July estimates. Not only the number of categories but also the value of the expenditures is considerable.

In Table 4A-16 are entered the 54 items of personal consumption expenditures, the first July estimates of which have been found to be poor either in 1963 or 1967. They are subdivided into three groups: (1) those unreliably estimated both in 1963 and 1967; (2) those unreliably estimated only in 1963; and (3) those unreliably estimated only in 1967. The 30 expenditure categories in the first group were estimated at $71.4 billion by the 1963 benchmarks and at $92.8 billion by the 1967 benchmarks. In both years these expenditures represented 19 percent of total PCE. The addition of the last two groups means that 41 percent of the 1963 and 32 percent of the 1967 estimates of PCE were unreliable in their respective first July estimates.

It is quite clear that each group is dominated by the services. This is the expected result for two reasons. The proportion of poor estimates among the service expenditures is about the same as the proportion of service items among all items of personal consumption expenditures. Thus, BEA distinguishes 82 consumption classifications and 52, or 63 percent, are designated as services. By our measure, 54 consumption items qualify as poorly estimated either in 1963 or 1967 or in both years and 33 of them, or 61 percent, are classified as services.

The second reason is that the Census Bureau has provided only partial coverage of the service industries both in its quinquennial censuses and monthly surveys. This is clearly indicated by the use of the words, "Selected Services" in the title of the Census Bureau's reports on the service industry. By contrast, the Census Bureau has had a much fuller coverage of commodities in its quinquennial censuses and annual surveys of manufactures and trade. As noted in the postscript to Chapter 3, the census coverage of the service group will be significantly expanded beginning with the economic censuses for 1977.

d. Relative growth in specific consumption expenditures

If an analyst in the second half of 1968 had been interested in quantifying the growth in consumption expenditures item by item from 1963 to 1967, the only suitable data would have been the third July estimates of the PCE components for 1963 and the first July estimates for 1967. One year later, the measures could have been based on the third July estimates for 1963 and the second July estimates for 1967 could have been substituted for the first July estimates. After July 1970, the measures could incorporate the third July revisions for both years. Only in the first months of 1976 would there have been the possibility of measuring the 'true' changes based on the benchmark estimates. Would the use of the successive interim estimates, in view of the many unreliable estimates among them, have resulted in misleading impressions of the rate of change? If it

would, in how many of the consumption items and which ones? A rate of growth of a given consumption item is "misleading" by our definition whenever the percent change between 1963 and 1967 based on interim estimates differs by 15 or more percent in either direction from the percent change based on the benchmark estimates.

The consumption items so poorly estimated on an interim basis in 1963 and 1967 as to give misleading indications of rate of change (using 15 percent difference as the cutoff) are all included among those listed in Table 4A-16 and are indicated by an asterisk. They are to be found in all three panels of the table and a high percentage are classified as services.

An analyst, regardless of which interim estimates were used, would have been misled as to the "true" change between 1963 and 1967 in about 20 percent of the PCE items. If "misleading" is defined as a difference of 10 percent, the percentage of misleading entries would be 33 percent when the 1967 levels are measured by the first July estimates and 29 percent when measured by the third July estimates. On the other hand, as the more recent interim estimates are substituted for earlier ones for measuring change, there was a significant increase in the percentage of PCE items with the smallest deviations from the "true" change, i.e., less than 5 percent. The percentage increased from 45 to 50 to 55.

TABLE 4A-16: Estimates of Detailed Personal Consumption Expenditures Classified as Unreliable Based on First July Estimates, 1963 and 1967a

A. Unreliable in 1963 and 1967

1 Shoe cleaning and repairing ***
2 Men's and boy's clothing
3 Cleaning and dyeing, etc.
4 Other clothing ***
5 Toilet articles and preparation
6 Rental value of farm houses
7 Kitchen and other household appliances
8 Semidurable house furnishings
9 Cleaning and polishing preparations
10 Water and other sanitary services
11 Other household operations **
12 Ophthalmic products and orthopedic appliances ***
13 Imported service of financial intermediaries
14 Expenses of handling life insurance
15 Auto repair, greasing, washing, etc.
16 Bridge, ferry and tunnel toll charges
17 Intercity bus transportation ***
18 Other intercity transportation ***
19 Books and maps ***
20 Wheel goods, durable toys, boats, etc. ***
21 Radio and TV repairs *
22 Flowers, seeds, and potted plants
23 Legitimate theatre, opera, etc.
24 Motion picture theatres
25 Spectator sports ***
26 Commercial participant sports
27 Pari-mutuel net receipts
28 Other recreation
29 Higher education *
30 Elementary and secondary schools

B. Unreliable in 1963 but not in 1967

1 Food produced and consumed on farms
2 Tobacco products
3 Barber shops and beauty parlors
4 Owner-occupied nonfarm rental
5 Tenant-occupied nonfarm rental
6 China, glassware, and tableware
7 Other durable house furnishings
8 Other professional services ***
9 Health insurance ***
10 Brokerage charges and investment counseling ***
11 Tires, tubes, accessories and parts ***
12 Airline transportation
13 Magazines, newspapers and sheet music
14 Radio and TV receivers *
15 Expenditures abroad by U.S. Government personnel **
16 Expenditures in U.S. by foreigners

C. Unreliable in 1967 but not in 1963

1 Women's and children's clothing
2 Stationery and writing supplies *
3 Other fuel and ice

4 Domestic service

5 New cars and net purchases of old

6 Auto insurance premiums less claims

7 Railway intercity transportation (excluding commutation) ***

8 Personal remittances in kind abroad ***

4. Benchmark revisions in national income by industry

To gauge the reliability of the interim estimates of detailed components of national income, we again examine the size of the revisions occasioned by the benchmark estimates for each of some 60 industries. This is the most detailed of the published national income estimates. The same test of reliability is used—a deviation of 7.5 percent or more from the benchmark estimate.

This is done despite the realization that this sort of reliability test applied to national income components is more crude than when it is applied to product components. This follows because the benchmark estimates of national income are affected only indirectly by the quinquennial input-output estimates. Another way of stating much the same point is that the estimator of national income has nearly as much data at hand in preparing the third July interim estimate as for the benchmark estimate itself. (This has not been the case for the estimator of the product benchmark estimates.)

This explains the lower incidence of unreliability by our standard among the 64 industry estimates than among the detailed components of personal consumption expenditures (Table 4A-17). That is, if independent and more comprehensive data were available for the national income benchmark estimates, undoubtedly a larger percentage of the national income components would be found to be unreliable by our definition. (Recommendations for improving selected income data in the quinquennial economic censuses are made in Chapter 3.) It is most unlikely, however, that those industry estimates designated as unreliable by our test would turn out to be reliable with more accurate benchmark estimates. We therefore accept this evidence of unreliability though it is caught in a net with a larger mesh.

In 1967, 25 percent of the first July estimates of 64 industries missed their benchmark estimates by 7.5 percent or more; as to the third July estimates, in principle the most reliable of the interim estimates, this percentage was reduced to 17 (Table 4A-17). (The comparable percentages for the components of personal consumption expenditures were 46 both for the first and third July estimates.)

That most of the industries had interim estimates that differed by negligible amounts from the benchmarks is clearly indicated by the nearly one-fifth of the industries having first July estimates for 1967 that differed by less than 1 percent from the 1967 benchmarks and nearly two-thirds of the industries that differed by less than 5 percent. In terms of the third July estimates, the comparable percentages are 40 and 80 percent, respectively.

For 1963, the first July estimates had a considerably higher incidence of unreliable industry estimates, more than two-fifths differed by 7.5 percent or more from their benchmark estimates. The comparable percentage for the third July estimates was about one-tenth (Table 4A-17). The sharp reduction must be attributable in good part to the mid-course correction in 1965 made by anchoring the estimates to the 1958 benchmark estimates.

To the extent the quarterly estimates by broad industry groups are based on the extrapolation of the annual estimates of the detailed industries composing the broader industry groups, the reliability of the first July estimates takes on a special significance. The introduction of the 1967 benchmark estimates revealed that 17 of the 64 industries had first July estimates that were not reliable, while the introduction of the 1963 benchmarks showed that 26 industries had first July estimates with unacceptable errors (Table 4A-18). Only 8 industries (those underscored) were common to the lists in both years.

It seems a reasonable inference that the data base, at least for the first July estimate, for these 8 industries needs to be improved to produce estimates with acceptable error. These 8 industries accounted for about 4 percent of national income for 1967. Also suspect is the data base for 10 industries, all of whose three interim estimates for 1967 were unreliable. Five of these, however, are also on the first list of 8, making a net addition of 5 industries with unreliable estimates for 1967. These 13 industries contributed nearly 11 percent of the 1967 national income—a share that certainly is large enough to be of concern both to estimators and users.

Footnotes to Table 4A-16:

a/ An unreliable estimate is defined as an interim estimate that either understates or overstates the benchmark estimate by 7.5 percent or more.

* Misleading change 1963-67 when first July estimate represents 1967 level (except for B14 when third July represents 1967). ** Misleading change 1963-67 when either first July or second July estimate represents 1967 level.

*** Misleading change 1963-67 regardless of which interim estimate represents 1967.

Note: The definition of misleading indication of change is discussed early in this chapter.

TABLE 4A-17: Distribution of Interim Industry Estimates of National Income by Deviation from Benchmark Estimates, 1967 and 1963

Percent Deviation of Interim from Benchmark Estimates (sign disregarded)	1967 Percent Distribution of Interim Industry Estimates by Deviation from Benchmark		1963 Percent Distribution of Interim Industry Estimates by Deviation from Benchmark	
	1st July Estimates	3rd July Estimates	1st July Estimates	3rd July Estimates
Less than 1%	18.8	40.6	23.3	53.2
1.0 - 2.4	34.3	29.7	6.7	17.8
2.5 - 4.9	12.5	7.8	20.0	11.3
5.0 - 7.4	9.4	4.7	6.7	8.1
7.5 - 9.9	12.5	7.8	13.3	4.8
10 or more	12.5	9.4	30.0	4.8
Total Percent	100.0	100.0	100.0	100.0
Number	64	64	60	62

Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by BEA.

TABLE 4A-18: Specific Industries with Specific Interim National Income Estimates with Unacceptable Errors

Industry	1967 Interim Estimates with Unacceptable Errors			1963 Interim Estimates with Unacceptable Errors		
	1st July	2nd July	3rd July	1st July	2nd July	3rd July
Farms	X	X	X			
Agricultural services, forestry and fisheries	X	X	X		X	X
Coal mining				X		
Metal mining	X		X			
Nonmetallic minerals				X		
Crude petroleum & natural gas	X					
Food and kindred products				X		
Tobacco manufactures	X					
Primary metal products				X		

TABLE 4A-18: Specific Industries with Specific Interim National Income Estimates with Unacceptable Errors—Continued

Industry	1967 Interim Estimates with Unacceptable Errors			1963 Interim Estimates with Unacceptable Errors		
	1st July	2nd July	3rd July	1st July	2nd July	3rd July
Petroleum refining & related industries		X		X	X	X
Rubber & misc. plastic products				X		
Motor vehicles & motor equipment	X	X	X			
Lumber & wood products, excluding furniture				X		
Air transportation	X			X		
Stone, clay & glass products				X		
Credit agencies, holding & other investment companies	X	X	X	X	X	X
Misc. manufactures				X		
Security brokers	X			X	X	
Water transportation				X		
Insurance carriers	X	X	X		X	X
Insurance agents, brokers, & service	X	X	X	X	X	
Pipeline transportation					X	
Transportation services				X		
Hotels & other lodging places	X	X	X	X		
Retail trade				X		
Motion pictures	X				X	
Real estate				X		
Nonprofit membership organizations	X	X	X	X	X	X
Misc. business services				X		
Private households	X			X		
Auto repair services				X		
Legal services				X		
Educational services				X		
Misc. professional services				X	X	
Government enterprises (State and local)	X	X	X	X		X
Rest of the world	X	X	X		X	X
Total number	17	11	11	26	11	7

Note: Underscoring indicates first July estimates in both 1967 and 1963 were unreliable.

Source: Interim estimates are those published in the appropriate issues of the Survey of Current Business and the benchmark estimates are based on special tabulations prepared by BEA.

CHAPTER 5

IMPROVING THE NON-BENCHMARK ESTIMATES

II: MONTHLY AND QUARTERLY ESTIMATES

The quarterly estimates of GNP and national income and monthly estimates of personal income are used most often by policymakers, theorists, and the general public to indicate the current performance of the U.S. economy. These estimates have been subject to significant revisions at various times, leading users to question the accuracy of the NIPA. As stated earlier, a major downward revision in 1971 of the GNP estimate in constant dollars prompted the initiation of this DIP study. In view of popular and professional interest, the quarterly estimates are treated in substantial detail in this chapter.

The quarterly GNP estimates are prepared currently at three cutoff points, described in some detail in the beginning of the preceding chapter. At each cutoff the estimates are based on a variety of estimating techniques which utilize directly reported data, proxy variables, and trending. For most components, information is available monthly or quarterly. However, there are several GNP components for which only annual data are available or relevant. The largest ones, as shown in the July 1976 *Survey of Current Business*, are listed below:

	1975 (billion $)
Other labor income	62.5
Proprietors' income	90.2
Net interest	64.6
Rental income of persons	22.4
Capital consumption allowances	161.4
State and local government purchases (excluding compensation, structures, and medical vendor payments)	48.3

Product Side

We deal first with the quarterly estimates on the product side of the national accounts. The major components are personal consumption expenditures, gross private domestic investment, net exports of goods and services, and government purchases of goods and services. A subsection is devoted to each component except net exports which are examined in Chapter 8. The following sections highlight the existing data problems in making quarterly estimates of these components and the Committee's recommendations for improving the data base.

An appendix at the conclusion of the chapter deals with the receipts and expenditures accounts of Federal, State and local governments. These accounts make use of several data sources in addition to those used in estimating government purchases.

A. Personal Consumption Expenditures

Personal consumption expenditures (PCE) account for over three-fifths of GNP. Because of this, small percentage errors in the PCE figures can have a greater impact on the reliability of the GNP aggregate than larger relative errors in other sectors of the product accounts. Thus, possible improvements in the data base which would be of marginal importance for other sectors could be more significant for PCE.

1. Concepts

Consumer expenditures measure the market value of goods and services purchased by individuals, and the operating expenses of not-for-profit institutions rendering services principally to individuals. (Purchases of homes are treated as investment and hence are not part of PCE.)[1] In addition to items purchased by an exchange of money between the buyer and seller, PCE includes imputations for the market value of nonmarket transactions for the following; space rental value of owner-occupied houses and nonprofit institutional buildings; services provided individuals and institutions by financial intermediaries without explicit charge; food furnished in kind to government (including military) and commercial employees; food and fuel produced and consumed on farms; standard clothing issued to

[1] The purchase of new dwellings is classified as capital investment. Purchases of existing dwellings are not recorded in the accounts except for real estate commissions associated with the sale, which are capitalized in the investment sector.

military personnel; and lodging provided to commercial employees.

The quarterly PCE estimates are published in three broad categories: durable goods, nondurable goods, and services. The broad categories are further subdivided into 14 detailed components. Durable goods—e.g., autos, furniture, household appliances—have a normal life expectancy of 3 years or more. Nondurable goods— e.g., food, clothing, gasoline—normally last for less than 3 years. Services are noncommodity items such as the use of housing (i.e., tenant and imputed owner-occupied rentals), utilities, medical care, private education, purchased transportation, repair, laundry, financial, legal, religious and welfare services. Most PCE imputations are made for services.

Purchases are recorded at the total price to the consumer as of the time the purchase is made, regardless of whether payment is made in full with cash or on credit. As a result, subsequent repayment of installment credit over the life of the loan appears in the accounts as personal saving rather than as PCE.

Interest paid by consumers for items purchased on credit and gift transfers by persons to foreigners in cash or in kind are not part of PCE or of GNP. A separate category referred to as personal outlays consists of PCE, consumer interest, and foreign transfers. This category is used to derive personal saving—i.e., disposable personal income minus personal outlays equals personal saving.

The principal data sources for the current quarterly PCE estimates are the Census Bureau's monthly establishment surveys of retail trade (mostly goods) and selected services. These are supplemented with other data on product sales of cars and gasoline for the goods estimates, and additional data on utilities and other service items. Also, proxy variables and trending of annual levels are used in estimating several of the services for which neither quarterly nor monthly data are available.

The data base for the goods component is better than that for services because the directly reported data of the former represent a larger proportion of the total. This difference will be narrowed but still persist even after the completion of the current expansion of the survey of service establishments to include private medical and legal services.

2. Data base and recommended improvements

Goods

The basic data for the PCE estimates of durable and nondurable goods are dollar sales of retail establishments, collected by the Census Bureau and published in *Monthly Retail Trade*. The figures are shown separately for the following categories of retail stores in the SIC 52-59 groups: food, eating and drinking; general merchandise; apparel; furniture; household appliances; building materials and hardware; automotive; gasoline stations; drug; liquor; and some specialty stores. In addition, estimates of sales for all retail stores are provided, separately for durable and nondurable stores. Sales are reported after deductions for returned merchandise. Sales include receipts for merchandise; sales and excise taxes (soon to be deleted); and all secondary activities, including service charges for repair, maintenance, delivery, installation, and carrying charges for goods sold on credit.

The figures are derived from monthly survey data obtained from a probability sample of the Social Security Administration's employer identification numbers classified as retail trade. The sample is composed of list and area components. The list component covers those firms that currently are fully reflected in the social security tax reporting system. Firms in the list component account for approximately 94 percent of all retail sales volume. The area component of geographic land segments covers firms with no employees that are operated solely by the owners, and new businesses not yet in the Social Security system.

The list sample is composed of four rotating monthly panels for the smaller firms which enter the sample and report once every 4 months, and a fixed panel of larger employers which is in the sample with certainty every month. The survey of the list component is conducted by mail.

The area sample is composed solely of 12 rotating panels which enter the sample once every 12 months. Local area enumerators screen the segment and collect data from businesses not appearing in the list component.

The Census estimates are based on a weighting system that forms a composite of the data collected for the current month plus the movements from previous months to the current month for approximately 3 years earlier. The purpose is to make use of a larger number of observations for the estimate of a single month.[2]

a. BEA methodology

The monthly Census data on retail sales at the *establishment* level are modified by BEA to eliminate those consumer commodities estimated by data from other sources. Quarterly PCE estimates for new and used cars and gasoline are developed independently of the Census survey data. Thus, the survey data for

[2] The weight given to the actual data collected in the current month is approximately 0.2, and the cumulative weight for the movement from previous months to the current month is 0.8.

passenger car and other automotive dealers ($85 billion in 1974) and gasoline stations ($40 billion in 1974) are deducted from the aggregate retail sales total ($538 billion in 1974). Sales of building materials, hardware, and farm equipment dealers ($32 billion in 1974) also are deducted because they represent primarily investment.

The remainder of Census retail sales is used to extrapolate all other types of goods as an aggregate. In 1974, this extrapolator totaled $380 billion, or approximately 70 percent of all retail sales. This total is used as the aggregate control in the subsequent development of detailed categories of PCE goods. The detail provides information for preparing separate estimates for durable and nondurable goods, as well as "real" or constant-price expenditures. Estimates of the detailed items are based on the movement of retail sales in the various types of stores that are associated with analogous groups of products. The relationship between product and store sales is derived using data on merchandise line sales by type of store from the quinquennial census of retail trade.

The PCE estimates for new cars and trucks ($28 billion in 1974) are based on data for unit sales separate from unit prices in two stages. First, detailed information from trade sources on production and list prices by nameplate, model, and options are weighted every 6 months to establish an average list price by nameplate. Second, this is extrapolated to the value of sales in the current month by using monthly information by nameplate for (a) unit sales from the Motor Vehicle Manufacturers' Association, (b) list prices from the Automobile Invoice Service, and (c) discounts from the Bureau of Labor Statistics in its preparation of the consumer price index. The allocation of sales to consumers and business is based on quarterly data from R.L. Polk. This organization supplies quarterly tabulations of auto and truck registrations that are classified in a rough way on the basis of name and address into vehicles owned by households and by business and government. (The total amount of these *product* sales of consumer cars and trucks is much lower than the above-noted *establishment* sales of automotive dealers since the latter also include receipts from used cars, gasoline, repair services, etc.; estimates of these items are covered below.)

The PCE estimate for profit and operating expense margins on the sale of used cars ($5 billion in 1974) is based on monthly data from the following sources: unit sales of franchised dealers (Motor Vehicle Manufacturers' Association), and average wholesale prices for the current period mix of sales (auction prices in *Automotive News*). The resulting estimate of the wholesale value of used car sales is used to extrapolate the annual level of the margin. The difference between the derived retail and wholesale sales values is used as the extrapolator for the margin estimates. The estimates of used car margins are not considered as reliable as those for the value of new car sales.

The PCE estimates for gasoline and oil ($36 billion in 1974) are based on monthly measures provided by the Ethyl Corporation on the quantity of gasoline sold in a sample of gasoline stations and the BLS consumer price index for gasoline.

b. Problems with the Census data

Experience in the use of the sales figures in *Monthly Retail Trade* for the PCE estimates points to several major areas of weakness—the sample, survey design, and reporting errors.

1. The problems of sample frame update are complicated by the dynamic nature of the retail trade industry. There is a continuous flow of firms both in and out of the market as well as mergers and acquisitions among ongoing firms. The retail sample has suffered from significant erosion in the past because of the difficulty of keeping track of the large number of small firms starting up in business in the industry. This has caused a continual problem of declining coverage and consequent understatement in the retail sales figures. However, a major improvement is planned. Beginning in 1977, the Census program calls for checking the survey sample quarterly against the up-to-date quarterly listing of firms in the industrial directory. This should prove to be a comprehensive and systematic basis for maintaining the original coverage of the sample.

2. Rotating panels are used to reduce the reporting burden. However, BEA has evidence that the panels are not equally representative of the population. Based on this evidence, adjustments are made in the PCE estimates to compensate for the suspected biases of some of the panels.

In fact, close examination by Census Bureau personnel discloses that the four rotating panels are not balanced with respect to such characteristics as size of business, business lines, and geographic region. This appears to corroborate the BEA findings. As noted below, Census plans to correct this deficiency in its forthcoming comprehensive revision of all of the sample panels.

3. Another contributor to the bias in the preliminary data reported for the current month by respondent firms is the Census survey methodology which does not obtain revised estimates of the same firms for the reference month. This pertains to all subsamples—the fixed panel of large firms and the four rotating panels of smaller firms in the list sample, and the 12 rotating panels of firms in the area sample. In order to minimize the reporting burden, a

revised figure for the preceding month is not requested. If the errors in early reporting were random, this would cause no difficulty.

However, a recent study by the Census Bureau of the reporting practices of small retail firms suggested a tendency for respondents to understate their reported sales by 0.57 percent for the current month and 0.20 percent for the previous month.[1] This also creates inherent bias in the survey data. Biases as a result of early reporting similarly could be a source of error for the large firms in the fixed panel, although they were not included in the Census study.

4. The inclusion of finance charges for goods sold on credit by most of the survey respondents in the valuation of sales receipts could cause spurious movements in the PCE estimates because of changing credit conditions and interest rates. Finance charges for retail establishments were very roughly estimated at $300 million in 1972. However, the reporting form has been modified to explicitly exclude finance charges from the retail sales figures.

5. The Census Bureau study of small firms revealed that sales taxes amounting to approximately 1.6 percent of sales in the current and previous months' estimates were not reported by some retailers largely because they do not think of taxes as sales or because they could only include sales taxes on a quarterly basis. Problems of underreporting of sales taxes by large firms have also been discovered. As a result, the reporting form has been modified to explicitly exclude the sales taxes in the valuation of retail sales. This change—which will become effective in 1977—will be accommodated in the PCE estimates by adding sales taxes as measured in indirect business taxes on the income side of the accounts to reported retail sales.

It should be noted that the Census Bureau has never used its Annual Retail Trade Survey (ARTS), based on a larger sample than the monthly survey and yielding implicitly higher levels of trade, to revise the earlier monthly data. It was this failure that made it possible for downward biases to accumulate in the monthly estimates over several years. The result was a major understatement and ultimately a major correction. Census now plans to utilize the ARTS survey for benchmarking the monthly data.

6. There is a general problem of the lack of product detail in the Census establishment figures. One weakness is the absence of itemized information on service repairs of auto dealers and gasoline stations. This reflects the lack of product detail obtained in the survey of these establishments, which are classified as retail trade because their primary activity is the sale of goods although they also do a significant amount of service repair work. In the case of new car dealers, there is an additional lack of product detail for distinguishing between sales of new and used cars. Such data would be useful as a cross-check on the estimate of new car sales in current prices based on the unit sales and price data obtained from private trade sources. Similar problems of product mix affect food and nonfood items sold in supermarkets, and major categories of department store sales (apparel, furniture, appliances, etc.) However, because such detailed product data are very difficult to collect monthly, and at the present time are not even collected annually, these data needs are considered in the preceding chapter on the annual estimates.

Recommendations:

The Census Bureau has also been concerned in recent years with the inadequacies of the monthly retail trade statistics and the staff has initiated efforts to improve these statistics. The Committee supports the Census Bureau plans to: (a) use the industrial directory to update the sample of firms quarterly; (b) replace the probability sample of employer identification numbers by a probability sample drawn at the company level; (c) use a more appropriate cutoff separating large from small companies; (d) reduce rotating panels from four to three; (e) make each panel balanced in terms of important variables; and (f) each year incorporate the new level indicated by the most recent Annual Retail Trade Survey. These changes should eliminate some of the downward biases and substantially reduce the effect of other problems.

We also recommend the following way of improving the survey of Monthly Retail Trade:

A study should be made of the feasibility and impact of collecting from the same firms data for the preceding month together with data for the current month. This should be done for the fixed panel of large firms as well as for the rotating panels of smaller firms. In this connection, the Census Bureau should explore the use of a shuttle schedule and should determine whether this additional question significantly affects the response rate and whether the revisions significantly affect the monthly estimates.

Services

The PCE estimates of services are based on a wide range of public and private data sources, as well as a considerable use of proxy variables and trend extrapolation of annual levels. The Census Bureau's *Monthly Selected Services Receipts* is used for the

[1] Bailor, Barbara A. and Sturdevant, Tyler R., "How Well Do Retailers Report Their Sales?", Bureau of the Census, presented to the American Marketing Association, Chicago, Illinois, April 15-17, 1975.

estimates of spending for hotel and motel accommodations, cleaning and laundering, beauty parlors and barbershops, motion picture admissions, bowling alleys and other commercial participating amusements, photographic studios, and funerals. Included among receipts are payments received for services rendered, merchandise sales, sales and amusement taxes, and carrying charges for credit. This survey provided the basis in 1974 for expenditure estimates of $19 billion, or 5 percent of the PCE services total.

The current quarterly PCE estimates of automotive repairs are based on the monthly movement of the number of car registrations and the consumer price index for auto repairs. The direct survey data on monthly receipts of establishments classified as auto repair services provided by Census are not used because they are a relatively small proportion of the total. In the recent benchmark revisions associated with the 1963 and 1967 input-output tables, the estimates of auto repairs were revised upward by approximately 5 percent in each of the benchmark years. This of course is only a measure of an apparent long-term downward bias in the estimates; it does not indicate the extent of the annual and subannual fluctuations in the error.

Estimates for the bulk of the regulated industries are based on the following: electric utilities ($16 billion in 1974) from monthly data of the Edison Electric Institute on sales to individual-metered residences; gas utilities ($8 billion in 1974) from monthly BTU sales and quarterly revenue data by customer class from the American Gas Association; telephone receipts ($15 billion in 1974) from monthly revenue figures for the total of residential and business local calls from the American Telephone and Telegraph Company; airline transportation ($4 billion in 1974) from monthly data on total passenger miles and quarterly data on all passenger revenues from the Civil Aeronautics Board; life insurance handling expenses ($10 billion in 1974) from current BLS payroll data; and brokerage commissions ($3 billion in 1974) from trend extrapolations of the annual levels.

Market rentals for tenant-occupied dwellings ($36 billion in 1974) and nonmarket imputed rentals for owner-occupied dwellings ($90 billion in 1974) are estimated as an aggregate. The figures are based on the (a) BEA annual perpetual inventory of nonfarm housing units and mobile homes, updated by monthly lagged figures on housing starts and mobile home shipments, and (b) the monthly consumer price index for rent. Imputations for financial services provided without payment ($17 billion in 1974) are based on the movement of net interest received by commercial banks, which in turn is derived from current information on interest-bearing assets and liabilities of commercial banks and interest rates.

Estimates of net foreign travel ($4 billion in 1974) are based on the Immigration and Naturalization Service's data on the number of travelers and BEA surveys on average traveler expenditures as described in Chapter 8 on the rest-of-the-world accounts.

The remaining large items associated with PCE, such as legal services ($7 billion in 1974), medical services excluding hospitals ($36 billion in 1974), private educational services ($14 billion in 1974), and religious and welfare nonprofit organizations ($12 billion in 1974), are trended from annual levels. Monthly figures for hospital outlays by households ($29 billion in 1974) are obtained from data on community hospitals from the American Hospital Association.

a. Problems with the data base

The principal problem areas are related to the survey methodology of the Census survey on Monthly Selected Services Receipts; reliance on trending annual levels for estimates of professional services and nonprofit organizations; a basic lack of direct data on tenant rentals; and weaknesses in the figures on foreign travel.

The difficulties with the methodology of the Census survey are similar to those noted above for retail trade—i.e. failure to maintain an up-to-date sample of firms and to obtain revised data from the same firms in the fixed and rotating panels for preparing corrected estimates for the "previous" month. The problem with the sample was highlighted by the recent upward revision of 8 percent in the aggregate receipts of the covered service industries compared with an average sampling error of 0 to 3.5 percent.[4] The correction resulted from use of an updated sample.

The inclusion of sales and amusement taxes could cause inconsistency in the valuation of these services as was the case noted earlier on the reporting of retail trade. However, the inclusion of finance charges in the service receipts is not a significant problem because of the small proportion of service sold on credit.

The trending by BEA of estimates for medical and legal services will be replaced by directly reported monthly data on receipts of doctors, dentists, hospitals, laboratories, and legal firms by the expansion of the Census survey to cover these services. The new data recently became available in 1977, but this improvement leaves untouched the inadequacy of the subcomponent of medical care relating to consumer expenditures on health

[4] *Monthly Selected Services Receipts*, September 1975.

insurance ($7 billion in 1974). These expenditures are measured for commerical companies as premiums received minus benefits paid, and for nonprofit insurance organizations by their operating expenses.

Estimates of educational services on a current basis are a problem, particularly for commercial and vocational schools ($3 billion in 1974) because of the changing level of enrollments during the year. The expansion of the Census survey to cover medical and legal services initially included educational services provided by for-profit schools, but this was discontinued because of the large number of uncovered not-for-profit institutions. The educational component has been replaced in the survey with new coverage of architectural and engineering firms. Current estimates for elementary, secondary, and higher education outside of the public school systems ($10 billion in 1974) are extrapolated, based on early enrollment data for the school year from the Office of Education, and trends in tuition costs are updated for the most recent year by the movement of the nonfood component of the consumer price index. This is considered to be a reasonable reflection of actual payments because enrollment in these institutions generally is for the full school year.

Because of the general dearth of data on operating expenses for nonprofit religious and welfare organizations, recommendations for improvement are limited to the quinquennial and annual estimates. Thus, the specification of improvements in the quarterly extrapolation factors for these organizations—including the possibility of obtaining more timely payroll figures—is deferred pending the development of more definitive annual measures.

Data improvement recommendations for tenant rentals are made below in connection with the prospective quarterly survey of income of the Department of Health, Education, and Welfare (Income Side: rental income). In addition, the forthcoming revision of the consumer price index by the Bureau of Labor Statistics, which is planned for 1978, should improve the current method of estimating rental payments. The new rent index provides for a system of monthly data collection which will permit month-to-month comparisons of rental movements. By contrast, the existing rent index is based on data collected quarterly for half of the sample, and thus the best measure of change for the current month reflects comparisons with rent of 6 months earlier.

Recommendations:

The Committee supports the Census Bureau's plans to use the industrial directory to update quarterly the sample of firms in its monthly survey of service industries.

We also recommend the following three ways of improving its survey of Monthly Selected Services Receipts:

1. *An exploratory study should be made of the feasibility of including in the estimates of receipts revised data from the same firms that reported in the previous month. This should be done for the fixed panel of large firms as well as for the rotating panels of smaller firms.* For further elaboration, see the similar recommendation above for Monthly Retail Trade.
2. *The survey should be expanded to include private for-profit commercial and vocational schools.*
3. *The definition of service receipts should be modified to exclude the collection of sales and amusement taxes.*

The Social Security Administration should collect quarterly data on premiums, benefits, and operating expenses from the Blue Cross and Blue Shield health insurance organizations and provide these data by 65 days after the reference quarter.

As a longer run objective, quarterly data on premiums and benefits of the large for-profit commercial health insurance companies also should be provided by 65 days after the quarter. These data are provided annually to the Social Security Administration by the Health Insurance Association of America.

B. Gross Private Domestic Investment

1. Purchases of Structures

Statistics provided by the Census Bureau serve as the primary source of data on investment in new construction for the national accounts. The Census series are derived by both direct and indirect measurement. A measurement is considered direct when it is based on periodic reports of the actual progress of construction or of the amount of construction expenditures. An indirect measurement uses proxy variables to estimate the actual progress. In recent years, there has been a shift by Census to direct measurement for many series in order to provide a more accurate reading of construction activity.

Residential Structures

a. Single-family units

Census derives the value put in place of single-family units ($24.0 billion in 1974) indirectly by calculating the total construction costs of single-family units started each month (the number of single-family units started each month multiplied by the average value per unit started) and distributing the cost over the subsequent months in accordance

with established monthly progress patterns—the average percentage of construction put in place each month until the project is completed. The average values are derived from building permits and increased by a factor of approximately 18 percent to account for undervaluation (the difference between finished cost and permit value), and architectural and engineering expenses. These adjustment factors are based on a 1956 study of single-family dwellings conducted by the Bureau of Labor Statistics. This 1956 BLS study also established the above-noted progress patterns.

A basic weakness in the current Census estimating methodology for single-family units is the reliance on 20 year old adjustment factors and progress patterns. There have been suggestions that Census begin measuring construction of single-family units directly, as is now done for multi-family residential units and nonresidential buildings. However, because of the short span to construct a home (usually around 6 months) and the fact that the bulk of construction and majority of costs occur during the first 120 days of the project, direct measurement of single-family construction has not been considered necessary.

Census plans to introduce new single-family unit progress patterns into its estimating procedures in 1977. The revised progress patterns are based on a recently completed study of progress patterns for single-family dwellings. In comparing progress patterns from the recent study to those derived in 1956, Census found only minor differences between the two. For example, the 1956 study indicated that in June after 4 months of construction, 83 percent of the value of construction would be in place; the new study indicates that at the same stage of construction, 78 percent of value would be in place. This lengthening is most probably attributable to the trend of building homes larger in square footage with additional bathrooms, etc.

Recommendation:

The Census Bureau should update every 5 years the progress patterns and adjustment factors (for permit undervaluation, architectural and engineering expenses, etc.) used in estimating construction put in place for single-family units. To update the adjustment factors, Census is encouraged to explore the feasibility of using the Survey of Construction to collect information every 5 years on the land costs, closing costs, and other nonconstruction cost items included in the sales price.

b. Multi-family units

Beginning in January 1973, the Census Bureau started collecting the value of multi-family residential construction ($13.5 billion in 1974) directly as the work progresses, and the new series was introduced in 1976. In view of this change in procedure, *no recommendation is made.*

c. Nonhousekeeping units

Since January 1973, estimates of total construction of private nonhousekeeping residential buildings (hotels, motels, and dormitories) have been derived directly in the same manner as that used for multi-family residential dwellings. Approximately $1.7 billion for nonhousekeeping residential construction were included in GNP in 1974. Prior to that date, direct measurement had been used only for the 13 Western States back to January 1968. In view of this change in methodology, *no recommendation is made.*

d. Mobile homes

With the benchmark introduced in January 1976, all purchases of mobile homes were reclassified into investment in structures. The 94 percent in 1967 of mobile home purchases previously classified as personal consumption expenditures was reclassified as residential structures; the remaining 6 percent in 1967, which had been classified as producers' durable equipment, were reclassified as nonresidential structures. Purchases of new residential mobile homes were valued at approximately $3 billion during 1974 in the national accounts.

For the quarterly GNP estimates, purchases of mobile homes are derived by multiplying monthly manufacturers' shipments data by monthly average values. The data are obtained from the Manufactured Housing Institute. A basic assumption in this estimating procedure is that manufacturers' shipments move with retail sales. The recently begun mobile home placement survey, conducted by the Census Bureau for the Department of Housing and Urban Development, is a more direct measure of the timing and installed value of mobile homes placed for residential purposes. Therefore, *no recommendation is made.*

4. Additions and alterations

Included in the GNP estimate of new residential construction are expenditures on additions and alterations to residential units ($8 billion in 1974) obtained from the Survey of Residential Alterations and Repairs (SORAR) conducted by the Census Bureau. SORAR is a quarterly survey of homeowners and owners of rental properties in which data are collected on expenditures for residential additions, alterations, maintenance, repairs, and replacements.

Several problems have reduced the usefulness of the SORAR data in the quarterly GNP estimates. A primary deficiency has been the large sampling variability because of the small size of the sample. This has made it necessary at times for BEA to

smooth out erratic movements in the data. Another problem is that the data have not been available in time for the current quarterly GNP estimates. For this reason, BEA uses a historical trend to estimate current quarters. The actual data are not incorporated into the GNP until the first annual July revision. Finally, it is generally suspected that the survey may have a high response error because of the tendency for households not to maintain records of such expenditures.

The FY 1978 Budget calls for a substantial reduction in the SORAR program. This includes reducing the sample size and, while continuing to collect the data quarterly, tabulating it on an annual basis only. It is uncertain what effect this modification will have on the GNP estimates.

A new effort, the Continuing Consumer Expenditure Survey (CCES), may be a feasible vehicle for collecting SORAR data. The CCES, currently in the planning stages, will be collecting quarterly information on major expenditures from a national sample of households. The Census Bureau will collect the data but the survey will be financed by the Bureau of Labor Statistics. Two advantages of using the CCES to collect SORAR information would be the larger sample size and increased accuracy of reporting as it is most likely that respondents will maintain some sort of diary of expenditures.

Recommendation:

The Census Bureau should improve the Survey of Residential Alterations and Repairs by increasing the sample size to a number that significantly reduces the sampling error, and by restoring the quarterly publication of the data (in time for the DIP proposed 75-day quarterly GNP estimate). Also, consideration should be given to merging this survey with the proposed Continuing Consumer Expenditure Survey, when it becomes operational, provided the data will be available in time for the 75-day GNP estimate.

f. Brokers' commissions on residental sales

Brokers' commissions on the sale of residential properties ($4.5 billion in 1974) are estimated in two segments—on the sale of new residential units and on the sale of existing residential units. The quarterly estimates, for both segments, are extrapolated from the annual estimates based on the value of new homes put in place. The assumption is that the majority of sales of new homes are made possible by the sale of previously-owned homes. For the annual July revisions, BEA estimates these commissions by extrapolation from the I-O value, using Census data on the total sales of new residential units and annual data on the sales of existing single-family homes from the National Association of Realtors. The quinquennial benchmark estimates of brokers' commissions are derived from data on sales of real estate, as reported in the census of governments, multiplied by assumed brokerage commission rates for the various types of properties reported in the census. There is concern that the estimates of commissions may be inaccurate owing to the lack of a firm statistical base from which to extrapolate the quarterly estimates. The recommendation in Chapter 3 for a census of the real estate industry as part of the economic censuses should substantially strengthen the estimating base. Therefore, *no recommendation is made.*

Nonresidential structures

a. Nonresidential buildings, excluding farm

Census estimates of the value of new nonfarm, nonresidential building construction put in place ($30.0 billion in 1974) are based on direct measurement of the actual value of construction as the work progresses. Data are collected via the monthly Construction Project Report from the owners, builders, or architects of a sample of new private nonresidential building projects. The sampling frame consists of F.W. Dodge contracts awarded in 37 Eastern States and the District of Columbia, and building permits in the remainder of the Nation, augmented by a canvass of construction projects in nonpermit areas.

A special study conducted in 1968 by the Census Bureau and F.W. Dodge determined that approximately 15 percent of the projects in the Eastern States are not covered by the F.W. Dodge reports. The undercoverage most likely can be attributed to projects valued at less than $100,000 that represent a small portion of nonresidential construction. Census has not updated the 1968 study primarily because of its high cost. Therefore, it is not known whether the factor of 15 percent for small projects is still valid.

Recommendation:

The Census Bureau should update its previous study of undercoverage of the F.W. Dodge reports for nonresidental structures and, on the basis of the results of the new study, determine feasible intervals (of not more than 10 years) to conduct the study on a regular basis.

b. Public utilities

The value of public utility construction in 1974—telephone and telegraph, railroads, petroleum pipeline, electric light, power and gas—totaled approximately $16 billion. Estimates of the value of structures put in place for the telephone and telegraph industry are based on reports of monthly

construction progress submitted directly to the Census Bureau. Telephone construction is reported monthly by the American Telephone & Telegraph Company which also provides an estimate for a number of small companies that are not a part of the Bell System. The Western Union Telegraph Company supplies quarterly reports that indicate its construction expenditures each month.

Quarterly data are available from the Interstate Commerce Commission (ICC) for railroad construction. The ICC also provides data on petroleum pipeline construction excluding the Alaska pipeline for which Census receives data directly from the consortium. The non-Alaska pipeline data are not available in time for the revised quarterly GNP estimates. Therefore, these estimates are derived by fitting a smooth curve to the ICC projection, based on annual data for previous years.

The Federal Power Commission (FPC) recently has begun collecting monthly construction expenditures of the electric light and power, and gas industries. As soon as possible, these data will supplant the present use of the BEA Plant and Equipment Survey as a quarterly extrapolator of annual FPC data.

No recommendation is made for the measurement of public utility construction because the existing and planned programs (i.e., for electric and gas utilities) are satisfactory.

c. Petroleum and natural gas drilling and exploration

As no quarterly or monthly data are available for expenditures on petroleum and natural gas well drilling and exploration (approximately $4 billion in 1974), BEA uses data on monthly footage drilled published by *World Oil* magazine as a measure of physical volume, and a composite construction cost index for pricing. Except for the price index, these data are adequate for the current estimating procedure. For recommendations regarding improvement of the price index, see Chapter 7 "Price Needs for Improving GNP Accounts in Constant Prices."

d. Farm

Monthly estimates of new nonresidential farm construction ($2 billion in 1974) are based on annual projections prepared by the Department of Agriculture. The projections are derived from Agriculture's Economic Survey of Agriculture instituted in the early 1970's. As Agriculture provides neither quarterly nor monthly data, the Census Bureau derives its monthly series for the nonresidential farm component of the value in place estimates by fitting a smooth curve to the Agriculture projection.

Recommendation:

The Committee recommends that the Statistical Reporting Service of the Department of Agriculture, as part of the proposed quarterly farm expenditure survey recommended in Chapter 6, should collect quarterly data on new farm construction.

e. Brokers' commissions on nonresidential sales

Brokers' commissions on the sale of nonresidential structures ($500 million in 1974) are estimated by using a procedure and data base similar to that used in estimating commissions on residential sales, described under residential structures. The quarterly estimates of commissions are extrapolated based on value put in place of new nonresidential buildings.

As with residential commissions, *no recommendation is made* in view of the Committee's earlier recommendation in Chapter 3 to include the real estate industry in the economic censuses.

2. **Producers' durable equipment**

For estimates of producers' durable equipment ($96 billion in 1974) the quarterly extrapolator is the average, typically unweighted, of the quarterly changes in: (1) a commodity flow estimate which uses (a) monthly Census data on manufacturers' shipments of capital goods adjusted to exclude exports and government purchases and to include imports, and (b) trade association data on retail sales of automobiles and trucks; [5] and (2) BEA's quarterly Plant and Equipment Survey after expenditures on nonresidential structures are eliminated and expenditures on certain equipment items and industries not covered by the survey are added.

To estimate PDE in constant prices, it is necessary to have a commodity breakdown. Such a breakdown is determined by adjusting the commodity flow estimate to the estimate derived by the averaging procedure described above. In so doing, certain commodity categories (such as automobiles, trucks, aircraft, and farm equipment) are considered to be accurate in the commodity flow estimate, and the discrepancy is distributed among the remaining commodities in proportion to the size of each.

a. BEA's Plant and Equipment Survey

Several deficiencies in the Plant and Equipment (P&E) Survey are in the process of being corrected. They include: broadening the coverage of the P&E Survey to include nonfarm industries not now covered, i.e., real estate, legal, medical and dental professions, and nonprofit organizations; enlarging samples where present coverage is limited, e.g., wholesale and retail trade, services, and trans-

[5] For allocation to personal consumption expenditures and producers' durable equipment, see discussion of PCE estimates.

portation; and separating expenditures for equipment from those for structures.[6] Some of the improved data, while not yet introduced into the published survey data, are used in the GNP estimates.

In addition, the timeliness of the P&E Survey data has been improved by the preparation of a preliminary tabulation in time for the revised (45-day) GNP quarterly estimate. The preliminary tabulations have been based on reports received from the larger companies, including the use of earlier survey data on anticipated expenditures for the current quarter.[7]

Other concerns which may affect the accuracy of the P&E Survey data relate to the sampling technique and statistical methodology used to derive the estimates. The concerns include: (a) the lack of a full probability sample; (b) the lack of updating the sample;(c) the failure to collect revised actual expenditure data from respondents; and (d) the lack of comprehensive validation procedures.

a. Probability samples of companies to be surveyed are drawn only when coverage is expanded to a new industry. This includes identification of companies that are willing to participate in the survey. Once this procedure is completed, these companies are included in the survey with no attempt to restore the probability basis of the sample design. The sample is never redrawn. As a result of the lack of a full probability sample, estimates of sampling error cannot be calculated. The expenditure data are benchmarked on a quinquennial basis from capital outlay data in the economic census and investment-related data from tax returns in Statistics of Income.

b. New firms starting up in business, (births), and existing firms going out of business, (deaths), are not explicitly introduced and removed after the initial sample is selected. The quinquennial benchmark data reflect the net effect of births and deaths for the benchmark year. This procedure assumes that the effect of births and deaths for non-benchmark years is offsetting. This may not correspond to actual behavior over the years. The lack of sample updating is a basic problem because new firms tend to have large capital outlays when starting up in business.

c. The current procedure is to collect information from companies on their investment expenditures on new plant and equipment for the most recently completed quarter only. Revised quarterly reports are submitted to BEA only at the discretion of the respondents.

d. With expansion of the survey to previously uncovered industries and larger sample coverage for other industries, there has been an increase in incorrect reporting of requested data items. This probably can be attributed to the failure of the respondent to understand applicable definitions or dissimilarities in levels of sophistication of accounting systems. There are two primary methods of validating reported data. Telephone checks are used to some extent, particularly if there appears to be a questionable response on the questionnaire. For publicly held companies, published financial statements are used to check the reasonableness of the data. However, neither of the two methods is used systematically nor is there verification that specified definitions are being adhered to.

Recommendation:

The Bureau of Economic Analysis should undertake a comprehensive examination of the sampling procedure and statistical methodology used in the Plant and Equipment Survey. Particular emphasis should be placed on the feasibility, estimated improvement, and cost of:

a. *Introducing a full probability sample;*

b. *Updating the sample of firms for births and deaths on a periodic basis;*

c. *Redrawing the sample periodically, e.g., in conjunction with a benchmark revision;*

d. *Collecting revised actual expenditure data for the previous quarter from respondents;* and

e. *Introducing comprehensive and systematic validation procedures.*

b. Census Bureau's Survey of Manufacturers' Shipments, Inventories and Orders (M-3)

The Census shipments data are deficient for estimating private purchases of PDE owing to the lack of a probability sample for small firms, the failure to collect revised data for the previous months, and to the fact that they cover not only shipments of capital equipment but also other types of goods as well, e.g., replacement parts. In addition, there is no sound basis in the NIPA estimates for separating shipments to the government (except for defense-oriented industries) from shipments to private purchasers. There is also inconsistent treatment of shipments of military goods with long

[6] It is anticipated that data collected from the expanded industry coverage will be introduced into the published data after the benchmark revision to be introduced during 1977. Separate data on expenditures for equipment and expenditures for structures probably will be introduced at the same time. Thought is now being given to expanding samples in other industries, particulary mining and construction.

[7] The Plant and Equipment Survey schedule is currently mailed to 10,000 to 11,000 companies on the first of the month following the reference quarter. Respondents are requested to return the questionnaires within 30 days. At the present time approximately 50 percent of the responses are back by the due date.

lead times of production depending on whether the contract is on a cost-plus or fixed-price basis. (This is discussed fully in the section on manufacturing inventories).

Recommendations:

The Census Bureau should improve the monthly survey of Manufacturers' Shipments, Inventories and Orders in the following ways:

a. *Convert the survey to a full probability sample. This is discussed in more detail in the next section on inventory change (manufacturing).*

b. *Explore the feasibility of collecting revised shipments data for the previous month.*

c. *Collect separate data on shipments to Federal, State and local governments for the following industries: furniture and fixtures: fabricated metal products; engines and turbines; agricultural machinery; construction machinery; mining and oilfield machinery; general industrial machinery; office, computing and accounting machinery; electric machinery; and instruments.*

d. *Refine the monthly reporting of the defense-oriented industries—ordnance, communications, aircraft and ship building—to insure that shipments are uniformly recorded in the period when the product is actually completed.* (This recommendation is also included in the recommendations regarding manufacturing inventories.)

3. **Quarterly nonfarm inventory change**

Current information on business inventories long has been identified as being seriously deficient as an economic indicator in its own right or as a component of gross private domestic investment in the GNP accounts.[4] As we have already noted, these deficiencies are also present in the annual estimates. In the quarterly estimates, however, they are even more pronounced. Some improvements have been made and others are under development, but significant gaps still exist. This section deals with the quarterly estimates of nonfarm inventory change. Data improvements for current *farm* inventories are covered in Chapter 6.

Several programs for improving the monthly inventory data of the Census surveys for trade and manufacturing have been undertaken in recent years. These include actual and planned improvements in various aspects of the samples of reporting firms; collection of information on inventory valuation; new coverage of wholesale trade petroleum bulk stations and assemblers of farm products; and studies of recordkeeping practices of companies to determine the kinds of inventory information actually available from company records.

During the course of the DIP study, the Census Bureau contracted with the National Bureau of Economic Research (NBER) to make an intensive study of means to provide more accurate measures of business inventories. Experimental surveys, company visits, delineation of conceptual issues, etc. are being undertaken as part of the NBER study, which is planned for completion in 1978. By contrast, inventory data are only one set of statistics, although very important, under examination in the DIP study. The DIP recommendations for the improvement of inventory data are not as extensive as those that will be emanating from the forthcoming NBER study. However, the DIP review has aimed at identifying the major existing weaknesses and recommendations for their amelioration that appear to be essential to a basic program for improving inventory statistics.

a. Importance in GNP of business inventory changes

Table 5-1 presents the quarterly and annual patterns since 1969 of the change in business nonfarm inventories at current prices and their relationship to business nonfarm GNP. Inventories increased in every quarter from 1969 to 1974. The quarterly increments in inventories during this period at seasonally adjusted annual rates typically were in the $4 to $10 billion range, although there were accumulations on the low side of $2 billion and at the upper end of $14 and $24 billion. The large increases reflected the strong buildup of inventories in the last quarter of 1973 and the first half of 1974. By contrast, inventories were liquidated in all four quarters of 1975. The decline in these holdings was most pronounced during the first half of the year, when the average annual rate was $28 billion.

Inventory swings had a significant bearing on the change in GNP in selected quarters (columns 2 and 3). This comparison underscores the importance of having accurate inventory figures. They are very volatile and sometimes account for sizeable amounts of the change in GNP, including the recessions of 1969-70 and 1974-75 when their negative impacts on production were so apparent.

As a proportion of GNP (column 4), quarterly inventory change ranged from -2.6 to +2.1 percent. The higher proportions occurred between 1973-IV and 1975-II as a reflection of the sharp pre-recession inventory buildup and the severe liquidation during the recession. For most other periods, the proportion ranged from .3 to 1.0 percent. Thus, inventory change

[4] For example, "Consultant Committee on Inventory Statistics," *Reports of Federal Reserve Consultant Committees on Economic Statistics, Joint Committee on the Economic Report, 79th Congress, 1955.*

accounts for a very small proportion of the *level* of GNP, but as noted above, it is a key factor accounting for the *change* in GNP, which of course is of major interest to policymakers. Because of these relationships, errors in estimating changes in business inventories can have a serious impact on interpreting the current outlook and hence on policy decisions. This is illustrated by the estimating errors that occurred in the second half of 1973 and the first half of 1974.

TABLE 5-1. Business Nonfarm Inventories and Business Nonfarm GNP
(seasonally adjusted annual rate)

	Inventories[1]			Quarterly GNP change	Inventory change as percent of GNP
	Change		Swing		
	(billions of current dollars)				
	(1)		(2)	(3)	(4)
1969		9.2			1.2
I	8.6		1.6	14.4	1.1
II	10.5		1.9	15.5	1.4
III	11.8		1.3	11.7	1.5
IV	6.1		−5.7	5.3	.8
1970		3.7			.4
I	2.4		−3.7	4.2	.3
II	4.0		1.6	9.3	.5
III	5.7		1.7	13.0	.7
IV	2.5		−3.2	.3	.3
1971		5.1			.6
I	5.8		3.3	26.9	.7
II	8.4		2.6	16.6	1.0
III	3.5		−4.9	16.6	.4
IV	2.6		−.9	14.4	.3
1972		8.8			.9
I	4.0		1.4	31.0	.4
II	9.3		5.3	22.4	1.0
III	11.7		2.4	18.4	1.2
IV	10.3		−1.4	30.1	1.0
1973		14.7			1.4
I	11.6		1.3	34.1	1.1
II	11.9		.3	15.1	1.2
III	11.4		−.5	19.6	1.1
IV	23.7		12.3	27.6	2.1
1974		12.2			1.1
I	14.5		−9.2	11.1	1.3
II	13.9		−.6	29.5	1.2
III	7.4		−6.5	25.0	.6
IV	12.9		5.5	8.3	1.1
1975		−17.6			−1.4
I	−25.6		−38.5	4.0	−2.2
II	−31.2		−5.6	30.0	−2.6
III	−4.2		27.0	49.3	−.3
IV	−9.5		−5.3	32.9	−.7

[1]Includes inventory valuation adjustment.

Source: *Survey of Current Business*, January and July 1976.

Recent revisions affecting the business outlook

Revisions of the inventory change estimates appearing in the July 1974 *Survey of Current Business* as part of the regular annual review of the GNP accounts by BEA were quite substantial. They indicated a significantly larger buildup of inventory stocks, particularly in 1973-IV and 1974-I than was initially estimated. In turn, the revised figures were an important element in a reevaluation at that time by economic analysts for a more modest increase in production than previously anticipated for the immediate quarters ahead.

Table 5-2 shows these early revisions appearing in July 1974 (i.e., before the recent benchmark figures shown in Table 5-1) for the quarterly estimates of nonfarm inventory change from 1972-I to 1974-I. These early revisions were most striking in 1973-IV and 1974-I when the revised figures showed a total inventory accumulation of $15 billion more than previously calculated. In addition, the understatement of the buildup in the previous estimates became progressively larger from the beginning of 1973, rising from $2 billion in the first quarter of 1973 to $8 billion in the first quarter of 1974. The revised data for 1972 also showed a persistent understatement of inventory increases, although in smaller amounts and not as steadily upward as in the later period. (The benchmark revisions in Table 5-1 show an even greater buildup in 1972 and 1973, although it did not change the previously noted "surprise" for 1973-IV and 1974-I which caused a significant change in the short-term business outlook.)

Most of the revisions occurred in the book value figures, which are summarized below, as distinct from the IVA component. The marked shift from FIFO to LIFO valuation methods by industry which became apparent in 1974 was not reflected in the early revisions for 1974-I.

The major cause of the book value revisions was the revision of Census data for manufacturing and trade inventories for the third month of the quarter which appeared after the 45-day GNP estimates were prepared. In addition, BEA introduced an adjustment for a bias between the monthly manufacturing and retail book value inventory series and annual benchmark surveys that become available later. The rationale for the bias adjustment was twofold: the consistent understatement of the current monthly inventory levels by monthly Census reports, especially in manufacturing; and evidence obtained from analysis of the GNP statistical discrepancy. The use of the bias adjustment was subsequently justified by upward revisions in manufacturing and retail book values in 1973. Later years were also revised upward with the sole exception of retail book values in 1974. Consequently, the bias adjustment now is made on a current basis and hence should not cause the problem that was created when it was first introduced in 1974. There were several other factors in the revisions, the most important of which involved BEA techniques for estimating the best quarterly movement of the inventory change component.

TABLE 5-2. Early Revision in Estimates of Nonfarm Inventory Change
(billions of current dollars, seasonally adjusted annual rates)

	Best estimate prior to July 1974 revision (1)		July 1974[1] revision (2)		Difference (2) - (1)	
1972		5.6		7.8		2.2
I	1.4		4.1		2.7	
II	4.8		7.0		2.2	
III	8.4		9.6		1.2	
IV	7.9		10.4		2.5	
1973		7.3		11.4		4.1
I	4.4		6.5		2.1	
II	4.4		7.7		3.3	
III	3.2		7.4		4.2	
IV	17.3		24.0		6.7	
1974						
I	5.0		13.1		8.1	

[1] *Survey of Current Business*, July 1973, July 1974 and May 1974.

b. Concepts and measures

Inventory change is part of gross private domestic investment. It is the change in physical volume of stocks measured in the average prices of the period. The measure of the change in business inventories (CBI) is derived as the sum composed of two broad elements: (1) increase or decrease in the book value of stocks held in the private sector, and (2) the inventory valuation adjustment (IVA) which measures gains and losses on inventory holdings due to price changes associated with the cost of goods sold. The IVA is estimated separately for the investment component of the product side, and for the corporate profits and proprietors' income components of the income side. (IVA pricing problems are discussed in Chapter 7.)

The general BEA technique for estimating the CBI is to deflate the reported book value figures for last-in, first-out (LIFO) and non-LIFO methods of valuation for two successive quarters. The difference between these two figures is the CBI in constant prices. This difference is then translated into current prices. The IVA is obtained as a residual, equal to the CBI minus the change in the reported book value figures. The deflation of the book value figures is based on differences in the acquisition and replacement costs as reflected in the wholesale price movements of goods typically held in inventory, and the length of time particular goods are assumed to be held in stock (i.e., turnover rates). There are several intermediate steps associated with the pricing procedure which differ for the LIFO and non-LIFO components because of variations in the effect that these alternative valuation methods have on the book value of inventories.

The CBI calculation is predicated on the availability of book value data for the third month of the quarter. However, for the -15 day projection and +15 day preliminary estimates, only 1 or 2 months of inventory data, respectively, are available for the quarter. Consequently, the procedure is to extrapolate either the book value or constant-dollar stock levels to the third month for each industry in manufacturing and trade, utilizing current inventory-sales ratios and qualitative information derived from newspaper accounts and discussions with trade sources.

The procedure as outlined above is used to prepare the IVA estimates both for the product and income sides. The only distinction is that the LIFO and non-LIFO proportions differ in the two calculations in order to be consistent with variations in the source data. Specifically, the data on inventories, which primarily are based on Census Bureau surveys of manufacturing and trade firms, typically refer to inventories as they are carried on the company books for purposes of managing the operations of the firm. By contrast, the data on corporate profits, which are derived from Federal Trade Commission surveys and company reports to stockholders, are oriented toward the treatment of inventories as reported on tax returns to IRS. Consequently, the LIFO proportions are altered in the estimates of the IVA on the income side to make them consistent with the tax-based measures; this adjustment is based on BEA and Census Bureau surveys of company reporting practices on different report forms.

Current monthly or quarterly information on book value nonfarm inventories is collected by the Census Bureau, Securities and Exchange Commission (SEC), and Federal Trade Commission (FTC). The monthly Census surveys of manufacturing, retail trade, and wholesale trade provide the bulk of the industry coverage for the nonfarm inventory estimates. The quarterly SEC data for nonfinancial corporations is used for estimating the total of the other industries—mining, construction, transportation, utilities, finance and services. The quarterly FTC information on manufacturing and trade corporations is used by BEA as a rough qualitative check on the Census manufacturing and trade figures.

Estimating factors for the commodity composition and turnover rates of inventories associated with the IVA calculations are derived from information in the quinquennial economic censuses and other sources. The commodity composition is based on data from the economic censuses on "materials consumed" for manufacturing and mining, and product sales for wholesale and retail trade, as well as purchases of materials from the BEA input-output estimates (Chapter 3). The turnover rates are calculated by dividing the yearend inventories by the average monthly cost of goods sold. Yearend inventory data are from the economic censuses, while the monthly costs of goods sold are extrapolated from the annual IRS Statistics of Income and other sources. These calculated monthly turnover rates are then judgmentally modified to correspond to the accounting practices of the various industries.

c. Data sources, inadequacies and recommendations

Quarterly estimates of nonfarm inventory change are prepared separately for manufacturing, retail trade, wholesale trade, and for all other industries (mining, construction, transportation, utilities, finance and services). The four groupings are discussed in turn, including recommended improvements for the data base.

Table 5-3 shows the industrial data for total inventory change and swings for recent years (including the IVA), and the book value levels for 1974.

They indicate that manufacturing and retail trade have the dominant year-to-year movements; these industries also account for the bulk of all inventory holdings (approximately one-half by manufacturing and one-fifth by retail trade.) The impacts of wholesale trade and "all other" inventories are less striking, but nonetheless important in the total inventory picture. These general patterns are similar for the book value changes (not shown separately).

TABLE 5-3. Industrial Nonfarm Inventory Change and Swing by Industry[1]
(billions of current dollars)

	All industries	Manufacturing	Retail	Wholesale	All other
Change					
1969	9.2	4.6	2.1	1.5	1.0
1970	3.7	1.2	−.4	2.0	0.8
1971	5.1	−1.7	4.7	1.4	0.7
1972	8.8	2.1	2.7	2.2	1.8
1973	14.7	6.2	3.9	3.0	1.5
1974	12.2	8.3	−1.3	4.0	1.1
Swing					
1969-70	−5.5	−3.4	−2.5	0.5	−0.2
1970-71	1.4	−2.9	5.1	−0.6	−0.1
1971-72	3.7	3.8	−2.0	0.8	1.1
1972-73	5.9	4.1	1.2	0.8	−0.3
1973-74	−2.5	2.1	−5.2	1.0	−0.4
End of year level (book value)					
1974	322.9	157.3	71.6	61.7	32.3

[1]Includes inventory valuation adjustment.

Note: Detail may not add to totals due to rounding.

Source: *The National Income and Product Accounts of the United States, 1929-74: Statistical Tables* (1977) and *Survey of Current Business*, July 1976.

Manufacturing

Inventory change estimates for manufacturing are based on monthly book value data provided in the Census Bureau's *Manufacturers' Shipments, Inventories, and Orders* (M3-1). The data are shown seasonally adjusted and unadjusted in total and by stage of fabrication (materials and supplies, work in process, and finished goods). At the total level, figures are shown for the durable and nondurable aggregates and selected 2- and 3-digit SIC industries. By stage of fabrication, information is provided for the durable and nondurable totals and a more limited list of 2-digit industries.

The data are obtained from a sample of manufacturing firms (corporate and noncorporate) at the company level for smaller firms and at the divisional or departmental-type level for larger diversified firms. They are benchmarked annually to the larger sample of establishments in the Annual Survey of Manufactures (ASM). The M3-1 monthly sample is composed of almost all companies with 1,000 or more employees and a nonprobability sample of the smaller ones. However, the development of a probability sample of firms with 100 to 1,000 employees was started in January 1976, and estimates from this group will be integrated into the M3-1 estimates during 1977. Plans to sample the firms with less than 100 employees—not presently covered in the M3-1 survey—are still in the formative stage. In the 1967 Census of Manufactures, firms with less than 100 employees accounted for approximately 14 percent of manufacturing inventories. The smaller firms could have different cyclical and seasonal movements from those of the larger firms.

The respondents are asked to value the inventories at current replacement cost if feasible; otherwise, at book values. The amount reported at replacement separate from book values is not collected. Starting with December 1974, LIFO, FIFO, etc. methods of valuation are obtained in the monthly reports for December of every year.

Revised data are not collected for the previous month. This could affect the accuracy of the inventory estimates since it is probable that the respondents' reports are not based on complete data for the reference period.

Some but not all of the reporting firms include the inventories of sales branches, central administrative

offices, etc. in the M3-1 reports. The omission of these data on inventories could affect monthly movements.

Total inventory (no stage of fabrication detail) and shipments information is given for certain products produced for the Department of Defense by prime contractors and some subcontractors. The information contains the aggregate of ordnance, communications, aircraft and parts, and shipbuilding contracts. Virtually all of shipbuilding is reported on a work done (percent of completion) basis, and hence there is no appreciable buildup in the data on work-in-process inventories. However, in the aircraft industry, shipments under fixed-price type of contracts are reported on a delivery basis when the contract is completed. As a result there is a buildup in work-in-process inventories after the start of new work and a reduction in these inventories when the completed work is delivered. By contrast, cost-plus type contracts in aircraft are treated on a work-done basis with no appreciable buildup in inventories.

Broad estimates of alternative measures of defense purchases during the buildup and contraction of the Vietnam war as derived econometrically from a limited sample of Department of Defense contract information indicated significantly sharper changes in defense production (deliveries plus inventory change) than defense purchases included in the actual GNP estimates. [9] For example, during the initial buildup from the fourth quarter of 1964 to the fourth quarter of 1966, defense purchases increased by $15.5 billion in the published series compared with an estimated increase in defense production of $20.5 billion. Similarly, during the first stages of the cutback in military activities from the fourth quarter of 1968 to the fourth quarter of 1969, the published figures on defense purchases declined by $1 billion compared with an estimated decline in defense production of $5 billion. Thus, the current measures of defense purchases do not reflect adequately the actual effect of changing defense procurement on private industry output.

Another source of information on manufacturing inventories is available in the Federal Trade Commission's *Quarterly Financial Report* (QFR). These quarterly data for corporations are provided in the aggregate (not by stage of fabrication), seasonally unadjusted, separately for the durable and nondurable aggregates and for each 2-digit and selected 3-digit SIC industries. They are used by BEA as a rough qualitative check on the Census figures. However, BEA plans to review the QFR figures more systematically as part of its effort to improve the methodology of estimating the manufacturing inventory component. The two sources, as indicated below, show different short-term movements.

The QFR is based on a probability sample of corporations which encompass the consolidation of subsidiaries as reported to stockholders. Inventory data are reported in terms of book values. Information on the LIFO, FIFO, etc. method of valuation was collected as a one-time survey for the year 1974 (published in the 1975-II QFR.)

Table 5-4 shows for 1974-I through 1975-III quarterly changes in the book value inventories (excluding the IVA and seasonally unadjusted) for all manufacturing industries as indicated by the Census M3-1 and QFR data. The QFR figures are based on the new reporting concept which covers domestic operations only of the surveyed companies, similar to the Census data. The Census figures generally show less volatile movements as exemplified by a steadier but slower buildup in 1974, as well as a one quarter lag in the slowdown in the rate of accumulation and in the liquidation occurring in 1975. At the same time, yearend 1974 inventory levels for the Census data were approximately 88 percent of the QFR levels. These differences are due to variations of unknown amounts in the two surveys with respect to industry classifications, company consolidation, sample and legal form coverage, and reported values.

TABLE 5-4. Quarterly Manufacturing Inventory Change in Book Value
(billions of dollars, seasonally unadjusted)

	Census	FTC
1974	33.8	33.9
I	8.2	10.6
II	7.2	7.7
III	8.5	10.0
IV	9.9	5.6
1975		
I	2.1	−.6
II	−4.1	−4.8
III	−2.5	−2.2

Note: Fourth quarter 1974 inventory levels: Census, $158 billion; FTC, $180 billion.

Recommendations:

The Committee supports the current Census Bureau effort to have a more representative sample of firms in its monthly survey of manufacturing companies.

1. We also recommend the following ways of strengthening its monthly survey of Manufacturers' Shipments, Inventories, and Orders (M3-1) as indicated below:

[9] "Economic Impact of Defense Procurement," *Survey of Current Business*, September 1971.

a. *When the ongoing improvement to develop a probability sample for firms with 100 to 1,000 employees is completed, a sampling procedure should be developed to obtain monthly inventory information from firms with less than 100 employees.*

b. *Efforts should be made to insure that inventories of sales branches and other auxiliary establishments are included in the reports of all manufacturing companies.*

c. *An exploratory study should be made for collecting and including revised data for estimates of inventories in the "previous month."* In this connection, the Census should devise a test of whether this additional question significantly affects the response rate and whether the revisions are in fact significant.

d. *Refine the monthly reporting of the defense-oriented industries—ordnance, communications, aircraft and shipbuilding—to insure that shipments are uniformly recorded in the period when the product is actually completed.* (This recommendation also appears in the section on producers' durable equipment.)

e. *Explore the collection of inventory data by stage of fabrication for military hardware with long production leadtimes (e.g., ships, aircraft, missiles, ordnance). This information should be collected from prime contractors of the Department of Defense and first tier subcontractors. These data showing raw materials, work-in-process, and finished goods inventories would make possible estimates of inventory change in the defense-oriented industries on a work-done basis for special economic analyses of the impact of defense procurement activities on private industry production.*

2. *The Bureau of Economic Analysis should conduct a systematic analysis of data in the Federal Trade Commission's Quarterly Financial Report for estimating and cross-checking measures of manufacturing inventory change.*

Retail Trade

The monthly data on retail inventories are collected by Census from a subsample of the sample of retailers reporting in the monthly sales survey (see section above on personal consumption expenditures). They are not published by Census because of concern for their statistical reliability. This arises from the high nonresponse (approximately 25 percent of the sample total), and considerable use of company estimates that are not based on any records. However, the raw unpublished information is processed (including seasonal adjustment) by BEA and published for the durable and nondurable aggregates and selected kinds of business in the *Survey of Current Business*. Starting with December 1974, LIFO, FIFO, etc. methods of valuation are obtained in the monthly reports for December of every year.

In deriving the monthly levels, BEA extrapolates the benchmark yearend levels which are published by Census in the *Annual Retail Trade Report* by using detailed percentage change movements of the monthly sample data. The yearend data represent the aggregate of December 31 and other fiscal yearend dates. No adjustments are made for companies with fiscal years other than December 31 (approximately one-fifth of the inventory total).

The inventory sample is one fixed panel (i.e., it has no rotating panels). Approximately one-half of the sample for selected kinds of business—e.g., food, general merchandise, apparel, etc. stores—is updated every year. There is no more frequent updating for births of new firms for the sample. This contrasts with the continuous updating during the year of the sample used for the retail sales survey.

The information collected on retail inventories refers to figures for the current month only. Revised figures for the previous month are not collected. However, revised data typically are not available for retail firms because of the lack of current inventory records and physical counts of stocks as noted below.

A longstanding nonsampling problem of collecting data on retail inventories is the lack of actual records on current inventories by the businesses themselves. According to recent Census studies on company recordkeeping practices for smaller retail trade firms, which account for approximately 70 percent of all retail inventories, the reported inventory figures were based on company records for approximately 35 percent of the group's inventories, and the remainder on estimates of various types. Among these smaller firms, companies holding three-fourths of the inventories took physical counts of the stocks only once a year. For the larger firms, which account for 30 percent of all retail inventories, two-thirds of the reported inventories were based on company book or computer records. Among these larger firms, companies holding one-half of the inventories took physical counts once a year. An additional one-fifth of the inventories was physically counted twice a year.

In developing the estimates of retail automotive industries, BEA supplements the Census information on stocks of automotive dealers with monthly figures of the Motor Vehicle Manufacturers Association on the unit stocks of new cars and trucks and unit prices from the Automobile Invoice Service. This permits a

separate estimate of inventory change for new cars and trucks.

A new retail trade inventory series recently became available from an expansion of the coverage of the FTC's Quarterly Financial Report to include retail trade corporations. BEA plans to examine this new data source for use as a crosscheck on the current estimates. Corporations have been accounting for an increasing share of all retail inventories; the present proportion is approximately 75 percent.

Recommendations:

The Committee supports the current Census Bureau efforts to test the feasibility of (a) collecting monthly retail inventory data as part of the monthly retail sales survey in order to maintain a more up-to-date representative sample of firms reporting on inventories; and (b) collecting monthly data on purchases and gross margins of retail firms which together with the existing data on sales, would permit the calculation of alternative estimates of inventories. As part of reviewing and checking its preliminary findings with the data producing agencies, the Committee had recommended similar approaches for improving the inventory statistics to the Census Bureau.

We also recommend the following way of improving the Census Bureau's monthly survey of retail trade inventories:

Explore the feasibility of using a screened sample restricted to those firms which report inventory figures from actual records. This would require the identification of possible bias in using this technique, and if present, the development of means to correct for it in developing monthly estimates of inventories.

Wholesale Trade

Census provides monthly data on inventories of merchant wholesalers in *Monthly Wholesale Trade.* The data are provided for the durable and nondurable aggregates and selected kinds of business, seasonally adjusted and unadjusted. Inventories are valued at the purchase cost to the wholesaler, and exclude goods held on consignment. Merchant wholesalers—e.g., merchants, jobbers, distributors, exporters, importers, terminal operators—primarily engage in buying and selling merchandise on their own account. Starting with December 1974, LIFO, FIFO, etc. methods of valuation are obtained in the monthly reports for December of every year.

Census presently is expanding its coverage of wholesale trade to include petroleum bulk stations and assemblers of farm products. Inventory information for these wholesalers—recently reclassified from the nonmerchant to the merchant wholesaler category—will become available in 1977.

The sample of firms is composed of fixed and rotating panels, and is updated for births, deaths, mergers, etc. by the same procedure used for the list sample noted in the previous section on personal consumption expenditures for Monthly Retail Trade and Monthly Selected Services Receipts. The only difference is that there is no area sample in Monthly Wholesale Trade.

Similar to the procedure in the retail and services surveys noted above, inventory data for wholesale trade firms are collected for the current month only. Revised data for the previous month are not collected from the fixed panel or from the same firms in the rotating panels. The Census estimating procedure also is based on a "composite" technique which incorporates in the estimates for any single month the movements from the previous months to the current month for approximately 3 earlier years.

There has been a general problem of understatement of the preliminary estimates of wholesale inventories for which Census now is adjusting by regression techniques. The understatement appears to stem from technical aspects of the composite estimating procedure. A review of the procedure will be made after more experience is gained with the new wholesale sample which will be implemented in 1977.

According to a Census Bureau study of wholesale trade firms, companies holding three-fifths of wholesale inventories base their monthly reported figures on company records, and the remaining companies use various types of estimates. Physical counts of stocks are taken once a year by firms holding three-fifths of the inventories, and most of the remaining inventories are physically counted more frequently during the year (semiannually, quarterly, monthly).

A new wholesale trade inventory series recently became available from an expansion of the coverage of the FTC's Quarterly Financial Report to include wholesale trade corporations. BEA plans to examine this new data source for use as a cross-check on the current estimates.

Recommendations:

The Committee supports the planned Census Bureau effort to strengthen the composite estimating methodology for its monthly wholesale inventory data.

We also recommend the following way of improving the inventory data in the Monthly Wholesale Trade Report:

An exploratory study shoould be made for collecting revised data of the same firms for estimates of inventories in the "previous" month for the fixed panel of large firms as well as for the rotating panels of smaller firms. In this connection, the Census Bureau should explore the use of a shuttle schedule and devise a test of whether this additional question significantly affects the response rate and whether the revisions are in fact significant.

All Other Nonfarm Industries

Quarterly estimates of inventory change for mining, construction, transportation, utilities, finance, insurance, real estate, and services are trended based on Securities and Exchange Commission (SEC) quarterly seasonally unadjusted inventory data reported in *Working Capital of Nonfinancial U.S. Corporations* and supplementary proxy variables. The SEC figures reflect the activities of all corporations required to report to the SEC under the various securities acts. They are benchmarked by SEC to the IRS corporate totals in Statistics of Income. (This survey will be conducted by the Federal Trade Commission starting in FY 1978.)

The figures are published as one aggregate, and selected unpublished industry detail is made available to BEA. Occasional sample checks have been made of the LIFO and FIFO valuation methods, but these checks are not developed into regular reports. Recent SEC regulations require that company reports to stockholders must restate inventories and other assets in current replacement costs. However, this refers only to annual reports.

The SEC information becomes available 100 days after the close of the first three quarters and 130 days after the close of the fourth quarter. Thus, it is too late for direct use in any of the current quarterly GNP estimates, including the DIP proposed 75-day GNP figure. It is used indirectly in the current GNP estimates in the following manner. For the industry detail reported by SEC, the stocks for the preceding quarter are extrapolated to the current quarter by the movement of manufacturing inventories. For construction, which is one of the industries not reported separately by SEC, the most recent inventory figures available from Statistics of Income are extrapolated to the current period by the value of total new construction put in place. BEA also plans to substitute more timely data from the Federal Power Commission on coal inventories held by electric utilities for use in the proposed 75-day GNP estimate.

Table 5-5 shows the inventory patterns for these industries based on the most recent IRS benchmark data for all businesses (corporate and unincorporated combined) for 1971 and 1972. These indicate that construction, utilities, and services in descending order are the most significant with regard to both inventory change and holdings.

A new inventory series for mining recently became available from an expansion of the FTC's Quarterly Financial Report to include mining corporations. BEA plans to examine this new data source for use as a cross-check on the current estimates.

TABLE 5-5. Inventories in Book value (billions of dollars)

	Change		Level[1]
	1970-71	1971-72	1972
Mining	.05	.2	1.7
Construction	.6	1.6	7.7
Transportation	.2	0	2.1
Communications	.1	.1	1.2
Electric, Gas, Water Utilities	.4	.3	3.5
Finance, Insurance, Real Estate	.1	.2	1.1
Ag., Forestry, Fishery Services	0	.1	.7
Other Services	0	.4	3.5

[1]End of calendar year.

Source: Unpublished BEA figures based on adjustments to IRS Statistics of Income data.

Recommendations:

As part of this review, the Committee examined the feasibility of the Securities and Exchange Commission providing advance tabulations of the inventory data from its quarterly report, *Working Capital of Nonfinancial Corporations*. Because of the delay by companies in filing their reports with the Commission, early tabulations for an adequate sample of the survey results would be available at best by 75 to 80 days after the quarter for the first three quarters of the year, and 75 to 110 days for the fourth quarter. Although this represents a speedup of about 25 days from the present publication schedule, it still is too late for use in a 75-day GNP estimate.

Therefore, we recommend that another review of the tabulation schedule be made in a few years for the possibility of speeding up the availability of these inventory data for use in the 75-day GNP estimates. Since the working capital survey was transferred to the Federal Trade Commission in FY 1978, the review would be conducted by that agency.

C. Government purchases of goods and services

1. Federal purchases

The quarterly estimates of Federal Government purchases of goods and services are based primarily on data taken from the Treasury Department's "Monthly Statement of Receipts and Outlays of the United States Government", commonly referred to as the Monthly Treasury Statement(MTS). The MTS presents by agency and appropriation the amount of Federally budgeted money spent each month. As the MTS is on a cash (checks-issued) basis, BEA adjusts the data to reflect actual physical deliveries by excluding payments not reflecting the actual transfer of goods (such as progress payments) and including goods received but not paid for. This adjustment primarily affects defense purchases and is made using progress payments data from the Department of Defense (DOD) and FTC data on accounts receivable and payable from companies working on Federal Government contracts. The FTC data are published in its *Quarterly Financial Report.*

As the MTS line items are not conceptually compatible with the NIPA definitions, BEA uses its translation of the Unified Budget to analyze the data on Federal expenditures. Each year, upon completion of the preparation of the President's Budget, BEA, with the assistance of staff from the Office of Management and Budget, analyzes the unified budget to align the fiscal year budget data with the national income accounting concepts. This translation is published as part of the official U.S. Budget. From the translation are derived proportions that are then used in classifying the MTS and other reports received from Federal agencies into expenditure categories for the quarterly GNP estimates.

At the time of the 15-day GNP estimate, only 2 months of MTS data are available for the quarter. To augment the data base, BEA obtains estimates of the missing month of data directly from selected agencies—DOD, Energy Research and Development Administration, Commodity Credit Corporation, and National Aeronautics and Space Administration. BEA also takes into consideration recent trends and budget projections in making the preliminary estimate of quarterly government purchases.

For the 45-day GNP estimate, 3 months of MTS data are available. With the availability of this final month of data for the quarter, a detailed line-by-line analysis of the MTS is made. In this analysis each MTS agency or program is examined to exclude financial transactions, land, transfer payments, grants, interest, and subsidies. Purchases are then derived essentially as a residual of total outlays less the excluded items. BEA accomplishes this analysis using its budget translation and its own analyses of data from prior fiscal years.

The most serious data problem arises at the time of the 15-day quarterly GNP estimate when projections from the agencies listed above are used to augment the 2 months of MTS data. These estimates are sometimes subject to large revisions and considerable judgment is required to derive the estimate of Federal purchases. For the 45-day GNP estimate, there is also the problem of making the timing adjustment to a physical delivery basis as DOD progress payments information is not available until approximately two and one-half months after the end of the quarter. Efforts have been made by DOD to speed up its tabulation of progress payments for BEA's use in making the timing adjustment, and although there has been some improvement in the timeliness of this information it still is too late for the 45-day estimate. A time lag also exists for the FTC data on accounts payable and receivable.

The probable introduction of a 75-day quarterly GNP estimate as recommended by the Committee will help to shore up the Federal purchases estimate. This will allow the inclusion of FTC data on accounts payable and receivable for companies working on Federal contracts except for the fourth quarter when companies are given additional time to file their quarterly reports. However, under the proposed schedule the DOD progress payments still will not be available for inclusion in a 75-day estimate.

Recommendation:

The Department of Defense should speed up its tabulation of progress payments to 60-65 days after the reference quarter for use in the proposed 75-day GNP estimate.

2. State and local purchases

Purchases of goods and services by State and local governments have grown rapidly during the post World War II years. In 1946, such purchases accounted for 36 percent of total government purchases. In 1974, State and local government purchases approximated 63 percent of total government purchases and accounted for nearly 14 percent of GNP. There are very few monthly or quarterly data available on purchases by State and local governments aside from construction and payroll expenditures. As a result, the quarterly GNP estimates of State and local purchases of goods and services are based heavily on trends and extrapolations of annual data, and judgment. The lack of an adequate data base for estimating this important and volatile sector is a serious data deficiency in the accounts.

a. Compensation of employees

State and local general government compensation (wages and salaries plus supplements) accounted for approximately 56 percent of total State and local purchases in 1974. The accuracy of the quarterly estimates of this component is affected by the absence of an accurate monthly or quarterly payroll series that can be used directly in BEA's estimating procedures.

The quarterly estimates of State and local government compensation are derived as part of the national income estimates. The estimates are based on the monthly BLS employment data for State and local governments, which are generated from the BLS form 790, and on BEA's own estimate of average earnings, which is based on previous trends, and on information concerning exogenous events such as strikes, layoffs, and pay raises. The monthly BLS State and local payroll series is not used directly in the estimating procedure because of variations in reporting of educational salaries during the vacation months.

The problem of the quality of the data from the 790 survey and recommendations for improvement are discussed later in the national income section of this chapter.

The estimates of supplements to State and local wages and salaries are, for the most part, trends based on the movement of wages. Employer contributions for social security and unemployment insurance are estimated by multiplying the effective tax rate by wages.

b. Structures

1. Put in place

Construction put in place accounted for 18 percent of total State and local government purchases in 1974. From 1975 forward the estimates are based on data from the Census Bureau which began a new data collection in January 1974 to measure the monthly value of construction put in place directly from a sample of State and local projects. Census is now collecting monthly construction progress data from a sample of approximately 3000 State and local projects via a shuttle questionnaire.

The data collected are identical to the information collected from private nonresidential project owners. The data elements include: a project description; project location; owner's name and address; contractor's name; type of ownership; starting date of construction; the construction cost of the project; architectural, engineering, and miscellaneous costs; and the value of construction put in place during the month.

Prior to 1975, the estimates were based on data from the monthly Survey of Construction Expenditures of State and Local Governments. This was a sample survey by the Census Bureau of governmental units in which the expenditure data collected were lagged 1 month to represent construction put in place.

2. Net purchases of used structures

This component accounted for approximately $1 billion of State and local government structures in 1974. These data are collected as part of the annual Governmental Finances Program. For the quarterly estimates, the fourth quarter estimate of the preceding year is held constant until actual data are available from the Governmental Finances Program.

3. General government new construction force account compensation

This item of approximately $700 million is netted against construction. To derive the quarterly estimates, the quinquennial benchmark level is extrapolated by the movement of highway construction put in place. This represents approximately 85 percent of the relevant force account compensation.

c. Medical vendor payments

Statistics on payments of about $10 billion in 1974 are collected by HEW's National Center for Social Statistics. The data are reported via the *Monthly Statistical Report on Medical Care* as part of a Federal/State cooperative program. The data are due in Washington 1 month after the end of the reference period; another 3 to 4 months elapse before the data are tabulated with most of the delay stemming from delinquencies in State reporting. Since these data are very late, they are used only as guides in trending the current quarterly estimates.

d. All other purchases

The residual of all other purchases totaled around $41 billion in 1974. Data for shorter than annual time periods are not available. Quarterly estimates are trended from the last available data from the Governmental Finances Survey (adjusted from a fiscal to a calendar year basis). This trend is modified to account for exogenous events, e.g., natural disasters, general revenue sharing, etc. The size of these modifications is based on personal inquiries by BEA analysts and other information available on the expected impact of such events.

Recommendations:

The Committee supports the proposed funding increase in the FY 1978 Budget submitted to Congress for the Census Bureau to conduct a quarterly survey of State and local government expenditures and nontax revenue.

In addition, the Committee recommends the following way of improving the quarterly estimates of

State and local government purchases:

The Department of Health, Education and Welfare should speed up its tabulation of medical vendor payments data so that these data are available 60 days after the end of the month.

INCOME SIDE

The major components of the income side of the accounts are employee compensation, proprietors' income, corporate profits, net interest, rental income of persons, capital consumption allowances, and indirect business taxes. They represent the resources used in the production of goods and services, i.e., the supply side of the economy or factor and nonfactor charges against final product as measured by the GNP.

This section deals mainly with the quarterly factor and nonfactor charges against final product for the nonfarm private and public sectors. It also includes data needs for estimates of monthly personal income. The quarterly farm income accounts are covered in Chapter 6.

A. Wages and Salaries

Wages and salaries of employees comprise dollar earnings received for straight time and overtime work; compensation of corporate officers; paid leave for vacations, holidays, sickness, civic duties, and personal care; piece rate remuneration; commissions; bonuses and tips; government pay of the military reserves; as well as clothing furnished by the employer (for military personnel only), food in kind, and lodging. This discussion concentrates on dollar earnings paid by the employer, which comprise over 99 percent of the total. Wages and salaries ($763 billion in 1974) are the dominant element of the income side, accounting for over one-half of the GNP. A timing adjustment of wage accruals less disbursements is made to assign retroactive wage increases to the periods when earned. Deferred salary payments of highly paid athletes and executives, which are spread over a multi-year period to lower income tax payments, are recorded in the month that the actual disbursements are made.

1. Private nonfarm industry and State and local governments

Private nonfarm industry and State and local government payroll data used in the current quarterly GNP estimates are obtained from monthly survey data (form 790) collected from a sample of establishments and governments by the Bureau of Labor Statistics and published in *Employment and Earnings*. As part of a Federal-State cooperative program, this survey obtains information on employment, hours paid for (private sector only), and earnings.

The monthly employment data are benchmarked by BLS every year, except for years when changes in the source data created by expanded coverage of the unemployment insurance laws, revised SIC codes, etc. necessitate skipping the annual benchmarking because of the greater workload caused by these changes. The benchmark for the private sector is for the month of March for the universe of firms covered by the State unemployment insurance laws. The benchmark for State and local governments is based on data from a larger sample survey of governments conducted by the Census Bureau for the month of October. The latter are published in *Public Employment*. The universe unemployment insurance data also are used by BEA in its annual revisions of the GNP accounts.

The monthly survey data for the private sector refer to the number of all employees as well as nonsupervisory employees, and to the average weekly earnings and hours paid for of production and nonsupervisory workers for the pay period which includes the 12th of each month. The preliminary monthly figures issued 3 weeks after the reference pay period are followed by two successive monthly revisions 6 and 9 weeks after the reference period.

Permanent and temporary workers, both full-time and part-time, are included in the survey if they receive money wages for any part of the reference pay period; they are excluded if they receive no pay for the pay period. Persons holding more than one job or who change jobs during the reference pay period are included in the reports of each establishment employing them. Proprietors, the self-employed, domestic workers in households, and unpaid family workers are excluded from the survey.

As a result of special events that may occur during the month, such as holidays, strikes, floods, retroactive pay, irregular bonuses, etc., payroll patterns during the reference pay period may not be representative of actual movements for the entire month. Since earnings and hours of supervisory workers (17 percent of all employees in the private sector in 1974) are not covered in the survey, differential movements in pay rates and time worked or paid for of these workers also are not reflected in the survey data; however, the survey does cover the number of supervisory and nonsupervisory employees.

BLS develops the sampling plan for the monthly survey that specifies the industry coverage by employment size of establishments at the State level. BLS also conducts second level edits after the initial State edits, and tabulates the data at the national level. The State government agencies select the sample establishments, maintain the sample, conduct the field collection work, edit the company reports,

and make estimates for statewide and metropolitan area totals. Owing to this highly decentralized data collection system, which involves each of the 50 State governments and the District of Columbia, there is a problem in maintaining uniform quality control procedures in implementing the sample design.

The monthly sample for the private and State and local government sectors was designed to cover approximately 54 percent of the employment universe, as compared with the actual response rate of 39 percent. There are variations in this overall response rate on an industry basis. For example, the called-for sample and response rate in manufacturing are 74 percent and 59 percent respectively; and for construction, 41 percent and 20 percent. Data for the railroad industry are obtained from mandatory reports filed by railroads with the Interstate Commerce Commission. The response rates for the railroad industry and for State and local governments have been adequate.

While the problem of low response occurs in most industries, it appears to be most serious in those industries that are characterized by a large number of small employer units and high birth and death rates such as construction, retail trade, and services. The problem is a result of (a) firms in these industries that often cooperate in reporting when first entering the sample but later do not respond, and (b) the fact that some States are not assiduous in maintaining the sample and obtaining industry cooperation partially due to limited resources. Although the erosion of the sample from lack of participation is most serious in the construction, trade and services industries, which have a relatively large number of small-sized firms, there is significant sample erosion in other industries as well.

There also is a problem with incorporating new firms starting in business (births) into the sample on a timely basis. The present lag of about 9 to 12 months leads to a downward bias in the employment estimates for all industries combined of approximately 100,000 workers per month, or 1.2 million per year. This estimate is based on the experience of the annual benchmark revisions to the monthly sample survey that reflect the more comprehensive statistics of the unemployment insurance program.

BLS increases its monthly employment estimates to compensate for the downward bias. This imputation accounts for a significant proportion of the period-to-period change in the employment and, consequently, the payroll figures. For example, from June 1975 to June 1976, total employment in nonagricultural establishments increased by approximately 2.5 million workers, of which 1.2 million (close to 50 percent) was attributable to the upward adjustment. The percentage of the month-to-month movements attributable to bias correction is much smaller—about 20 percent.

The actual downward bias varies over the course of the business cycle, and BLS presently reflects some of this variation in its estimating procedures. Thus, during periods of economic recovery and expansion, the monthly series are augmented by the same amounts as the average of previous benchmark revisions, but during the 1974-75 recession the augmentation was lowered to approximately 70,000 per month. The variation during the recession was introduced judgmentally by reference to other current economic indicators.

The BLS estimating procedure is based on the "link-relative" technique of month-to-month percentage change in employment for identical establishments actually reporting in the monthly surveys and linked to the extension from the last benchmark. Imputations for nonresponse are not made because they are not required for the link-relative estimating method.

This survey presently is based on a probability proportionate to size (PPS) sample. A brief history of the development of the sample will elucidate the nature of the current sample. When the survey was expanded in the 1930's to its present measures of employment, hours and earnings in the nonagricultural economy, the initial sampling frame was limited to firms with 250 or more employees. The sample has been updated since then by introducing new firms (births) as they appear in the unemployment insurance reporting system. A completely new sample based on the universe of firms has not been drawn since the initial sample of the 1930's, although subsequently it was enlarged to cover all firms, including those with less than 250 employees. The sampling frame was increased to its current number of firms in 1969. Because this sample has not been freshly drawn for four decades, there is the possibility that the responding firms are not representative of the universe (this reflects the problem of self-selecting samples).

The sample for the State and local government component of the 790 survey was started in 1939 to cover employment only, and was expanded in 1955 to include payroll data. The sample is both designed and implemented by the State governments. (This differs from the sample for private industry which, as noted above, is designed by BLS and implemented by the States.) The methodologies for sampling the local governments vary among the States. Some are based on probability techniques and others are not, and thus nationwide this segment of the survey is not a probability sample. The extent of this problem of lack of uniformity is not known because the actual

sampling procedures used by each State are not presently compiled by BLS.

The State and local government payroll figures pertain to wages and salaries for the entire month for all workers. This, of course, is the desired measure for the GNP accounts.

With regard to the nonsampling aspects of the State and local government component, there is a problem associated with the seasonal reporting of educational salaries. The pattern for covering teacher payrolls during the summer vacation months varies among the localities—e.g., some communities pay teachers the equivalent of the annual salary during the school year, while others prorate the annual salary to payments during all 12 months of the year.

This has caused significant seasonal aberrations in the State and local payroll data for the June - September period, especially the local component, thus affecting the data for the second and third quarters of the year. By contrast, the educational employment figures reflect all regular members of the faculty during the summer months regardless of whether they are paid in those months. Educational payrolls account for approximately one-half of all State and local wages and salaries. How BEA circumvents this difficulty has already been described in the preceding section on the product side under "State and local government purchases."

a. Use of monthly BLS data

The BEA uses these monthly survey data for the bulk of the private sector by industry. Generally, monthly wages and salaries are derived as the product of the employment, hours, and earnings data. The procedure is to raise the average hourly earnings for nonsupervisory employees to monthly total payrolls per worker by reference to accompanying survey data on hours paid for during the pay period. These are adjusted by BEA estimates of workdays, holidays, strikes, etc. during the month. As noted earlier, only employment data are available for supervisory employees. In the calculation of payrolls by industry, BEA varies its use of the BLS data to account for its assessment of differential characteristics between supervisory and nonsupervisory employees among industries and the different amount of industry detail provided in the BLS data.

Industry variations in the BEA use of these data in developing the estimates may be summarized as follows. For manufacturing production workers, the survey data on employment, hours, and hourly earnings are used. For manufacturing supervisory workers, the survey data on employment and straight-time hourly earnings (i.e., excluding overtime pay) are used along with a constant number of weekly hours estimated by BEA. For mining, transportation, utilities, trade, finance, insurance, real estate, and a limited number of service industries (hotels, laundries, photographic studios, motion pictures, hospitals), the figures are used in the aggregate for all workers rather than separately for supervisory and nonsupervisory workers because supervisory workers are a smaller proportion of the total in these industries than in manufacturing. For construction, the survey data on employment and earnings are used, but those on hours are not used because of the wide fluctuations in the figures, apparently arising from the weak sample and the exclusion in the series of vacation days which are paid for by the union.

For most personal, business, and professional services (i.e., other than the limited number noted above), published industry data on employment are combined with BEA estimates of monthly income based on past trends.

The survey data on employment for State and local governments are used to extrapolate the overall level allowing for a judgmental trend in earnings. The BLS State and local payroll data are not used because of the above-noted seasonal problems created by the treatment of educational salaries. An alternative method which BEA will explore is to use the payroll figures for the noneducational category (approximately 50 percent of all State and local wages), and the employment information for the educational estimates.

2. **Federal Government**

For the current quarterly estimates of wages and salaries of the Federal Government, Civil Service Commission (CSC) data are used for the civilian component and DOD information for the military.

Monthly CSC data on payrolls and employment of civilian workers are obtained from Federal agency reports submitted to the CSC. To have the data reflect a calendar month period, estimates by the reporting agencies include adjustments to the pay period time frame of the source data to account for work days which overlap consecutive months. The series on payrolls fluctuates by approximately $100-200 million on a monthly basis. This fluctuation is caused by monthly variations in the number of workers, work days and overtime work; and the effects of introducing pay raises, including retroactive payments, lump sum payments for annual leave, etc. BEA applies its own working day adjustment to the reported data to develop a smoother series.

Preliminary CSC data are provided approximately 40 days after the reference month. These are revised 1 month later. Thus, 2 months of figures (one revised and one preliminary) are available for the 15-day

GNP estimate, and 3 months of data are available for the 45-day estimate (two revised and one preliminary). A subsequent revision to the monthly data is made 2 months after the preliminary figures are received, i.e., 100 days after the reference month. However, under present procedures the last revision is not incorporated into the quarterly estimates until the first July revision of the GNP estimates.

Monthly DOD data on the number of military personnel are adjusted by BEA to account for general pay increases. Existing DOD monthly figures on personnel compensation, which are available 35-40 days after the reference month, will be examined by BEA as a more direct data source for payrolls.

Recommendations:

Bureau of Labor Statistics

The Bureau of Labor Statistics should undertake a broad-based research and development program to strengthen the sampling, estimating, and reporting aspects of the monthly establishment payroll survey (form 790) in the areas listed below. The research should include feasibility studies to determine the problems and costs likely to arise in making these improvements part of the ongoing collection program.

1. *Strengthen the response rates for the sampled firms and the procedures for introducing new firms into the sample.* Approaches for dealing with the basic problem of the existing sample due to nonresponse by the firms in these industries include (a) increasing the level of followup activities for recalcitrant firms, (b) exploring the possibility of using rotating panels of reporting firms, and (c) other techniques that appeared worthwhile in the recent BLS tests of alternative solicitation methods.

For dealing with the downward bias in the employment estimates caused by the late introduction into the sample of new firms, research and experimentation with alternative remedial methods should include the feasibility of using the quarterly unemployment insurance data (form ES 202) as a source of new firms to incorporate into the monthly sample (form 790) before the annual benchmarking. In addition, the adjustment factors for downward bias should be refined during periods of economic recovery (the early stages of cyclical expansions in economic activity) to reflect variations in these factors when the economy turns upward from the longer-run trend of the bias. This would be similar to the current practice of using differential factors during economic recessions to reflect cyclical downturns.

2. *Collect total wage payments for the calendar month (or pay periods most closely corresponding to the entire month)—including pay of supervisory workers, retroactive pay, and irregular bonuses—for the month preceding the one for which the pay period preliminary figures are collected.* This specification would place the basic data directly in the conceptual coverage and time frame required for the wage and salary estimates.

The data would be obtained as a "revision" 1 month after they were first collected. Pay periods that overlap months should be adjusted to conform to the calendar month, based on information collected on the dates of the pay periods.

This study also should include the feasibility of adding earnings and hours for supervisory workers to the existing survey which reflects the pay period of the 12th of the month.

3. *Examine the need for a periodic drawing of a complete new sample of all firms and implementing a full probability sample.* Consideration should be given to the (a) desirable frequency for drawing new samples, and (b) benefits and feasibility of implementing a full probability sample by improving the sample design and preparing imputations for nonresponse associated with the data collection process (see 4 below).

4. *Investigate ways to improve the processing of the survey data.* Three areas should be studied initially: (a) for the first estimate 3 weeks after the reference period, the development of aggregate figures using data received from key reporters who are representative of various industry size classes as a refinement of the present technique of using all available data; (b) for the third and final estimate 9 weeks after the reference period, the preparation of figures based on probability sample survey techniques by incorporating imputations for nonresponse; and (c) a quality control review by BLS of the procedures used in the various States for implementing the sample design. Initial experimentation with the key reporter system has actually begun, and the Committee encourages further development of this method as a potential alternative estimating technique.

5. *For the State and local government component of the survey, a systematic compilation should*

be made of the sampling methods used by each of the States in designing the sampling frame of local governments for collecting payroll data. This compilation should be used to identify any problems and necessary improvements in existing State procedures, and to examine the need and feasibility of implementing a full probability sample. Consideration should be given in this study to having BLS design the sampling frames for the survey of State and local governments (similar to the present procedure used in the private industry component of the survey).

6. *Refine the seasonal adjustment of payroll data used by State and local governments for education to deal with apparent aberrations arising from varying practices among the governmental jurisdictions of paying teachers and custodial help for summer vacation months.* An examination should be made of the basic reporting schedules and State editing of the 790 schedules to determine the need for changes in the editing procedures to put the nationwide estimates on a uniform basis. A similar examination was conducted in the early 1970's, but that review did not study the problem of variations in seasonal reporting of local government educational payrolls. Because of the new law that requires all local government employees to be covered by the State unemployment insurance laws by January 1978, research also should be conducted on using the quarterly unemployment insurance data (form ES 202) to quantify the effect of varying payment practices among local jurisdictions.

Internal Revenue Service

The Internal Revenue service should speed up tabulations of the Employer's Quarterly Federal Tax Returns (form 941) by using a probability sample and give more attention to editing them. The recommendation in full and a discussion of the problems and recommended improvements appear in the next section on wage supplements (social insurance).

B. Supplements to Wages and Salaries

This component of employee compensation is composed of two parts: employer contributions for social insurance and other labor income. *Social insurance* includes payments by employers for social security, State unemployment insurance, railroad retirement and unemployment funds, Federal Government worker retirement and veterans life insurance, and State and local government worker retirement and sickness compensation funds. *Other labor income* refers to employer contributions to private pension, health, welfare and group insurance plans, profit sharing and stock purchase plans, compensation for injuries, and directors' fees.

The current quarterly estimates for both social insurance and other labor income are based on the movement of wages and salaries and known changes in contribution rates. This indirect procedure is used for social insurance because the available monthly and quarterly data are neither sufficiently timely nor of adequate quality. For other labor income, monthly or quarterly data are not available. Total supplements in 1974 were $111 billion of which social insurance accounted for $56 billion and other labor income $55 billion.

1. Social insurance

A prospective source of current quarterly information of the social insurance component is the ongoing tabulation by the Internal Revenue Service of the Employers Quarterly Federal Tax Return (form 941). IRS recently started tabulating these tax data by liability quarter for total wages and tips subject to withholding plus other taxable compensation, social security taxable wages under the Federal Insurance Contribution Act (FICA), taxable tips reported, withheld income taxes, and FICA taxes. Potentially, the figures for FICA taxes provide direct measures for 65 percent of the social insurance component of wage supplements. (The information on wages and income taxes also could be very useful data for estimating wages and salaries and disposable personal income).

However, the current tabulations of these data are not sufficiently accurate or timely for use in the GNP accounts. For example, unadjusted quarterly patterns of taxable FICA wages for 1973 showed a sharp drop from the first to the second quarter and relative stability in the third and fourth quarters. This differs from the expected movement for taxable FICA wages of relative stability between the first and second quarters, a drop in the third quarter, and a sharp decrease in the fourth, which reflects the yearly pattern of reaching maximum taxable social security wages. The annual levels of these data also overstated the actual FICA taxable wages by $11 billion or 2.2 percent.

In addition, the bulk of the data necessary to estimate FICA tax liabilities is not available until 8 months after the reference quarter, and complete coverage is not available for an additional 9 months. Employer reports are due to be filed with IRS about 6 weeks after the close of the quarter.

The collection of data on State and local government worker retirement and sickness

compensation funds—14 percent of all social insurance employer contributions in 1973—is addressed in the previous product side section on "State and local government purchases."

2. Other labor income

Annual data on other labor income are obtained from a wide range of sources, including the Social Security Administration, Internal Revenue Service, Bureau of Labor Statistics (biennial), Institute of Life Insurance, and Health Insurance Association of America.

The reporting required under the new "Employee Retirement Income Security Act" (ERISA) to the Internal Revenue Service and the Labor-Management Services Administration (LMSA) in the Department of Labor may provide the basis for developing comprehensive annual measures of the major components of other labor income—private retirement, welfare, health and thrift-savings plans. (Tabulations of these annual ERISA data as national aggregations are recommended in Chapter 4.)

The Bureau of Labor Statistics experimented with collecting quarterly data on wage supplements in 1970. Information on employer payments was obtained from a sample of 500 private establishments. Quarterly data for social security payments were available. The basic problem was the lack of monthly or quarterly data for substantial elements of other income because of the nature of the payment. Specifically, private pension and other insurance contributions often are paid on an annual or multi-year basis. These long-term payments also vary by company in terms of the reporting period during the year when they are counted as an expense. At the same time, some Blue Cross and Blue Shield payments are made semiannually. It was concluded that the quarterly collection of these data was not viable because of the timing problems, and the effort was discontinued.

The possibility of collecting quarterly data on private pension, health and welfare payments by employers on an accrual basis during the year was examined as part of this DIP review. Such information requires the reporting firm to allocate annual levels to quarterly periods. Another level of estimation would be needed because even the annual payments are subject to considerable uncertainty for large segments of industry.

For example, most of the payments into private pension plans are calculated after the plan year, based on actuarial financing which permits a wide range of discretion as to what is actuarily sound. Actual payments into these pension funds reflect this discretionary range as well as the company's financial condition and its perception of how much it can pay. In the case of health funds, payments by large employers are often made for 1 to 2 years in advance. However, subsequent rebates based on experience rates can substantially modify the actual payments.

Despite these difficulties, it is evident that companies include estimates of these costs in their quarterly income statements to stockholders and to the Federal Trade Commission for its *Quarterly Financial Report* (discussed later under Corporate Profits). Expenses for employee benefit funds are included in the QFR under the broad category of operating costs except depreciation, depletion, and amortization. There is no itemization of the various operating costs on the reporting form. Also, it is not known to what extent the company estimates of the costs of pension, health, and welfare funds are based on a quarterly accrual method as distinguished from the inclusion of the entire payment for the plan year or multi-year period in the quarter when the payment was actually made.

Recommendations:

1. *As stated in the previous section, the Internal Revenue Service should tabulate a probability sample of Employer's Quarterly Federal Tax Returns (form 941) to provide national totals by 70 days after the close of the quarter and give increased attention to editing these tabulations to provide more accurate totals.* Separate tabulations should be provided for the private, Federal, and State and local government components for the following categories: (a) total wages and tips, (b) income tax witheld, (c) taxable FICA wages, (d) taxable FICA tips, and (e) total FICA taxes. The editing procedures should include a review of the quarterly movements of total wages and FICA wages as a check on the reasonableness of the relative patterns of these two series throughout the year.
2. *The Federal Trade Commission should collect explicit figures on employer contributions to private pension, health, and welfare benefit plans on an accrual accounting basis as part of its Quarterly Financial Report.* The reporting instructions should specify that quarterly estimates on an accrual basis be made for those plans which are paid in one lump sum to cover the plan year or multi-year period. That is, estimates should be provided for the costs of these plans attributable to the quarter in which they are incurred regardless of when the payments were made. The information should be obtained separately for three broad categories; pension (retirement); health (Blue Cross, Blue Shield, other); and welfare (life insurance, day care, etc.).

C. Proprietors' Income

Proprietors' income refers to the net income of unincorporated enterprises derived from current business operations. It covers as one total the income associated both with profits and wages of the owner or partners of the firm. Income associated with capital gains or losses, including changes in inventory valuation, are excluded. Proprietors' income ($59.5 billion in 1974) is one of the more cyclically sensitive income elements.

Three broad industry groups accounted in 1973 for 85 percent of all nonfarm unincorporated income. These were personal, business and professional services (46 percent), wholesale and retail trade (28 percent), and contract construction (11 percent). These industries are characterized by a large number of small enterprises, many of which are organized as proprietorships or partnerships. By contrast, manufacturing, public utilities, and several branches of transportation are dominated by large enterprises organized as corporations.

No monthly or quarterly data are reported for proprietors' income. The quarterly estimates are derived indirectly from relationships with Census Bureau monthly measures of construction put in place and of business receipts for trade and services, and from trend extrapolations of historical annual levels reported in the IRS *Statistics of Income* series for other industries. The most recent annual levels from this source are available about 2 years after the reference year.

Two statistical agencies considered as vehicles for obtaining data on unincorporated income are the FTC and the Census Bureau. The FTC—which provides quarterly figures on corporate profits in mining, manufacturing and trade—does not survey unincorporated firms, in part because of the problem of sampling the large number of firms. In addition, the statutory authority for FTC to conduct a company reporting program emphasizes the collection of information from corporations (except banks and common carriers) engaged in interstate commerce. The FTC regulations would have to be reviewed, and probably changed, in order to expand its data collection to the noncorporate sector and to firms that are primarily engaged in intrastate commerce.

The Bureau of the Census has not collected data on profits in its industry surveys. The collection of such information would be a major departure from past practice. However, in its Current Population Survey (CPS), using households as the respondents, Census provides annual figures on nonfarm self-employment income. These data are for unincorporated businesses only. They accounted in the 1970-1973 period for over 90 percent of nonfarm proprietors' income. Approximately three-fourths of the estimate is based on reported survey data, and one-fourth is based on imputations for nonresponse.

This data source has been used as a broad cross-check of the proprietors' annual income estimates, but BEA has not examined it for more direct use in its estimating procedures. Presently BEA plans to look into this source more thoroughly. This also suggests the potential usefulness of another household survey currently under consideration by the Department of Health, Education and Welfare (HEW). The primary purpose of the prospective HEW quarterly household survey is to obtain more comprehensive and up-to-date income data on low income groups of the population, although data are planned to be obtained for all income groups. Income from nonfarm self-employment would be one of the data items. In terms of the needs for the GNP estimates, it would supplement the presently collected annual income figures on self-employment income in the CPS by obtaining this information on a quarterly basis. In the current planning stage, the Census Bureau is considered to be the most likely collecting agency.

Recommendation:

The Department of Health, Education and Welfare should explore the collection of figures on nonfarm self-employment income in its prospective quarterly household income survey to provide national totals by 65 days after the reference quarter. Alternatively, it may be more feasible to supplement the proposed survey with a quarterly establishment survey to obtain the self-employment figures. The household survey could encounter problems with collecting the data because typically business records are not kept at home and net income is calculated only annually for income tax reporting. BEA should be consulted in formulating the definitions of self-employment income for the survey questionnaire.

D. Corporate Profits

Figures on the net income of corporations cover the earnings of domestic corporations, excluding intercorporate dividends from domestic companies, plus the net receipt of dividends and branch profits from abroad. The definition of profits excludes capital gains and losses (both from inventory holdings and from other capital assets) and includes depletion charges. Profits of Federal Reserve banks and mutual financial institutions are in the corporate sector. Corporate profits ($91 billion in 1974) are among the most cyclically sensitive of the income elements.

There are no 15-day estimates of corporate profits (and therefore of the statistical discrepancy) because quarterly data on profits generally are not available.

Quarterly estimates for manufacturing, trade, and mining are based on the Quarterly Financial Report (QFR) of the Federal Trade Commission. These industries account for 60 to 65 percent of all corporate profits. For the first three quarters, estimates of corporate profits, based on preliminary FTC tabulations, are prepared for the 45-day estimate. A revised estimate is published 1 month later. For the fourth quarter, the first estimate appears as a 75-day estimate; this is largely the result of the extra time required by the companies reporting to FTC to complete their yearend audits before submitting the fourth quarter figures.

The QFR sample survey data are published approximately 75 days after the end of the first three calendar quarters and 95 days after the fourth calendar quarter. In order to provide data in time to meet the quarterly GNP publication schedule, the FTC provides BEA with preliminary figures based on responses received by an early cutoff date. This provides preliminary results in time for the 45-day estimate for the first three quarters, and for the 75-day estimate for the fourth quarter. [10]

For commercial banking, air transportation, and communications (10 to 15 percent of all corporate profits), quarterly estimates are based on a BEA sample of publicly held firms that provide quarterly reports to stockholders. In addition, a quarterly or semiannual survey of commerical banks, conducted jointly by the Comptroller of the Currency, Federal Deposit Insurance Corporation, and Federal Reserve Board, was initiated in 1976. This survey will provide an income statement itemizing the various income and expense categories quarterly for large banks which account for approximately 60 percent of all commercial bank assets, and semiannually (June and December) for the smaller banks. The present schedule will provide national aggregate tabulations 75 days after the close of the quarter.

However, there are problems with the use of this survey for the NIPA estimates: (1) only the large banks are surveyed quarterly, (2) operations of the domestic entities and the foreign affiliates of the banking company are reported as a single figure in a consolidated statement, and (3) the tabulations are available too late for use in the current NIPA estimates. Of course, all three agencies conducting the survey would have to be involved in any improvement effort.

The Federal Reserve Board provides quarterly reports for the twelve regional Federal Reserve banks (about 5 percent of profits).

Quarterly estimates of savings and loan associations (approximately 2 percent of profits) are extrapolated from annual levels using as a guide Federal Home Loan Bank Board (FHLBB) monthly information on mortgage debt outstanding and interest paid to depositors. Although the FHLBB has been collecting monthly information on income and expenses of insured savings and loan associations since 1973, the survey has not yet yielded meaningful aggregate income and expense data, primarily because the respondents have had some problems in reporting on an accrual basis. An effort is now underway to improve this reporting. It is anticipated that these aggregate data will be available during 1977 or 1978 at least quarterly, and possibly monthly, by 30 days after the reporting period.

For rail, truck, and pipeline transportation and electric and gas utilities, which comprise about 5 percent of all profits, quarterly estimates are based on company reports to regulatory agencies—the first three, to the Interstate Commerce Commission and the fourth one, to the Federal Power Commission. The FPC recently converted its data processing operations to a computerized system. Complications with implementing the new system have caused considerable slippage in providing tabulations of monthly data on a timely basis for the NIPA estimates. The FPC expects the computer problems to be solved during 1977 and monthly data to be provided to BEA approximately two and one-half months after the reference period. The rest-of-the-world estimates—broadly 5 percent of all profits—are based on BEA quarterly survey information of direct investment income (see Chapter 8).

The remaining 5 to 10 percent of corporate profits originate in the construction, service, insurance, and real estate industries. For the first two, the quarterly estimates are prepared using proxy relationships with monthly measures—in the case of construction, new construction put in place and for the service industries, receipts of service establishments. Both monthly series are compiled by the Census Bureau. Trend extrapolations are used for the insurance and real estate industries. These two industries typically do not release quarterly profits data to the public because they either are dominated by small nonpublicly held firms; or, as in the case of insurance, there is a high proportion of mutual (in contrast to stock) companies that also do not issue public quarterly reports. For property insurance companies, BEA obtains quarterly income reports from the New York State regulatory insurance agency for the

[10] A recommendation is made in Chapter 4 for the Federal Trade Commission to conduct an annual survey based on the fully audited company reports of firms in the QFR sample for the preceding year in time for use in the first July GNP revisions.

national activities of those companies registered in that State.

Recommendations:

1. *The Federal Power Commission should speed up its tabulation of monthly data for electric and gas utilities so that the data are available by 60-65 days after the reference period.*
2. The Committee supports the current effort of the Federal Home Loan Bank Board to provide quarterly, and possibly monthly, national aggregates on income and expenses of savings and loan associations by 30 days after the reference period. These data are expected to be available in 1977 or 1978.

In addition, the Committee recommends the following for improving the current quarterly estimates of corporate profits of commercial banks:

3. *Joint efforts should be made by the Federal Reserve Board, Comptroller of the Currency, and Federal Deposit Insurance Corporation to modify their design of the new subannual survey of the income of commercial banks so as to obtain (1) quarterly tabulations of net income 65 to 70 days after the reference quarter, and, if possible, on a preliminary basis 40 days after the quarter; and (2) net income figures for the domestic entities of the banking companies, as distinct from their foreign affiliates.*

The timeliness stipulation is supported by several considerations. *First*, the minimum requirement for tabulations 65 to 70 days after the quarter would necessitate only a 5 to 10 day speedup over the present schedule of 75 days after the quarter. Since respondents are supposed to report by 30 days after the quarter, this acceleration is feasible even allowing for late reporting. *Second*, given the existing universe survey, which is conducted quarterly for large banks and semiannually (June and December) for small banks, tabulations should be provided to BEA for the first and third quarters of the year for the large banks on a matched basis for the same banks reporting in the previous quarter. As a supplement to these tabulations, the development of a method for raising the large bank sample data to universe totals for the first and third quarters of the year should be explored. As a longer run objective, the smaller banks should be surveyed quarterly; use of probability samples would be satisfactory for these quarterly surveys. *Third*, the provision of a preliminary estimate 40 days after the quarter would involve the use of those reports that have been received to date. Since the respondents that report on time are not necessarily representative of the industry, matched tabulations for the same banks reporting in the previous quarter should be provided to BEA. In addition, the development of estimating techniques, including imputations for late respondents, should be explored for raising the reported figures to representative national estimates.

For the provision of net income estimates from the domestic entities of the banking companies, the present reporting system would have to be modified to obtain the information for the domestic operations of the firm "deconsolidated" from its worldwide activities. A similar type of reporting on the domestic entities as distinct from the foreign affiliates, recently was instituted by the Federal Trade Commission in its Quarterly Financial Report of manufacturing, mining, and trade corporations.

E. Net Interest

Conceptually, net interest measures monetary and imputed interest accruing to U.S. persons and governments from the domestic business system and from abroad. Interest payments to business by consumers and governments are excluded from the net interest component because they are not treated as a factor cost of production. [11] However, these interest receipts of business are included in the measures of corporate and unincorporated business incomes. Imputed interest for financial intermediaries is measured as the excess of property income received from funds entrusted to them by persons over property income returned in monetary form to persons; this appears on the product side in personal consumption expenditures as financial services received in kind. Imputed interest also includes property income of life insurance companies (excluding operating profits) and of noninsured pension plans. Net interest has been the fastest growing income element in recent years. The $71 billion total in 1974 was composed of $33 billion for monetary and $38 billion for imputed interest.

Statistically, the measure is prepared as interest paid by the business sector and the rest of the world minus interest received by the business and foreign sectors. Conceptually, this is net interest paid to persons (including nonprofit organizations) and government by business and the rest of the world. This indirect measure, in which intrabusiness payments and receipts cancel out, is utilized because of the lack of direct data on interest received by persons from business.

[11] For a discussion of the reasons for excluding consumer and government interest payments see *Survey of Current Business*, August 1965, p. 10, fn. 6.

That the existing data base primarily is an annual one is a basic weakness for the current quarterly estimates. Thus, the quarterly estimates are developed as extrapolations of recent annual trends, largely based on current proxy data from financial institutions and regulatory agencies on interest rates, intermediation, sources and uses of funds, etc. This basic data base is drawn upon for both the monetary and imputed components.

However, a new partial source of quarterly data on interest recently was started as part of the quarterly survey of large commercial banks—semiannually for smaller banks—by the Comptroller of the Currency, Federal Deposit Insurance Corporation, and Federal Reserve Board, as noted in the above section on corporate profits. The survey would provide separate data on interest income arising from loans and investments in private, Federal, and State and local government securities; for interest expenses, separate data are scheduled for time deposits, other deposits, borrowed money, and subordinated notes and debentures.

For the estimates of net imputed interest paid, Federal Reserve Board survey data on the ownership of demand deposits at commercial banks are used in preparing the estimates of nonmonetary interest income and of financial services provided without explicit charge to persons. These data show the ownership of demand deposits separately by financial business, nonfinancial business, consumer, foreign, and an all other category. They are provided monthly for large commercial banks, and quarterly for all insured banks, for the last month of the calendar quarter. The figures for the consumer share of total deposits for the large commercial banks do not always show the same movements as those for all insured banks. The Board had under review in the first half of 1976 the question of whether to continue the survey in view of the limited analytical use made of these data and the reporting burden placed on respondents. Its decision was to continue the survey at least for another 2 years while concurrently evaluating how worthwhile the data are.

Savings and loan associations are another source of interest payments to persons. The FHLBB presently provides monthly data for interest paid on deposits and on the amount of mortgage loans outstanding. Weighted average interest rates on the outstanding mortgages are provided semiannually. Thus, neither timely nor direct data are available for estimating interest received by savings and loan associations. The problem is with the interest received component because of the late information on weighted interest rates. These interest rates, together with the figures on mortgages outstanding, could be used to develop indirect estimates of interest receipts of savings and loan associations if the interest rate data were more timely.

However, as noted earlier, the FHLBB is in process of developing more frequent and timely data on income and expenses of savings and loan associations (see section on corporate profits). This information should be available in 1977 or 1978.

Other elements of the interest accounts stemming from the insurance industry, credit agencies and other financial intermediaries as well as nonfinancial sectors are not covered here because they are part of an ongoing in-depth BEA review of the entire interest sector. The review is examining the estimating procedures for all facets of this complex subject. Needs for any further data development in the interest accounts are not examined in this study pending the results of the review.

Recommendations:

As indicated in the section on corporate profits, the Committee endorses the current effort of the Federal Home Loan Bank Board to provide more frequent and timely data on income and expenses of savings and loan associations.

The Committee also supports the Federal Reserve Board's recent 2-year renewal of its survey of demand deposit ownership of commercial banks.

In addition, the Committee makes the same recommendation as stated in the previous section on corporate profits that *joint efforts should be made by the Federal Reserve Board, Comptroller of the Currency, and Federal Deposit Insurance Corporation to refine the design of the new survey of the income of commercial banks.*

F. Rental Income of Persons

The measure of rental income comprises monetary income derived from the rental of real property, except by persons primarily engaged in the real estate business; imputed estimates for the rental value of owner-occupied dwellings; and royalties received by persons for natural resource rights, patents, and copyrights. Rental income in 1974 totaled $21 billion, of which the monetary component was $11 billion.

Owing to the lack of current information, the quarterly estimates of rental income are prepared as a straight line extrapolation of annual levels. Special adjustments to rental income are made for the effect of storm damage to properties. For example, current information on damages and compensatory payments for hurricane Agnes in 1972 was obtained from the Small Business Administration and insurance companies.

In previous tests by BEA, the figure derived from the simple aggregate trending was very similar to that

based on separate current estimates using proxy variables for estimates of monetary rent received and landlord expenses for various categories of residential and nonresidential tenant-occupied buildings, imputed rental income for owner-occupied dwellings, and royalties. Estimates of rental income and consumer expenditures for rent are used as cross-checks for these interrelated components of the NIPA.

BEA considers the rental income estimates to be among the least reliable elements of the GNP accounts.[12] This qualitative assessment reflects the lack of data for the current quarterly estimates, and the reliance on data for the market valuation of homes to estimate the imputed rental value of owner-occupied housing.

Recommendation:

The Department of Health, Education and Welfare should include the collection of figures on gross (and if possible net) rental income separately for nonfarm residential and nonresidential properties in its prospective quarterly survey of the sources of household incomes; the data should be tabulated as national totals by 65 days after the close of the quarter. In the household interviewing process, information should be obtained on whether the rental income is reported on the respondents Federal income tax return (IRS form 1040) as supplementary income (Schedule E) or as a business income (Schedule C). Income reported in both categories should be tabulated quarterly to have a comprehensive measure of this source of income.

G. Capital Consumption Allowances

These nonfactor charges against final product comprise depreciation allowance and accidental damage to fixed capital for business capital, capital owned by not-for-profit institutions, and owner-occupied houses. Starting with the 1976 GNP benchmark revisions, this use of capital is valued in current replacement prices and based on consistent economic lives of capital assets.[13] This is the most significant of the conceptual revisions. The valuation adjustment between the measures of (a) economic life in replacement values, and (b) tax concept in historical costs, is published quarterly. Capital consumption allowances including the adjustment in 1974 amounted to $134 billion.

The quarterly estimates of capital consumption allowances are based on trend extrapolations of the economic life measure in current prices and the tax-based measure in historical costs. The economic life estimates are derived from annual perpetual inventory estimates of the capital stock. The perpetual inventory procedure derives estimates of capital stock for a particular year by cumulating past investment data and deducting an estimate of capital that is discarded.

Estimates of depreciation allowances directly affect corporate profits, proprietors' income, and rental income of persons. For example, differential effects on nonfinancial corporate profits of alternative estimates of depreciation allowances in current prices (i.e., the new GNP concept) for 1975 range from approximately $7 to $23 billion.[14] Because of the significant impact of the depreciation estimate on estimated net profits, it is important to have the method of valuation used by companies in arriving at reported depreciation. This information, however, is best obtained from annual surveys as recommended in Chapter 4.

No recommendation is made for capital consumption allowances.

H. Indirect Business Tax and Nontax Liability

These receipts of Federal, State and local governments measure sales, excise, and property taxes, customs duties, motor vehicle licenses, toll and tuition charges, miscellaneous fees, etc. They exclude business and personal income taxes, as well as capital gains, estate, and gift taxes. State and local governments receive approximately 80 percent of all indirect business taxes. Total indirect taxes in 1974 were $127 billion.

The quarterly estimates of indirect business taxes of both Federal and State and local governments are based on partial directly reported data supplemented by proxy variables as extrapolator factors and by judgmental trending. The proxy variables include monthly data on wholesalers' withdrawals of alcohol and tobacco products from bonded warehouses, retail sales, gasoline production, and personal consumption expenditures for telephone services, modified by known changes in tax rates. The estimates based on proxy variables are cross-checked with the trend of tax receipts data for previous quarters which were received too late for use in the current estimates.

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[12] Young, Allan H., *Reliability of the Quarterly National Income and Product Accounts of the United States, 1947-71*, July 1974, pp. 31-35; and *National Income: 1954 Edition*, 1954, p. 63.

[13] For a detailed description, see Allan H. Young, "New Estimates of Capital Consumption Allowances in the Benchmark Revision of GNP," *Survey of Current Business*, October 1975. Prior to this recent revision, the estimates for the nonfarm business, housing, and not-for-profit sectors reflected depreciation in historical costs, with the business estimates based on tax return data and the nonbusiness elements on an economic life concept derived from perpetual inventory calculations by BEA. (The farm sector was consistent with the new concept of economic life in current replacement prices—Chapter 6.)

[14] "Alternative Estimates of Capital Consumption Allowances and Profits of Nonfinancial Corporations, 1973-75," *Survey of Current Business*, August 1976.

The actual current data available on indirect business taxes are as follows. For Federal taxes, excluding excise taxes, the Monthly Treasury Statement (MTS) monthly figures are used for estimating aggregate categories of indirect tax collections. The MTS data are very timely; 2 months of figures are available for the 15-day GNP estimate, and all 3 months of the quarter for the 45-day estimate. Alcohol and tobacco excise taxes, which accounted for about 35 percent of the Federal total in 1975, are estimated on the basis of monthly information provided by the Treasury Department's Bureau of Alcohol, Tobacco, and Firearms on the physical quantities of alcohol and tobacco products withdrawn from bonded warehouses. These data are used instead of the MTS data because excise tax liabilities are incurred at the time of these withdrawals. The distinction between liabilities and expenditures for other indirect taxes is not as great a problem. In addition, proxy variables of seasonally adjusted auto and gasoline production and personal consumption expenditures for telephone services are used for seasonally adjusted estimates of these excise taxes.

The monthly data on withdrawals of cigarettes, cigars, beer and distilled spirits generally are available on the following time schedule: 1 month of data for the quarter for the 15-day GNP estimate, and 2 months of data for the 45-day estimate. However, there have been cases when the distilled spirits data for the first 2 months of the quarter fell behind schedule and only 1 month of data was available for the 45-day estimate. Distilled spirits account for approximately 50 percent of all Federal alcohol and tobacco excise taxes.

For State and local indirect taxes, quarterly survey data by the Census Bureau are published 3 months after the close of the quarter in the *Quarterly Summary of State and Local Tax Revenue*. State government taxes account for approximately 45 percent of the State and local total. Tax data for about 30 State governments are available for use in estimating the State component for the 45-day GNP figures; estimates are inputed by BEA for the missing States. Preliminary tabulations of State government tax revenues for about 40 States are published approximately 45 days after the quarter, but too late for the 45-day GNP estimate.

Local government data are available 3 months after the reference quarter, too late for use in the current GNP estimates. The longer processing time for the local as contrasted with the State figures reflects the need to survey many more local jurisdictions to have a representative sample. Property taxes are estimated as trend extrapolations of historical patterns, and sales tax estimates are based on movements of retail sales figures.

Recommendations:

1. *The Census Bureau should provide preliminary quarterly tabulations of local government tax revenues by 60 days after the close of the quarter.* The tabulations for all categories of taxes should be made available to BEA on a matched basis for the same governments which reported by this time schedule for the previous quarter. These preliminary tabulations would be superseded by the more complete coverage in the subsequent publication of *Quarterly Summary of State and Local Tax Revenue.*
2. *The Bureau of Alcohol, Tobacco, and Firearms of the Department of the Treasury should make special efforts to adhere to its schedule of providing monthly data on withdrawals from bonded warehouses of distilled spirits 60 days after the month for 10 months of the year, and 70 days after the month for June and December.*

SOME GENERAL RECOMMENDATIONS

A. Publication Schedule

At several points, attention has been directed to the current BEA practice of calling the quarterly NIPA released 45 days after the close of the reference quarter the "revised estimates". Corporate profits and the statistical discrepancy, both in the income side of the accounts, are altered 1 month later (75 days after the reference quarter) by substituting final sample results on corporate profits for the preliminary results; net exports on the product side are also revised 75 days after the reference quarter to reflect new data on international investment income flows. Thereafter the quarterly estimates typically are not revised again until the preparation of the first of the annual July revisions. The quarterly estimates are also subject to revision in the two following July revisions.

The fuller data base that is available after the 45-day estimate is not used, except in the case of corporate profits, until four quarters later for the second quarter GNP estimate and three, two, and one quarter(s) later for calendar quarters III, IV, and I, respectively. It contributes to changes in the quarterly estimates released with the first July estimates being so large on occasion as to take the user by surprise. For some examples of these occurrences since World War II, see Chapter 2.

The Committee has thought about this BEA trade-off between timeliness and accuracy. It believes the implementation of a 75-day estimate would improve the terms of this trade-off.

With a 75-day estimate, policymakers in the Federal Government would continue to receive the projected estimate 2 weeks before the end of the

quarter. Also, the projected estimate would continue to be confirmed or amended in the estimates 15 days and 45 days after the end of the reference quarter. Analysis of revision changes has indicated that the 15-day estimate has generally been sufficiently reliable to serve legitimate uses to which such a measure can be put. A BEA study of revision changes for the period 1964-1971 found that "the average revisions of the quarterly changes in GNP in the 1964-71 period have been small. The revision between the first published estimates prepared 15 days after the close of the quarter and the latest available estimates [15] have averaged 16 percent of the quarterly change in GNP." This prompted the conclusion that "...early estimates almost always provide an accurate indication of whether the ultimate estimate of a quarter's change... will be large or small and ...whether the ultimate estimate will be larger or smaller than the preceding quarter."[16]

The 45-day estimate was somewhat closer to the latest available estimate than the 15-day estimate but still subject to substantial revision. Compared with the 16 percent for the 15-day estimate, the revision between the 45-day GNP estimate and the latest available estimate averaged 13 percent and for the first July estimate, 8 percent. For certain important components the improvement in reliability in the 45-day estimate was even less impressive than for the GNP aggregate.

Some part of the revision change between the 45-day and the first July estimate arises from the necessity of basing the 45-day estimate on 2 months of data for approximately 11 major components and from the use of preliminary monthly or quarterly series for the all important corporate profits estimates, retail trade data, and manufacturers' shipments and inventory data. The data missing for the 45-day estimate plus the recommendations in this report for improving the quarterly data base would be available for the recommended 75-day estimate. This additional information will provide more accurate current quarterly estimates of the NIPA.

Recommendation:

The Bureau of Economic Analysis should institute a new practice of releasing a published set of GNP estimates 75 days after the close of the reference quarter. This revised estimate would then incorporate the entire quarterly data base and make it possible to include additional or revised data far more promptly than the first July revision.

B. Role of Judgment

The estimator of GNP must use professional judgment when the data are lacking or seriously inadequate. This occurs whenever:

a. data are available for less than 3 months of the reference quarter at the time the estimate is made. (The estimator either explicitly or implicitly makes an assumption about the probable magnitude of the missing data. An explicit assumption obviously is an exercise of judgment.)

b. a proxy variable fails to yield "reasonable" economic sense. (Illustrative of this is the assumption for personal consumption expenditures on gasoline that household purchases of gasoline have the same relative movement as the total sales of gasoline. During the energy crisis when drivers in households had a relatively low priority in the allocation of gasoline, it was reasonable to expect that the consumer had a significantly smaller share. As there were no suitable data to determine the magnitude of this decrease, the BEA estimator had to exercise judgment in divining the true movement of this component.)

c. the estimator realizes that the trend line used in extending certain GNP components needs to be altered to reflect changes in relevant current developments.

It should be emphasized, however, that the impact of the judgmental factor in this context is constrained within rather narrow limits. First, the exercise of judgment is curbed by the existence of independent data that often can be used for cross-checking the larger aggregates which include components subject to judgmental consideration. Secondly, judgment is disciplined by the estimator's understanding of economic relationships in the framework of business cycle fluctuations and seasonal patterns during the year. The economic relationships are based on historical experience, but the economy in any particular period may not conform to the past relationships.

Recommendation:

The Committee supports the recent BEA practice of providing in its GNP press releases a probable range of revisions for the estimates of change in the current-dollar GNP, real GNP, and the GNP implicit price deflator.

The Committee also supports another recently instituted BEA practice of describing in the *Survey*

[15] Latest available estimate refers to the historical quarterly figures from the most recent annual July revisions at the time Mr. Young's study was undertaken.

[16] Young, Allan H., *Reliability of the Quarterly National Income and Product Accounts of the United States, 1947-71*, July 1974, pp. 2-3.

of Current Business the assumptions made to fill selected major data gaps for preparing the 15-day GNP estimate. This was in response to earlier discussions between the Committee and BEA. The Survey article appears approximately 3 weeks after the 15-day estimates are released, and the coverage does not systemmatically summarize the judgments made for all of the major GNP components.

Therefore, the Committee recommends that BEA append to the release of its 15-day estimate, or provide as quickly as practical after the release of its 15-day estimate, a brief statement of the judgments used for all of the major GNP components and their economic and/or statistical rationale. Those users who differ with BEA's judgmental determination could then modify the official estimate by substituting their own judgment for particular elements in the official estimates.

C. Extending the Monthly Personal Income Accounts

With one exception, the most timely measures of the national economic accounts appear on a quarterly basis. This timing is dictated by the availability of the underlying data. The major exception is the series on personal income, which is prepared monthly and released approximately 15 days after the reference month.

The Committee believes that for the personal sector of the accounts, it is feasible to extend the presently available figures on monthly personal income to encompass the broad aggregates for the disposition of personal income. These would provide more timely measures of acceptable accuracy for the important household sector. Specifically, it is now statistically feasible to publish monthly estimates of personal taxes, personal consumption expenditures, and personal saving in addition to the monthly estimates of personal income already being published. Consumption expenditures, moreover, can be published with breakdowns for motor vehicles, other durables, nondurables, and services. The statistical feasibility of these monthly estimates has been demonstrated by BEA in its experimental effort to develop estimates of monthly GNP.

The publication of these additional monthly series has been among the planned innovations in the BEA's publication program. Nevertheless, no firm starting date for publication has been set.

Recommendation:

The Bureau of Economic Analysis should expand its present monthly series on personal income to include monthly estimates of personal taxes, personal consumption expenditures, and personal saving. In the Committee's view this should be accomplished as soon as possible since no additional resources are required.[17]

D. Seasonal Adjustment

The measurement of seasonal variation was not examined as part of the DIP study. This is a highly technical and complex subject which requires more intensive analysis and specialized expertise than time or resources permitted. Nonetheless, the Committee recognizes the importance of obtaining accurate seasonal measures and supports efforts by the statistical community to improve the techniques for seasonal adjustments of economic time series in general as well as the GNP estimate, in particular. In fact, a BEA analysis suggests that a significant part of the revisions in the quarterly movements of the seasonally adjusted GNP estimates is attributable to revisions in the seasonal factors of the underlying data.[18]

In this connection, the Committee commends the Census Bureau for undertaking jointly with the National Bureau of Economic Research a broad-based evaluation of seasonal adjustment techniques by commissioning papers on the subject by outside experts for a conference held in September 1976. Although it is beyond the scope of this report to summarize the findings of these conference papers, it is relevant to note the conclusion of one paper.

> 'It has been shown that the methods of seasonal adjustment studied tend to result in a similar adjustment for the full period, *but that significant differences occur for the current period*....It is the data for the current period which are most important for policy analysis . . . .' (emphasis supplied).[19]

Recently the Bureau of Labor Statistics also has been examining the properties of various techniques for seasonally adjusting the unemployment rate.[20]

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[17] Dissenting comment by Edward F. Denison: Annual estimates of personal saving in the most recent periods are subject to regrettably large errors and quarterly estimates to still larger ones. Monthly estimates would be much less reliable still, and probably too erratic to interpret unless they were arbitrarily smoothed. I am not convinced that a monthly series sufficiently accurate to contribute to economic analysis can be constructed.

[18] Young, *op. cit.*, pp. 9-10. For a nontechnical discussion of problems in the seasonal adjustment of economic time series, see Benjamin D. Kaplan, "Needs for Seasonal Adjustment Research," Bureau of the Census, presented to the annual meeting of the American Statistical Association, August 1971.

[19] Kuiper, John, "A Survey and Comparative Analysis of Various Methods of Seasonal Adjustment," presented at the National Bureau of Economic Research/Bureau of the Census Conference on Seasonal Analysis of Economic Time Series, September 10, 1976, p. 19.

[20] Plewes, Thomas J., "Revision of Seasonally Adjusted Labor Force Series," *Employment and Earnings*, February 1976.

The Committee hopes that all of these efforts will be followed by more experimentation in the various statistical agencies to test alternative methods of measuring the seasonal factor. For example, the need for conceptual work on the seasonal factors in estimating farm crops was noted in the discussion of farm inventories. [21]

Basic longstanding problems, such as whether to adjust by multiplicative or additive techniques and what time span to include in the historical experience, require continued monitoring. It also is possible that seasonal patterns may change significantly during periods of intense inflation and pronounced cyclical instability characterized by exceptionally high operating rates in selected industries or by deep economic recession, such as was experienced during the first half of the 1970's. These in fact may represent a type of "break" in the seasonal factors derived from periods of relative price stability.

It goes without saying that advancements in the methods of seasonal adjustment are necessary for bettering our understanding of the current economic situation and its short-term prospects. In recent years, however, relatively little attention has been given to basic conceptual issues of seasonal measurement prior to the efforts of the Census Bureau and of the Bureau of Labor Statistics noted above.

Recommendation:

The major Federal agencies providing economic statistics should adopt a general policy of giving a higher priority to the problem of seasonal measurement on a continuing basis, including the behavior of seasonals during different stages of the business cycle. The coordination of this effort on an interagency basis should be the responsibility of the OMB Statistical Policy Division.

E. Capacity for Quick Surveys

There is a need for the creation of a capacity somewhere in the Federal statistical system for carrying out quick surveys on economic subjects on short notice. This capacity is required whenever unexpected changes in the economic climate and in business behavior create the need for information that is not being collected currently.

This need is well illustrated by the recent effort of BEA in surveying industry to determine the extent of the shift from FIFO to LIFO in valuing inventories in the cost of goods sold and the effect of this shift on company profits. In this particular instance, BEA had to cover the cost of this unbudgeted survey from its own funds, thereby forcing some curtailment in its regular work.

Recommendation:

A budgetary reserve for carrying out essential surveys on short notice should be provided. Such funds might well be at the disposal of the Statistical Policy Division of the Office of Management and Budget for allocation to collection agencies when such needs arise.

APPENDIX

Quarterly Estimates of Government Receipts and Expenditures

A. Federal

The procedure for estimating the quarterly Federal receipts and expenditures accounts is like that used for estimating quarterly Federal purchases discussed earlier in this chapter. The estimates are based primarily on data from the Monthly Treasury Statement (MTS). As previously discussed, these data do not always conform to national accounting definitions and a single appropriation account may contain several different categories of NIPA receipts and expenditures as well as some cash outlays excluded from the accounts. BEA, therefore, augments the MTS data with information obtained directly from administering agencies and by applying proportions derived from its budget translation or prior year analysis.

1. Receipts ($288 billion in 1974)

On the receipts side of the accounts, BEA relies heavily on information concerning the items being taxed. Tax revenues are estimated by applying the effective tax rate to relevant taxable income. The MTS data are used primarily as a cross-check on the results of the methods used. Withheld personal income taxes are estimated by applying the average tax rate to the wage and salary estimates. Corporate

[21] See Chapter 6 of this report.

profits tax accruals are estimated similarly, in the course of estimating corporate profits. Current estimates of excise taxes rely on the current production of gasoline and withdrawals from warehouses of alcohol and tobacco. (Excise taxes are further discussed in the income section of this chapter.)

The seasonally adjusted quarterly estimates of contributions for social insurance are derived by applying FICA and unemployment insurance average rates to the seasonally adjusted national income wage and salary estimates. These estimates are checked against the detailed unadjusted data components as they become available from Social Security data on FICA taxes withheld from wages and salaries and contributions to the fund from the self-employed, MTS data on contributions to retirement and social insurance funds, estimates of payments into unemployment compensation funds based on Labor Department data from the ES202 (Quarterly Report of Insured Employment and Wages), and Veteran's Administration data on payments for veteran's life insurance.

2. **Expenditures** ($300 billion in 1974)

For tranfer payments, the most difficult portion to estimate is the State unemployment insurance component. The problem with relying solely on MTS data for these payments is that sometimes withdrawals from the fund represent anticipated future payments or a reimbursement for past payments rather than actual benefits paid. BEA obtains data on total benefits paid by State unemployment agencies and on unemployment compensation for Federal employees from the Labor Department's report on claims and payment activities. Although this is a monthly report, data from it in the past have not always been available in time for inclusion in the quarterly GNP estimates. When this has occured, missing months have been estimated using Federal disbursements to State benefit-paying agencies from the MTS and the weekly insured unemployment levels (available from Labor with a 1-week lag). In recent months, however, the Labor Department has been working successfully with the State employment security agencies to have the data reported on a more timely basis. The remaining transfer payments are estimated using both MTS data and agency records.

Estimates of grants-in-aid are derived using the MTS and specific information obtained directly from agencies, particularly for some large programs with unusual accounting problems. The estimates of net interest paid and subsidies are based on MTS and Budget data as well as recent trends.

Recommendation:

The Labor Department should continue to take steps to ensure that the data from the report on State unemployment benefit claims and payment activities are available at least by 60 days after the reference month.

B. State and Local

1. **Receipts** ($210 billion in 1974)

Data for the receipts accounts are largely from the *Quarterly Summary of State and Local Revenue* which is a Census Bureau survey of the 50 States and a sample of local governments. The most serious problem with the survey is the timing of the data which are available with a one quarter lag. Some State reports are available more currently; data from local governments are perpetually late. A recommendation concerning more timely tabulations of this survey appears in the income section of this chapter.

a. Personal tax and nontax receipts ($39.2 billion in 1974)

Estimates of personal taxes are based on the *Quarterly Summary of State and personal tax data* component are based on the *Quarterly Summary of State and Local Revenue*. While this survey provides good personal tax data, the timing problem discussed above precludes its use for the current quarterly estimates. For current seasonally adjusted personal income tax data, the national income series on wages and salaries is used as an extrapolator.

Data on *nontaxes* (e.g., fees, hospital charges, tuition, rents, special assessments), are not reported in the quarterly Census survey. This component, which is only available annually via the *Governmental Finances* line item, "current charges and miscellaneous general revenue", is trended for the quarterly estimates based on the rate of change of past data.

b. Corporate profits tax accruals ($6.8 billion in 1974)

Quarterly estimates of these payments are extrapolated based on the movement of the corporate profits in the national income accounts. Figures on corporate income tax collections, as distinct from accruals, are obtained in the *Quarterly Summary of State and Local Tax Revenue*.

c. Indirect business tax and nontax accruals ($106.7 billion in 1974)

Information on most taxes is taken from the *Quarterly Summary of State and Local Revenue*. The same timing problem noted previously for this survey also applies to this item. For certain fairly minor local taxes, annual data from *Governmental Finances*

are used in place of the quarterly revenue data which are of uncertain quality. This entails trending the last annual data.

For current seasonally adjusted data the following extrapolators are used:

1. for general sales tax - retail sales
2. for gas taxes - domestic demand for gas
3. for tobacco - tobacco from personal consumption expenditures
4. for alcohol - liquor retail sales

Information on tax law changes is obtained from the *Commerce Clearing House* and by direct contact with State and local governments

d. Contributions for social insurance ($13.7 billion)

Data on total contributions to retirement funds and temporary disability funds are available annually. Contributions to retirement funds are supplied by HEW; data on temporary disability insurance (TDI) contributions come from the Employment and Training Administration in the Department of Labor. For the quarterly estimates, State and local total wages and salaries are used as the extrapolator of contributions to State and local retirement funds. Total wages and salaries are used to extrapolate TDI.

Recommendation:

The Committee supports the proposed quarterly survey of State and local government expenditures and nontax revenues discussed earlier.[22]

2. **Expenditures** ($203 billion in 1974)

Quarterly estimates of purchases of goods and services by State and local governments are discussed earlier in this chapter. The other expenditure accounts include net interest paid, transfer payments, subsidies, and the current surplus of enterprises. As the primary data source for these accounts is *Governmental Finances*, the same data deficiencies discussed earlier also apply here.

a. Net interest paid

There are no monthly or quarterly data for net interest paid. Data from the most recent *Governmental Finances* are extrapolated by changes in the debt of State and local governments as reported in the Federal Reserve Board's flow of funds estimates. Attention is also paid to movements in relevant interest rates. (For the deficiencies in the estimates of State and local government debt in the flow of funds estimates, see discussion in Chapter 9.)

b. Transfer payments ($20 billion in 1974)

Data for *categorical and general assistance* programs such as aid to families with dependent children, about $10 billion in 1974, are available monthly from HEW's National Center for Social Statistics. These data are collected as part of the "Monthly Statistical Report on Medical Care."

In January 1974, the Federal Government assumed primary responsibility for old age assistance, aid to the blind and aid to the permanently and totally disabled under the Supplemental Security Income Program. State and local government supplements to this Federal program are counted as part of State and local categorical assistance transfer payments. The data are available monthly with a 60-day lag.

Benefits and withdrawals from pension funds totaled approximately $7 billion in 1974. Current data are collected via the quarterly Survey of Assets Held by Public-Employee Retirement Systems, a part of the annual *Governmental Finances* program. The form is sent to approximately 100 of the largest public employee retirement systems in the United States. These systems account for about 85 percent of all assets held by public employee retirement funds. Data are available approximately 2 months following the end of the quarter.

BEA receives, with a 2-month lag, monthly expenditure data for *temporary disability insurance* from the Employment and Training Administration, Department of Labor. This component totaled approximately $500 million in 1974.

With the NIPA benchmark revisions introduced in 1976, publicly administered workman's compensation funds were reclassified from government enterprises and treated as social insurance funds. The quarterly estimates of State administered workmen's programs ($900 million in 1974) are trended, based on employment figures.

The remaining transfer payments, which consist mainly of payments to nonprofit institutions and educational assistance, accounted for about $2.2 billion in 1974. Approximately 90 percent of the data for this component is taken from the annual *Governmental Finances* survey and are therefore not available for shorter intervals. The remaining 10 percent is estimated using information collected in the past, e.g., categories identified in previous government finances surveys that are no longer included on the collection schedule. An example of how error, though of trivial size, can be introduced via this procedure occurred in 1972. BEA had estimated aid to veterans at approximately $11 million per year from 1969-1974. The I-O table based on 1967 economic census data indicated that a larger amount was transferred to veterans and in reconciling the discrepancy it was learned that the State of

[22] A related recommendation appears in the discussion of flow of funds estimates in Chapter 9.

Massachusetts alone transferred $32 million in aid to veterans during 1972.

The quarterly estimates for all other expenditures for transfer payments are trended, based on rates of change from the most recent *Governmental Finances* data.

c. Subsidies less current surplus of government enterprises

An attempt to identify and measure *subsidies* by State and local governments was begun by BEA in 1973. To date, only State government payments to private railroads ($114 million in 1974) are included in the accounts. The quarterly estimates are trended from annual ICC data using current information from ICC on developments in the rail industry. Neither Census nor any other agency currently collects data on other subsidies paid by State and local governments. Therefore, it is not known if there are other subsidies and what their magnitude is. Some thought is being given to making definitional changes in the accounts to allow the inclusion of general government payments to government enterprises. If this change is made, the monies involved will be much larger. At that point, how to and who should measure this item will take on more importance.

Current surplus of enterprises is shown as an offset to expenditures from operating revenue data, primarily for liquor stores, electric utilities, and water supply systems. The data are taken from *Governmental Finances* with no monthly or quarterly detail available. Most of this component is trended for the quarterly estimates. Indicators (such as electricity usage) are used to move the annual data forward.

CHAPTER 6

IMPROVING THE NON-BENCHMARK ESTIMATES

III: FARM SECTOR

In recent years the gross product originating in U.S. agriculture has amounted to about 4 percent of GNP. Why then, it may well be asked, devote a separate chapter to the estimates of the income and product from farming? First, the farm sector is volatile in the short run, largely due to the uncertainty of weather conditions, and this volatility periodically has significantly affected quarterly changes in the Nation's output. Second, farming is one of the largest industries in the economy. Third, the recent deterioration in the world food economy and the enhanced importance of North America (United States and Canada) in covering the growing grain deficits of much of the rest of the world have (a) been an important contributor to the recent worldwide inflation, and (b) introduced complexities in preparing current measures of gross farm product.

It is incumbent on those who have responsibility for the Federal statistical system to ensure the development and availability of statistical information that is adequate for analysis and guidance of the highly critical role now thrust on the U.S. farm sector. To give emphasis to this recently emergent need is our principal reason for a separate chapter on the GNP statistics on the farm sector.

A secondary reason is that our current agricultural statistics reveal, perhaps more clearly than the statistics of other industries, a serious degree of obsolescence as a result of the major structural changes in farming operations that occurred after the current statistical system at the Federal level had been developed. This obsolescence received professional notice before the development of worldwide food shortages—as early as 1972 in the report of the American Agricultural Economic Association's Committee on Economic Statistics.

> "The Committee on Economic Statistics concludes that the data systems upon which we depend are in serious crisis. With each passing year, fundamental structural change transforms agriculture and rural life. Thus theoretical concepts around which we have constructed our data systems grow progressively more obsolete—so obsolete that minor tinkering with each census or survey no longer serves to bridge the basic inadequacy of the ideas being quantified."[1]

This chapter concentrates on data improvements for current quarterly estimates in current prices of (a) gross farm product, and (b) farm inventory change. Gross farm product, the value added in farming, measures the unduplicated output (i.e., net of intermediate purchases) of the farm sector. Farm inventory change represents increases or decreases of crops and livestock owned by farmers and stored on farms. Estimates underlying the gross farm product and farm inventory series are prepared in current prices by the Economic Research Service (ERS) of the Department of Agriculture (USDA). BEA adjusts these series slightly to conform to the conceptual measures of the national income and product accounts. The major survey data underlying the ERS estimates are provided by the Statistical Reporting Service (SRS) of USDA, including data provided to SRS by State government collection agencies. These are supplemented with data collected by ERS, other USDA agencies, Census, and private sources. BEA prepares the real farm GNP figures using SRS price information as deflators.

The disposition of farm output and investment by farmers in depreciable assets affects GNP components on the product side—e.g., consumer expenditures, fixed investment, general government purchases, and net exports. These are derived from other statistical series including retail sales of food stores and restaurants, manufacturers' shipments of farm equipment, value put in place of new farm structures, exports and imports of food and fiber products, and government purchases of agricultural products, excluding those for the price support program. Thus, the data for these components are obtained from more general information systems which also encompass the nonfarm economy.

[1] *American Journal of Agricultural Economics*, December 1972, p. 868.

Consequently, it is more efficient for the DIP study to consider any data weaknesses relating to the product side of the farm economy in the context of the various data sources used in preparing those economy-wide estimates. The sole exception is the inventory change.

The improvements recommended by the Committee refer to the output of crops (SIC 1) and livestock (SIC 2), including the price support transactions of the Commodity Credit Corporation (CCC). Since extrapolations of annual data are widely used for the quarterly estimates, the overriding objective of the recommendations is for improving the basic data used in the quarterly estimates of GNP and income originating in the farm sector. That is, the aim is to shift from the largely indirect data base now currently in use to one relying more on directly reported figures. The collection of some of these new data will not be easy because of conceptual and measurement problems, particularly those centered around the pronounced seasonals in certain production expenses and the equally pronounced but differing seasonals in cash receipts from crop and livestock products. Because of these problems, it will probably be necessary to continue the use of some indirect estimates. In this regard, there are certain key recommendations which are indicated in Chapter 1. Other recommendations with a lower priority are included as well for a more complete development of the data base for gross farm product.

Revision of the 1973 Farm Estimates

Before we describe in detail the data sources and estimating procedures, it should be helpful to examine a major revision in the quarterly and annual estimates for 1973 for clues to some significant weaknesses in data and methodology. As we shall see, the revisions in farm income were substantial and understandably upsetting to those charged with the formulation of economic policy.

Annual estimates of gross farm product and farm inventory change for 1973 appeared in the July 1974 *Survey of Current Business*. Table 6-1 summarizes the changes in these aggregates and their major components from the initial estimates published in February 1974.

For gross farm product, the revised 1973 annual level of $56.5 billion is approximately $9 billion, or 18 percent, above the initial estimate. For farm inventory change, the revised annual level of $4 billion is $3.5 billion higher than the initial estimate.

The quarterly patterns of the gross farm product revisions were substantial throughout the year, with the largest upward adjustments occurring in the second and third quarters. This reflected the net effect of differential revisions on a quarterly basis of both cash receipts and production expenses. The quarterly inventory change estimates also were adjusted upward in sizable amounts all during 1973; the amount of these revisions became progressively greater throughout the year except for the second quarter.

Cash receipts and inventory change were the dominant elements underlying the upward revision of gross farm product for the year as a whole. These two items were raised by a total of $8.5 billion. By contrast, production expenses were revised upward by only $300 million.

The crop estimates accounted for most of the revision—$7.5 billion for cash receipts plus inventory change. Also, the revision of $1 billion for livestock was not insignificant. Although the annual production expense figures were revised only slightly, there were substantial offsetting revisions of $4 to $4.5 billion between the first and second halves of the year.

The source of the revisions reflects the reliance on a considerable amount of forecasting for preparing the current quarterly estimates because of the absence and inadequacies of monthly or quarterly data. The technique of using annual projections and trending these totals as quarterly patterns throughout the year, based on historical relationships, generally has produced adequate annual levels. However, in periods of such sharply changing demand, supply, and price conditions as occurred in 1973, the indirect estimating factors and extrapolators based on average relationships in previous years are much less likely to reflect current activity. This then is a serious data deficiency.

The revised farm estimates for 1973 also reflect a benchmark revision back to 1959 based on census of agriculture data for 1964 and 1969, revised annual production, disposition and income reports for commodities for 1964-69, and surveys of agricultural finance for 1970 and of production expenses for 1971. The major effect of the benchmark revision on the 1973 figures was the incorporation for the first time of estimated income from machine hire, custom work, and recreational services. In 1973, these totaled $800 million. The benchmark had very little effect on the revised 1973 figures for cash receipts from farm marketings. It did significantly raise the estimates of farm expenditures for 1973 and earlier years, roughly by $1 to $2 billion in the early part of the 1960's to $3 to $3.5 billion from 1966-73.

In 1974, BEA incorporated the results of this benchmark revision in the gross farm product estimates in terms of its effect on the annual changes rather than the annual levels (Table 6-1). The benchmark levels were incorporated into the major

GNP benchmark revision of 1976. The results of this later revision showed gross farm product in 1973 to be $50.1 billion (Table 6-2), in contrast to the earlier revised level of $56.5 billion (Table 6-1). Approximately one-half of the revised reduction of $6.4 billion reflects the incorporation of the benchmark production expense figures as levels. The other half stems from subsequent USDA revisions which lowered cash receipts and inventory change, and raised rent paid to nonoperator landlords.

monthly and quarterly revisions of the farm income estimates into the GNP figures. There were differences between BEA and ERS with regard to the analytical interests each agency had in quarterly movements in contrast to annual levels of farm income. There also were differences in the frequency with which each agency was willing to revise previously released quarterly figures. Part of the problem stemmed from a 1956 policy of the predecessor to the OMB Statistical Policy Division

TABLE 6-1. Initial and Revised Estimates of Gross Farm Product and Farm Inventory Change, 1973
(seasonally adjusted annual rate)
(billions of dollars)

	Initial (February 1974) (1)	Revised (July 1974) (2)	Difference (1-2)
Gross Farm Product	47.7	56.5	8.8
Farm Inventory Change	.6	4.0	3.4
Selected Components			
Cash Receipts	83.5	88.5	5.0
Crops	38.2	42.3	4.1
Livestock	45.3	46.2	.9
Production Expenses[1]	64.4	64.7	.3
Inventory Change	.6	4.0	3.4
Crops	−.6	2.2	2.8
Livestock	1.2	1.8	.6

[1]Includes intermediate purchases of goods and services (e.g., feed, livestock, seed, fertilizer, repairs, utilities), and selected value added components (employee compensation interest, depreciation, and indirect business taxes).

Source: Revised data from *Survey of Current Business*, July 1974, and Economic Research Service (USDA), *Farm Income Situation*, July 1974.

Early Use of DIP Findings

These revisions were embarassing, of course, to the statistical establishment in the Department of Agriculture. But more importantly, it forced the realization upon the Departmental authorities of the need to review and evaluate the statistical program underlying its farm income estimates. To this end the USDA convened a task force of outside experts to review the concepts, methodology, and data used in preparing the farm income estimates.

The interim findings of the DIP study on the farm sector were shared with the Task Force on Farm Income Estimates. They were presented and discussed at the first meeting of the task force and copies of DIP memoranda were provided to all of the members. In the section of its final report of January 1975 dealing with data needs,[2] the task force adopted the basic thrust of the DIP recommendations.

In addition to the problems of underlying data, the DIP study also examined the policy of incorporating

(Office of Statistical Standards in the Bureau of the Budget). That policy called for quarterly measures of farm income prepared by USDA always to be the same as those incorporated in the GNP accounts.

The early DIP memoranda on the subject recommended that these issues be resolved by BEA adopting a more flexible policy for incorporating revisions in the current quarterly GNP estimates between the 45-day estimates and the annual revisions each July; and for ERS to focus its quarterly estimates more sharply on developing figures that represent the best measures of quarter-to-quarter change. This issue was also brought to the attention of the USDA task force.

The problem was subsequently reviewed jointly by ERS and BEA, and an accommodation was reached in the summer of 1975 with the approval of the

[2] Report of Task Force on Farm Income Estimates, Economic Research Service, USDA, Mimeographed, January 1975.

Statistical Policy Division. The agreement was along the lines suggested by the DIP analysis, and also as recommended by the task force. It relaxed the 1956 policy by permitting current quarterly estimates of farm income used by BEA and ERS to diverge during the year, but subsequently to be brought into line with the annual revisions. The DIP recommendations for additional and more timely data, if implemented, would alleviate much of the need to have divergent measures during the year, but these improvements would take several years to accomplish.

Gross Farm Product

As a measure of value added at market prices, the BEA concept of gross farm product encompasses on the income side the factor and nonfactor payments of business output—employee compensation, proprietors' income, corporate profits, net interest, indirect business taxes, and capital consumption allowances; direct government subsidies are excluded from this measure. This differs from the ERS concept of net farm income which is equivalent to the aggregate of proprietors' net income and corporate profits including direct subsidies.

The current quarterly estimates are calculated as the (a) sum of the outputs as measured by cash receipts from farm marketings, including the net effect of loan receipts from and redemption payments to the Commodity Credit Corporation (CCC) price support loan program;[1] imputed value of home consumption of farm products; inventory change; and cash and imputed rental value of farm dwellings, minus (b) farm production expenses for purchases of feed, livestock, seed, fertilizer, repairs, electricity, etc. associated with the output activities. The difference between receipts and expenses represents gross farm product.

A. Magnitudes In Recent Years

Table 6-2 shows gross farm product and its share of the GNP during the 1970's. In current prices, gross farm product in 1975 was estimated at $50 billion, close to twice the estimate for 1970. In constant prices, farm output increased by only 10 percent. Gross farm product rose much faster than GNP in current prices over this period, but at about the same rate in constant prices. Thus, gross farm product as percent of GNP moved from 2.6 percent in 1970 to 3.8 percent in 1973 and 3.3 percent in 1975, when both numerator and denominator are measured in current prices. However, the share in constant prices was 2.9 percent in both 1970 and 1975, and for the whole time span fluctuated by only 0.4 percent. These differential movements in values and volume reflect, of course, the much sharper rise and greater volatility in farm than nonfarm prices in this 6-year period.

Table 6-3 gives for 1975 the major output and expense components of gross farm product. Cash receipts from livestock and crops amounted in that year to $89 billion, with other elements of production totaling $11 billion. Expenses totaling $49 billion were spread among a number of categories.

Table 6-4 shows the factor and nonfactor components of gross farm product for 1975. These elements on the income side are consistent with those shown in Table 6-3 for the derivation of the aggregate gross farm product figure.

Proprietors' income is the major single item, amounting in 1975 to $25 billion, or 50 percent of gross farm product. It includes cash income from farm operations (preponderant share) as well as imputed income for rentals and home consumption. The other elements, in descending order, are capital consumption allowances, employee compensation, net interest, indirect business taxes, and corporate profits. Direct subsidy programs such as government payments for land conservation, feed grain, etc., are included in proprietors' income and corporate profits, and hence are deducted to derive the measure

TABLE 6-2. Gross Farm Product in Current and Constant Prices, 1970-1975

	Billions of Dollars		Percent of GNP	
	Current Prices	1972 Prices	Current Prices	1972 Prices
1970	25.9	31.1	2.6	2.9
1971	27.7	32.8	2.6	3.0
1972	32.0	32.0	2.7	2.7
1973	50.1	32.3	3.8	2.6
1974	48.5	32.0	3.4	2.6
1975	50.3	34.1	3.3	2.9

Source: *Survey of Current Business*, January and July 1976.

[1] By contrast, direct government payments to farmers for special programs (e.g., conservation and feed grain, wheat, sugar, wood, etc.) result in income derived from subsidies and hence are excluded from the gross farm product and included in the figures on national income orginating in farming.

TABLE 6-3 Output and Expense Components in the Derivation of Gross Farm Product, 1975

	Billions of current dollars		
Total Output			100.2
Cash Receipts[1]		89.4	
Livestock	42.9		
Crops	46.5		
Home Consumption		1.3	
Machine Hire, Custom Work, Recreation		1.0	
Inventory Change		3.0	
Gross Rental Value of Homes[2]		5.5	
less: Intermediate expenses			49.2
Feed		12.9	
Livestock		4.9	
Seed		2.2	
Fertilizer & Lime		6.8	
Repairs & Operation of Capital Items[3]		6.9	
Miscellaneous Supplies and Services (pesticides, greenhouse, veterinary, utilities, insurance, etc.)		8.8	
Net Rent Paid to Nonoperator Landlords[4]		6.7	
plus: Other Items			−0.7
equals: Gross Farm Product			50.3

Note: Totals do not necessarily equal sum of the parts owing to rounding.
[1]Includes CCC loans and redemptions.
[2]Imputed value of owner- and tenant-occupied farm homes. Appears also as rent outlay for farm dwellings in personal consumption expenditures.
[3]Repairs for residential and nonresidential structures and farm machinery, operation of farm business motor vehicles, and fuels for farm business use.
[4]Payments for farm dwellings and land in form of cash and in-kind share payments. Appears also as net rental income of persons and income of nonfarm business.
Source: *Survey of Current Business*, July 1976, and unpublished BEA information.

TABLE 6-4. Factor and Nonfactor Components of Gross Farm Product, 1975

	Billions of current dollars
Total	50.3
Proprietors' Income[1]	24.9
Capital Consumption Allowances[2]	11.8
Employee Compensation	6.5
Net Interest	5.2
Indirect Business Taxes	2.4
Corporate Profits[1]	0.3
Subsidies to Operator Landlords[3]	−0.7

Note: Total does not equal sum of the parts owing to rounding.
[1]With inventory valuation and capital consumption adjustments.
[2]With capital consumption adjustment.
[3]Included in proprietors' income and corporate profits.
Source: *Survey of Current Business*, July 1976.

of farm product. By contrast, these subsidy payments are in the BEA and ERS income measures of income originating in farming and farm income, respectively. The CCC price support transactions of loans to and redemptions by farmers—as distinct from the above direct subsidy payments—are included in both the income and the product estimates.

B. Receipts, Intermediate Expenses, and Value Added Components

There is a fundamental difference in the quarterly data base between the output and the expense estimates. For the output figures, there are some quarterly or semiannual survey data of cash receipts and inventory change for most crop and livestock products. However, the data for crop receipts are largely surrogates based on anticipated harvests. Quarterly estimates of home consumption and rentals are trended from annual projections.

By contrast, there are no quarterly survey data for production expenses except employee compensation. Quarterly estimates for all costs except employee compensation are interpolated judgmentally over the course of the year based on annual projections.

This section covers the various items of gross farm product except for inventory change which is covered separately in a later section. All survey data and recommendations refer to SRS data unless otherwise specified.

1. Cash receipts for crops

Data on output of crops are estimated in quantities (e.g., bushels, number) and converted to dollar values by the use of unit prices. The quantity of output for the current quarter is estimated as the product of acreage planted multiplied by expected yields per acre. Later on, this estimate is replaced by surveys of actual harvests. This is the procedure used for food grains, feed, oil seeds (e.g., soybeans, peanuts, cottonseed, flaxseed), fruit, and vegetable crops. These output estimates are converted to marketing receipts based on semiannual information which is available 4 months after the reference period. For the current quarterly estimates, this necessitates the use of historical averages of the ratio of marketings to output. Such a procedure is unlikely to capture any significant departure from historical relationships that may occur in any particular quarter. Receipts for this group of products in 1973 were approximately $35.0 billion, or 83 percent of all crop receipts.

The annual revisions each July are based on yearly reports of production, disposition, and gross income. These reports become available in the April-June quarter. This is so near to the July revisions that adequate cross-checks and examinations of problem areas cannot be made.

The crop year refers to the marketing season of the various crops in each State. The season runs from harvest to harvest. Because harvests for the same commodity do not start in the same month for all States, the national marketing season for some crops exceeds 12 months.

Examples of the national crop year for major field crops are listed below. Although the bulk of the marketings for most crops occurs in the first calendar year of the crop year, a substantial amount takes place in the second year. These proportions change from year to year, which in fact was a major source of the revisions in the 1973 farm income estimates.

	Crop Year	Months	1972-73 Crop Year % Marketed in: 1972	1973
Wheat	5/1 – 6/30	14	72%	28%
Sorghum	7/1 – 9/30	15	63%	37%
Corn	8/1 – 9/30	14	36%	64%
Cotton	8/1 – 7/31	12	62%	38%
Soybeans	9/1 – 8/31	12	54%	46%

Direct information on quarterly marketings of cotton are obtained from a Census survey of cotton ginnings, and of tobacco from weekly warehouse auction data on sales and prices. Receipts for these items in 1972 were $4.3 billion, or 10 percent of all crops.

No monthly or quarterly output data are available for greenhouse, nursery, sugar, forest (on-farm), and a number of miscellaneous minor crops. Quarterly estimates for all these categories are trended from annual projections. Receipts in 1973 for this group were $3.1 billion, or 7 percent of all crop receipts. The major products of this group, noted above, account for four-fifths of the total.

Greenhouse and nursery products ($1.3 billion in 1973 of which 30 percent was nursery products) are estimated in two segments. One segment consists of an estimate of nursery products, sod, bulbs, cut flowers, plants, seeds, and vegetables grown under glass that is based on annual data from selected State governments. This segment accounts for about two-fifths of the national total. The remaining three-fifths are estimated as an extrapolation of quinquennial census of agriculture data, using the number of nursery businesses reported annually by the Association of American Nurserymen. Annual SRS survey data on mushrooms grown under glass (over $100 million) also are used in the calculations.

Annual estimates for sugar beets and sugar cane ($.8 billion in 1973), and forest products ($.4 billion in 1973) are based on annual SRS surveys. Annual levels for the minor crops of legume and grass seeds, hops, mint, broomcorn, popcorn, hemp fiber and

seed, and flax fiber ($.6 billion in 1973) are based variously on SRS annual surveys and extrapolations of quinquennial census data.

No monthly or quarterly output data are available on secondary types of income for machine hire, custom work, and recreational services operated jointly with the farm enterprise. The annual estimates are based on data collected by USDA in the annual Economic Survey of Agriculture. The 1973 estimate of this income for both crop and livestock farms combined was approximately $600 million.

Recommendations:

1. *Speed up the collection of data on the movement of crops to market for soybeans, corn, wheat, cotton, and sorghum to a system of quarterly reports during the year.* These data should be available by 60 to 65 days after the close of the quarter. Sales of these major field crops largely determine the pattern of all crop receipts. This acceleration would provide actual data on crop receipts.

In order to obtain comprehensive measures of crop receipts, the importance and feasibility of collecting data on interfarm sales (i.e. receipts from shipments directly from farm to farm rather than through wholesale markets) also should be explored.

2. *Speed up annual reports of production, disposition, and gross income by 3 months to the first quarter of the calendar year.* These figures are annual cross-checks, as distinct from the quarterly marketings in recommendation number 1 above.
3. *Collect annual survey data on the output and marketings of greenhouse and nursery products.* services operated jointly with the farm enterprise for both crop and livestock farms.
4. *Collect, every third year, survey data on secondary type income received from machine hire, custom work, and recreational services operated jointly with the farm enterprise for both crop and livestock farms.* This would provide updated estimates for 1 year between each quinquennial census and would be adequate for the amount of income involved.

2. Cash receipts for livestock

Livestock products are composed of meat animals (cattle, calves, hogs, sheep, lambs); milk, eggs, poultry, wool, and a miscellaneous category (e.g., horses, fur animals, mohair, honey). The only direct data on receipts from meat animals, but without distinction as to source (slaughter, interstate shipments, and intrastate shipments), are those obtained quinquennially in the census of agriculture. For all noncensus years and calendar quarters, estimates of the value of livestock output must be derived as the product of estimates of output in physical quantities multiplied by unit prices, as in the case of crops. Meat animal receipts in 1973 were $31 billion—cattle and calves ($22.7 billion), hogs ($7.6 billion), sheep and lambs ($.4 billion)—or 66.5 percent of all livestock receipts.

Quarterly receipts data for meat animals are based primarily on the live weight of commercial slaughter. The figures both for federally inspected plants and those not under federal inspection are based on monthly survey data. In addition, indirect estimates are included for receipts stemming from interstate shipments between breeding farms and feedlots and other types of interfarm sales of feeder animals (for food) and stocker animals (for breeding).

Receipts from interstate shipments of feeders and stockers are included in the estimates because the purchase price to the buying farmer exceeds the sales price of the selling farmer due to marketing charges for transportation, selling, care, etc. Thus, the marketing charges represent a net expenditure within the farm sector. Approximately two-thirds of the cattle and calf receipts are based on monthly slaughter survey data, and one-third reflects indirect estimates of interstate shipments. The interstate shipments account for about 5 percent of the receipts for hogs and pigs and 20 percent of sheep and lamb receipts.

The estimates of interstate shipments between farms are based on recent annual relationships between this income source and total sales (including slaughter). The annual interfarm estimates are derived from State-by-State reports using perpetual inventory figures of animals on farms. These include annual data from SRS surveys of farmers reporting beginning and yearend inventories, births, deaths, interstate sales, and slaughter on farms during the year; monthly data from SRS surveys of slaughter at commercial plants; and reports on inshipments from other States by some State governments (reporting depends on individual States—no SRS survey as such). Owing to the limitations of the reported data on inshipments, these estimates are obtained as a residual, and cross-checked against the information reported for selected States.

Reliance on historical relationships for estimating the current interstate movement of cattle feeders and stockers is a major weakness in the livestock figures. In fact, this was the primary factor in the underestimate by close to $1 billion of the initial 1973 receipt figures for livestock, when the abnormal demand, supply, and price conditions resulted in shipments patterns that differed significantly from those in previous years.

Receipts from intrastate movements of meat animals between farms are not in the estimates. Because there are no actual data on intrastate activity, it is assumed that there are no marketing charges associated with these transactions and hence they wash out as zero receipts for the farm sector as a whole (i.e., receipts of selling farmer are cancelled by purchases of buying farmer).

Quarterly receipts for milk are based on monthly estimates of the number of milk cows on farms and the average production per cow. The current number of cows is obtained from monthly survey data. Monthly production per cow is based on survey information obtained on average daily rates of output at the beginning and end of each month. These preliminary estimates are cross-checked initially, with about a 2-month lag, against receipts data obtained from a sample of the dairy manufacturing industry as reported by milk processors under various State and Federal regulatory orders, and for the production of selected dairy products (e.g., butter, cheese, ice cream). Receipts for milk in 1973 were $8 billion, or 17.5 percent of all livestock receipts.

Quarterly receipts for eggs produced by smaller farms and larger commercial flocks are based on monthly estimates of the number of hens and pullets of laying age and the average daily rate of egg production per layer. The number of layers is obtained from monthly survey data. Estimates of egg production per layer are based on survey data obtained at the beginning and end of each month. Receipts for eggs in 1973 were $3 billion, or 6.5 percent of all livestock receipts.

Quarterly receipts for chickens, turkeys, and other poultry (ducks, geese, etc.) are based on monthly survey data for (1) production (number of chicken hatchings and placements with broiler producers for feeding of chickens, and hatchings of turkeys), (2) slaughtering weight of all poultry in federally inspected plants, and (3) slaughtering weight of chickens and turkeys in nonfederally inspected plants. Marketings are based on monthly slaughter data, including a timing adjustment based on historical trends of the difference between hatchings and placements on the one hand and slaughterings on the other. Current quarterly estimates for nonfederally inspected slaughter (approximately 2 percent of all poultry) are trended from annual data. Cash receipts for poultry in 1973 were $4 billion ($3 billion for chickens and $1 billion for turkeys and all other), or 8.5 percent of all livestock receipts.

The data on poultry placements with other farms for feeding are not used to estimate receipts from interfarm sales because of the nature of the poultry industry, in which ownership of the hatchings and growing birds typically does not change hands. Thus, roughly 90 percent of all placements are made with contract raisers who are paid for their services but do not take ownership to the poultry, and another 7 percent are comprised of hatchings and raising done by the same company.

Quarterly receipts of wool, mohair, and other miscellaneous products are based on extrapolations of annual data. Receipts for these categories in 1973 were $505 million ($120 million for wool and $385 million for all other products), or 1 percent of all livestock receipts.

Recommendations:

1. *Collect current quarterly (instead of annual) data on interstate sales and purchases of feeder and stocker cattle.* The data should be available by 60 to 65 days after the close of the quarter. On account of the magnitudes involved, information on hogs, pigs, sheep, and lambs is much less important and no recommendation is made for the collection of such data for these animals. pigs, sheep, and lambs.

2. *Institute a research project to explore possible ways of measuring intrastate sales and purchases of cattle, calves, hogs, pigs, sheep, and lambs.* These shipments presently are not in the estimates of meat animal receipts, and there are no measures of their importance. Since they do not come under the Federal interstate commerce laws, there are no systematic checking points for recording these transactions, so other approaches for obtaining the data would be necessary.

One approach would be to utilize State government records, although this would be on a limited basis because the reporting requirements and quality of records vary among the States. In the case of cattle and calves, another technique would be the disaggregation of existing monthly and quarterly survey data of cattle placed on feed by State (placements), currently reported as one global figure, into the following components:

(a) Placements originating in the same State

(b) Placements originating in other States

(c) Change of ownership after placement (e.g., feedlot operator buys from breeder)

(d) No change of ownership after placement (e.g., breeder farm and feedlot have the same owner, feeding done on contract basis).

At present, data are not available on placements for hogs, pigs, sheep, and lambs, and hence State government records probably would have to be supplemented with new surveys.

3. *Collect data every third year on secondary type receipts for machine hire, custom work, and recreation services operated jointly with the farm enterprise.* The same recommendation applies here as noted previously for crop farms.

3. Home consumption

Quarterly estimates of food, animal feed, and fuel wood produced and consumed on farms are trended from annual projections. For most livestock, crop items, and fuel wood, historical annual information is obtained from survey data. The data typically are specified in quantities and converted to dollar values using current market prices; the fuel wood figures are based on direct dollar value measures. The annual estimate of fruits and vegetables grown in home gardens (approximately $250 million in 1973) is particularly weak. The last benchmark for home gardens was obtained for 1959; ever since then, this benchmark has been extrapolated by changes in the number and size of farms, and estimates of per capita consumption of these items.

No recommendation is made because of the relatively low dollar value of this item and the complexity of collecting such information.

4. Gross rental value of homes

Quarterly estimates of this nonmoney receipt are trended from annual projections. The item represents payments for shelter which would be made if all owner- and tenant-occupied farm dwellings were rented separately from the nonresidential part of the farm. This is part of the gross output of farming; it also is the rent component of personal consumption expenditures for farm dwellings. The procedure assumes that interest payments, which would be attributable to the total sales value of the home, plus expenses for repairs, depreciation, insurance and taxes represent the total rental value. Since the estimates initially are prepared for operators' dwellings, they are augmented statistically to include all farm dwellings.

The most comprehensive benchmark of the annual estimates is based on 1935-39 data on the market value of farm homes updated by an intermediate type benchmark for 1970. The update provided the basis for measuring the aggregate value of all farm buildings, i.e., residential and nonresidential as one total, and led to a downward revision of roughly $1.5 billion, or 3 percent of the market value.

The annual extrapolator factors—data source in parentheses—are as follows: Market value (triennial survey of farm crop reporters); interest rate (reports of farm real estate loans); repairs (assumed relationship with new housing construction); depreciation (perpetual inventory capital stock series in current replacement prices); insurance (reports from government insurance programs); property taxes (survey of local tax officials); and operator-nonoperator shares (survey of farm families and number of farms). The market value surveys are conducted every 3 years, and are trended for the intervening years.

Recommendations:

1. *Collect approximately every 5 years separate figures for the value of residential and of nonresidential buildings at replacement costs.*
2. *Collect annual survey data on cash rents, in-kind rents, and current costs for repairs, taxes, insurance and interest of farm dwellings.*

5. Production expenses

Quarterly estimates for all production expenses as well as rental payments to nonfarm landlords are derived from annual projections. The quarterly movements are trended to reflect seasonally adjusted annual rates, based on a straight-line interpolation of annual projections, modified by changes in the monthly index of prices paid by farmers for purchased goods and services, interest, taxes, and wage rates.

Annual figures on production expenses are collected as part of the newly instituted annual Economic Survey of Agriculture (ESA). This survey was introduced, starting with the 1971 data year, to provide current information on the cost structure of agriculture, including up-to-date weights for the index of prices paid.[4] It includes a comprehensive coverage of the various purchases of goods and services. Preliminary data for 1975 were provided in July 1976, too late for use in the first July revision. The SRS goal is to provide preliminary tabulations by May 1 of the year following the reference year. This would be in time for use in the first July revision.

The value added data in this survey cover the following items: (a) hired worker employee compensation comprised of cash wages, social security taxes, and in-kind board, lodging and other perquisites, (b) interest on real estate debt and other than real estate debt, and (c) property taxes for real estate and personal property. Recommendations for the value added components are included in the subsequent "Value Added" section.

[4] The last complete survey of farm production expenses before the newly instituted series in the 1970's covered the year 1955. Selected expense items, accounting for about one-third of intermediate purchases, have been included in the quinquennial census of agriculture.

Recommendations:

1. *Institute a survey to collect current quarterly data on farm production expenses for major cost items: feed, livestock, seed, fertilizer, pesticides, petroleum products, repairs and operations, hired labor, contract labor, interest, and property taxes, and new construction.* The data should be available by 60 to 65 days after the the close of the quarter. The survey should be based on a subsample of the annual Economic Survey of Agriculture. The data should be collected for the quarter in which the outlays were made and, if possible, also reflect the quarter in which the purchased items were used in production.
2. *Speed up preliminary tabulations of the annual Economic Survey of Agriculture to have them available 4 months after the data year for use in the first annual revision each July.* For example, data for calendar 1977 should be processed no later than May 1 of 1978. This would be consistent with the SRS goal.

6. Rent paid to nonoperator landlords

Quarterly estimates of rental payments from tenants to non-operator landlords are trended from annual projections. The rentals cover net payments for dwellings and land in the form of cash and in-kind share payments. These payments in turn become part of net rental income of persons and income of nonfarm business (proprietors' income and corporate profits). Estimates of the cash and in-kind share rental for the aggregate of land and all residential and nonresidential buildings are based on data for 1970 from the Census Bureau's Survey of Agricultural Finance, updated by the movement of cash receipts. The proportion of these rents flowing from farms to the nonfarm sector also is based on these 1970 survey data. A similar survey of agricultural finances is planned for 1979.

Recommendation:

Collect annual data in the Economic Survey of Agriculture on rental payments to nonoperator landlords, separately for cash and in-kind share rentals, each divided between dwellings and land.

7. Value added

On the income side, quarterly estimates of the factor and nonfactor components of gross farm product are trended from annual projections, with the major exception of current survey data for wage and salary payrolls. The annual data base for the value added components is summarized here, together with the data for the quarterly estimates of employee compensation.

a. Employee compensation

Employee compensation is composed of cash wages and salaries, social security supplements, and in-kind payments for room, board and other services of hired field, managerial, clerical, maintenance and other overhead workers directly on farm payrolls. Wages of workers hired through farm labor contractors (SIC 0761) appear as an intermediate contract expense to the farmer and as value added in the agricultural services industry (SIC 7), and hence are not included in the income components of crop and livestock farms (SIC 1 and 2).

The quarterly cash wage and salary estimates are based on surveys conducted by USDA of farm operator establishments on a monthly basis for employment and hours worked, and quarterly for wage rates prevailing in local areas. The covered employees include agricultural laborers, maintenance, office, supervisory, and contract workers. Corporate officers are excluded from the surveys, but a question on the salaries of corporate officers was added to the quinquennial Census of Agriculture for 1974.

Annual estimates for cash and in-kind payments are obtained from survey data in the ESA. Separate estimates for social security payments are based on Social Security Administration data. Expenditures for contract labor are itemized separately in the ESA. The ESA instructions specify the coverage of all hired workers, including hired managers. In the training of enumerators, it is stressed that overhead hired workers (maintenance, office, etc.) as well as those doing agricultural labor are included in the definitional coverage.

If the farm also sells at retail, sales workers are included in the ESA data when the retail activity (e.g., roadside stand) is included as part of the farm enterprise. If the retail activity is set up as a separate company entity (e.g., dairy selling to the public), the sales workers are not included in the ESA.

Recommendation:

The recommendation above to collect quarterly data in the Economic Survey of Agriculture includes hired labor as one of the data items.

b. Capital consumption allowances

Capital consumption allowances in current replacement prices are derived from a perpetual inventory of the capital stock of farm buildings and equipment. Each year new purchases are added to and depreciation is deducted from these assets of the preceding year on a line item basis. Estimates of purchases are based on data collected in the ESA for plant and equipment and Census data on manufacturers' shipments of farm equipment.

Depreciation rates are based on IRS guidelines, university research studies, and trade source information. The initial base year figures for 1935-39 of this running inventory were derived from earlier surveys and previous censuses of agriculture. The IRS *Statistics of Income* figures on depreciation are not used because of the company-establishment industry classification problem and the lack of IRS depreciation data related to the farming operations of partnerships and corporations (discussed below under "Proprietors" income and corporate profits"). Capital asset data are collected periodically in the ESA, at the current market value, separately for (a) dwellings, (b) nonresidential buildings, other improvements, and land, and (c) machinery and equipment. ESA data also are collected on depreciation according to the IRS historical cost basis.

Recommendation:

Collect annual data in the Economic Survey of Agriculture on the market value of nonresidential buildings and other depreciable capital improvements separately from land. In the present ESA, the value of land is combined with the value of nonresidential buildings and other depreciable capital assets.

c. Net interest

Net interest is based largely on cash interest payments data for real estate debt and other than real estate debt in the ESA. The real estate and other than real estate components are shown separately each year in the ESA. BEA prepares the estimates of imputed interest.

Recommendation:

The recommendation above to collect quarterly data in the Economic Survey of Agriculture includes cash interest as one of the data items.

d. Indirect business taxes

Indirect business taxes are estimated separately for property and nonproperty payments. Property tax payments separately for (a) all real estate (b) other than real estate business, and (c) personal property are collected annually in the ESA. BEA prepares estimates of economy-wide sales, excise, and other tax and nontax payments; they are distributed among the farm and nonfarm industries based on legislative and administrative program information and on the relative distribution of sales and value added by industry.

Recommendation:

The recommendation above to collect quarterly data in the Economic Survey of Agriculture includes property taxes as one of the data items.

e. Proprietors' income and corporate profits

Proprietors' income and corporate profits are derived in a single total as the residual of gross farm product less the above factor and nonfactor charges. This aggregate figure is equivalent to the USDA concept of net farm income excluding direct subsidy payments. The corporate share is estimated from IRS *Statistics of Income* data on the same basis as profits before taxes of nonfarm industries. Proprietors' farm income is the difference of the USDA farm income less the IRS-based corporate profits estimates. (Data on legal form of organization are available quinquennially from the census of agriculture.)

The USDA data are not comparable to the IRS data. The USDA estimates are based on the product concept of all income from farming regardless of the primary activity of the owning company or establishment. In contrast, the company concept of IRS figures do not show income derived from farming if that is a secondary activity of the firm. In the case of sole proprietors, however, there is a special tax form which does provide separate data on income from farming. In addition, definitions of income and expense items differ between the two sources. For example, USDA measures depreciation on a replacement cost basis and IRS on a historical cost basis. Broad estimates of these differences in the late 1960's were in the range of $1.0 to $1.5 billion. It should be kept in mind that the differing USDA and IRS data concepts used in preparing the farm income estimates affect only the division between proprietors' income and corporate profits; that is, the measure of total income from farming as the sum of the corporate and noncorporate sectors is consistent with the USDA definitions.

Direct data are obtained on annual sales and net income as well as expenses through the ESA. These measures of income as reported by farmers are based on their income tax records. The data are not presently used by ERS because of the differing definitions of farm income and expenses used by USDA and IRS. Nevertheless, these income measures provide broad cross-checks on the present estimates of net income that are derived as the difference of gross income from livestock and crop receipts based on various estimating techniques, less the associated expenses reported in the ESA.

ESA data are obtained on legal form of organization classified separately as (a) individually operated, (b) partnership, (c) corporation, and (d) cooperative. This information is used for sampling controls and developing universe estimates. Data on the number of farms are tabulated by legal form. However, the ESA figures on income and expenses are not tabulated by legal form.

Recommendations:

1. *Tabulate the Economic Survey of Agriculture data on income and expenses by legal form of organization.* More experience by ERS in using the direct measures of farm income obtained from the ESA is needed before making specific recommendations for the sales and income items. *However, as a generalization for the future, serious consideration should be given to modifying the ESA questions on gross sales and net income as suggested by ERS experience.*
2. *For corporations and partnerships associated with farm enterprises, IRS should specify and tabulate business expenses associated with farm business receipts as it does currently on IRS Schedule F for sole proprietors. This should be done for 1 or 2 years to determine whether this additional information can transform the IRS Statistics of Income into an effective cross-check of the USDA estimates of farm income. If the answer is yes, the additional data should continue to be collected and tabulated.*

Farm Inventory Change

For the product side of the GNP accounts, the estimate of farm inventory change is added to that for nonfarm inventories to obtain the economy-wide total of inventory change.

Farm inventories for the GNP estimates are composed of crops and livestock owned by farmers and stored on farms (including cattle feed lots). Crop inventories held in off-farm storage elevators, warehouses, etc. are not included in the farm inventory figures. All stocks are measured in physical quantities and valued at average current unit prices for the year. Consequently, no inventory valuation adjustment is required.

Measured crop inventories refer only to harvested products and do not include a "work in process" category for growing crops. It raises the question of how to measure farm output before the crops are harvested. By contrast, livestock are counted as young or fully grown animals and are valued by prices weighted for the composition of all animals; hence, the livestock figures account for the "work in process" of growing animals.[5]

Stocks on loan or owned by the Commodity Credit Corporation are deducted from farm inventories since the loan or income from these transactions is included in cash receipts for the period; if the farmers redeem the CCC loans and thus regain possession of the commodities, the products become cash receipts or are added back to farm inventories, and the redemption payments are deducted from cash receipts as of the redemption period. These transactions also affect government purchases and the surplus and deficit accounts of government enterprises.[6] The exception to this general treatment of CCC loans occurs in the case of tobacco crops, which are never included in the government accounts because they are always redeemed by the farm co-operatives.

A. Magnitudes in Recent Years

Farm inventory change is a direct component of gross farm product and the GNP. The change is the first difference of stocks held by farmers. Increases appear with a plus sign and decreases with a minus sign in the accounts.

Inventory swings refer to the increase or decrease of the change from period to period. Thus, the swing is comparable to the period-to-period change in gross farm product.

Table 6-5 summarizes the estimates of farm and nonfarm inventory change since 1970. The change of $3 billion in farm inventories in 1973 and 1975 was at least twice as large as those in the other years.

Table 6-6 presents the quarterly movements (seasonally adjusted annual rates) of farm inventory change and gross farm product in current prices for the period 1970-75. From increases of $0.1 billion during 1970, the pattern of inventory change showed a large buildup of $1.7 billion in the first quarter of 1971; this was followed by a general downward trend in the rate of accumulation during the next eight quarters to $0.2 billion in the first quarter of 1973. The subsequent large increases in the last three quarters of 1973 averaged over $4 billion. Farm inventories were liquidated throughout 1974, and subsequently built up throughout 1975, although at varying rates throughout both years.

Farm inventory change as a proportion of gross farm product ranged from -3 percent in 1974 to over 6 percent in 1973 and 1975. The quarterly movements of this share generally had similar patterns as those indicated above for inventory change itself.

[5] ERS presently is considering the conceptual changes needed for clarifying the current and capital statistical measures of the agricultural sectors, including the treatment of inventories.

[6] BEA recently changed the government accounts to reflect inventory gains and losses associated with Commodity Credit Corporation loan and purchase programs arising from differentials between CCC acquisition prices (period 1) and market prices at the time of redemption or CCC sale (period 2). Thus, the CCC crop support programs now are revalued in the GNP accounts to the current market price of the crops at the time of their redemption; this is similar to the measure of nonfarm inventory change after the inventory valuation adjustment. See *Survey of Current Business*, January 1976 (Part 5), p.10.

TABLE 6-5 Farm and Nonfarm Inventory Change
(billions of current dollars)

	Total	Farm	Nonfarm	Farm Percent of Total
1970	3.8	0.1	3.7	3
1971	6.4	1.3	5.1	20
1972	9.4	0.6	8.8	6
1973	17.9	3.2	14.7	18
1974	10.7	−1.5	12.2	(1)
1975	−14.6	3.0	−17.6	(1)

Source: *Survey of Current Business*, January and July 1976.
[1]Not applicable.

TABLE 6-6. Farm Inventory Change and Gross Farm Product
(seasonally adjusted annual rate)
(billions of current dollars)

	Inventory change		Gross Farm Product		Inventory Change as Percent of GFP	
1970		0.1		25.9		0.4
I	0.1		26.5		0.4	
II	0.1		26.2		0.4	
III	0.1		25.4		0.4	
IV	0.1		25.5		0.4	
1971		1.3		27.7		4.7
I	1.7		28.2		6.0	
II	1.2		27.1		4.4	
III	1.3		26.1		5.0	
IV	0.9		29.3		3.1	
1972		0.6		32.0		1.9
I	0.7		31.0		2.3	
II	0.8		32.0		2.5	
III	0.5		31.1		1.6	
IV	0.5		34.1		1.5	
1973		3.2		50.1		6.4
I	0.2		42.6		0.5	
II	3.5		48.6		7.2	
III	4.0		52.7		7.6	
IV	5.3		56.4		9.4	
1974		−1.5		48.5		−3.1
I	−1.9		53.1		−3.6	
II	−0.9		46.6		−1.9	
III	−0.1		46.9		−0.2	
IV	−3.2		47.2		−6.8	
1975		3.0		50.3		6.0
I	3.4		42.5		8.0	
II	1.2		49.0		2.4	
III	2.2		55.0		4.0	
IV	5.2		54.8		9.5	

Source: *The National Income and Product Accounts of the United States, 1929-74: Statistical Tables*, 1977 and *Survey of Current Business*, July 1976.

B. Major Products Held in Inventory

Farm commodities in inventories held on farms are those that can be stored for periods of time without concern for perishability. By contrast, products which are very perishable and either must be consumed in the immediate future, put in cold storage, or processed by manufacturers are moved quickly off farms after production and are neither significant for nor included in measures of farm inventories. Examples of such items are fruit, vegetables, milk, eggs, and broilers.

Table 6-7 shows inventory change during 1973 valued in average prices, inventory stock as of January 1, 1974 valued in beginning-year prices, and cash receipts for 1973 in current prices. Both detailed product categories and the aggregates of crops and livestock are included.

Of the total inventory change in 1973 of $4 billion, crops accounted for $2.2 billion and livestock for $1.8 billion. Soybeans, corn, wheat and cotton comprised approximately 90 percent of all crop inventory change; over the years, these products and sorghum are the major commodities affecting crop inventory change. Cattle and calves in 1973 were over 90 percent of all livestock inventory change, and for some time have been the dominant item affecting livestock inventory change.

1. Crops

Quarterly survey data on harvested crop inventories are obtained separately for stocks on farms, CCC-owned grain at bin sites, and other off-farm mills, elevator, warehouse, processing plants, etc. storage for the following products: corn, sorghum, oats, barley, wheat, rice, rye, soybeans, and flaxseed. The figures are as of January 1, April 1, and October 1, except for rice (August 1) and soybeans (September 1). Yearend information on stocks of cotton and tobacco are obtained from farmer co-operative associations.

Other survey data reported more than once a year are obtained for on-farm stocks only for hay (January 1 and May 1), hops (March 1 and

TABLE 6-7. Farm Product Inventories and Receipts
(millions of current dollars)

	Inventory Change[1] (1973)	Inventory Stocks[2] (1/1/74)	Cash Receipts (1973)
Total	4,014	66,224	88,590
Crops	2,232	20,432	42,346
Soybeans	973	3,480	8,847
Corn	517	7,952	7,535
Wheat	382	1,741	5,688
Cotton lint	113	869	2,287
Oats	70	563	307
Sorghum grain	68	459	1,520
Barley	62	435	620
Rice	54	122	1,090
Hay	19	3,645	1,022
Tobacco	−33	185	1,570
All other	7	981	11,860
Livestock	1,782	45,792	46,244
Cattle & calves	1,706	40,906	22,739
Hogs & pigs	102	3,676	7,646
Farm chickens[3]	9	669	165
Sheep & lambs	−35	541	384
All other[4]	—	—	15,310

Note: These ERS figures differ by less than $100 million in the aggregate for all farm products from the estimates in the July 1974 *Survey of Current Business* because (a) BEA had not yet benchmarked to the new ERS levels, and (b) tobacco CCC loans are treated differently by BEA.

[1] Calendar year change valued in average prices during 1973.

[2] Holdings valued in prices as of 1/1/74.

[3] Egg laying chickens only; excludes shorter lived broilers.

[4] No farm inventories assumed for dairy products, eggs, broilers, turkeys, wool, honey, etc.

Source: Economic Research Service, USDA, 1974.

September 1), fall potatoes (December-March), and peanuts (monthly). Inventory survey data for on-farm stocks on a once-a-year basis are obtained for seedcrops, cabbage, onions, and cucumbers.

SRS data on crop inventories include all stocks in an aggregate category held in off-farm mills, elevators, warehouses, terminals, processing plants, etc. regardless of ownership. These off-farm inventories account for roughly three-fourths of all soybean, wheat, and sorghum stocks; two-fifths of all oats and barley stocks; and one-fourth of all corn stocks. Because the proportion of the off-farm stocks owned by farmers is unknown, these data are not used in preparing the farm inventory estimates. In attempting to deal with this problem, SRS recently started an exploratory study to collect information on the ownership of off-farm inventories.

Recommendations:

1. The Committee supports the recent Statistical Reporting Service study for obtaining information on the ownerships of crops stored in off-farm facilities, and *recommends that the collection of these data becomes a part of the ongoing quarterly program on inventories.*

2. *In considering what the seasonal factors for the output of farm crops should attempt to measure, thought should be given to the effect of cash flows to farmers throughout the year.* For example, while crops are growing in the spring and summer, credit is extended to farmers by suppliers and banks. Subsequently, when the crops are harvested and sold, these debts are paid off. Are farm product and income generated while the crops are growing and credit is extended? *More conceptual work by ERS is needed in deciding how to account for these seasonal phenomena of the industry.*

2. Livestock

Quarterly survey data of hogs and pigs on farms are available as of March 1, June 1, September 1, and December 1. These are collected separately for breeding, nonbreeding, and five weight class categories.

Semiannual survey data for January 1 and July 1 are provided for cows, heifers, steers, and bulls in weight classes of over and under 500 pounds. Inventory data for cattle and calves on feed for slaughter are collected monthly for seven selected States and quarterly for 23 States; the monthly and quarterly figures account for approximately 75 percent and 95 percent, respectively, of all cattle on feed. However, cattle on feed are only about 10 percent of all cattle inventories, and the movements of the two series are quite different. For example, in the 1-year period from July 1973 to July 1974, the number of cattle on feed increased by 6 percent, while all cattle inventories decreased by 21 percent.

Cattle and calves are the dominant element of livestock inventories, and the present semiannual survey program of January 1 and July 1 necessitates the use of a considerable amount of indirect estimates of the quarterly patterns. The lack of quarterly cattle inventory data accounted for the bulk of the $600 million revision in the 1973 estimates of livestock inventory change.

Annual calendar yearend survey data are provided for farm stocks of sheep, lambs, egg laying chickens (December 1), and breeder hen turkeys (December 1).

Recommendation:

Collect national inventory data for cattle and calves as of April 1 and October 1 to supplement the existing semiannual livestock inventory information. The presently collected monthly and quarterly inventory survey data of feeder cattle in selected States should be augmented as necessary to develop national quarterly estimates for all cattle.

CHAPTER 7

PRICE NEEDS FOR IMPROVING GNP ACCOUNTS IN CONSTANT PRICES

A. General Considerations

1. Use of price data

The primary use of prices in the NIPA is for the deflation of expenditures expressed in current dollars in order to obtain a measure of real output (i.e., changes in prices levels are removed.) Modern economic analysis, including current analysis and long-range research, depends heavily on this information and the related productivity measures. The use of the constant-dollar data is so extensive that it is interesting to recall that it was not until 1951 that they were provided on an annual basis, and then in quite summary form, and not until 1958 that they were provided on a quarterly basis.

In the major revision of the accounts published in January 1976, the valuation period underlying the constant-dollar estimates (i.e., the base price weights for aggregating quantities) was shifted from 1958 to 1972. The estimates were reworked back to 1929 on the basis of 1972 = 100.[1] In addition, several new constant-dollar measures were introduced. Quoting from the *Survey of Current Business*, "Net variants of constant-dollar measures at market price—most importantly net national product and net private domestic fixed investment—are calculated using economic capital consumption. Constant-dollar measures at factor cost—most importantly national income—are also introduced. To calculate the latter, it is necessary to convert all nonfactor charges against GNP into constant dollars. The methods used are somewhat arbitrary in some cases."[2]

As will be described in summary fashion below, the availability of expenditures expressed in both current and constant dollars permits the calculation of derived "price" series (the implicit deflators). Most series of deflated expenditures and the associated price deflators are available on an annual basis beginning with 1929 and on a quarterly basis beginning with 1947. Personal disposable income is deflated by the implicit deflator for personal consumption expenditures to obtain a measure of real consumer income. Other uses of prices involve deflation of both outputs and inputs in the GNP by industry series and the input-output (I-O) tables and the calculation of measures of real capital stock. The resulting aggregative measures of output, particularly total real GNP, total private output, and total private nonfarm output, are used by BLS in estimating measures of output per person or hour (labor productivity) for these aggregates. Constant-dollar figures (in 1972 prices) and the associated implicit deflators are provided quarterly for the major demand sectors and in much more detail annually for product categories in personal consumption expenditures, private investment, government purchases, and net exports.

In addition to the implicit GNP price deflators—which are calculated on the basis of current-year weights—two related measures have been developed in recent years: (1) fixed weight price indexes for GNP and major components (Lasperes formula), and (2) a chain price index, in which for each quarterly change, price changes are weighted by expenditures in the first of the two quarters involved in the comparison. These measures are the most comprehensive now available in terms of the total economy output of goods and services, and are used increasingly as measures of price change for the economy as a whole.[3] Moreover, the accounts provide the only published measures of prices for

[1] *Survey of Current Business*, January 1976, Part 1, p. 21. See this source also for the reasons for the choice of 1972 as the basis of valuation and for a brief discussion of the possible effect of the sharp relative price increases of food and energy after 1972.

[2] These new measures are derived as deductions of constant-dollar estimates of nonfactor charges (capital consumption allowances, indirect business taxes, etc.) from the product side GNP total. See *Survey of Current Business*, January 1976, Part 1, p.21.

[3] The Bureau of Labor Statistics is planning to use eventually the industry sector indexes which it is developing (discussed later) to construct a monthly General Price Index, base weighted and for final demand. A BLS statement notes: "In order to measure the impact of price changes on domestic markets, it will not be possible to follow the GNP deflator concept."

such important sectors as Federal, State, and local purchases of goods and services, and exports and imports of goods and services.

As noted by BEA, "In practice, the implicit deflator is only an approximation of a Paasche price index. The deflation is not performed at the level of individual commodities.... Instead, components that encompass expenditures or an array of commodities are deflated. The components are deflated with conventional, fixed weighted price indexes that combine price relatives for individual types of commodities included in the expenditure component. Therefore, the implicit deflator involves current period weighting among the component price indexes, as in a Paasche index, and fixed weighting within the components." [4]

In the NIPA, real product is generally estimated by deflating purchases in current dollars by appropriate prices. This general procedure does not preclude the use of physical product data in a few cases in which they are both available and appropriate for use in the accounts. While physical volume (as expenditure in constant prices) is generally obtained by dividing expenditures by a price index, in some cases, expenditures are first estimated by multiplying physical units by average price per unit (e.g., new automobiles) and in others a constant-dollar series is estimated by extrapolating a base expenditure series by a physical volume series (or even, as in some instances in GNP by industry, by an employment series).

The reliability of the price change between selected periods, rather than the reliability of the actual price itself, is the characteristic of prices given the highest priority for GNP deflation.

2. Real product and industrial production

The only other current major measure of output on a significant scale is the Federal Reserve monthly index of industrial production. While this index is confined to the output of factories, mines, and utilities, these comprise a major component of total U.S. output. This index also is benchmarked to quinquennial data from the economic censuses. Since more of these census data are available in value than in physical volume terms, price and deflation techniques are also used extensively in estimating the physical volume measures of the industrial production index. While both the NIPA and the industrial production index rely heavily on the quinquennial census data for benchmarking, the extrapolators for current change (quarterly or monthly) are very different. Thus, about half of the weight of the industrial production index currently is based on physical volume data (not fully available until the final estimate for a given month which is available 2 1/2 months following the reference period). The bulk of the remaining weight is based on electric power inputs into various industries, adjusted to estimate productivity change and, to a lesser extent, on employee-hours data, also adjusted for estimated productivity change. The electric power inputs by industry are not available until the second estimate for a given month available 45 days after the reference period.

This means that for a significant and volatile portion of real GNP, another measure of change in physical volume output is available. While the two aggregate measures differ in concept, and to a great extent in data sources, comparative analyses have been made of the movements of both series, and for more or less comparable measures of aggregate goods output as well as for subgroups such as producers' durable equipment, new motor vehicles, durable goods, and nondurable goods.

At the simplest level, quarterly changes in total real GNP have been compared with quarterly changes in industrial production. In a year such as 1974, when the U.S. economy was turning into recession, some analysts were contrasting and raising questions about continued declines in GNP at a time when industrial production was at a plateau. In this instance, when comparisons were made for reasonably comparable categories, the differences were relatively minor (e.g., for the components of motor vehicles and producers' durable equipment).

Other comparisons for real GNP and industrial production, including efforts to adjust for conceptual differences, have been made in a sporadic fashion. Recently a comparison by BEA was published of quarter-to-quarter changes from the first quarter of 1973 to the third quarter of 1976 in adjusted real GNP and the index of industrial production.[5] Adjusted real GNP was calculated as "goods output less gross farm output plus 40 percent of structures plus PCE gas and electricity less used car margins." While the two series generally showed fairly close

[4] *Survey of Current Business*, March 1969, p. 49. As of 1977, 149 components of GNP are deflated on a quarterly basis separately as shown below (based on unpublished data from BEA):

	No. of Series
Gross national product, total	149
Personal consumption expenditures	47
Private fixed investment	41
Change in business inventories	17
Exports	4
Imports	4
Government purchases of goods and services	36

[5] *Survey of Current Business*, October 1976, p. 9 (chart) and p. 10 (text). See also *Federal Reserve Bulletin*, June 1976, pp. 477-8.

changes over the interval, the discrepancy was substantial in a few quarters and warrants further inquiry.

The annual BEA series on GNP by industry provide closer counterparts to industrial production than does GNP. The GNP series on manufacturing are published for total manufacturing, durable goods industries, and nondurable goods industries, with more detailed industry measures available for manufacturing on a 2-digit SIC basis. The GNP series on manufacturing are estimated by a double deflation procedure, i.e., deflated measures of inputs (costs) are subtracted from deflated measures of sale (output) and the difference represents GNP by industry. Discussion of the complexities and potential pitfalls of double deflation is beyond the scope of this review. The series for 2-digit industries not surprisingly tend to show larger differences from the industrial production counterparts than do more aggregative groupings. As in the case of GNP, comparisons have been made from time to time of GNP by industry and industrial production.

3. Sources of price data

A wide range and variety of sources are used in obtaining price deflators for the NIPA estimates, although the major sources are the BLS wholesale and consumer price data. Before the recent revision of the accounts, almost 60 percent of the 1958 base year weights in the deflation of GNP were accounted for by BLS price data. In addition, earnings indexes, for which BLS also is the major source, accounted for 12.5 percent. Approximately 30 percent of the weight was then represented by other government agencies and by private sources. In the January 1976 revision with the replacement of the Department of Agriculture farm price indexes by the Consumer Price Index in the estimation of constant-dollar PCE, BLS data now account for well over three-fourths of the weight used in deflating GNP.[6]

For the GNP by industry and I-O measures, much more extensive and intensive use is made of the available BLS wholesale prices—for estimating implicit output and input price deflators—than is the case for GNP and its components. Wholesale prices are currently being collected by BLS for 2700 commodities, up from 2400 about 3 years ago, and a sizable proportion of these are used in the GNP by industry and I-O series.

[6]*Survey of Current Business*, January 1976, Part 1, p. 22. The reasons for this shift are also summarized here: The Department of Agriculture "indexes are deficient because they do not distinguish between various grades of goods and accordingly their use gives rise to calculations in which what should be real changes appear to be price changes. (Moreover) . . . prices measured by the Consumer Price Index have become increasingly representative of prices paid by consumers living in rural areas."

4. Price data deficiencies

The more important standard criticisms of existing price statistics are summarized in a BEA paper:

First, there are coverage problems. A large number of important products are not priced at all.... For many other products, price indexes are available, but they are based on very small samples....

Second, some of the prices are list prices rather than transaction prices. This means that the price indexes tend to be sticky, and when they do change, the change may be too abrupt. This is because the list prices that are measured do not reflect the smoother transition that gradually moves the transaction price from the old list price to the new list price.

Third, the available price indexes are to varying degrees faulty because they are not fully corrected for changes in product quality; that is, some quarterly changes erroneously appear as price changes rather than as output changes. This occurs because the specifications of the product monitored by the pricing agencies are not precise or because they do not cover all of the relevant characteristics. Furthermore, even for characteristics that agencies do monitor, the information on the costs of the quality change is not sufficient to allow an accurate adjustment to be made for the change in specifications.

A related and fourth problem is that some indexes are derived from unit values rather than from price observations. Unit values are usually computed for heterogeneous mixes of products. In such cases, variations over time in the product mix will be read as changes in prices.

The last shortcoming . . . affects construction and some services, where proper price indexes are almost nonexistent. Instead, we are compelled to use indexes of the cost of inputs as poor substitutes.[7]

5. Role of the Bureau of Labor Statistics

Highly relevant to any consideration of data improvement is the ongoing BLS program for improving its price indexes. (See the Appendix for a description of the planned BLS industrial and international price programs). In broad outline, the BLS program consists of revising and extending its consumer and wholesale price indexes, of greatly expanding its pricing program for exports and imports, of expanding the item coverage of the indexes, and of improving the quality of the data with a continuing emphasis on transaction prices actually paid rather than list prices.

[7]Murimoni, Martin L., "Deflating Quarterly GNP," Papers presented at the Federal Statistics Users' Conference, October 2, 1974, Washington, D.C.

A comprehensive revision of the Consumer Price Index (CPI) is scheduled to be published in 1978. The BLS revision entails the production of a new and broader CPI which encompasses virtually all urban consumer units in addition to the continued publication of a revised index covering the wage earner and clerical worker population. This new index—which obviously is more appropriate for the deflation of the GNP expenditures component—affects not only weights, but also outlets priced, commodities, and a wider range of commodity grades. The general thrust of the revised CPI will be to provide better measures of price change for the NIPA deflation.

A substantial improvement program is planned for the Wholesale Price Index (WPI). The meaning of "wholesale price" is not free of ambiguity. For the WPI, it is defined as prices established in "primary markets." Usually it is the price charged by a manufacturer or other producer often to another producer or to an intermediary other than a retailer. The ongoing and planned BLS programs for improving the WPI and the related prices fill a major gap in the data base for preparing the NIPA constant-dollar estimates. In addition, the improvements extend far beyond the NIPA needs in terms of overall usefulness for economic analysis of prices and costs, a topic of increasing importance in an economy that as of now appears to have a long-term inflationary bias.

The following planned long-term program for measuring domestic and international prices and price change would provide improved price deflators for the quarterly GNP estimates and the annual GNP by industry and I-O series:

a. A program to conduct consumer expenditure surveys on a continuing basis to provide current information on the kinds of goods and services purchased by households. In the past, consumer expenditure surveys have been conducted approximately every 10 years. They have been based on much larger household samples than those planned for the continuing surveys. The more up-to-date data should be useful to identify new items not presently in the CPI that require more direct price measures for deflating PCE.

b. In the WPI, a shift to the use of probability sampling in contrast to the current system which is essentially judgmental, based on knowledge of industries and commodities. Probability sampling would be used for all revisions of price series and reporting panels as well as for all extensions of coverage of the WPI and industrial price indexes. The program of revision and extensions of coverage, as presently envisioned, could extend easily over a decade depending on the financial support available.

c. An extension of the coverage of the recently developed commodity export and import price indexes based on fixed specifications. These indexes measure price changes in internationally traded goods more accurately than the unit value indexes now provided by the Census Bureau.

d. The development of monthly price indexes—both for output and input—for all the approximately 1,000 4-digit SIC goods and service industries. At present industrial price indexes are available for about 150 industries, primarily in manufacturing and also in mining and railroad freight transportation. Developmental work is also underway for constructing industry price indexes for motor freight, transportation, telephone communications, and life insurance. The successful implementation of this program will require considerable conceptual and empirical research on measuring quality, technological, and productivity change for a wide spectrum of industries.

General Recommendations:

1. *The necessary funds should be provided to the Bureau of Labor Statistics over an extended period for improvement of the consumer, wholesale, industrial, and foreign trade price indexes in line with the thrust of the (a) BLS plans as described above, and (b) other GNP price data needs as described in the sector discussions comprising the remainder of this chapter.*
2. *The Bureau of Economic Analysis and the Federal Reserve Board should develop jointly a systematic and continuing effort to analyze the relationships, similarities, and differences between the measures of real GNP and the industrial production index on an aggregative and disaggregated basis, and the results of this joint enterprise should be made available periodically to the public.*

B. Personal Consumption Expenditures

1. Data sources

The price series now used for the quarterly deflation of personal consumption expenditures (PCE) are primarily the detailed consumer price measures in the CPI. Over three-fourths of PCE is directly comparable with the coverage in the CPI. The remaining fourth of PCE includes net purchases of used cars, imputed expenditure items such as the retail value of owner-occupied housing, the expenditures of not-for-profit organizations, and other items that are not directly comparable conceptually to the associated measures in the CPI. Selected CPI components are used to deflate some of these items for which the CPI price movements are

considered to be adequate or the best available information.

Other minor sources include a few WPI series. Implicit deflators are used in the case of imputed interest, for in-kind financial services received by households (estimated by extrapolating the 1972 value of expenditures by employee-hour estimates), and for net purchases of used cars (estimated by extrapolating the 1972 value of used car margins by unit sales of used cars).

Annual deflators for expenditures by not-for-profit organizations are estimated from information on wage earnings and wholesale prices. The quarterly deflators for these organizations are extrapolated by the total CPI less food.

2. Recent benchmark revisions affecting deflation of PCE

In the GNP revision of January 1976, three major changes were introduced into the deflation of PCE:

a. Prior to the NIPA revisions released in January 1976, food expenditures had been deflated by the composite CPI index for food purchased for home consumption. In the revised series, constant-dollar expenditures on food consumed at home is estimated by applying specific price indexes to 17 categories of food. These are combined by weighting the 17 categories by their relative importance in each year. The revised procedure is used in all years, beginning with 1958.

b. Also beginning with the series for 1958, BEA discontinued the use of Department of Agriculture (USDA) indexes of prices paid by farmers. The method of pricing employed by the USDA was not as rigorous (or clear-cut) with respect to specifications, as is the case with the CPI. As a result, the meaning of price changes was not clearly differentiated from quality/quantity change. Another reason for not using the USDA figures was the BEA viewpoint that the price movements of items bought by rural households have become closer to those paid by urban households as measured in the CPI.[8] Subsequently, the USDA discontinued compiling the indexes.

c. A new procedure was adopted to measure the constant-dollar output of services furnished without payment by financial intermediaries except life insurance carriers. It assumes that the real volume of this output is proportional to full-time equivalent employment in these financial intermediaries. Although arbitrary, this is considered preferable to the previous procedure.[9]

3. The CPI: Adequacy and new developments

As a general assessment, the price data on goods and services in the CPI are good in regard to coverage and quality, and, indeed, are the best of all the GNP major demand categories. An analysis made by BEA supports this assessment as far as coverage is concerned. The item coverage of the CPI was compared with the item coverage of PCE to determine whether additional price information is needed. In general, the CPI coverage appears to be reasonably satisfactory. However, there are certain gaps in the CPI coverage associated with expenditures of roughly $30 billion in 1963, or about 8 percent, of total PCE in that year. About $20 billion of this total stems from conceptual differences or omissions due to measurement problems. Some examples are consumer trucks, pari-mutuel receipts, margins on used cars, expense of handling life insurance, nonprofit organizations, stock brokerage commissions, and foreign travel. The other $10 billion results from definitional differences in BEA and BLS expenditure classes. This leads to some detailed items estimated separately in PCE that are not priced directly in the CPI.

The GNP consumer expenditure component has for its universe the totality of consumer expenditures, and conceptually uses weights based on and appropriate to this universe. The CPI is based on prices of about 400 items selected to represent the movement of prices of all goods and services purchased by wage earners and clerical families (representing about 35 to 40 percent of the population). However, BLS is now engaged in a program to expand the universe coverage, as was recommended by the Price Statistics Review Committee (Stigler Committee) in 1960.[10] In the CPI revision, virtually all urban civilian consumer units (75-80 percent of the total population) will be included. From the point of view of deflation of GNP, the most important aspect of this revision will be the array of consumption items and types of outlets that are representative of the consumer sector as a whole.

The sample design of the new CPI will also be revised. BLS has been using probability sampling within 52 expenditure classes in selecting the list of items to be priced. One improvement will be the selection of items for pricing from an enlarged list of 68 expenditure classes. Items with the largest expenditure weights and some other items are chosen as "certainty items." Other items are selected for pricing by a random process, with the probability of being chosen proportional to the expenditure

[8] See footnote 6.

[9] *Ibid.*

[10] Price Statistics Review Committee of the National Bureau of Economic Research, Report to the U.S. Bureau of the Budget, *The Price Statistics of the Federal Government* (1960).

weights. As a result of these changes, fewer detailed price series will be available.

Two other major improvements to the CPI include: (a) a continuing survey of outlets, for which funding has already been provided; and (b) a proposed continuing quarterly survey of consumer expenditures, which will enable BLS to identify and quantify quickly significant changes in consumption patterns and in weights. Funding for this is proposed in the FY 1978 Budget.

Recommendations:

The Committee supports the proposed program in the FY 1978 Budget for the Bureau of Labor Statistics to conduct a continuing survey of consumer expenditures. In addition, we recommend the following ways for improving the price measures used to deflate personal consumption expenditures:

1. *The Bureau of Labor Statistics should price household items not covered in the Consumer Price Index to provide price measures of important changes in consumer preferences as they occur.* The proposed continuing consumer expenditure survey would provide basic information for identifying new goods and services to be priced independently of the Consumer Price Index.
2. *The Bureau of Economic Analysis and the Bureau of Labor Statistics should work more closely together to increase the concordance of the expenditure classes in the Consumer Price Index with those in the personal consumption expenditures component of the GNP.*

4. Not-for-profit organizations

There are a number of institutions or organizations whose output is included in PCE services but is not priced in the CPI. Surrogate measures of price change based on wage earnings and WPI series are used for quarterly. These organizations—3 percent of PCE in 1972—include schools, hospitals, religious and social welfare organizations, foundations, and labor unions.

Recommendation:

The expansion of the quinquennial economic censuses to cover not-for-profit organizations, including information on what they purchase, as recommended in Chapter 3, would meet the basic data needs for deflating the nonprofit sector. Additional price data probably would not be required since presumably the items purchased are now covered in the consumer and wholesale price indexes.

5. Data gaps in measuring rents

The deflated estimates for housing rentals are based on the movement of the BEA perpetual inventory of housing units. Rent for housing (15 percent of PCE in 1972) is a major category for which a price index is used in conjunction with a measure of quantity to obtain current-dollar consumption. Current-dollar estimates of the aggregate value of nonfarm rents for both rented and owner-occupied units are made by multiplying the number of housing units by the movement of the CPI rent index, with an adjustment factor incorporated to allow for the changing size of housing units and all other quality features.

Housing rentals in 1972 were estimated at $31 billion for nonfarm tenant-occupied, $74 billion for nonfarm owner-occupied (imputed), and $3.5 billion for all farm housing. The level of rents for tenant-occupied units is available from each decennial census of population. This decennial level is extrapolated to the current period by data from the Census Bureau/HUD Annual Housing Survey and figures on monthly housing starts, and the CPI rent index.

Much less information is available for owner-occupied homes. For this item, the benchmark estimate for the average rental equivalent dates back to the 1940 Census of Population when the question asked was essentially, "How much would your home rent for if it were on the rental market?" As a benchmark, these answers have at least two defects: (a) the potential for bias in the answers to such a question, and (b) the fact that the data were collected more than 35 years ago. A similar question was asked in the 1972 BLS Survey of Consumer Expenditures. These data have been evaluated and tabulated. This survey, despite a relatively low response rate and potential for bias, is a possible data source for updating the benchmark figure used for the rental equivalent of owner-occupied homes and BEA is studying its use for that purpose. These data are supplemented by ratios of rentals to housing values from information in other decennial censuses.

A major assumption in the owner-occupied rental estimates is that imputed rental equivalents on owner-occupied homes move like cash rents paid by tenants. Given the major changes in housing markets since World War II, including rent controls and their removal and numerous differences in markets and type of housing for rental and owner-occupied housing, this appears to be a dubious (even if pragmatic) assumption, at least for short-term changes.

The forthcoming revision of the CPI includes significant improvements in the index of rents paid by tenants. New housing units will be introduced into

the samples systematically, based largely on Census Bureau data on housing permits, and there will be monthly pricing of rents in all cities. Also, since the new index will have an enlarged universe of urban wage earners, it will be more representative of rentals paid by all households.

Since owner-occupied units consist primarily of single-family houses, it is appropriate that a rent paid index for single-family units be used in the derivation of imputed rent for owner-occupied houses. For the estimation of tenant rentals, the appropriate index of rent paid is one that covers both single-family and multi-family units with the correct weights. Data for tenant rentals are collected, both for single- and multi-family housing, but only the combined index of rent paid is calculated.

The presently published homeownership price index [11], available since 1953, will be continued in the new CPI. It will be based on the universe of housing financed by the Federal Housing Administration (FHA). BLS will examine methods for augmenting the FHA sample because the FHA program may not be representative of all price ranges and types of housing (e.g., condominiums).

The BLS has studied two alternatives to the housing price index in recent years: (a) a rent equivalent index derived through collection of data on a sample of appropriate homes that are rented, and (b) a flow of services cost function approach, which sums for each index period the various cost elements that enter owner-occupied housing. [12] This is a complex area where more conceptual and empirical research needs to be conducted.

Recommendation:

The Committee supports the plans of the Bureau of Labor Statistics to make the sample used in the housing price index of the Consumer Price Index representative of all housing, and its continuing effort to develop indexes of rental values for owner-occupied housing. In addition, we recommend the following way to improve the rent index information:

The Bureau of Labor Statistics should calculate monthly indexes of rent paid by tenants separately for single-family and multi-family structures.

[11] Includes home purchase, mortage interest, taxes, insurance, and maintenance and repairs.

[12] For a detailed description of these two approaches and the various conceptual and empirical problems involved, see Robert Gillingham, "Measurement in the Consumer Price Index of the Cost of Shelter for Homeowners" BLS mimeograph, revised December 1973, and Dale A. Smith, "The Flow of Services Approach to Estimating the Homeownership Component of the CPI" BLS mimeograph, January 21, 1975.

C. Producers' Durable Equipment

1. Coverage and quality gap

Deflation of expenditures for producers' durable equipment (PDE) relies very heavily on components of the WPI. For aircraft, ships, and telephone and telegraph equipment, BEA uses special indexes prepared by the Civil Aeronautics Board, the Maritime Administration, and the American Telephone and Telegraph Company, respectively. Over 25 broad categories of equipment are deflated quarterly and annually. In addition, in the second July revision, about 150 detailed components of PDE are used to weight the WPI's into deflators for the broad categories. Constant-dollar estimates and implicit price deflators are published annually for 23 product groups.

There are many items for which there is a paucity of price information. The following list indicates several of the major areas where gaps in price information are important. In many cases, these are items that are built to order or to custom-made specifications or are subject to frequent and significant technological and quality change that is difficult to measure. In general, the WPI relates to equipment with standard specifications. Thus, for some items such as machinery and tools, coverage in the WPI is poor or nonexistent. This necessitates the use of price data for other products to serve as surrogates which may not reflect the price movements of the more specialized products. The available BLS prices for PDE have been criticized as subject to significant cyclical and secular biases because of the failure to make adequate allowance for changes in quality.[13] Areas where gaps in price information are important include:

large aircraft

ships and boats

computers and related equipment

automotive plant machinery—special tools and dies

service industry machines—commercial laundry, refrigeration, cooking

instruments—medical, laboratory, etc.

communications equipment

Recommendation:

The Bureau of Labor Statistics should increase the coverage of equipment items in the Wholesale Price

[13] Executive Office of the President, Council on Wage and Price Stability, *The Wholesale Price Index: Review and Evaluation*, June 1977, pp. IV-11-13. This report was prepared by Richard Ruggles of the National Bureau of Economic Research. The cited pages are a review of an earlier study by Robert J. Gordon on the problems of quality change in the deflation of producers' durable equipment.

Index to give more comprehensive measures of price change for capital investment. This will necessitate research and experimentation to develop techniques for measuring technological and quality change. In this regard, the Committee supports the proposed funding increase for the BLS industrial price program in the FY 1978 Budget. The Committee also supports this program because it would provide improved price deflators for the industry measures in the GNP by industry and annual input-output series.

2. Pricing at time of order or shipment

Another issue—which has become especially important during the steep inflation of recent years—is the fact that there are lags of varying length between manufacturers' orders and shipments. Shipments are one of the main extrapolators for current-dollar value of PDE in the quarterly accounts. The WPI quotations for most machinery and equipment are current market quotes or order prices, i.e., prices at which a firm is currently offering to sell a specified product. However, the dollar value of shipments in the current period reflects prices at the time the order was placed. There is a timing problem with the price data used for the PDE deflation because of the lack of information on which monthly data of an earlier period apply to the shipments figures of the current period.

The actual pricing problem is further aggravated by the existence of numerous escalator clauses for items with a long production period and—in an inflationary environment—by the reluctance of producers to make firm price quotations for more than a brief period ahead. Actual deliveries in any one quarter may thus represent a wide range of contractual agreements with respect to the appropriate date of the price charged. Conceptually, what is needed in this situation is an appropriately weighted average (for the various categories) of prices actually charged at the time of shipment or delivery. Groups particularly affected by the absence of appropriate prices directly relating to shipments are electrical machinery and nonelectrical machinery. BEA developed an approximation to such prices by using as quarterly deflators weighted averages of quoted prices lagged over a number of months based on unfilled orders to sales ratios for most categories of PDE.[14] The new procedures result in substantial differences from the published implicit deflators for PDE in several quarters from 1969-I to 1973-IV. The effect on the deflator for total GNP, however, is generally quite small.

[14]For a description of this procedure, see Irving Rottenberg and Gerald F. Donahoe, "Improved Deflation of Producers' Durable Equipment," *Survey of Current Business*, July 1975.

Recommendation:

The Committee supports the BLS plans to collect prices at the time of shipment in its industrial price indexes. If implementation of this is not feasible, we recommend the following:

The Bureau of Labor Statistics should conduct periodic (perhaps annual) surveys in selected machinery and equipment categories to obtain a comprehensive picture of current pricing practices in these industries. The surveys should obtain information that would provide a factual basis for computing a weighted average of quoted prices over a number of months as an approximation of actual shipment prices in a particular month.

D. Construction

Construction price indexes have had longstanding deficiencies. In 1960, the Stigler Committee report was highly critical of the available indexes. Since the publication of the Stigler Report, some improvement has occurred, particularly in the measurement by the Census Bureau of prices of single-family homes, but the inherent difficulties of price measurement in an industry producing a heterogeneous array of products in a multitude of local markets and with a great number and variety of inputs has militated against dramatic breakthroughs on a wide front.[15]

The available measures of construction costs are for the most part indexes that are based on input prices (materials and labor). In some cases the inputs are combined with outmoded weights. Often the indexes are inadequately adjusted for productivity change and profits. These deficiencies characterize the price indexes that are used to deflate the bulk of construction. There are two notable exceptions, the deflators for single-family homes (Census Bureau) and highway construction (Federal Highway Administration). Together they account for nearly 30 percent of total construction. These conform to the desired concept of "output" price indexes.

Reliance on commercially produced indexes for some types of construction also has the drawback

[15]The same point is made by BEA analysts: "The preparation of good price indexes for the various types of construction is extremely difficult. The essence of price measurement is that a time series of price observations be obtained for products of the same specifications. This is easily done for homogeneous products (coal, sugar, wheat), but the output of construction is one of the most heterogeneous that must be faced in price measurement. Houses are rarely built with the same specifications for more than a year or two; factories, office buildings, and shopping centers are almost never built twice with the same specifications. Hence, the proper measurement of price change in construction is at the 'frontier' and requires special techniques not normally used in preparing price indexes." *Survey of Current Business*, August 1974, p. 19. *Survey of Current Business*, August 1974, p. 19.

that knowledge of the methodology used in preparing many of these indexes is severely limited.

1. Recent revisions

In an attempt to compensate for these various deficiencies, BEA recently instituted a revised set of price deflators for new construction for the post World War II period.[15] These revised deflators were incorporated in the benchmark revision of the national accounts released in January 1976. (Earlier, the revised deflators beginning with the first quarter of 1971 had been incorporated by linking into the accounts in the annual revision published in July 1974.)

The revised figures are the product of a joint effort by BEA and the Bureau of the Census. Although no new data were collected for this effort, a searching review was conducted by the two agencies of the large number and variety of price indexes already available for various types of construction. A selection was made of those indexes or combinations of indexes that appeared most reliable for deflation purposes. Table 7-1 lists the revised indexes.

TABLE 7-1. Revised Indexes Used to Deflate New Construction

Type of construction	Value of new construction in 1973 (billions of dollars)	Revised Indexes (no change prior to 1947)
Residential buildings (nonfarm)	56.9	1947-63 Unweighted average of 70 cities and FHA price-per-square-foot. From 1963: Census single-family houses, excluding land.
Industrial buildings	6.4	Unweighted average of Turner Construction Co. residential and Bureau of Public Roads structures.
Commercial buildings	16.0	Do.
Educational, hospital and institutional, religious, other nonfarm nonresidential buildings	17.8	Do.
Farm nonresidential	1.3	Do.
Farm residential	.5	Same as residential buildings (nonfarm)
Railroads	.5	1947-67: Interstate Commerce Commission railroad From 1967: same as "All other"
Telephone and telegraph	4.0	Weighted average of Bell System indexes for buildings and outside plant
Electric light and power (private)	8.2	Weighted average of Handy-Whitman electric plant (90%) and utility buildings (10%)
Gas	1.4	Interstate Commerce Commission pipelines
Petroleum pipelines	.2	Do.
Military facilities	1.2	Weighted average of Bureau of Public Roads composite (50%), residential (25%), and Turner Construction Co. (25%)
Highways and streets	10.6	Bureau of Public Roads composite
Sewer systems	2.5	Unweighted average of Environmental Protection Agency sewers and sewage treatment plant.
Water supply facilities	1.1	Unweighted average of sewer systems and Interstate Commerce Commission pipelines
Conservation and development	2.3	Bureau of Reclamation composite
All other, private and public	3.4	Unweighted average of Bureau of Public Roads composite and Bureau of Reclamation composite

Source: Survey of Current Business, August 1974, Part 1, p. 26.

[15] "Revised Deflators for New Construction, 1947-73," *Survey of Current Business*, August 1974.

The general results of using the new indexes were that over the 1947-73 period, construction prices rose at a slower rate than previously estimated, and correspondingly the physical volume of construction rose at a faster rate. There were differential movements in this general pattern for particular groups of years during the period.

2. Residential construction

The Census Bureau compiles an index of sales prices for single-family homes which dates back to 1963 on an annual basis and to 1969 on a quarterly basis.[17] Actual transaction prices are collected monthly via a probability sample of units sold. Quality change and differences are handled through a regression method (hedonic approach) that eliminates the effects of changes in 8 physical characteristics.

The quarterly index is developed both including and excluding the land value. It is available on a preliminary basis 45 days after the reference quarter and on a revised basis 1 month later. In addition, the Census Bureau provides BEA with monthly indexes based on early information from its housing sales survey. These monthly indexes are only calculated with the land included.

Conceptually, the single-family index excluding land values is ideal as a construction deflator. The preliminary index is available in time for inclusion in the 45-day GNP estimates, but the revised data are too late for use in the proposed 75-day GNP estimate.

The present use of the single-family index for deflating the value of multi-family construction does not allow for differential price movements for structural characteristics unique to the construction of multi-family buildings—e.g., high rise buildings, elevators, large-scale power plants for central air-conditioning, heating and plumbing systems. The Census Bureau has been collecting data in recent years on the physical characteristics of buildings with two or more housing units for use in developing a multi-family construction price index. The present plan is for the development of a quarterly multi-family construction price index, similar to that for single-family housing around 1980.

For residential additions and alterations, the price index for new single-family construction probably reflects more adequately the type of outlays associated with enlarging and altering existing single-family housing than it does for modifying existing new multi-family buildings. However, there are differences in the kind of work associated with modifying existing structures and the construction of new single-family houses. The extent of these differences and their impact on price movements are not known.

Recommendations:

The Committee supports the Census Bureau plans to provide a quarterly price index for multi-family housing construction about 1980. In addition, we recommend the following ways for the Census Bureau to improve the price deflators for residential construction:

1. *Speed up the revised price index of single-family houses to be available 65 to 70 days after the reference quarter.*
2. *Examine the need and feasibility of developing a special construction price index for residential additions and alterations.* This would involve (a) an assessment of the relationships between construction costs for additions and alterations to existing structures with those for new single-family residences, and (b) specification of the types of information necessary to develop a price index for additions and alterations.

3. Nonresidential and public structures

The index used to deflate highway construction, prepared by the Federal Highway Administration, represents the price of constructing a mile of highway based on contract award data for Federally aided highway projects. The index for deflating conservation and development construction, prepared by the Bureau of Reclamation, is a mixture of output prices from contract awards and input prices. Both of these indexes are satisfactory for deflating the NIPA, although the highway index is superior because it better meets the criterion of an output price deflator.

The rest of nonresidential construction is handled by a variety of input cost indexes, generally compiled by private industry, but with some indexes produced by Federal agencies. Most of these indexes are based on fixed weights with no allowance for technological or productivity change. The Turner index for large office buildings and the Bell System index for telephone plant are the exceptions that include adjustments for productivity change.

The Census Bureau collects information on the physical characteristics of private and State and local government nonresidential buildings as part of its survey data for the value of new construction put in place. The information on characteristics—e.g., new or addition, square footage, measures of capacity

[17] For more details on the development of this index, see John C. Musgrave, "The Measurement of Price Changes in Construction," *Journal of the American Statistical Association*, September 1969.

such as beds in hospitals and students in dormitories, type of fuel for heating and air-conditioning—forms a nucleus of basic data for developing hedonic type output price indexes for nonresidential buildings.

Recommendations:

1. *The Census Bureau should develop quarterly output construction price indexes excluding land costs for nonresidential buildings similar in concept to the existing one for single-family houses.* In addition to the data now collected on the physical characteristics of private and State and local nonresidential buildings, the usefulness of collecting other information on these structures—e.g., number of floors, load bearing factors, use of reinforced concrete—should be explored for the development of the price indexes.
2. *The Census Bureau should explore the feasibility of developing output price indexes for deflating construction expenditures for electric light and power plants, sewer systems, water supply facilities, and railroad plants.*

4. Price of drilling oil and gas wells

There is one particular type of capital investment that is custom-made in a rather unique way, viz., exploration and drilling of oil and gas wells. The BEA defines this activity, excluding outlays for equipment (e.g., drilling rigs), as construction. Expenditures for this purpose in 1975 were $5 billion out of $52 billion invested in all of private nonresidential construction. Over the next 5 to 10 years, this sum may become much larger in response to the growing pressure to expand oil and gas reserves. In this event, it would be specially helpful to have accurate measures of the real flow of investment into exploration for additional supplies of oil and gas.

At the present time, the quinquennial benchmark of expenditures for oil and gas well drilling is provided by the expenditure data reported by the census of mineral industries. The benchmark is extrapolated annually by the annual change in such expenditures reported to, and released by, the Joint Association of the U.S. Oil and Gas Producing Industries. The same source also reports on footage drilled, making possible the computation of expenditures on cost per foot drilled. Both expenditures and footage drilled are available separately for drilling in Alaska, offshore U.S., and continental U.S. onshore.

For the quarterly estimates, the cost per foot drilled as derived for the last annual estimate is extrapolated by the quarterly change in a composite construction cost index composed of a weighted average of WPI's for two major types of oil well casing and the Federal Highway Administration composite index of highway construction costs. The extrapolated price for the quarter is multiplied by the footage drilled as reported monthly in *World Oil*, an industry periodical, to arrive at quarterly expenditures.

In light of the derivation of drilling expenditures in current prices, its conversion into expenditures in constant prices is straightforward. One merely multiplies the estimated footage drilled in each time period by the cost per foot in the base year. There is, however, a serious flaw in the estimation of both series. It is not sufficient to classify expenditures and footage drilled according to a three-way geographic subdivision. At least of equal importance is differentiating footage by depth of well since the per unit cost of drilling is significantly lower for shallow than for deep wells.

Recommendation:

The Federal Government, perhaps the Federal Energy Administration (or successor agency) jointly with the Census Bureau, should collect annual survey data on oil and gas well drilling and exploration classifying footage drilled and expenditures incurred by depth of wells. Consideration should be given to collecting these data as part of the Census Bureau's Annual Survey of Oil and Gas.

E. Nonfarm Business Inventories

1. Relationship of prices and inventory valuation

Inventory change in the NIPA represents the change over a specified period (quarterly or annually) in the physical volume of business stocks. Price data have a unique role in the measurement of inventory change because the book value data on inventories obtained from company surveys cannot be used directly since sales are made from stocks which generally are purchased at prices different from those currently prevailing (i.e., from current replacement cost). As stocks are sold and then replenished at higher or lower prices, book values may change even if physical volume is stable. The firm's method of inventory valuation directly affects its cost of goods sold, profits, and book value measures.

The transformation of these levels of inventories as valued in company books to the change in physical volume of inventories expressed in current dollars is achieved through a complicated estimating process in which the explicit use of prices is an essential ingredient. Inventory change is estimated by adjusting book values to physical volume values expressed in current period prices. The difference between the change in the book value figures and the derived change in business inventories (CBI) in

current prices is the inventory valuation adjustment (IVA). Estimates of the IVA are incorporated in both the product and income sides of the NIPA. A more detailed description of the procedures and data sources used in estimating the CBI is given in Chapter 5.

The exceptionally sharp price increases of some recent years have been reflected in extraordinarily large increases in book values of inventories. For example, the IVA rose from $7 billion in 1972 to $43 billion in 1974 (a peak of $58 billion in the third quarter of 1974 at annual rates); in 1976 the IVA was much lower but still substantial at $13 billion; and in the fourth quarter of 1976 and first quarter of 1977, the IVA turned up again to over $20 billion at annual rates. The increased magnitude of the IVA supports the need for better information on inventories and their valuation as specified in chapter 5.

2. Quality of data for valuing inventories

The data deficiencies in the pricing of inventories stem primarily from reliance on surrogate data. As inventory data are not available in the necessary commodity detail, the weighting of prices used for trade inventories is based on the detailed product line sales data in the quinquennial economic censuses. The product detail, however, often is not sufficiently defined for assigning appropriate prices. The census of wholesale trade provides inventory data by type of operation which are broad aggregates. The census of retail trade does not contain inventory data (and monthly and annual retail inventory data are available only for major groups of establishments). For manufacturing, weights are based on the "materials consumed" and shipments data in the census of manufactures. No data are available on the commodity composition of trade and manufacturing inventories.

Estimates of the monthly rates of inventory turnover used in calculating the CBI are based on indirect data and broad statistical judgments (see Chapter 5). There is no information available for checking the validity of the estimated turnover.

With few exceptions, wholesale prices are used to deflate both trade and manufacturing inventories. About 150 "elements" of the WPI are used (i.e., not only individual series, but combinations or groups of various sorts). The problems of sampling, coverage, and quality adjustment in the WPI which were noted in the PDE section of this chapter apply to these estimates as well.

The Census Bureau recently started collecting end-of-year information on the LIFO, FIFO, and other methods of inventory valuation in its surveys of manufacturing and trade inventories. This new information has improved the reliability of the valuation adjustments made to the book value figures.

Also, as noted in Chapter 5, the National Bureau of Economic Research, under contract with the Census Bureau, is making an intensive study of means to improve the quality of inventory data. The study is expected to be completed in 1978 and will provide additional approaches for dealing with this very difficult problem.

Recommendation:

Improvement of the quality of price data per se—important as it is to the process of moving from book values to inventory change—is only one requirement for increasing the accuracy of the NIPA estimates of inventory change. It is more important to improve data on (1) inventories in book values, (2) inventory accounting methods, (3) inventory commodity weights, and (4) inventory turnover.

Committee recommendations on all these elements in the measurement of changes in business inventories have already been presented in Chapters 3, 4, and 5.

F. Net Exports of Goods and Services

1. BEA Methodology

Exports and imports of goods and services are deflated separately in four broad categories: exports of goods, exports of services, imports of goods, and imports of services. The difference between total constant-dollar exports and total constant-dollar imports is net exports in constant dollars.

Exports and imports of goods are deflated by unit value indexes compiled by the Census Bureau. The indexes are calculated as dollar values divided by a relevant quantity figure—pounds, tons, bushels, number of units, etc. While the Census indexes are based on several classification schemes, BEA uses the total unit value indexes for classes consisting of: crude materials, crude foodstuffs, manufactured foodstuffs, semimanufactures, and finished manufactures.

For services, a variety of indirect measures and procedures are used for deflation. These are essentially the same as described in a BEA paper several years ago: "Freight charges are represented by a volume index combining broad categories of freight with base-year value weights. Indexes of the volume of passenger transportation and travel also have been constructed, using the numbers of passengers and travelers in the various routes and areas, but for recent years we have attempted the more direct index pricing of passenger fares, with weights proportional to the numbers going to the various areas, and have

deflated travel by consumer price indexes adjusted for exchange rates.

"In the absence of more pertinent information, the merchandise deflator is made to serve also for the miscellaneous services of government and military items, while miscellaneous private services are deflated by the aggregate or overall deflator (of merchandise, freight, passenger fares, and travel). Finally, the convention is adopted with respect to investment income, of deflating receipts by the imports deflator and payments by the exports deflator."[11]

Table 7-2 shows the trade and major service components of exports and imports for 1975 to provide a perspective on the importance of the component shares. Merchandise exports accounted for 72 percent of all exports of goods and services, and merchandise imports accounted for 74 percent of all imports. The next largest item is income receipts and payments on international assets.

TABLE 7-2 Exports and Imports on Current Account by Major Component, 1975
(billions of dollars)

Exports of goods and services, total	148.4
Merchandise, excluding military	107.1
Military agency sales contracts	3.9
Passenger fares and travel	5.9
Other transportation	5.7
Income receipts on U.S. assets abroad	18.2
All other	7.6
Imports of goods and services, total	132.1
Merchandise, excluding military	98.2
Direct defense expenditures	4.8
Passenger fares and travel	8.8
Other transportation	5.4
Income payments on Foreign assets in U.S.	12.2
All other	2.7

Source: *Survey of Current Business*, June 1976.

2. Deficiencies of present data

The deflation of merchandise exports and imports represents one of the weakest sectors of the GNP accounts. A major recommendation of the Price Statistics Review Committee (Stigler Committee) in its 1960 report was that "The export and import unit value indexes should be brought into closer conformity with price indexes by increased utilization of price information from sources external to foreign trade statistics, particularly by use of BLS wholesale prices and the collection of some prices by specification from the field."[12] The Review Committee for Balance of Payments Statistics (Bernstein Committee) in its 1965 report endorsed the recommendations of the Price Statistics Committee. The desirability of using specification pricing instead of unit value indexes was reiterated in 1970 by the Bureau of the Budget Interagency Committee on Measurement of Real Output.

A basic inadequacy of the Census Bureau's unit value indexes is the deficiency of unit values as a proxy for price. In the words of the Stigler Committee (p.82), "... changes in average value (obtained by dividing quantities into values) usually represent the result of an unknown combination of price change and variation in product mix. In some instances, the change in the nature of the product within a given classification may be quite substantial." No adjustment is made in the unit value indexes for changes in quality. Quantity data are lacking or incomplete for many commodities, particularly finished manufactures and especially the important machinery category, so that deficiencies of coverage may be added to those of unit values. There are also problems of classification for commodities such as agricultural products and raw materials, which appear to be fairly homogeneous but are not, and for which shifts in product mix may seem of little consequence when unit values are used as a proxy for

[11] Grose, Lawrence, "Real Output Measurement in the United States National Income and Product Accounts," reprinted in the Bureau of Economic Analysis, *Readings in Concepts and Methods of National Income Statistics*, National Technical Information Service, U.S. Commerce (1976).

[12] Price Statistics Review Committee, *op. cit.*, p. 29.

price change but are very important. For example, the BLS in an unpublished study of several commodities of this general nature found (1) a sizable difference in price between the lowest and highest quality, of many "homogeneous" products (e.g., wheat) and (2) a tendency for a shift out of the higher priced units into lower priced grades when prices rise, and vice versa when prices fall, even though the relative price differential between grades is very stable. Thus it appears that mix changes plague unit values even for primary products.

Differences can be substantial in the rate of change of unit value indexes and of price indexes for comparable groupings. The BLS compared the changes between successive Junes from 1965 to 1973 of a unit value index and of its export price index for selected manufactures. Over this 8-year interval, the unit value index increased 57 percent while the price index rose by only 32 percent. Differences were large in most years. In 1 year, for example, the unit value index rose 10.2 percent compared to 4.7 percent for the price index. Some of the reasons underlying these differential movements include differences in product mix, measures of quality changes, and sampling variations. The importance of each factor is not known, but the differences are large enough to question the accuracy of the measurement of real exports. A similar comparison is not available for U.S. imports.

This problem is not unique to the United States. For example, West Germany is one of the few countries that compiles price indexes (as well as unit values) for exports and imports of its trade in goods. A study, "Indices of Foreign Trade Prices on Base 1970," published by the German Federal Statistical Office, compares price indexes and unit value indexes for both exports and imports from January 1968 to April 1974. From beginning to end point of this period, prices rose much more rapidly than unit values, the reverse of U.S. experience. There has been no analysis of the factors that account for these differential movements. The German study also indicates that price indexes of imports rose much more rapidly than did unit values. However, for quarterly and annual periods within this 6-year interval, there were significant variations in the differential movements of the price and unit value indexes. Consequently, the quarterly and annual trends of real gross exports and imports and real net exports would be substantially different depending on which indexes were used for deflation.

As noted previously, the deflation of the service and income components is based heavily on the merchandise trade unit value indexes because of the lack of direct nonmerchandise price data. However, price movements for service and income transactions could vary significantly from those for merchandise trade. The deflation of services and income poses difficult theoretical and empirical problems. For example, what is the appropriate deflator for income on foreign investments? Very little conceptual work has been done in this area.

3. BLS program for pricing exports and imports

An ongoing effort to improve the deflators of merchandise exports and imports exists in the foreign trade price program that BLS has been developing for several years. Merchandise export and import price indexes are produced quarterly, based on data for the third month of every quarter. The indexes are available 1 month after the reference quarter, in time for the 45-day GNP estimate. Thus far, the work has been concentrated on manufactured export items. As of early 1977, BLS had covered approximately 47 percent of merchandise exports including an aggregate index for machiney and transportation equipment, and 15 percent of imports. During FY 1978, the plan is to increase the coverage to 50 percent for exports and 40 percent for imports. The export price indexes represent free on board (f.o.b.) factory transaction prices or free alongside ship (f.a.s.) U.S. port.

The import price indexes are based on U.S. dollar prices paid by U.S. importers. The prices are foreign port transaction prices or cost, insurance, and freight (c.i.f.). The price data are collected from sample surveys of U.S. exporters and importers. The sampling initially was done on a nonprobability basis, but now is being converted to a probability basis with respect to product, firm, and specification.

While present coverage of exports and imports is limited, BLS has prepared a detailed program of systematic expansion to have virtually full coverage of exports and imports by 1982. By then, BLS is planning to process some 30,000 price reports in each of the 4 index months of the year, about evenly divided between exports and imports—roughly twice as many price quotations for both exports and imports as now enter the monthly WPI.

Recommendations:

1. *The Bureau of Economic Analysis should supplement the use of unit value indexes with the partial data on export and import prices for deflating the merchandise trade component of net exports until more complete price data become available.*
2. *The Bureau of Economic Analysis and the Bureau of Labor Statistics should conduct jointly basic research on the theoretical and empirical aspects of developing more direct price measures for deflating the service and income components of net exports.*

G. Government Purchases of Goods and Services

Federal and State and local government purchases of goods and services are composed of purchases from private industry and wages paid to government employees. Both of these components are deflated for the estimates of government purchases in constant dollars.

The measurement of government output presents very difficult conceptual problems because there is no measure of the market value of services provided by the government. The convention used in the NIPA is that the value of government output is measured by its employee compensation.

1. Federal Government

Constant-dollar estimates and deflators for Federal Government purchases of goods and services are published only for total Federal purchases on a current quarterly basis. In the annual July revision, constant-dollar purchases are published both on an annual and quarterly basis, separately for employee compensation, durable goods, nondurable goods, services, and structures. Constant-dollar estimates that distinguish between defense and nondefense outlays are not provided. However, a major project is underway in BEA that is aimed at providing estimates of defense purchases in constant dollars.

a. Procedures for deflating major components

Employee compensation:

Prior to the GNP benchmark revision published in January 1976, employee compensation in constant dollars was estimated by extrapolating compensation in the base year by an employment index. For civilian employment, only the total was used. For military employment, indexes of employment for eight categories of enlisted personnel and officers were used as extrapolators of the base period payroll for each category. This procedure assumed no productivity increases for civilian workers or for military personnel except for promotions to a higher rank.

In the revision of January 1976, a more sophisticated procedure was adopted. "An attempt is made to approximate specification pricing for the value added by general government, which is measured by the compensation of government employees . . . in effect, indexes (1972 = 100) of employee hours in the various Civil Service and wage board grades are given weights that are proportional to 1972 payrolls in these grades. The rationale of this weighting system is that average pay by grade reflects such factors as experience and education."[20] The procedure also adjusted for "grade inflation" during the 1950-69 period; during the 1960's, there was a concerted program to attain comparability in pay scales between the private and Federal sectors which is assumed to have been achieved in 1969. The treatment of military employees is the same as prior to the revision.

The revised procedure for civilian workers yields a measure of output that can change over time even if total employment is unchanged. A relative shift to higher grades, reflecting longer experience and more education, means more labor, and vice versa. While the revised procedure is a desirable improvement, it remains an indirect measure. Also, it does not allow for changes in productivity within grades over time, such as efficiencies reflecting improved management, or better use of nonlabor resources, or technological change in capital resulting from increased use of computers. As a result, there remains a gap in the measurement of Government output.

Purchases from private industry:

The deflation of goods and services purchased from private industry other than construction is based mainly on the WPI and CPI. A small number of commodities are deflated by price information provided by the Federal agency making the purchase. The item detail was expanded considerably in the 1976 benchmark revision to approximately 280 separate categories. For construction, the deflators incorporate the appropriate series for the recently improved data on construction described in the construction section of this chapter.

b. Major problems and remedial efforts

The foregoing summary indicates that Federal purchases are deflated by price indexes which have been developed for the private sector. However, there are two general reasons why these indexes are not necessarily indicative of prices paid by the Government or, what is most important for deflation purposes, of the movement over time of these prices. First, some defense outlays are for items that have no counterparts in the civilan economy—e.g., military hardware such as missiles, submarines and tanks—and thus are not covered in the BLS price indexes. Second, for goods and services common to both the Government and private sectors of the economy, the prices paid by the Government may differ widely from prices for the same items purchased by the private sector because of the bulk and timing of Federal outlays.

Three ongoing programs of the Federal Government give promise of filling significant aspects of these data gaps. The first one is a research and development project by BEA with funding provided by the Department of Defense (DOD) for preparing estimates of quarterly real national defense

[20] *Survey of Current Business*, January 1976, Part I, p.22.

purchases. The estimates are based on a continuing sample and analysis of DOD's records of its purchases of goods and services and on data collected directly by BEA from DOD contractors. A report on this project, including preliminary defense implicit price deflators, was completed in September 1977. The quarterly estimates of constant-dollar defense purchases—including the components of employee compensation, goods, services, and structures—are planned to be incorporated in the NIPA estimates with the July 1978 annual revision. The BEA will prepare quarterly estimates of defense purchases in constant dollars during FY 1978 under joint financing by DOD and the Department of Commerce because there is no permanent financing for this program in the BEA budget.

The second program is a recent initiative by the Federal government—the authorization of the Federal Procurement Data System (FPDS). Although this development was described in Chapter 3, it is useful to recall that each Federal agency is obligated to report quarterly (45 days after the close of the quarter) each individual procurement action over $10,000. Each action is to be identified by, among other things, type of transaction, effective date of award, total dollars obligated on transaction, cumulative dollars obligated on contract, object classification, and contractor establishment code (enabling the assignment of a Standard Industrial Classification code). For procurement actions of $10,000 or less, a quarterly summary is to be reported with substantially less detailed information. When this data system is fully operative, it will provide a much improved set of weights for combining whatever price-indexes from the private sector are currently used to deflate Government nondefense purchases.

The third program is the preparation by BLS of annual productivity measures for selected operations of the Federal Government.[21] These estimates of output, employee years, and output per employee year (productivity) provide direct measures of productivity change for Federal workers. In 1976, they were based on studies that covered 57 agencies (including 328 organizational units within the agencies) and 66 percent of total Federal civilian employment. Estimates are published for the overall sample total; for 25 functional categories common to various organizations such as citizens records, printing, procurement, power production, regulation, and medical services; and for the Postal Service. Agency data are provided to the individual organizations for their use as a management tool, but with the exception of the data for the Postal Service, agency data are not made available to others.

Initial estimates of these productivity measures were available in the early 1970's.[22] They were not used for developing the NIPA constant-dollar estimates of Government employee compensation because of BEA concern regarding various technical aspects of the measures. These problems are the combination of intermediate and final outputs of individual agencies, aggregations of agencies with different functions, use of proxy measures of output, homogeneous treatment of all labor input, exclusion of capital inputs, and use of a non-random sample.[23]

The most important of these limitations—combination of intermediate and final output—reflects fundamental problems of measuring Government output distinguished between "final" output which represents services provided to the Nation (e.g., health care), and "intermediate" output which is an ingredient providing the end service (e.g., training of doctors). These concepts present complex theoretical and measurement problems that require major research and development work.

Recommendations:

The Committee reiterates its support for the successful implementation of the Federal Procurement Data System with the data elements outlined in Chapter 3 and reviewed in this chapter. Also, we recommend the following ways of improving the price deflators of Federal Government purchases:

1. *The Bureau of Economic Analysis developmental project for preparing quarterly estimates of national defense purchases in constant dollars should be made a permanent part of the BEA budget.*

2. *The Bureau of Economic Analysis should reconsider the possibility of introducing measures of productivity for selected Federal Government*

[21] For the latest discussion of the program, see National Center for Productivity and Quality of Working Life, *1976 Annual Report to the President and Congress*, 1977, pp. 47-52. Another recent development has been the creation of a commission on productivity by the National Academy of Sciences for the National Center for Productivity and Quality of Working Life. This commission will be examining methods for improving the measurement of productivity.

[22] Civil Service Commission, General Accounting Office, and Office of Management and Budget, *Measuring and Enhancing Productivity in the Federal Sector* (1972).

[23] For the discussion and reply on these issues, see Allan D. Searle and Charles A. Waite, "Current Efforts to Measure Productivity in the Public Sector: How Adequate for the National Accounts?", and Jerome A. Mask, "Comments on Searle and Waite Paper," National Bureau of Economic Research, *New Developments in Productivity Measurement, Studies in Income and Wealth*, Volume 44, forthcoming.

operations as adjustment factors for deflating Federal Government employee compensation.[24]

3. *When the Federal Procurement Data System becomes operational, the Bureau of Labor Statistics should prepare quarterly price indexes of Federal Government procurement by 70 days after the reference quarter.* This would require the collection of unit prices of standardized goods and services in keeping with the purchase classifications in the Federal Procurement Data System, and the combination of the unit prices and purchases data.

2. State and local governments

Constant-dollar estimates and deflators for State and local government purchases of goods and services on a current quarterly basis are published only for total purchases. In the annual July revision, constant-dollar purchases are published both on an annual and quarterly basis for the total, compensation of employees, durable goods, nondurable goods, services and structures.

For employee compensation, the deflation procedures aim at "specification pricing," similar to that noted above for the Federal Government. A basic distinction is made in the State and local sector between educational and non-educational employees. For education, weights are developed for teachers, based on educational attainment, and in the case of elementary and secondary school teachers, employee hours also are used. For nonteaching employees in education, occupational categories are used as weights. For employees not engaged in education, weights are based on adjusting employee hours by the information on grades developed for Federal civilian employees. Weights for each category are proportional to the 1972 payrolls. The weights are extrapolated for the quarterly constant dollar estimates by monthly data on employment.

This procedure allows for changes in productivity of State and local government employees based on shifts in the composition of educational attainment, occupations, and Federal grade categories. It is of course an indirect estimate of constant-dollar wages, and does not allow for changes in productivity within each category, similar to the weaknesses in the Federal sector.

The prices for deflating purchases (excluding structures) by State and local governments from private industry are based on the WPI and CPI. As in the case of Federal Government, there is a question whether movements in these prices are adequate proxies for changes in prices actually paid by governmental units. Purchases of construction are deflated by the most appropriate series from the recently improved data on structures discussed in the construction section.

Recommendations:

In Chapter 3, the recommendation to study the feasibility of collecting data on itemized purchases of goods and services by State and local governments in the quinquennial census of governments would, if the collection of such data proves practical, provide better information on price weights for the State and local sector. These weights also would be strengthened by the Chapter 3 recommendation to develop sales by class of customer data from the quinquennial census of transportation.

[24]Dissenting comment by Edward F. Denison:

I dissent from the recommendation which was not examined by the Committee as a group, that in deflating government purchases BEA should reconsider the use of productivity measures for Federal Government operations.

Government is now treated as a final consumer of the goods and services it buys. Insofar as possible, specification pricing is used to deflate government purchases—whether of goods, labor, or other services—just as it is to deflate other components of GNP. A conceptual alternative would treat government purchases as intermediate, and as a final product substitute some estimate of the value of the goods and services that flow from government to the rest of the economy. Unless it were simply valued by purchases, such an estimate would require independent measures in constant prices of the quantity of national security provided, the quantity of education provided, and quantities of a host of smaller items many of which defy not only measurement but even definition.

No actual or prospective series for government productivity fits either of these concepts. Unless some preferable third concept into which they do fit can be stated, such series simply are not pertinent to national product measurement. A recommendation for a conceptual change is in any case outside the scope of the Committee's charge.

This note expresses no opinion as to the usefulness of BLS research in this area for other purposes.

APPENDIX

Comprehensive Revision of the Industrial Price Program*

Proposal:

To initiate a comprehensive revision of the Industrial Price Program.

The Need:

This proposed program change reflects the need to address several major deficiencies which exist in the current Industrial Price Program. Generally, these deficiencies stem from the fact that unlike any other major statistical series of the Federal Government, no major effort to revise and improve the Industrial Price Program has been undertaken for nearly 30 years. During those years, the importance of accurate, complete measures of price changes in the industrial sector has increased because the indexes have assumed greater significance in the development of economic policy and in the escalation of contracts. Over the past few years limited efforts have been made to expand and improve this program. Major improvements to date include the revision of the weights for the Wholesale Price Index (WPI) and Industry Sector Price Indexes (ISPI) to reflect the value of shipments data from the 1972 Census of Manufactures, the increased use of transaction price data, and expansion of the coverage of the WPI and ISPI. The present series, however, still suffer from several conceptual and statistical inadequacies.

Limited coverage: Many major industries are either unpriced or underpriced: ISPIs are available for only about one-fourth of the manufacturing and mining industries; WPIs are available for less than half of the total value of shipments in agriculture, manufacturing and mining; and almost nothing is priced in the service or construction sectors.

Multiple counting: The aggregation structure by total shipments in the WPI leads to multiple counting of price changes.

Pricing heterogeneity: Prices collected are varied in nature—some are spot market prices, some contract prices, others are based on prices of delivered orders, list prices, nominal or trade journal prices. While most of these prices are intended to reflect accurately transaction price movements, current procedures are deficient in accounting for the differing implications or adequacy of these differing sources of prices.

Sampling shortcomings: Sampling is largely judgmental. As a result, no estimates of reliability are possible, and biases of unknown origin may prevail. Probability sampling would make it possible to produce measures of reliability of the measures of price change. Although not all bias can be removed, probability sampling can remove judgment bias.

Missing elements: Some of the price indexes necessary for a more complete understanding of the mechanism of price change in the economy are missing entirely; for example, input materials price indexes and final demand price indexes.

Incomplete measures: The stage-of-processing indexes, as currently structured, do not permit a clear, rigorous analysis of the flow of price change through the economy.

The Program:

The objective of the Industrial Price Revision is to design and implement a program which will provide comprehensive and accurate measures of price change for the major industrial sectors of the American economy. To achieve this objective, the revised program will provide a complete system of price measures consisting of the following major elements:

Output price indexes for all major industrial sectors of the American economy.

Detailed commodity indexes and services indexes covering both primary and secondary production.

Stage-of-processing indexes which accurately reflect processing flows in the economy.

Input materials price indexes for all major industry sectors.

Final demand price indexes by major industry sectors.

The Standard Industrial Classification system, which defines industries in accordance with the composition and structure of the economy and which establishes a consistent, government-wide framework for the compilation and publication of data, will provide the overall framework for the development of the Revised Industrial Price Program. Within this framework, the first phase of the program will focus on the development of output price indexes for all 500 manufacturing and mining industries.

In fiscal year 1978, data will be collected for 15 industries in mining and manufacturing, resulting in 15 output price indexes and about 200 detailed commodity price indexes. In addition, the sample will be selected and data collection documents prepared for

*(Reprinted from the *Hearings on Departments of Labor and Health, Education, and Welfare Appropriations for 1978*, Part I, U.S. Congress, House Committee on Appropriations, 95th Congress, 1st session, 1977, pp. 847-50, nominal or trade journal prices.

the initiation of about one-third of the 230 industries that are planned for collection in fiscal year 1979. If this and a subsequent request for resources are approved, it is planned that by fiscal year 1983 the following indexes will be published monthly: 500 industry output price indexes, 500 industry materials input price indexes, 8,000 detailed commodity price indexes, and 20 summary stage-of-processing price indexes.

To Continue the Development of the International Price Program

Proposal:

To expand the coverage of indexes to measure the change in prices of U.S. imports and exports and to develop analyses of the price trends of U.S. products in world markets. The objective of this program is to provide coverage for all major groups of exported and imported products by 1983 and to analyze the price trends of U.S. and other countries' goods being marketed in the principal industrially-advanced countries.

The Need:

Even though U.S. foreign trade policy is of growing concern to economic policymakers, comprehensive and accurate information on the price trends of U.S. exported and imported products does not exist. The lack of such data precludes reliable analysis of the effect of import and export price changes on the U.S. economic situation and hampers assessment of the effects of U.S. government policy decisions on balance of payments and trade problems. Better data are also required for deflating the foreign trade sector of the national income and product accounts.

Accurate and reliable measures of export and import price trends are needed to estimate the growth of the volume of exports and imports, to improve the quality of the data in the national accounts, and to evaluate the effect of alternative trade and tariff policies and exchange rate realignments. The data produced so far in this program are now being used by U.S. negotiators and in analyses for other policy problems such as aspects of the relation between the foreign sector and the U.S. domestic economy. The data are also useful for export promotion programs and to measure changes in prices of U.S. products in relation to price changes of comparable groups of products of other major industrial countries with which the U.S. competes.

The Program

Export Indexes: the Bureau's survey of exporters will be extended to cover an additional 10 percent of the value of U.S. exports by including categories of selected crude materials such as man-made fibers, wood and lumber, and chemicals and fuels. When this expansion is completed, about 65 percent of the value of total U.S. exports would be covered by the indexes.

Import Indexes: the survey of importers will be expanded by about 10 percent of the value of U.S. imports by including additional intermediate products, particularly in the area of textiles and selected consumer goods. This will raise the value of U.S. imports covered by the indexes to approximately 50 percent.

Analysis of Price Trends: analyses of U.S. price changes in relation to those in other countries will be prepared for additional product categories. Data collected on U.S. export and import price behavior will be compared with price information already available on domestic and export prices in a number of major industrial countries whose products compete with U.S. goods abroad, or which are major trading partners of the U.S. An example of this latter category is the recently completed analysis of U.S. export price trends and OPEC oil prices.

CHAPTER 8

IMPROVING THE REST-OF-THE-WORLD ACCOUNT

International Transactions and the Domestic Economy

International economic transactions have an important effect on the growth and stability of the U.S. economy. Exports generate production and employment, with the associated business and labor incomes and tax revenues. Imports, aside from providing wanted foodstuffs and raw or semiprocessed materials, also extend the choices of U.S. consumers and producers. During periods of high operating rates in American business, imports are an additional source of industrial capacity, serving to dampen upward pressure on prices.

As pointed out in a recent study by the Senate Budget Committee, U.S. exports of goods and services in 1976 were about $160 billion. This amount is "approximately equal to business fixed investment and two and one-half times as large as residential construction."[1] The study highlighted the strong interrelationships between the U.S. and foreign economies; the far-reaching effects that the fivefold increase in petroleum prices since 1973 has had on the economies of oil importing nations; the constraints on using only domestic economic policy instruments for achieving our economic goals related to full employment, inflation, and balanced budgets; and the need for obtaining more coordination of economic and financial policies with the industrial and developing nations.

The treatment of international economic transactions in the GNP accounts is as a net figure—i.e., exports less imports. The "net exports" figure, of course, is a much smaller percentage of the GNP, approximately 0.4 percent in 1976, compared with gross exports noted above of approximately nine and one-half percent. Clearly, the low percentage associated with net exports does not reflect the real impact of international transactions on the domestic economy. Thus, for the latter, it is essential to consider the major components of net exports separately, namely gross exports and gross imports.

There are very significant international capital transactions in the form of direct and portfolio investments, loans, grants, and movements of funds in the balance of payments figures that do not appear in the GNP figures. By definition, the latter are limited to goods and services on current account. These capital transactions may have major impacts on the U.S. and other national economies and need to be included in economic analyses beyond the framework of the GNP accounts.

A. Early Developments

The Bernstein Report of 1965 was a comprehensive study of the needs of the balance of payments (BOP) accounts, including in its purview capital as well as current transactions, conceptual and data problems, and the presentation and interpretation of statistics.[2] Since the Bernstein Report, important improvements in the BOP data base affecting the goods and services component have been or are being developed—e.g., valuation of merchandise imports; reconciliation of bilateral trade figures with statistics of other countries (initially Canada); measures of services, direct investment income, and military transactions; and price indexes of foreign traded goods. Nonetheless, significant problem areas still exist, encompassing weaknesses noted in the past as well as those identified in this study.

BEA memos of 1971 and 1973 that identified needed improvements in the BOP data base were updated for the DIP review. In addition, major users of the net export and BOP figures on the staffs of the Treasury, Council of Economic Advisers, Federal Reserve Board, and Special Representative for Trade Negotiations were interviewed to identify the

[1] Ooms, Van Doorn, and Packer, Arnold, Staff Members of the Committee on the Budget, U.S. Senate, *The International Economy and the Federal Budget*, December 30, 1976, p.1.

[2] Review Committee for Balance of Payments Statistics, *The Balance of Payments Statistics of the United States: a Review and Appraisal*, April 1965.

principal weaknesses in the estimates from a wider perspective. Within BEA, the National Income and Wealth Division may be considered a "user" and the BOP Division a "producer" and "user." This chapter incorporates the review comments of both BEA divisions as well as those of the various data-producing agencies.

The recent change in the conceptual presentation of BOP statistics, which eliminates some previously published balances, does not affect the quality of the underlying data examined in the DIP study.[3]

B. Integration of BOP and GNP Accounts

The BOP accounts are composed of the two broad components of "current" and "capital" transactions. The current transactions of goods and services, including income flows plus unilateral transfers generated by the private and public sectors of the economy, are added in the case of exports and deducted in the case of imports in the measurement of GNP. The net export component of the GNP is the difference of gross current exports minus gross current imports of goods and services.

Gross exports to the rest of the world represent one of the final markets of goods and services provided by U.S. industry and are a component of the GNP. Gross imports, which are entered into the GNP as a negative amount in the net export sector, are offset by positive amounts inasmuch as such imports are included in the other GNP components of consumer expenditures, investment, government purchases, and gross exports. In effect imports have an aggregate weight of zero in the GNP accounts—the proper treatment for transactions which do not represent U.S. production. The statistical problem is one of synchronizing the corresponding foreign and domestic entries. For example, when a good is exported from inventory, inventories should be drawn down by the amount of the export in the same time period. The rather complex relationships between the BOP and GNP accounts for Government civilian and military aid to foreign countries is described in the addendum at the end of this chapter.

Goods and services are composed of the following: civilian merchandise trade; military sales and purchases; travel; transportation of passengers and freight; fees, royalties, and other services between U.S. private residents and foreign residents not affiliated with U.S. organizations; transactions of U.S. Government nonmilitary agencies and their personnel with foreign countries; direct investment fees, royalties, other services, interest, dividends, and branch earnings; interest and dividends from securities investments and other private assets and liabilities; and interest, profit, and loss associated with U.S. Government assets and liabilities.

Other BOP items are: unilateral transfers; capital transactions including direct and portfolio investments, loans, deposits, and other assets and liabilities; and statistical discrepancy. Net exports of goods and services plus unilateral transfers (current account) plus allocations of special drawing rights equal "net foreign investment" in the national income and product accounts.

Geographically, net exports in the BOP cover the 50 States, District of Columbia, Puerto Rico, Virgin Islands, Panama Canal Zone, and other territories under U.S. jurisdiction. Adjustments for the territories are not made to conform to the GNP geographic boundaries of the 50 States and the District of Columbia, largely because of the lack of adequate data on services.

In 1974, the measure of gross domestic product (GDP) became part of the regular BEA estimates of the national accounts.[4] This concept counts as output production attributable to factors of production located in the U.S., regardless of ownership. GDP represents GNP plus factor income (employee compensation, net interest, and profit-type income) earned in the U.S. by foreigners, minus factor income received from abroad by U.S. residents.

Deflation of international transactions in goods and services into constant prices is done for the GNP estimates only. There are no constant price BOP estimates as such. Conceptually, there are inherent difficulties in establishing satisfactory theoretical definitions for deflating the income elements of net exports.[5]

C. Statistical Discrepancy

For every international transaction, there is a credit (plus, receipt, capital inflow) and a matching debit (minus, payment, capital outflow); so that all of the entries should sum to zero. Since the recorded credits and debits are obtained through diverse reporting systems, missing credits or debits result in a statistical discrepancy. Prior to the recent change in the presentation of BOP statistics,[3] the statistical discrepancy was referred to as "errors and omissions". The change in nomenclature to statistical discrepancy was made to emphasize that it is derived as a residual.

[3] The Report of the Advisory Committee on the Presentation of Balance of Payments Statistics appeared in the *Survey of Current Business*, June 1976, and the *Statistical Reporter*, June 1976.

[4] *Survey of Current Business*, August 1974, p.1.

[5] See Chapter 7 for an elaboration of this element of the pricing problem.

Statistical discrepancy (SD) represents an aggregate statistical discrepancy in the BOP figures, analogous to that in the GNP accounts. It results from coverage, timing, and valuation inconsistencies in the credits and corresponding debits. It does not indicate in which particular accounts the inconsistencies occur. Since it is a balance of various inconsistencies, it also does not reflect the inherent quality of the figures, i.e., completeness of the coverage and accuracy of the reported figures. Thus, if the SD is negligible or changes very little for several quarters or years, it can simply mean that inconsistencies in the reported data are offsetting for that period of time, or that both the credit and debit entry for a transaction may be missing.

Analysts relying on qualitative considerations have attributed the bulk of the SD to different accounts at different times. For example, the Bernstein Report indicated that some observers linked the general pattern of positive SD in the 1950's to the underestimate of current exports of goods and services in the reported figures. The report suggested tentatively that the negative SD figures for the first half of the 1960's reflected the dominance of unrecorded capital flows associated with the convertibility of currencies of Western Europe and Japan, investment opportunities abroad, and anticipated appreciation of foreign currencies.[4] Subsequently, the large rise of negative SD in the 1971-73 period generally has been thought to represent unrecorded capital outflows arising from speculative sales of American funds in anticipation of devaluation of the dollar. In 1974, the SD shifted to a positive balance of substantial magnitude which may reflect large amounts of unreported capital movements. Table 8-1 below summarizes the SD figures since 1969.

Although it is not possible to associate the SD figure with any specific category of transactions, it is a major guide that suggests the need for (1) cross-checking the initial estimates in the preparation of the accounts by BEA; (2) giving users a rough range of reliability of the published estimates; and (3) improving the underlying data. The recommendations for data improvement in this chapter are addressed to the current transactions for goods and services, including income flows. It is difficult to foresee the effect of implementing these recommendations on the SD independent of or jointly with improvement of the data base on capital transactions. As a generalization, all data improvements (including those currently underway and noted below) rest ultimately on achieving the best possible conceptual and statistical measures for each item, including consistency among the various items. In the long run, this would tend to reduce the level and gyrations of SD as a comprehensive set of improvements gradually takes place. However, in the continuing process of strengthening the accounts incrementally by introducing improved data as they become available, SD movements sometimes may be accentuated. In practice, both the BOP and GNP accounts are improved incrementally on the pragmatic grounds that (a) it is desirable to have the best possible measures at any point in time, and (b) interrelationships between the credits and debits are too complex to identify the actual effects of any set of improvements on discrepancies between these two accounting entries.

TABLE 8-1. Statistical Discrepancy
U.S. International Transactions

(billions of dollars)

1969	−1.4
1970	−.4
1971	−9.6
1972	−1.8
1973	−2.1
1974	4.6
1975	4.6

Source: *Survey of Current Business*, June 1976.

D. Ongoing Programs for Data-Base Improvement

Three programs, in varying stages of development, are presently underway for strengthening the data and estimating procedures underlying the net export estimates in current prices. (The BLS program for developing price indexes of merchandise exports and imports is covered in Chapter 7.) The three programs are:

1. Bilateral reconciliation of merchandise trade statistics

Statistics of foreign transactions between any two countries theoretically should be the same as those reported by each country, except for conceptual definitional differences in each country's reporting system. The Census Bureau and Statistics Canada have reconciled the U.S.-Canadian merchandise trade figures as reported by both governments on an annual basis starting with the 1970 data and on a quarterly basis with the 1974 data. This program is scheduled to be abolished at the end of FY 1977. Recommendations for continuing the Canadian reconciliations as well as expanding bilateral reconciliations to the trade data of other major U.S. trading partners are included in the section on Data Base Items.

[4] Review Committee for Balance of Payments Statistics, *op. cit.*, pp. 88-90.

2. Bilateral reconciliation of balance of payments statistics

BEA has for many years attempted to reconcile U.S.-Canadian BOP statistics. The major discrepancy was always in merchandise trade, but concurrently with the above-noted Census effort on trade, BEA has reconciled the U.S.-Canadian current account.

3. BEA improvement program

Funds were appropriated in the FY 1975 Budget for BEA to strengthen and expand its data collection and estimating procedures for the BOP estimates. This included refinements in the existing methodology for incorporating the above noted Census data on U.S.-Canadian reconciled trade flows; strengthening the estimates of portfolio investment income flows, private services, and U.S.-Mexican border travel; development of a reporting system for international leasing transactions, which at present are not recorded or are recorded incompletely and are not separately identifiable in the BOP accounts; strengthening the estimates of unilateral transfers (items not in net exports); and guidance to Treasury for refining its survey forms on international financial transactions. This is a continuing long-term program in which the above items and others will be phased over a period of years.

E. Magnitudes in Recent Years

Table 8-2A presents the values in current prices of nine broad goods and service categories of net exports for 1970 through 1975. Table 8-2B gives for 1975 the gross flows of exports and imports by the same nine categories.

TABLE 8-2A. Net Exports of Goods and Services

(billions of dollars)

	Net exports					
	1970	1971	1972	1973	1974	1975
Total	2.9	−.3	−6.0	3.9	3.6	16.3
Merchandise Trade	2.6	−2.3	−6.4	.9	−5.4	9.0
Military	−3.4	−2.9	−3.6	−2.3	−2.1	−.9
Travel	−1.6	−1.8	−2.2	−2.1	−1.9	−1.5
Passenger Fares	−.7	−.7	−.9	−.8	−1.0	−1.3
Other Transportation	.3	.2	.1	−.2	−.2	.4
Fees & Royalties	2.1	2.3	2.5	2.8	3.4	3.9
Other Private Services	.5	.6	.7	.8	1.0	1.4
U.S. Govt. Misc. Services	−.4	−.4	−.4	−.5	−.6	−.6
Investment Income	3.5	4.7	4.3	5.2	10.2	6.0

TABLE 8-2B. Gross Transactions, 1975

(billions of dollars)

	Exports	Imports	Net exports
Total	148.4	132.1	16.3
Merchandise Trade	107.1	98.2	9.0
Military	3.9	4.8	−.9
Travel	4.9	6.4	−1.5
Passenger Fares	1.1	2.4	−1.3
Other Transportation	5.7	5.4	.4
Fees & Royalties	4.3	.4	3.9
Other Private Services	2.8	1.4	1.4
U.S. Govt. Misc. Services	.4	1.0	−.6
Investment Income	18.2	12.2	6.0

Note: Detail may not add to totals owing to rounding.
Source: *Survey of Current Business*, June 1976.

Table 8-3 shows the quarterly and annual patterns in current prices since 1970 of net exports and its relationship to GNP. These figures on net exports differ from the corresponding ones in Table 9-2A because of conceptual and statistical reasons. Most important is the different treatment of U.S. Government interest income payments to foreigners ($4.5 billion in 1975). In the BOP, these are included

TABLE 8-3. Net Exports[1] and GNP

(billions of current dollars, seasonally adjusted annual rate)

	Net exports (dollars)		Quarterly GNP change (dollars)	Net exports as percent of total GNP
	Level	Change		
	(1)	(2)	(3)	(4)
1970		3.9		0.4
I	3.9	1.6	10.9	0.4
II	4.4	0.5	12.3	0.5
III	4.7	0.3	16.1	0.5
IV	2.7	−2.0	3.7	0.3
1971		1.6		0.2
I	3.9	1.2	37.7	0.4
II	1.4	−2.5	22.2	0.1
III	1.9	0.5	16.2	0.2
IV	−0.9	−2.8	18.8	−0.1
1972		−3.3		−0.3
I	−4.6	−3.7	35.8	−0.4
II	−4.1	0.5	29.7	−0.4
III	−2.3	1.8	24.7	−0.2
IV	−2.1	0.2	33.0	−0.2
1973		7.1		0.5
I	1.7	3.8	45.9	0.1
II	4.3	2.6	23.1	0.3
III	10.0	5.7	29.1	0.8
IV	12.7	2.7	37.6	8.9
1974		7.5		0.5
I	15.0	2.3	17.6	1.1
II	3.9	−11.1	26.7	0.3
III	2.9	−1.0	32.2	0.2
IV	8.1	5.2	17.6	0.6
1975		20.5		1.4
I	15.0	6.9	−3.0	1.0
II	24.4	9.4	36.1	1.6
III	21.4	−3.0	66.4	1.4
IV	21.0	−0.4	39.5	1.3
1976[2]		6.6		0.3
I	8.4	−12.6	48.0	0.5
II	9.3	0.9	39.0	0.6
III	4.7	−4.6	34.6	0.3
IV	4.2	−0.5	35.3	0.4

[1]As measured on GNP basis.
[2]All data for 1976 are preliminary.
Source: *Survey of Current Business*, January 1976, Part I, July 1976, and March 1977.

as imports; in the national accounts, they are in a special category of the foreign transactions account. Beginning with the fourth quarter of 1973, there was also a different treatment for deliveries of military equipment to Israel. This difference was approximately $600 million in 1973 and $400 million in 1974. These shipments are treated as transfers under U.S. military agency sales contracts in the BOP accounts while they are treated as U.S. military grants of goods and services in the NIPA. In addition, the figures for 1972 and earlier years differ statistically in the two tables because of the lag in incorporating revised BOP data into the GNP estimates.

Although net exports account for a relatively small share of GNP, the quarterly movements of net exports in some periods have a noticeable effect on the change in GNP (columns 2 and 3). This was most apparent in the fourth quarter of 1970, third quarter of 1973, and selected quarters from 1974-76.

Data Base Items

A. Merchandise Trade

Monthly data on merchandise trade in the Census Bureau publication, *Highlights of U.S. Export and Import Trade* (subsequently refered to as Highlights), is the major source of information for the BOP estimates. Monthly foreign trade data on nonmonetary gold shipments are provided by Census in *Gold Movements*. Other data sources are noted below.

The Census data are derived largely from individual reports prepared by the exporter or his agent for exports, and the importer or customs broker for imports. The reports are required to be filed with Customs at the U.S. port of export or entry. In addition, a few large companies presently file automated statistical data on exports and imports directly with Census on a monthly basis. These company computer tapes facilitate the Census operations by eliminating the need to process many individual documents. The Census Bureau is attempting to broaden this industry cooperation.

Census reports to BEA, on an informal basis, monthly information on the carryover of shipments. This report reflects data received after the monthly processing cutoff as well as data intercepted by the computer for review, and any corrections. BEA incorporates adjustments for these carryovers into the BOP estimates.

In addition to these Census data, the BOP merchandise trade estimates for exports and imports of electric energy between the U.S. and Canada—formerly based on annual Federal Power Commission data—currently are obtained quarterly from Canadian trade statistics. Merchandise estimates of U.S. international sales and purchases of ships and other vessels are derived from notices of such transactions in trade magazines and from Maritime Administration data.

Some other adjustments are made to include exports and imports of the U.S. Virgin Islands, exports by parcel post, and to exclude exports and imports between the U.S. and the Panama Canal Zone.

1. Exports

The statistical information for exports is extracted from the Shipper's Export Declaration (SED), a Department of Commerce (Bureau of the Census and Domestic and International Business Administration) form that is filed with Customs. The SED serves as the source of export statistics and as a document for the administration of the export control program.

The valuation of exports in *Highlights* as well as in the BOP estimates is defined as the value at the U.S. port of export. This is equivalent to the free alongside ship (f.a.s.) value, which excludes the cost of loading the merchandise aboard the carrier and all freight, insurance and other costs beyond the port of export. It is composed of the f.o.b. price at the U.S. place of production (e.g., farm, mine, manufacturing plant) plus all inland freight, insurance, and other charges to the U.S. port of export. The f.a.s. export valuation also applies to U.S. reexports, that is exports of foreign goods previously purchased and imported into the U.S. and then reexported (resold without alteration while in the U.S.) to foreign destinations. The carrier loading, freight, insurance, and other costs of shipping the goods to foreign countries are part of the BOP estimates of services as discussed in later sections.

The quality of the export statistics is affected by the lack of a satisfactory check on the data reported on the SED. As a result, there is considerable uncertainty about the extent to which the stated value on the SED forms is consistent with the f.a.s. definition. This largely involves SED figures that include overseas and Mexican transportation and insurance costs and exclude inland freight to the Canadian border (the adjustment presently made is based on a previous study conducted by the Census Bureau in 1968). Other problems are nonreporting or underreporting of exports (as revealed in the U.S.-Canadian reconciliation project), valuation of exports to affiliates of multinational firms, goods shipped as containerized freight, and proper commodity identification. There presently is no check by Customs on the validity of the export data at the time the SED is submitted. The SED's are subjected to some review and edit procedures by Census as part of

the regular statistical processing. Absence of a quality check on exports by Customs reflects that agency's major concentration on imports and its statutory responsibilities for the collection of import duties.

The extent of these statistical deficiencies is unknown, and consequently no adjustments are made for them by BEA, except to correct for the exclusion (in Census figures) of inland freight to the Canadian border. Previous checks of a very limited nature have indicated problems of valuation for exports negotiated on the bases of foreign delivered cost and on U.S. plant f.o.b. price, as well as the bilateral trade reconciliation project with Canada.

The month in which the export shipment is recorded in the export data is the date (except for the previously noted carryover adjustment) when the shipment leaves the U.S. as indicated on the SED form. For truck, rail, and pipeline shipments, this is the date when they cross the border to Canada and Mexico; for ship and air transport, it is the date when the overseas carrier departs or is cleared from the port at which the merchandise was loaded on the carrier. The shipment dates do not necessarily correspond to the time when the ownership changes hands, which is the pure balance of payments concept. This distinction would be very difficult to measure, and in most cases probably makes no more than 1-month's difference in the date of inclusion in the export statistics. If the payment occurs in a different quarter from that for the shipment of the goods, the missing side of the transaction would appear in the statistical discrepancy item.

Exports under military grant-aid programs in aggregate total are identified in *Highlights* from reports supplied by the Department of Defense (DOD). Exports of goods sold by DOD under its Foreign Military Sales Program are not identified in *Highlights*. The adjustment for these sales is discussed below under Military Sales and Defense Purchases.

Recommendation:

The Census Bureau should study the quality of reporting on the Shipper's Export Declaration form. The study should focus on how closely the instructions on the SED form are being followed, including consistency with valuation definitions. *Based on the findings of the study, reporting instructions for exporters should be revised to correct the known deficiencies. A monitoring program then should be instituted to maintain and improve the coverage and quality of the reporting on a continuing basis.*

2. Imports

The statistical information for imports is extracted from a Treasury Department (Bureau of Customs) Import Entry form. Three alternative valuations of imports, beginning with monthly 1974 data, have been published in *Highlights*. The applicable one for the BOP estimates is the actual transaction value expressed in f.a.s. terms, foreign port of exportation. The cost for carrier loading and the other costs (such as marine insurance and freight, etc.) are part of the BOP estimates of imported services which are discussed more fully at a later point.

The month in which the import shipment is included in the import data is the date when the Customs form is filed for release of the goods. This filing date generally is associated with the arrival of the vessel, airplane, train, truck, or pipeline shipment at the Customs port designated for the import, or shortly thereafter.[7] As noted previously for exports, this does not necessarily conform to the theoretical BOP concept of change in ownership. However, the desired timing would be very difficult to obtain in practice, and probably would not significantly affect the recorded figures by much more than 1 month. Any differences which affect the quarter in which the shipment and payment are recorded would be a statistical discrepancy.

It should be noted that beginning with January 1978, the Census Bureau plans to compile import statistics on a "date-of-import" rather than the current basis that is linked to the filing date of the Customs form. This new concept will reflect the date the merchandise enters a U.S. Customs port with intent to unlade. Because of the extensive use of "immediate-delivery" procedures,[8] the new method will reflect more accurately when imported goods enter the American economy.

A recent Brookings Institution study raised the question of possible distortions in the reported figures on the Customs import forms when foreign exchange rates change significantly between the time the order is accepted by the foreign exporter and the time of settlement.[9] Conceptually, the recently instituted f.a.s. actual transaction value method of pricing imports eliminates this problem of changing exchange rates. In practice, Customs is required to verify the reported values for consistency with all three definitions, and indicates by a mark on the form that the figures have been validated. The subsequent Census processing of these data includes checks for reasonableness that are built into the computer routine; in those cases where the reported values do

[7] In the case of "immediate-delivery" procedures, importers may file the import entry up to 10 work days after the actual date of the release of the goods.

[8] See footnote 7.

[9] Magee, Stephen P., "U.S. Import Prices in the Currency-Contract Period", *Economic Activity*, The Brookings Institution, 1974:1.

not meet these tests and are "rejected" by the computer, Census obtains from Customs a reverification of the figures.

The reported import values resulting from the new program of import valuation appear to confirm the consistency of the reported data with the reporting definitions. Before 1974, the only reported import value figures were based on the varying pricing definitions by product as specified in the tariff laws. Earlier joint Census-Customs studies indicated that for the total of all commodities the f.a.s. actual transaction value was approximately 0.6 percent below the reported value based on the tariff law definitions. Correspondingly, actual data collected under the two methods for 1974 show the actual transaction value as 0.7 percent below the legally defined values.

No recommendation is made for import data.

3. Bilateral trade

Theoretically, for trade between two nations, exports reported by Country A should equal imports reported by Country B and vice versa, if the figures of both countries follow the same definitions. Practically, because some foreign trade shipments are shipped on consignment to an intermediate third country for reexport to the final destination, it is not always possible to completely reconcile trade statistics between two countries. Beginning with data for 1970, Census and Statistics Canada have reconciled annually the bilateral merchandise export and import figures reported by both governments. This program was expanded to quarterly reconciliations beginning with data for 1974.

Discrepancies between the two sets of figures as high as $2 billion have been identified. Thus, it has been a valuable contribution for pointing up weaknesses in the statistical programs of each country and for developing adjustment factors to various elements of the reported data. In 1975, the U.S. reported data on exports to Canada were $1.4 billion lower than the Canadian reported data on imports from the U.S.; the U.S. data on imports from Canada were $1.1 billion higher than Canadian data on exports to the U.S. Previous patterns of differences in the two sets of data are not necessarily reliable indicators for reconciling current statistical differences because the reason for the differences is continually shifting. Among the varying reasons in recent years are nonreceipt by Census of export documents, changes in exchange rates, treatment of Canadian export taxes on petroleum, differing classifications of commodities, errors in documents, etc.

Imports are monitored more closely at ports than exports because of the revenues derived from import duties and the legislated obligation to oversee import quotas. As a result, import data tend to have better coverage than export data. This has been revealed in the greater volume of U.S. exports to Canada that appear in the Canadian import statistics. The two countries are examining the possibility of exchanging monthly tapes of their bilateral trade figures to enable each one to generate cross-checks of its own data on a current basis. This type of cooperation for improving the quality of each country's data is a direct outgrowth of the reconciliation program.

The FY 1975 Budget appropriations raised the level of funding by $470 thousand to expand the Census bilateral reconciliation program in stages to Mexico, West European countries, and Japan. However, as a result of the rescission of $300 thousand (stemming from the fiscal policy objective of slowing down increases in total Federal spending), the expansion of the reconciliation program will be confined to Mexico and perhaps some Common Market countries and stretched out over a longer period of time. The additional funds to date have been used only to expand the U.S.-Canadian reconciliations to the above-noted quarterly series, and for exploratory analyses of bilateral reconciliation problems with Mexico.

However, the FY 1978 Budget calls for the abolition of the U.S.-Canadian reconciliation program as it "has accomplished most of its goals."[16]

The scope and pace of such reconciliations would, of course, be controlled by the mutual interest of foreign countries. Preliminary discussions with Mexico in 1976 and earlier with West European countries through the European Economic Community have indicated a strong interest in the program by these nations. Also, the U.S.-Canadian Committee presented a paper in 1974 on the North American reconciliation project to the 18th Session of the United Nations Statistical Commission, and a number of countries attending showed keen interest in the techniques developed for the reconciliation.

Recommendations:

1. *The Census Bureau's program of reconciling bilateral trade statistics between the U.S. and Canada should be continued and the Committee recommends that funding of this program be restored in FY 1978.*
2. *The Census Bureau's bilateral reconciliation program for merchandise trade statistics should be*

[16] *Special Analysis G, Budget of the United States Government*, 1978, p.150.

expanded to include reconciliations with other major trading partners of the U.S.—particularly, Mexico, selected Common Market countries, and Japan. Initially, the U.S. will have to be the catalyst in encouraging its major trading partners (other than Canada and, more recently, Mexico) to give a high priority to a program of bilateral reconciliations. This higher level of effort on the part of the U.S. in the early stages of the program should be considered an investment for obtaining a commitment from the other nations to devote the necessary resources for this very useful endeavor.

B. Military Sales and Defense Expenditures

These accounts include (1) transfers under U.S. military agency sales contracts (exports), and (2) direct defense expenditures by U.S. Government military agencies (imports). The exports represent deliveries of military hardware and other goods and services to foreign governments under the Foreign Military Sales (FMS) program, sales of excess property of military installations abroad, and logistical support provided (not on a grant basis) to U.S. allies and United Nations' emergency forces. They exclude direct sales to foreign governments by U.S. private firms, which are part of the merchandise trade and other private service accounts.

The imports represent purchases by the Department of Defense (DOD) of foreign goods and services; personal spending or investing by U.S. military and defense civilian personnel and their dependents in foreign economies; foreign expenditures of military post exchanges, commissaries, etc. abroad; foreign expenditures of U.S. contractors and their personnel employed to construct and operate U.S. military installations abroad; offshore procurement of military equipment to be transferred as aid to foreign countries; and foreign outlays to support NATO and other international military organizations. Also included are similar expenditures by the Coast Guard. They exclude expenditures for imported products purchased from private U.S. suppliers in the U.S. by U.S. military agencies, a domestic transaction; such foreign products were already recorded as private imports in the merchandise trade account.

The estimates of U.S. military sales for the BOP account on Government military transactions are based on quarterly figures supplied to BEA by DOD's Defense Security Assistance Agency (DSAA) from its financial reporting system. The Census Bureau's export figures employed in the merchandise trade account may duplicate to a considerable extent the merchandise transactions contained in the estimates prepared for the Government transactions. To avoid this duplication, export sales under the FMS program must be identified in the Census statistics and deleted from the merchandise trade account discussed in the previous section. The FMS program in 1973 was approximately $2.3 billion.

The Census statistics on FMS export shipments are obtained from two sources. One is the commercial Shippers' Export Declaration (SED) representing the delivery of FMS goods, manufactured under contract to DOD, and shipped directly to the foreign government by the manufacturer, forwarder, foreign government, or other non-DOD party. The other source is from "dummy" SED's prepared by Census from reports supplied by DOD; these reports reflect instances in which DOD has initially taken possession of the manufactured item and has itself arranged for the shipment to the foreign government.

The Census figures on shipments of military exports compiled from the Armed Forces' reports are obtained monthly from the three separate services of the Army, Navy, and Air Force. DOD figures representing total military exports and based on financial accounting records are obtained quarterly by BEA from DSAA. Although both series in fact come from the three services, the two sets of figures differ because of (a) conceptual and timing variations, and (b) problems with the statistical reporting.

The Census figures on total military export shipments are lower than the corresponding DSAA financial data. For example, cumulatively over the 1971-74 period the DSAA reported that FMS shipments exceeded Census statistics by approximately $1.5 billion. The difference is attributable in part to the following conceptual distinctions in the measurement content of the two series: DSAA reporting includes dollar changes to the original value as the FMS transaction is concluded, while the Census figures do not reflect such changes; DSAA data include offshore transfers of goods, overseas construction, and technical assistance, while the Census data do not include these items; DSAA data include a 2 percent administrative charge for handling the case, while the Census data do not; DSAA data reflect accounting periods that may lag the actual month of shipment as reflected in the Census figures by approximately 2 to 5 months; and DSAA data also include "nonhardware" type assistance such as training and overseas construction, while this assistance is not included in the Census figures.

Statistical shortcomings also account for some of the difference. First, FMS shipments including aircraft flown out of the U.S., arranged by the manufacturer, forwarder, foreign government, or other non-DOD party are not always marked as an

FMS shipment on the SED form. The instructions for this Department of Commerce form do not presently require this marking. The FMS case number assigned by DOD is the basis for identification by Census of those military shipments that should be matched against figures on military exports received from the Army, Navy and Air Force to avoid double counting of these export shipments in the Census data. Since the FMS case number does not always appear on the SED form, the avoidance of double counting is incomplete.

In addition, indications of possible understatement in the Census figures appear from time to time as a result of BEA's scrutiny of Census and DOD information. In these instances, BEA has alerted Census to possible discrepancies, and Census in turn has checked with the individual services who, following a review of their records, sometimes identified certain missing items. Unfortunately, a record of these instances has not been kept in the past.

For defense purchases of miscellaneous goods and supplies, the DOD reports do not identify the "imported" goods that remain abroad as distinct from those that come into the U.S. They also do not indicate the separation of goods from services and the destination of the goods categorized as defense payments "for the purchase of materials and supplies," "for construction," and "for services." To avoid double counting with the military transactions account, estimates of those purchases that represent actual imports into the U.S. (about $300 million in 1975) are deducted from the merchandise trade account.

Estimates of defense purchases from abroad are based on monthly Customs data for imported goods used by the Federal Government for which no duty is paid (Duty Rate 16). There are problems with these data because of (a) the uncertainty that the product and country information is sufficiently complete to allow for the exclusion of foreign purchases by defense subcontractors; and (b) classifications of "services" differing from those in the DOD data. If future FMS contracts should call for a greater use of imported components by U.S. manufacturers, and this seems to be the trend, these shortcomings would become more serious.

Recommendations:

1. *The Department of Commerce should refine the instructions to its Shipper's Export Declaration form to require that the case number assigned by the Department of Defense be marked on the declaration forms for export shipments under the Foreign Military Sales program.* The required marking pertains to those shipments of foreign military sales, including airplanes flown out of the U.S., for which the manufacturer, forwarder, foreign government, or other non-Department of Defense party arranges the transportation to the foreign country.

2. *The Department of Defense should explore the feasibility and costs for refining its monthly reports of the three services to the Census Bureau so as to identify whether the transportation of the exports under the Foreign Military Sales program to the foreign country was arranged by the Department of Defense by the manufacturer, or other non-Department of Defense party.* This additional information would provide a more systematic cross-check for the Census Bureau's military export statistics.

3. *The Department of Defense should provide BEA with quarterly figures on defense purchases from foreign suppliers separately for (a) goods that are originally delivered in the U.S. through U.S. Customs districts, and (b) those goods (and services) that are purchased abroad and remain abroad.* Under the provisions of OMB Circular No. A-65, DOD is required to report the distinction between goods that are imported into the U.S. and goods used abroad. However, owing to the lack of resources, DOD has not reported these figures. The new Federal Procurement Data System is an appropriate vehicle to obtain this information.

C. Travel

Expenditures for international travel cover outlays by foreign travelers in the U.S. (exports) for lodging, food, transportation within the U.S., entertainment, gifts, and other personal goods and services, plus passenger fares paid to U.S. carriers by Canadian and Mexican travelers visiting the U.S. Outlays by U.S. residents traveling in foreign countries (imports) include the comparable items generated in the host nation. Excluded from the travel accounts are expenditures on trips exceeding 3 months by foreign and U.S. Government personnel and their dependents, expenditures by foreigners residing in the U.S., and U.S. citizens residing abroad, and outlays for overseas transportation (covered in the following section on Passenger Fares). Attempts are made to exclude purchases abroad of automobiles which conceptually should be in the trade statistics because they enter separately from the traveler.

The general estimating procedure is to multiply (a) estimates of average per traveler expenditures obtained from a BEA questionnaire distributed to a sample of travelers, by (b) the number of travelers. The number of travelers is obtained from the U.S.

Immigration and Naturalization Service and the Department of Transportation.[11] The principal weakness of these data is the low response rate to the BEA sample expenditure survey. As indicated below, there is some differentiation in this general technique for three broad geographic areas: Canada, Mexico, and overseas countries.

Table 8-4 shows for the 1970-73 period the aggregate dollar value for all travel exports and imports, and the relative importance of U.S. international travel with Canada, Mexico and overseas areas.

The value of U.S. travel transactions in both directions with Canada and Mexico exceeds those with any other single country (not shown separately in Table 8-4). In 1973, Canada and Mexico combined accounted for 53.5 percent of our export receipts, and 42.4 percent of our import payments. At the same time, travel with all other nations (in Europe, Asia, Americas, etc.) has been taking an increasing share of the total.

TABLE 8-4. U.S. International Travel Transactions

(billions of dollars)

	1973	1972	1971	1970
Exports[1]	3.3	2.7	2.4	2.3
Imports[2]	5.4	4.9	4.3	4.0
Net Exports	−2.1	−2.2	−1.9	−1.7
		(percent)		
Exports[1]	100.0	100.0	100.0	100.0
Canada	32.2	34.1	36.4	36.9
Mexico	21.3	22.8	24.2	25.0
Overseas	46.5	43.1	39.4	38.1
Imports[2]	100.0	100.0	100.0	100.0
Canada	20.0	21.0	25.1	25.6
Mexico	21.5	21.0	20.3	19.5
Overseas	57.6	58.0	54.6	54.9

[1]U.S. receipts from foreign visitors in U.S.
[2]Travel payments of U.S. visitors in foreign countries.
Source: *Survey of Current Business*, May 1974.

1. Canada

U.S. receipts from Canada are estimated by Statistics Canada and are exchanged for estimates of U.S. payments to Canada prepared by BEA. Both estimates are based on per traveler expenditure data obtained from sample surveys, multiplied by the number of travelers. Statistics Canada provides data on the number of U.S. travelers to Canada because Canadian border crossing statistics are more detailed than U.S. data.

The data base for the Canadian travel estimates is the strongest of the figures used for the three geographic areas shown in table 9-4. Canada also gives more attention than the U.S. to its travel estimates because of the greater importance of tourism to that country.

2. Mexico

Separate estimates of travel transactions with Mexico are made for visits to the interiors of both countries and for border crossings. Receipts from Mexican travelers to the interior of the U.S. (exports) are based on expenditure data collected from quarterly BEA survey questionnaires on outlays by Mexican visitors, multiplied by data on the number of Mexican visitors reported by the U.S. Immigration and Naturalization Service (INS) on a monthly basis and adjusted to exclude travelers in the border area. The BEA questionnaires are distributed to the Mexican visitors at the time of their arrival in the U.S. The completed questionnaire is to be mailed to BEA at the end of the trip. This delay is one factor contributing to the low response rate of less than 1 percent. BEA is exploring ways to have the questionnaire distributed when the visitors leave the

[11] Primary data on the number of travelers are collected by the Immigration and Naturalization Service. The tabulation of the number of travelers by air is done by the Department of Transportation.

U.S. in the expectation that this timing will raise the response rate.

Payments by U.S. residents visiting the interior of Mexico (imports) are derived from quarterly BEA sample surveys of the expenditures of travelers returning by air and automobile. Questionnaires are handed out by U.S. Customs at the time of arrival in the U.S. and the estimated expenditures are multiplied by the number of U.S. visitors departing Mexico, as reported monthly by the Mexican government.[12] This expenditure survey also has a low response rate—approximately 12 percent.

3. Overseas areas

Estimates of travel transactions with overseas countries are obtained from BEA sample survey data yielding estimates of per traveler expenditures and from INS and Department of Transportation data on the number of travelers. For export receipts, questionnaires on expenditures are distributed one week per quarter to foreign visitors on arrival in the U.S., and mailed back to BEA at the time of departure. The overall response rate is roughly 5 percent with the bulk of the response being from Europeans. For import payments, questionnaires are given for one week each quarter to returning U.S. residents on their arrival, completed at home, and mailed back to BEA. The overall response rate is 12 to 15 percent.

Recommendation:

The Bureau of Economic Analysis should have a continuing program to indicate to U.S. Customs and Immigration officials the importance of issuing the BEA expenditure survey questionnaire to (a) returning U.S. resident travelers from abroad, and (b) foreign travelers entering the U.S. The low response rates to the BEA questionnaire surveys is the major weakness in the travel estimates. The effectiveness of a greater effort on the part of Customs and Immigration officials has been demonstrated in the past. After periodic visits by BEA personnel to officials at the airports of some major cities to point up the importance of collecting these data, the response rate increased temporarily.

D. Passenger Fares

This account covers passenger fares for overseas transportation associated with travel and permanent emigration and immigration. Export transactions are fares received by U.S. air and ocean carriers from foreign residents for travel to and from the U.S. as well as between foreign countries. Import transactions are fares paid by U.S. residents to foreign air and ocean carriers for transportation to and from the U.S. Excluded from passenger fares (but included in travel expenditures) are passenger transportation between the U.S. and Canada or Mexico, foreign resident transportation within the U.S. purchased in the U.S., and U.S. resident transportation purchased abroad for transportation within and between foreign countries.

The estimates are based largely on the sources already noted in the travel account. Information in the BEA travel expenditure surveys on fares and the name of the overseas carrier is used to derive estimates of average fares and of proportionate travel aboard U.S. and foreign carriers. The Immigration and Naturalization Service and the Department of Transportation provide data on the number of U.S. and foreign travelers. The bulk of the transactions estimates reflects the multiplication of the number of travelers by the estimates of average fares and proportionate use of carriers of U.S. or foreign ownership. In addition, adjustments for inter-airline transfers are based on reports of U.S. air carriers to the Civil Aeronautics Board.

Recommendation:

The same improvement for raising the response rate of the BEA expenditure surveys as indicated in the above travel account recommendations applies here. Since the data base of the passenger fare estimates rests heavily on the same sources as used in the travel estimates, the improvement previously recommended for these sources is equally relevant for the passenger fare transactions.

E. Other Transportation

Transportation transactions are composed of the following components. Export receipts include (1) freight revenues of U.S. operators of ship, air, rail, and pipeline carriers associated with the transportation of U.S. merchandise exports and hauling foreign goods between foreign countries; (2) expenditures by foreign operators for fuel, harboring, repairs, ticket offices, and other items in U.S. ports; and (3) receipts of U.S. owners from foreigners for the charter and rental of aircraft vessels and railroad freight cars. Import payments by U.S. residents refer to (1) outlays to foreign operators of carriers for U.S. merchandise imports; (2) U.S. payments in foreign ports; and, (3) U.S. payments to foreign owners of chartered and rented vessels and freight cars.

Conceptually, the freight component of this account measures as international transactions the receipts by U.S. operators and owners from foreigners for carriage of U.S. exports and goods between foreign countries, and payments by U.S.

[12] INS data do not differentiate between travelers to the border area and those to the interior of Mexico.

residents to foreign operators and owners for carriage of U.S. imports. Merchandise trade transactions are valued f.a.s. border of the exporting country; the importer pays for the freight either directly or indirectly.

In order to obtain accurate information on international transportation transactions, the data on exports and imports between countries should reflect the country of the operator of the carrier. At the present time, the data on ocean freight transactions often reflect the country of registration of the ship (flag) rather than the country of the operator. This is the major weakness in the data base of the transportation account.

Table 8-5 shows for the 1970-73 period the dollar value of gross and net international transportation flows, and gross exports and imports for broad categories of the transportation transactions. Total gross exports and imports are of the same order of magnitude, rising steadily from $3 billion in 1970 to $4 billion in 1973. Among the components, freight and port expenditures are the major elements together accounting for 98 percent of exports and 90 percent of imports. For exports, port expenditures are roughly twice the size of freight transactions, while these relative amounts are reversed for imports.

1. Ocean freight exports

Estimates of ocean freight receipts are limited to the transport of U.S. exports by U.S. operated carriers on the assumption that freight charges are paid for by the importer. This procedure reflects the fact that merchandise trade is valued f.a.s. port of export. Freight charges from port of export to port of import and beyond are paid by the importer, either directly or indirectly.

The estimates for ocean freight exports (approximately $1.0 billion in 1973), are based on data from two sources: (1) a quarterly BEA sample survey of U.S. ship operators, and (2) the monthly export tonnage reported by Census. The BEA survey of U.S. shipping companies shows freight revenues for transporting U.S. exports and for carriage of foreign goods between foreign countries, and the tonnage carried. The sample data are used to estimate changes in freight rates. The survey data are received approximately 2 months after the reference quarter, in time for use in the preliminary quarterly BOP estimates in the third month of the quarter following the reference quarter.

The estimates are derived indirectly as the product of (a) average tonnage rates obtained from the BEA survey and other published data, multiplied by (b) shipping tonnage figures reported in the Census merchandise trade figures obtained from the Shipper's Export Declaration form. The proportion of ocean export receipts carried on U.S. ships is based on the classification in the Census data of the nationality (i.e., U.S. or non-U.S.) of the vessel according to the country in which the owner registered the ship (flag of the ship). It is assumed that U.S. flag

TABLE 8-5. U.S. International Transportation Transactions

(millions of dollars)

	1973	1972	1971	1970
Exports[1]	4,298	3,551	3,277	3,113
Freight	1,495	1,177	1,072	1,107
Port Expenditures	2,710	2,301	2,131	1,941
Charter & Rental	93	73	74	65
Imports[2]	4,190	3,482	3,078	2,816
Freight	2,547	2,153	1,815	1,577
Port Expenditures	1,198	981	904	839
Charter & Rental	445	348	359	400
Net Exports	108	69	199	297
Freight	−1,052	−976	−734	−470
Port Expenditures	1,512	1,320	1,227	1,102
Charter & Rental	−352	−275	−285	−335

[1]Revenues received from foreigners by U.S. operators (freight), port facilities (port expenditures), and owners (charter and rental). Freight export estimates cover hauling of U.S. merchandise exports and of foreign merchandise between foreign points.

[2]Payments by U.S. residents to foreign operators (freight), port facilities (port expenditures), and owners (charter and rental). Freight import estimates cover hauling of U.S. merchandise imports.

Source: *Survey of Current Business*, June 1974, and unpublished BEA figures.

ships are U.S. operated; also an estimate is included of foreign flag U.S. operated ships.

2. Ocean freight imports

Estimates of ocean freight payments cover the transport of U.S. imports by foreign carriers. For 1973, they are estimated at $2.3 billion.

There are no directly reported quarterly data on this component. The quarterly estimates are extrapolations of annual figures, using monthly Census merchandise trade data of imports carried on foreign flagships. A sample of 11 countries submit to BEA through their embassies in the U.S. annual reports in which they consolidate all companies in each country into a national total. Each of the 11 countries, whose combined reports account for approximately one-half of ocean import payments, reports separate figures on tonnage carried and freight receipts associated with ocean trips to the U.S. These figures are increased to encompass (a) all ocean import payments, by relating Census merchandise import data on shipping tonnage carried by foreign flagships to the "embassy reported" tonnage data on the operator and flag, and (b) freight rates derived from data reported annually by U.S. agents of foreign ship operations not covered in the reports from the 11 countries.

3. Great Lakes freight

These estimates—amounting in 1973 to $13 million for exports and $28 million for imports—are obtained quarterly from the Canadian government based on its surveys of operators. Approximately two-thirds of the Great Lakes transportation between the U.S. and Canada in both directions is carried on Canadian ships.

4. Air freight

The values for 1973 are estimated at $235 million for export receipts and $185 million for import payments. In a BEA mail sample survey, U.S. airlines report quarterly revenues derived from carrying U.S. exports and foreign goods between foreign points. The airlines included in the sample account for approximately 90 percent of the volume of all air freight exports carried by U.S. airlines as reported in the Census data on merchandise trade, described in an earlier section. These are expanded to universe totals by reference to the Census data on air tonnage exports.

Foreign airlines, accounting for approximately 90 percent of the volume of all air freight imports carried by foreign air carriers, report to BEA annually, through their U.S. agents, receipts for transporting goods to the U.S. The quarterly estimates are extrapolated by reference to the Census merchandise trade data on air tonnage imports.

5. Miscellaneous freight

Estimates of transportation charges for overland U.S. export and import freight to and from the borders of Canada and Mexico by rail and pipeline are included in the value of merchandise trade which is valued f.a.s. the export port (or border). No estimates are made for truck transportation charges. Some of these charges for truck transportation would not be counted as an export or import because, as part of Interstate Commerce Commission regulations, a transfer is made at the border to a national carrier for U.S.-Canadian shipments hauled by major trucking companies.

Annual data obtained from a sample of U.S. railroads and from Statistics Canada are trended for the quarterly estimates based on the freight movements in the previous year.

For pipeline shipments, the only international transactions arise from receipts of U.S. pipeline companies that carry in-transit petroleum and gas shipments from one part of Canada to another. The estimates are based on quarterly data obtained from three U.S. pipeline companies operating in the Canadian border area.

6. Port expenditures

These transactions are the expenditures by foreign operators in U.S. ports and payments by U.S. operators in foreign ports. The estimates are derived from sources and methodologies similar to the passenger travel and freight transportation estimates. As a result, they are subject to the same limitations and recommendations for improvement as expressed for passenger travel and freight.

Estimates of receipts are based on annual reports to BEA in a sample survey, similar to that noted earlier for ocean freight imports, of payments to the U.S. for port expenditures by freight and passenger ocean vessels, together with annual reports to BEA from a sample of foreign airlines. Both are extrapolated quarterly and adjusted for coverage by Census data on tonnage of merchandise imports and exports carried by foreign lines, and U.S. and foreign travelers estimated to be carried by foreign lines.

Port expenditure payments are derived from quarterly reports to BEA by a sample of U.S. shipping and airline companies. These payments are then adjusted for coverage by Census data on tonnage of merchandise imports and exports and U.S. and foreign travelers estimated to be carried by U.S. lines.

7. Charter and rental

Estimates of receipts and payments for charter of vessels are based on quarterly data from the BEA sample survey of U.S. operators. No adjustment is made to raise these figures to universe totals because the universe is unknown.

Railroad freight car rentals involve transactions with Canada and Mexico. The receipts and payments from freight car rentals reflect annual information obtained from the Association of American Railroads, and are trended for the quarterly estimates.

Recommendation:

For ocean freight imports, the Census Bureau should tabulate monthly, from presently available information, the value of transportation freight charges separately from insurance and other handling charges for merchandise imports by country of the operator of the liner-type ships. The Customs import entry forms provide the value data and the name of the vessel, and Census has supplementary information from Maritime Administration reports on the name of the vessel by the country of the operator. Thus, the tabulation would require a cross-referencing of these two information sources.

In addition, a study should be made of the need and feasibility of extending these tabulations to tanker and tramp shipments. In order to include such shipments, the Maritime Administration would have to develop operator codes for tanker and tramp vessels where operators differ from the operators of liner vessels.

No recommendation is made for the other components of the international transportation accounts.

F. Fees and Royalties

These accounts cover international fees and royalties transactions for use of intangible property or rights such as patents, techniques, trademarks, copyrights and manufacturing rights; rentals of tangible property; and use of professional and management services. The estimates are prepared and published separately for two components: (a) foreign residents not affiliated with U.S. organizations (intangible property only), and (b) foreign affiliates of U.S. firms and U.S. affiliates of foreign firms (tangible and intangible property, and services).

Quarterly estimates of the unaffiliated component are trended from the annual figures. Annual export receipts ($.7 billion in 1973) from and import payments ($.2 billion in 1973) to unaffiliated foreign residents are derived from annual BEA surveys of U.S. firms directly involved in such transactions. The sample coverage is not raised to universe totals because there is no benchmark universe.

Net receipts from foreign affiliates of U.S. firms ($2.5 billion in 1973) are based on quarterly BEA sample surveys of U.S. parent companies. These companies report fees and royalties as part of a broader survey of information on direct investment income. The sample coverage is expanded to universe totals by reference to benchmark surveys. These surveys will be taken every 5 years under the International Investment Survey Act of 1976.

A similar quarterly survey by BEA is the source of data for estimates of net payments by U.S. affiliates of foreign firms ($0.2 billion in 1973). Here again, the reported amounts are raised to universe totals by use of benchmark surveys. These surveys also will be taken every 5 years under the International Investment Survey Act of 1976.

No recommendation is made for fees and royalties.

G. Other Private Services

These accounts cover a wide range of miscellaneous private international service transactions between unaffiliated U.S. and foreign residents, and between (a) U.S. residents, and (b) foreign governments and international organizations. They include reinsurance; cable, telephone and radio communications; services of construction, engineering, consulting, etc. firms; expenditures in the U.S. by foreign embassies (including foreign government personnel), and administrative outlays in the U.S. of international organizations; employee compensation of temporary workers (U.S. residents working abroad and Mexican and Caribbean residents working in the U.S. for less than 1 year); earnings of U.S. and Canadian residents who commute across the border for employment; and other minor items. Estimates of direct insurance are not made because of the lack of information; it is assumed that these exports and imports are equivalent and thus net to zero.

Receipts and payments are estimated from annual BEA surveys of U.S. individuals and firms, reports to BEA (partly quarterly, partly annually) from foreign government agencies, and annual publications of foreign governments and international organizations. These sample survey data are not raised to universe totals because of the lack of corresponding benchmark figures.

BEA presently is developing improved methods for obtaining data on services performed by U.S. residents for foreign governments, as well as better coverage of international leasing transactions. In addition, items that are covered incompletely or are not measured at all but belong in this category include

direct insurance transactions with foreigners and advertising expenses.

Services performed by U.S. residents for foreign governments are estimated in 1973 at close to $400 million. The methodology for this component was recently improved by using data on U.S. expenditures by agents of foreign governments collected in Department of Justice surveys under the Foreign Agents Registration Act.

New information on international leasing transactions for items such as vessels, aircraft, computers, offshore drilling rigs, and related equipment indicates that a considerable amount of these transactions is included in the operations of foreign affiliates of parent firms. However, the amount of these transactions is difficult to identify in the existing surveys of direct investment. This new information could lead to refinements in existing reporting forms for the direct investment surveys noted in the later section on Investment Income.

Recommendation:

BEA should conduct for a single year a benchmark survey of U.S. business to determine the amount of payments for private international transactions in miscellaneous services. Such a benchmark survey would also broaden the coverage of the annual sample survey. The absence of an existing benchmark has led to unknown amounts of undercoverage and thus to an inability to expand the existing sample survey data to universe totals. The need for subsequent benchmark surveys would be ascertained at a later time.

H. U.S. Government Miscellaneous Services

These accounts cover international transactions arising from the nonmilitary operations (excluding grants) of the U.S. Government. Export receipts arise from services rendered to foreigners and from deliveries of goods to foreigners from U.S. nonmilitary facilities located abroad, as well as from administrative expenses of the Agency for International Development and other aid programs in the U.S. and abroad. Import payments represent expenditures by the U.S. Government for foreign services and goods purchased and used or stockpiled abroad; also included are net payments to U.S. nationals employed abroad and their dependents, as well as payments to international organizations for membership assessments.

The estimates are derived primarily from quarterly reports by Federal agencies to BEA. These generally are adequate, although not always explicitly available in balance of payments categories.

No recommendation is made for improving the data base for U.S. Government miscellanous services.

I. Investment Income

This broad category of international income transactions for both receipts and payments is composed of three accounts which are estimated and published separately: (1) interest, dividends, and branch earnings from direct investment; (2) interest and dividends from ownership of bonds, loans, bank deposits, stock and other private nondirect investment; and (3) interest on securities and monetary service charges of the U.S. Government.

Table 8-6 shows for the 1970-73 period the aggregate gross and net income flows, and gross exports and imports for the three separate categories. The balances of the three accounts vary; net direct

TABLE 8-6. U.S. International Investment Income Transactions, 1970-73

(millions of dollars)

	1973	1972	1971	1970
Exports	13,984	10,419	9,830	8,840
Direct Investment	9,415	6,925	6,385	5,330
Other Private	3,741	2,697	2,556	2,597
U.S. Government	828	797	889	913
Imports	8,694	5,893	4,809	5,056
Direct Investment	892	687	621	441
Other Private	3,966	2,522	2,344	3,591
U.S. Government	3,836	2,684	1,844	1,024
Net Exports	5,290	4,526	5,021	3,784
Direct Investment	8,523	6,238	5,764	4,889
Other Private	−225	175	212	−994
U.S. Government	−3,008	−1,887	−955	−111

Source: *Survey of Current Business*, June 1974.

investment income has been in surplus (export surplus), other net private income in relative balance, and net U.S. Government income in deficit (import surplus).

1. Direct investment income

These income estimates of foreign affiliates are based on two quarterly BEA sample surveys. Receipts (exports) are derived from survey data of income of U.S. parent organizations received from their investments in foreign affiliates abroad, net of payments to foreign affiliates. Payments are also obtained from survey data of payments by U.S. companies to their foreign parents, net of receipts from foreign parents. The surveys also provide the data noted previously for direct investment fees and royalties.

The sample survey data for U.S. investment abroad are raised to universe totals by factors from benchmark surveys most recently taken for 1957 and 1966; the 1966 benchmark resulted in a downward adjustment to the 1966 income figures of $185 million (excluding definitional changes). The list of firms for the quarterly sample survey is updated on a current basis by reference to newspapers, trade journals, State Department cablegrams, etc.

The International Investment Survey Act of 1976 requires that benchmark surveys of U.S. direct investment abroad and foreign direct investment in the U.S. be conducted at least once every 5 years. The first of these newly mandated periodic surveys is scheduled to be taken for the year 1977.

The Foreign Investment Study Act of 1974 provided for a one-time benchmark study for 1974 on foreign direct investment in the U.S. The survey for 1974 was completed in 1976. The benchmarking of the quarterly data to reflect the new 1974 information will be completed in 1977. Prior to the 1974 benchmark, the most recent benchmark survey of foreign investments in the U.S. was for 1959. The next such survey is due by 1979 under the new act.

The 1974 benchmark also pointed to the need for a considerable expansion of the sample of firms surveyed quarterly, and this expansion is underway. For a complex set of reasons the benchmark data revised income payments downward by 6 percent, raised the capital investment position by 22 percent and raised capital inflows by 70 percent.[13] The list of firms for this quarterly sample is also updated on a current basis by reference to newspapers, trade journals, State Department cablegrams, etc.

[13] *Survey of Current Business*, May 1976, pp.50-51.

2. Other private income

These estimates are based on the multiplication of appropriate interest rates by monthly and quarterly figures of the international asset and liability position of U.S. banks, and industrial, commercial, and other financial companies. Included among the assets and liabilities are short- and long-term loans, deposits, and other financial instruments. Income on long-term securities, excluding Treasury issues but including equities, is derived by adjusting base-period estimates (1941 for foreign securities, 1949 for U.S. securities) for subsequent changes in income. The changes in income are calculated by multiplying changes in holdings by appropriate dividend and interest rates.

The asset and liability figures and the purchase and sale data that result in changes in holdings of securities and other claims and liabilities are collected for the Treasury Department by the Federal Reserve System. The regional Reserve banks collect the data on banking claims and liabilities from banks in their regions and submit them to the New York Reserve bank for compilation; the New York Reserve bank collects all of the data for nonbanks. The interest and dividend rates are obtained from U.S. and foreign governments and private sources, published and unpublished.

The Treasury surveys are virtually universe canvasses, allowing for reporting exemptions. Maintenance of an up-to-date list of banking firms seems well done. For nonbank concerns, there is a basic problem in keeping up with firms that newly enter international operations. The last major updating of the nonbanking list was done for 1969; it showed understatements of $600 million for claims on foreigners and $900 million for liabilities to foreigners. Of course, the income receipts and payments generated by these understatements in capital values in absolute terms would be much smaller but not necessarily in relative terms.

Currency upheavals and large unrecorded flows in early 1973 provoked general public concern over coverage of reported international capital flows. The Treasury and Commerce Departments jointly requested respondents to examine their reporting of capital flows. As a result, Treasury revised outstanding liabilities in 1973 by $300 million dollars and claims by $900 million.

The current estimates of securities holdings are based on extrapolations of benchmark data using monthly information on purchases and sales. The benchmarks were obtained in the early 1940's as direct surveys, and in 1949 indirectly by capitalizing the IRS withholding tax data on dividend and interest income paid to foreigners, using available information on yield rates of the securities. The

Treasury Department recently conducted a new benchmark survey of bank and nonbank holdings of U.S. securities by foreign residents. This benchmark, completed in 1976, represents holdings as of the end of calendar year 1974. The benchmarking of the figures to reflect the new 1974 information is planned for 1977.

Under the terms of the International Investment Survey Act of 1976, the next benchmark survey is due for 1979. The act also requires that a new one-time benchmark survey of U.S. portfolio investment abroad be completed by 1981, and that based on that survey, the President recommend in a report to Congress the need for conducting future benchmark surveys on a periodic basis. The President is also given the authority to conduct future surveys if they are deemed feasible and desirable.

Changes in holdings of securities, multiplied by dividend and interest rates, is an indirect technique for deriving estimates of income transfers. It is checked for reasonableness with estimates of domestic dividends. A general problem is the fact that the simple holding of securities does not necessarily generate dividend income.

Primary problems with the interest and dividend rates—the other element of the estimates—are: (a) a lack of adequate detail on the types of outstanding securities and loans which frustrates the choice of applicable rates; and (b) the confidential character of bank interest rates on actual loans and deposits to customers suggests that the published or reported rates do not necessarily reflect those in the actual transactions.

3. U.S. Government income

Estimates of receipts are based primarily on reports of Federal operating agencies. Income payments are based on Treasury data. BEA periodically consults with Treasury to insure the accuracy of the BOP estimates.

Recommendations:

1. *The Treasury Department should institute a research program to collect direct data on other private income (non-direct investment) transactions from banks and nonbanks as part of the Treasury-Federal Reserve collection of foreign exchange data.* The research program should focus on the magnitude and nature of the problems of collecting these flows directly, as well as on devising feasible means for overcoming any major collection problems. If direct reporting is feasible, it would supplement the existing Treasury Foreign Exchange Report forms that collect statistics on capital account items.

2. *The Treasury Department should use the Census Bureau's industrial directory to update once in 3 years the Treasury-Federal Reserve coverage of nonbank firms in the collection of foreign exchange data for other private income transactions.* Because of the confidentiality of the Census Bureau's data, the industrial directory is not yet made available to other agencies. In order for this to be done, some means will have to be found to overcome the confidentiality restrictions.

Broad-Based Improvements

There are two areas of a general nature which affect all segments of the BOP accounts and their use in the GNP: (1) bilateral reconciliations with other countries, and (2) incorporation into the GNP rest-of-the-world account revised estimates of exports and imports of goods and services.

A. Bilateral Reconciliations

It is obvious that the statistics on international trade between trading partners are interrelated since the exports of one are the imports of the other (except for shipments on consignment to an intermediate third country). As indicated in the previous discussions, reconciliations of U.S.-Canadian merchandise trade data by Census are being used as cross-checks on the reported statistics for U.S.-Canadian shipments of goods. In the case of services, some elements of the travel, transportation, and service accounts are developed from data supplied by foreign countries. An unfunded bilateral reconciliation of U.S.-Canada BOP current accounts (trade and services) has been made by BEA for 1970-75. An expansion of this work to other countries would require additional funds. It bears repeating, however, that because of known limitations in this technique even "reconciled" bilateral statistics are not strictly comparable owing to differences between countries in data definitions, collection methods, and problems of confidentiality.

The BOP accounts presently show bilateral figures quarterly for the United Kingdom, Canada, Japan, and for broad regional groupings of Western Europe Common Market countries separate from the remaining Western European countries; Eastern Europe; Latin America and other Western Hemisphere; Australia, New Zealand and South Africa; other Asia and Africa; and international organizations. These are derived from the regular data base available to BEA, plus a minimal amount of cross-checking which can be done with published statistics of other countries. Annual bilateral data are published for Belgium, Netherlands, France, Germany, Italy, Mexico, Venezuela, Australia, and South Africa.

Recommendation:

The Bureau of Economic Analysis should institute a bilateral reconciliation program for the service and income balance of payments accounts with the major trading partners of the U.S.—particularly Mexico, selected Common Markt countries, and Japan; and continue its program with Canada.

B. Current Revision Policy for Quarterly GNP

The BOP quarterly estimates are published in the third month of the quarter following the reference quarter, and thus are available somewhat later than the comparable GNP figures. For the preliminary estimates, the BOP figures are published 2 months after the GNP; and for the first revised figures, the BOP lags the GNP by 4 months. This is illustrated in the following example of the publication schedules for a January-March data quarter.

Estimates for January-March Quarter

	Preliminary	First Revision
GNP	April	May
BOP	June	September
Spread	2 months	4 months

The BOP figures are revised with each new quarterly estimate and with the annual revisions in June. This contrasts with the current general policy for the revision of preliminary quarterly GNP that calls for only one revision of the preliminary estimate before the annual revisions each July.

Underlying data for net exports in the preliminary (15-day) and first revised (45-day) GNP estimates are limited to two and three months of data, respectively, for merchandise trade; estimates for services and income are based on trend, modified by adjustments for known developments. However, 75 days after the quarter, the net exports estimates are revised to reflect data collected directly for international investment income transactions. The revised income transactions data are incorporated into the GNP estimates because very limited data are available for the early estimates. By contrast, the data base for trade and all other services is more complete for the early estimates and, therefore, the revised data for these components are not incorporated at this time. This is in keeping with the general policy of not revising the 45-day GNP estimates until the following July.

The DIP proposal to have a second GNP revision 75 days following the reference period would permit the use of all of the underlying data base included in the preliminary published BOP estimates.[14]

This will not prevent future differences in "historical" statistics between the BOP and GNP net export figures as a result of the conceptual differences noted in this chapter. Also, between quinquennial benchmarks, the annual GNP revisions each July are made only for the previous 3 years. However, annual revisions in the BOP figures each June may affect that series prior to the most recent 3 years. For example, GNP revisions in July 1976 covered the 1973-75 period and, as a consequence, do not reflect the BOP revisions in June 1976 for 1972 and earlier years. These differences are eliminated periodically with each quinquennial GNP benchmark.

ADDENDUM: Offsetting Entries of Foreign and Domestic Transactions for Government Related Exports

For the BOP and GNP accounts, exports of military equipment and supply items that are given without cost to foreign countries are excluded from the BOP export figures used for GNP purposes. However, these grant items are included in the GNP component of Federal purchases when they are purchased by the Federal Government from the domestic producing industry (typically an earlier period than the time of shipment abroad). Exports of "military" goods that are sold by the defense agencies to foreign countries are included in the BOP export figures used for GNP purposes; since they had been included in the GNP component of Federal Government purchases in the period when they were purchased, an offsetting deduction from federal purchases is made in the period when they appear in the export figures. Thus, there is no effect on the total GNP at the time of export.

Economic aid exports of agricultural goods are included in the BOP export figures. These goods appear in the GNP component of Federal Government purchases as a buildup of Commodity Credit Corporation (CCC) inventories. Since the reduction of the CCC inventories at the time of the export shipment also reduces Government purchases in that period, there is no effect on the total GNP at the time of export.

This contrasts with economic aid shipments of nonagricultural goods by the Agency for International Development. Since these transactions are made between the private U.S. exporter and the foreign country recipient of the aid, they do not involve initial purchases of the goods by the Federal Government.

[14] See Chapter 5.

CHAPTER 9

DATA NEEDS IN FLOW OF FUNDS*

The flow of funds system of national accounts, though not originally constructed by the Board of Governors of the Federal Reserve System, has been maintained and developed by the Federal Reserve since shortly after the inception of these accounts. The Federal Reserve has responsibility for preparing and publishing flow of funds estimates on a current and historical basis independently of other national accounts work that is done by the Bureau of Economic Analysis of the Department of Commerce. Flow of funds accounting is nevertheless integrated with BEA's national accounts and can be regarded as an extension of the investment and saving account of the national income and product accounts (NIPA) into detailed sector financial statements. The nonfinancial segment of the flow of funds system is taken directly from the NIPA, and BEA provides directly the data inputs that are needed for a sectoring of nonfinancial activity. It is for this reason that we have included the flow of funds system of accounts within the scope of this report.

This chapter is a highly summarized and selective assessment of the data base and needed improvements for the flow of funds accounts. Later, a more comprehensive and intensive evaluation should be made, similar to that conducted for the NIPA in other chapters of this report.

A. Concept of Accounts

The flow of funds system of national accounts is designed to bring financial activities of the U.S. economy into explicit statistical relationship with one another and with the nonfinancial activities that generate income and production. The purpose of the accounts is to provide, systematically, the aggregate measures of transactions needed to identify both influences of the nonfinancial economy on financial markets and reciprocal influences of financial market developments on demand for goods and services, sources and amounts of saving and investment, and the structure of income. The accounts are intended to provide an empirical base for exploring such questions as the sensitivity of borrowing to interest rates as against other influences, the effects of cost and supply of credit on physical investment demand, the role of money holdings in the public's structure of assets and liabilities, and the relation of financial positions—levels of assets and liabilities—to demands for goods and services, for credit, and for investment in financial claims.

The flow of funds system focuses on such questions in a macroeconomic setting that covers, as far as possible, all institutional groups and all types of transactions in the economy. Some elements of the system exist elsewhere and separate from the structure—as statements of, for example, corporate finance, government finance, balance of payments, money and banking activities, individuals' saving, residential finance, and security market activity. These elements are incorporated into the system as integral parts, together with information from income and product accounts on saving and capital formation. Each such element is one aspect of an integrated economy, and each connects with the others in several ways. The security markets, for example, are a point of intersection among business developments generating long-term credit needs, international capital movements, bank credit availability, flow of credit through financial institutions, and the financing of government deficits. When all of the relevant information is put together in mutually consistent fashion in one framework, each element is seen as part of a broader macroeconomic system, and its connection with the other parts can be made explicit enough for analysis. Like the NIPA published by BEA, the flow of funds system is a social accounting structure that records both the payment and the receipt aspects of any transaction included in the system and that includes a balance in each account of the structure between total payments and total receipts. The flow of funds accounts can, in fact, be viewed as a direct extension of the BEA income and product structure into the

*This chapter was prepared by Stephen P. Taylor, Division of Research and Statistics, Federal Reserve Board.

financial markets of the economy, with the purpose of establishing direct linkages between the BEA data on saving and investment—the capital account in the income and product structure—and the lending and borrowing activities that are associated with saving and investment.

The nature of those linkages and, more generally, the relation of financial markets to the nonfinancial activities are set down in a matrix table of sector columns and activity rows. The arithmetic of the matrix is fairly simple, and when applied to the full system of accounts it provides a basis for understanding both the accounting relationships among the time series and the analytic approach underlying the system.

The accounting rules of the matrix and their consequences for analysis can be briefly spelled out. It is a statement of capital account for the economy as a whole, showing for each sector investment in assets in the uses columns and means of financing that investment in the sources columns. The economy is divided into several sectors, each of which has a column in the matrix, and all transactions are recorded on one or another of the matrix rows. The top row—saving—is for each sector the net sum of current receipts from income less current outlays for consumption, operating expenses, and so forth. Saving appears as a net amount available from current operations for investment purposes. Other amounts are borrowed in financial markets by each sector, and borrowings and saving together are the sources of funds used to acquire physical and financial assets.

A distinction is drawn between nonfinancial transactions (purchases and sales of goods and services, transfer payments and receipts, and taxes) and financial transactions (net changes in the capital amounts of claims owed as liabilities or held as assets by each sector). All of the financial transactions of a sector are combined into a net financial investment that is the excess of the sector's lending (financial uses) over its borrowing (financial sources).

The two most basic constraints in the matrix are that (1) total investment for each sector—capital outlays plus net financial investment—is equivalent to the saving shown in row 1 for the sector, and (2) on any one row of the matrix, the sum of all uses of funds shown across the columns is equal to the sum of all sources of funds in that row. With balance vertically between saving and investment and horizontally between payments and receipts, each column and each row constitute one full account of the structure. The relationships among columns, among rows, and between columns and rows, express the interlocking nature of the accounting system as a whole.

The condition that saving equals investment for each sector is identical in form with the well-known equality of saving and investment for the overall economy in income-and-product accounting. For the total economy, investment on a consolidated basis consists of outlays for capital goods plus net foreign investment, the excess of lending abroad over borrowing from abroad. In the flow of funds accounts, similarly, each sector's investment consists of its purchases of capital goods plus a net financial investment that includes net lending to the rest of the domestic economy as well as to foreign economies.

At present, the system includes 24 sectors and 48 types of financial claim. The count of sectors is based on the number of separate groups for which balance sheets are published, and the count of claim types is at the most detailed level at which both lenders and borrowers can be fully identified. For claims, this criterion subdivides several of the standard transaction categories for which tables are shown. For sectors, the balance sheet count goes somewhat beyond the count for which full *flow* statements exist.

Flow of funds accounting at the Federal Reserve Board originated in the work of Morris Copeland during the late 1940's[1] sponsored by the National Bureau of Economic Research. The Board continued that work and published another version of the data in 1955,[2] which was continued on an annual basis until 1959, when the first quarterly version was published.[3] Converting to a quarterly basis occurred in conjunction with an extensive restructuring of the accounts which made the link to the NIPA more simple and direct. Further modifications in 1962, when the first seasonally adjusted accounts were published[4] and in 1965, at the time of the major NIPA revision,[5] made the flow of funds consistent with the NIPA, a relationship that has been maintained ever since. The present form of the accounts is described in *Introduction to Flow of Funds Accounts*, a Federal Reserve publication of February 1975 which spells out the NIPA connection.

Flow of funds work at the Federal Reserve was parallel to and closely related to two other data sets. These were compilations by the Securities and

[1]Copeland, Morris A., *A Study of Moneyflows in the United States*, New York: National Bureau of Economic Research, (1952).

[2]Board of Governors of the Federal Reserve System, *Flow of Funds in the United States 1939-53* (1955).

[3]"A Quarterly Presentation of Flow of Funds, Saving, and Investment," *Federal Reserve Bulletin*, August 1959, p. 828.

[4]"Flow of Funds Seasonally Adjusted," *Federal Reserve Bulletin*, November 1962, p. 1393.

[5]"Revision of Flow of Funds Accounts," *Federal Reserve Bulletin*, November 1965, p. 1533.

Exchange Commission, in its work on individuals' saving, and Raymond Goldsmith's *Studies in the National Balance Sheet of the United States* (Princeton, 1963; with Lipsey). The SEC work on individuals' saving is now published by the Federal Reserve on a flow of funds basis.

In relation to the NIPA, an interesting aspect of flow of funds accounting is that it provides a measure of personal saving that is statistically independent of income and consumption and that can thus serve as an alternative estimate of this important quantity. The connection lies in the (conceptually) simple identity that personal saving is equal to the net investments that are made from saving:

Personal savings = net personal investment
or Personal saving = net purchases of physical assets
+ net purchases of financial assets
- net borrowing
or, in context of sources and uses of funds:

Personal saving + net borrowing = net purchases of physical and financial assets.

National income accounting measures personal saving as income less both taxes and consumption, while flow of funds accounting adds up asset purchases and borrowing by type to arrive at a net personal investment total that should be equal to personal saving. When all parts of the total are suitably defined, the difference between saving from income accounts and net investment from capital accounts can only be a statistical discrepancy arising from inadequacies of the data. The flow of funds sector statement for households puts together the income measure of saving and a separate measure of investment, and shows at the bottom of the statement the statistical discrepancy between the two.

Such a check on estimates of saving was a major purpose of the SEC's pioneering work in the area begun during the late 1930's. While that work was focused entirely on personal saving, however, flow of funds accounting was framed more broadly to develop similar statements for all major sectors of the economy. As a result, flow of funds accounts produce a broad set of independent measures of saving for business and for governments that parallel the household statement and that are derived from the same broad body of data on investment and borrowing.[4]

For the U.S. relationship with the rest of the world, this kind of statement already existed in balance of payments accounting, which relates the current-account balance to the U.S. capital-account balance and shows the statistical discrepancy between the two measures of international flows. National income accounting is limited to the current balance; flow of funds accounts incorporate the entire international payments statement, although with substantial reclassification of items to fit the categories of financial instruments that constitute separate markets in the flow of funds system.

B. Publication and Revision Schedule

The principal publication of current data for flow of funds accounts consists of quarterly tables of both seasonally adjusted and unadjusted flows. These current tables are extensions for up to 5 or 6 quarters of base data that result from an annual revision process. The base data are published each year as tables of annual flows from 1946 to the present and yearend outstanding claims from 1945 to date. Summary forms of the flow of funds data appear monthly in the *Federal Reserve Bulletin*.

The current quarterly tables are available 6 weeks after the end of the most recent quarter included, and the data for that most recent quarter are very preliminary and tentative. Each issue of the tables includes for the next-to-last quarter revisions based on the large amount of data that have become available since the quarter's first preliminary tabulation. The tables may also include revisions of earlier quarters of the current calendar year to conform to revisions in source data. On a current quarterly basis, however, revisions are not carried back to years that have already appeared in the annual publication, even when the source data are revised back for several years. Such longer-run changes are postponed until the annual revision.

The annual revisions are intended to introduce all of the new information that has become available in the preceding year. The revisions include new benchmarks for earlier years, or—as in the case of the NIPA figures—revisions of source data based on new benchmarks, but it can also include shifts to new data sources, changes in derivation methods, improvements in table formats, and even changes in sectoring and transaction categories. Such changes can affect the accounts back to the earliest years even when no new data have appeared for those periods.

C. Data Sources

While a full derivation statement is beyond the scope of this chapter, it is possible and useful to list the principal bodies of data that go into flow of funds calculations at present and to indicate briefly the availability schedules for these data. The summary list in Table 9-1 omits many peripheral and

[4]For a brief discussion of the size and character of the discrepancies in saving estimates as measured by flow of funds and the NIPA, see Appendix to this chapter.

occasional sources of information, but it indicates the statistical skeleton of the system. For some areas, both benchmark and current sources are listed, and where no such distinction is shown, the sources used for current information are not subject to revision except as indicated.

Table 9-1 has two conspicuous omissions. The first is in sources of nonfinancial data related to incomes and expenditures, such as saving, corporate cash flows, government surplus, and capital outlays. These data come directly from the NIPA. The sectoring in flow of funds requires detail that does not appear in

TABLE 9-1: Sources of Financial Data for Flow of Funds Accounts

Area	Source	Availability
Federal Government—debt, cash balances, and loans	Monthly Treasury statement of receipts and expenditures, Treasury *Bulletin*	Monthly, about 30 days after month end; June data subject to revision after 5 months
Federally sponsored credit agencies	Statements of condition for five groups	Monthly quarterly, or semi-annual: 25 days
State and local governments—benchmark:	Census Bureau, *Government Finances*	Annual, about 17 months lag
current:	Gross offerings of securities, Securities Industry Assn.	Monthly, 30 days
	Banking data	Weekly, 10 days, revised by semiannual call reports
	Treasury *Bulletin*	Monthly, 60 days
Commercial banking—benchmark:	Call Reports	Semiannual, about 4 months
current:	Several weekly and monthly reporting systems	10 to 20 days after period end, revised twice a year
Savings and loan associations	Federal Home Loan Bank Board	Monthly reports, 25 days
Mutual savings banks	National Association of Mutual Savings Banks	Monthly reports, 45 days
	Call Reports	Semiannual, 8 months
Credit unions	National Credit Union Admin.	Monthly reports, 24 days
Life insurance—benchmark:	Life Insurance *Fact Book*	Annual, 8 months
current:	Insatitute of Life Insurance, *Tally*	Monthly, 30 days, revised after 12 months
Private pension funds	SEC *Statistical Bulletin*	Quarterly, 10 weeks, revisions annually
State & local governments retirement system—benchmark:	Census Bureau, *Governmental Finances*	Annual, 17 months
current:	Census Bureau	Quarterly, 10 weeks
Other insurance—benchmark:	*Best's Aggregates & Averages*	Annual, 9 months
current:	Treasury	Monthly, 60 days
	SEC	Quarterly, 10 weeks
Finance companies—benchmark:	Federal Reserve census of finance companies	Quinquennial, 28 months
current:	Federal Reserve consumer credit data	Monthly, 35 days
Real estate investment trusts	National Association of REIT's	Quarterly, 3 months
Security brokers and dealers—benchmark:	SEC annual report	Annual, 12 months
current:	Banking data	Weekly, 10 days, and monthly 20 days
Investment companies	Investment Company Institute	Quarterly, 6 weeks, and monthly, 30 days

DATA NEEDS IN FLOW OF FUNDS

Foreign—benchmark:	BEA (Commerce Dept.), Balance of Payments and International Investment Position	Annual, 6 to 9 months
current:	BEA, Balance of Payments	Quarterly, 10 weeks
	Treasury	Monthly, 6 weeks
	Banking data	Weekly, 10 days
Corporate business—benchmark:	SEC, Current assets and liabilities of nonfinancial corps., revised to IRS Statistics of Income	Annual, 4 years
current:	*Ibid.*	Quarterly, 10 weeks
	Also, banking data (q.v.) and balance of payments (q.v.)	
	SEC, Net change in corporate securities outstanding	Quarterly, 10 weeks
	Mortgage data (q.v.)	
Nonfarm noncorporate business—benchmark:	IRS, Business tax returns, partnership tax returns, corporate income tax returns	Annual or biennial, 3 to 4 years
	Census Bureau, housing census	Approx. decennial, 2 years
current:	Banking data (q.v.)	
	Corporate data (q.v.)	
	Consumer credit statistics (q.v.)	
Farm business—benchmark:	USDA, Balance sheet of agriculture	Annual, 9 months
current:	Banking data (q.v.)	
	Federally sponsored agency data (qv.)	
	Mortgage data (q.v.)	
Mortgages	Federal Reserve compilations, as in Federal Reserve *Bulletin* with further detail by type and holder	Quarterly, with preliminary in 30 days, revisions from institutional data
Consumer credit	Federal Reserve	Monthly, 35 days, revised at various intervals
Open-market paper	Federal Reserve Bank of New York	Monthly, 20 days, revised occasionally

the published NIPA but is provided on an unpublished basis by BEA. For the preliminary quarterly flow of funds estimate, the 15-day NIPA figures are used. These first NIPA estimates omit corporate profits and profit tax accruals, which are therefore estimated for the preliminary figures.

It is important to mention that flow of funds data requirements from NIPA include seasonally unadjusted accounts as well as the more commonly used seasonally adjusted version. Only in unadjusted form can a clear accounting relation be established on a quarterly basis between the NIPA receipts and expenditures and independently derived financial transactions. The seasonal adjustment process produces a variety of effects on individual series, many of them mutually inconsistent, and the uncertainties generated by adjustment make impossible any judgment on the validity of the total body of data. Seasonal adjustment in flow of funds accounts is a complex operation that integrates some hundreds of separate seasonalities into a coordinated whole.[7] The accounts cannot be used in adjusted form without the coordination process, and they cannot exist unadjusted without unadjusted NIPA. Either way, unadjusted NIPA are essential to the system. BEA provides historical quarterly unadjusted NIPA data as part of the annual July revisions for all components on the product side and for corporate profits (excluding the capital consumption adjustment) only on the income side. Unadjusted data on the income side are limited to corporate profits because the data base for the other income components is inadequate for preparing unadjusted estimates. That is, for wages and salaries the

[7]The principle of coordinating seasonals is discussed in the November 1962 *Federal Reserve Bulletin*, pp. 1399-1404, as part of the first publication of seasonally adjusted accounts. The procedure described there is still used but with numerous changes in detail in its application.

underlying BLS data do not cover the entire month and there are no direct underlying data for the quarterly estimates of the other components (see Chapter 5).

Recommendation:

The Bureau of Economic Analysis should provide current quarterly seasonally unadjusted data for all components of the product side and as many components as feasible for the income side of the national economic accounts. The feasibility of unadjusted data for the remaining income components will be enhanced as the DIP recommendations for improved measures of these items are implemented. Selected unadjusted quarterly measures were provided in the early 1970's, but were discontinued because of BEA's increasing workload.

The other major omission from the table is the household sector. Data for this sector are almost entirely residuals from the rest of the calculation in that virtually all of their transactions and balances are measured from reports by other parties to their transactions. (The exceptions consist only of mortgage and trade debt liabilities of nonprofit organizations included in the sector.) Because of this characteristic, it has been suggested that the sector should properly be labelled "errors and omissions, including households." In any case, the residual status of the sector means that a listing of data sources for all the other sectors together is implicitly a listing of sources for households.

None of the inputs listed in Table 9-1 are compiled explicitly or exclusively for flow of funds accounts, although those needs have been one consideration in the design of many of the reporting forms. Flow of funds accounting consists rather in absorbing and digesting a wide variety of financial information, both flows and balances, each piece of which has been constructed in isolation from the others with its own accounting procedures, timing classifications, and institutional coverage. The estimation process is intended to make the claims and used components consistent. That is, a transaction in a financial claim is consistent as a source of funds to the seller in that type of claim and a corresponding use of funds for the buyer, in the same time period, at the same value, and correctly related to the other sources and uses of funds of the two parties to the transaction.

Consistency problems in classification arise mainly from the variety of different groupings used for assets and liabilities in balance sheets. Items such as "cash," "notes receivable," and "other securities" may or may not include large negotiable certificates of deposit (CD's), U.S. Government agency securities, Euro-dollars, commercial paper, and other instruments for which it would be useful to have well-delineated market accounts. Consistency in timing is a problem mainly in bank-related claims, which can be highly volatile from day to day, and in Treasury transactions, which are frequently very large on key days such as month ends. If any single source could be identified as the major source of uncertainty in flow of funds accounting it would very probably be the day-to-day swings in bank-related claims and the complex structures of floats that are generated in the system by those swings. Valuation consistency problems occur mainly in long-term marketable securities, for which holders' values as assets are commonly different from issuers' valuations as debts. For all of these consistency questions, the answers lie in financial reporting that is specific in detail and definition beyond what most institutions are accustomed to. Uncertainties in these matters in the existing and available reporting systems are key sources of statistical discrepancies and obscurities in market analysis that are present in flow of funds accounts as they now exist. For flow of funds purposes, as a result, data requests are always for a level of detail and specificity in transactions and positions that can appear unreal and unreasonable to people working in more limited contexts. The requests are nevertheless based on real and continuing requirements. Their reality is attested to by the number of inquiries over recent years into the nature of markets for CD's, commercial paper, and other financial instruments that now have major roles in the functioning of the financial system both domestically and internationally.

D. Major Areas for Data Improvement

1. Large corporations

Improvements and expansion in the Federal Trade Commission's *Quarterly Financial Report* leave continuing serious data problems in business financial analysis. A variety of data sources are used to compile estimates of business investment and business financing in a coherent form. FTC provides indicators for manufacturing, mining, and trade on balance sheet positions and income. But for a statement of financial activity there are a number of gaps, mainly capital outlays and new security issues. Even for these covered industries other sources must be used, such as the BEA data discussed above, both to fill in missing items and to maintain consistency with other bodies of information. Because of the lack of parallel reports for most other industries, estimates for the total corporate sector are an unsatisfactory mixture of working capital data from company reports, allocations of BEA data, SEC tabulations of security issues, and lending information from

financial institutions, most of it ultimately benchmarked to IRS tabulations of tax returns.

The aggregates that are published for business are too broad and possibly too tentative for many specific applications of the data, both for market analysis and for study of business financing trends. The flow of funds statement for nonfinancial corporate business is used extensively and in a variety of ways as a proxy for activities of large industrial and utility firms that are the main focus of attention for capital market investors and shorter-term lenders. This is a weakness, partly because the proxy includes much that is not relevant to this application and partly because the data to develop a more specific and more accurate statement appear to exist already in accessible form.

The most useful basis for defining and reporting big business is undoubtedly the SEC registration lists, augmented by certain exempt industries such as railroads. Registered companies do not constitute the entirety of large firms, but they have other advantages as a defined group. Their securities are widely held and thus have in general entered the public security markets that are accessible only to substantial companies. Their population can be tracked continually through changes in registration lists, avoiding the problem of spotting companies as they cross the line of an arbitrary dollar-size definition of a group. Another advantage is that as publicly held companies they inherently are a subject of direct interest to the investor community.

Most importantly, a registered-company criterion has the potential for generating an integrated set of data on capital spending, inventory investment, issues and retirements of public and private debt and equity by the group, and corporate structure changes through mergers, acquisitions, and spin-offs. Such a compilation is an ambitious goal, well beyond what either FTC or SEC has done in the past. As mentioned, the FTC form encompasses only an income statement and balance sheet. SEC has a quarterly reporting program for registered companies, but the program has so far been for public disclosure rather than statistics, and the requirements for reporting have been fairly general accounting standards without specific item requirements. SEC leans, moreover, toward worldwide consolidation of a company's accounts, which is appropriate for security analysis but not for U.S. social accounts. Both the world figures and U.S. operations are needed, and they should come from the same reports for compatibility.

In spite of the difficulties of using SEC's annual and quarterly reports (10-K and 10-Q, required by law), these are clearly the appropriate data source for tabulations of detailed information on large registered corporations. The SEC reports are already required of registered companies, and they are in their nature public information. Although tabulating the SEC information would require a skilled reading of the reports that would go beyond the requirements for processing a standardized report form, this kind of intelligent editing is required for the commercial data banks of company reports that are now for sale, and has been used in earlier years in the Government for generating meaningful totals of company financial statistics. There is, thus, experience that can be used to estimate the costs of applying the SEC forms and perhaps some history from the 10-K's that might be bought commercially as a data base for the system.

Recommendation:

The Securities and Exchange Commission should explore the feasibility of tabulating the quarterly and annual reports filed by all registered large nonfinancial corporations to provide an integrated statement income, balance sheets and sources of financing. This should be done in consultation with the Federal Reserve Board.

2. State and local government finances

Current quarterly information on State and local governments is probably more unsatisfactory, in relation to their importance in activity and financial markets, than for any other major sector of the economy. Basic information on these governments consists of the Census annual surveys of governmental finances, which are not completed until well over 12 months past the close of the year reported. On the assumption that this lag is necessary for the surveys, some interim form of direct reporting is urgently needed for major units to keep current quarterly estimates somewhat on track. For financial transactions, part of this need is met by the very useful quarterly survey of retirement system assets. That survey is limited to about 115 retirement funds which hold most of the dollar totals of retirement systems. For other government funds, all that is known in financial activity beyond the Census surveys are bank reports on government deposits, the Treasury survey of ownership on U.S. obligations and agency securities, and gross public offerings of debt securities. Thus, with the present data for this sector, much financial analysis is based mainly on hearsay and market talk.

Recommendation:

The Census Bureau should collect quarterly data on cash and security holdings of State and local governments. These data could be collected as an expansion of the proposed quarterly survey of

State and local expenditures and nontax revenues discussed in Chapter 5.

3. Sector distribution of fixed capital formation

An earlier part of this chapter mentions that flow of funds accounting produces estimates of sector gross investment that ought to be equal to the NIPA calculations of gross saving for the same sectors and that can be compared with the NIPA measures of saving. A major part of this alternative estimate is physical capital formation, distributed among households, nonprofit organizations, noncorporate business, and corporate business. Estimating the corporate component is basic to the distinction between personal and corporate saving which appears explicitly in the NIPA, while the other components contribute valuable meaning to the nature of the personal saving total.

Annual NIPA estimates have included a breakdown of net inventory investment between corporate and noncorporate holders. BEA also has prepared unpublished estimates of purchases of residential construction and business plant and equipment for use in the flow of funds accounts.

With the newly benchmarked accounts, a capital consumption adjustment divided among types of savers and capital consumption allowances are now published annually. The allowances and adjustments are derived from a perpetual-inventory calculation of stocks of fixed assets valued in current, constant, and historical prices. These fixed-asset stocks are a major ingredient for a system of complete sector balance sheets presently being developed in the flow of funds accounts and discussed in the following section. As these measures are not prepared quarterly, a sectoral reconciliation of income, expenditures, and balance sheet items cannot be made on a current basis.

Recommendation:

The Bureau of Economic Analysis should provide quarterly measures of fixed capital outlays, stocks, and capital consumption charges by sector and by type of capital as part of the national income and product estimates.

4. Ownership of nonfinancial assets

Flow of funds accounting generates much of the information needed for compiling aggregate balance sheets of individual sectors or of the economy as a whole, and these balances of assets and liabilities contribute vitally to an analysis of the financial flows that are reported quarterly. Empirically the system gives evidence that financial flows, while integrated in an accounting sense with nonfinancial activities, occur for the purpose of adjusting balance sheet positions to changes in activity and that such adjustment processes affect nonfinancial activity. To illuminate these processes, flow of funds publications include tables of outstanding claims held by and owed by the several sectors of the system, presenting them both in sector position tables and in market condition tables.

The balance sheets that have been published so far in the system have been incomplete, however, in that they have included only financial claims on the asset side and have omitted nonfinancial assets. Without physical and intangible assets, there have been no estimates of sector net worth, which by definition consists of total nonfinancial and financial assets less total liabilities. Thus it has not been possible with the accounts to examine debt-equity (equity=net worth) ratios or to relate specialized forms of debt, such as mortgages, to the physical properties that secure them.

In the last two decades, there has been substantial progress in the Government in compiling the basic aggregates on nonfinancial assets which would permit more complete balance sheets. Building on earlier private research by Goldsmith, Kendrick, and others, BEA has developed extensive and detailed compilations of reproducibles such as houses, business structures, and machinery that can be stated in valuations that are consistent in both pricing and depreciation methods. This material constitutes an important step toward more complete balance sheets and is presently being integrated into flow of funds accounting to pursue that goal.

Beyond the reproducibles, there are two broad categories of assets—land and intangibles—for which the data are thin or nonexistent in forms that allow sensible aggregation and for which even the conceptual basis for measurement has not been thoroughly worked out. This is particularly true of intangibles—leaseholds, patents, mineral rights, timbering rights, and the like—which represent substantial relationships among sectors but are seldom recorded in forms that are relevant to national compilations. Land is more manageable in concept and a more clear-cut element of any balance sheet, but the information available is sketchy outside of farming, where the Department of Agriculture makes comprehensive measures of market values of properties. For the nonfarm sector, it has been necessary to use such occasional data as tax assessments and residential land-to-structure values related to Government-insured mortgages.

Recommendation:

Basic research should be conducted on the measurement of land values with respect to use, ownership, encumbrances, and intangibles related to

natural resources and leases. The National Bureau of Economic Research is urged to devote one or more sessions of its annual meetings of the U.S. Conference on Research in Income and Wealth in the near future to this subject.[4]

5. Disaggregation of households

The household sector includes two substantial groups—personal trust funds and nonprofit organizations—that are different from individuals in their financial management and should be separated out to the extent possible. They are in the sector because data for identifying them have been scarce and sketchy for the period covered by the accounts. Households are the principal residual sector, as mentioned earlier, and without information these other two groups fall into the household numbers by default.

a. Personal trust funds

Information on personal trust funds has improved in recent years through the annual tabulations of bank trust departments which have been done by Federal banking agencies since 1968. The data are only annual, however, and do not become available for almost a year. The classification of items is also less useful than it could be for studying trust department activity in financial markets.

Recommendation:

The Federal Reserve Board, Federal Deposit Insurance Corporation, and Comptroller of the Currency should improve bank trust department reporting by collecting the data quarterly or semiannually, speeding up the tabulation of the annual data to 6 months after the reference year, and refining the classification of financial components, e.g., separate tabulations of domestic corporate bonds, foreign corporate bonds, and other major market instruments.

b. Nonprofit organizations

Nonprofit organizations are probably smaller in dollars of financial assets than personal trusts, and they are diverse in nature, ranging from foundations to medical and school institutions and labor unions. While there have been scattered and summary reports on some types of nonprofit groups, none of the material has been useful for longer-term financial analysis and is virtually nonexistent for current work.

A start, however, is being made on filling this gap. The postscript to Chapter 3 reports on the decision of the Census Bureau to include for the first time a census of nonprofit organizations (except religious membership organizations) among the quinquennial economic censuses next scheduled to cover the year 1977. Although data on financial transactions will probably be very limited, this census will nonetheless be an important advance by providing data on dollar receipts and expenditures and complete, or nearly complete, rosters of nonprofit organizations by type and purpose. These, in turn, can serve as sampling frames for a series of follow-up sample surveys to obtain the required data.

Recommendation:

The OMB Statistical Policy Division should assume responsibility for organizing and guiding an interagency task force to exploit the new census of nonprofit organizations for preparing measures of expenditures and financial transactions to be used in the national income and product and the flow of funds accounts.

c. Income and expenditures of wealthy individuals

A third form of household disaggregation which would be of great value is a separation of wealthy individuals from the total. The beginnings for this exist in IRS estimates of personal wealth based on estate tax returns. These are estimates of total personal assets for that set of individuals with gross estates in excess of $60,000 with as much classification by type of asset as feasible. This work is still developmental. It has been done only for a few years—1962, 1969, and 1972 so far—and consists only of balance sheet conditions, so it is still far from providing a statement of activities over time for this category of people. Such work can never produce current information, but the IRS estimates of personal wealth provide an important background for the study of financial developments. A complete statement for the category of wealthy individuals would require information on the income and expenditures of the group subject to estate taxes—a far more ambitious project.

There is, however, a project under way in the IRS that should provide much of the required data on the income of wealthy individuals. IRS now has in progress personal wealth estimates by size class based on estate tax returns for the year 1976. Each estate return will be matched with the income tax of the decedent fof 1974, and possibly for 1969.

Recommendation:

The Internal Revenue Service project on personal wealth estimates should be adequately funded. In addition, the OMB Statistical Policy Division should

[4] A major start on the conceptual problems to be faced in nonfinancial asset measurement appears at the United Nations level in their publication, "The Proposed Balance Sheet and Reconciliation Accounts of the System of National Accounts" by Harold Spicer, a publication identified as ST/STAT. 70, (15 October 1973).

take the leadership in forming an interagency task force to monitor this IRS effort in order to appraise the usefulness of the results and the frequency of repeating the project, and to give thought as to how the project could be extended to cover the expenditures of wealthy individuals.

6. International flows

The Treasury's monthly tabulations are the principal data source for international flows in loans, deposits, and securities. The BEA's quarterly statements of international transactions show clearly the integration of Treasury data into the quarterly statement. Nevertheless a troublesome problem remains in relating the Treasury's definition of a "bank" to the scope of the banking system in broader banking statistics, and also in relating the Treasury's classification of claims with the structure of banking statistics. Integration of international flows into domestic financial developments would be very much improved by some work on reconciling definitions. This has been tried in the past without notable success, but it is still a worthwhile goal for statistical policy.

Recommendation:

The OMB Statistical Policy Division should establish an interagency task force to reconcile operational definitions on international transactions used by the Bureau of Economic Analysis, Treasury Department, and the Federal Reserve System.

7. International investment position

The balance sheet counterpart of the BEA's international transactions statements has been much improved in recent years, but the investment position statements are not complete historically.

Recommendation:

The Bureau of Economic Analysis should prepare a time series on the U.S. international investment position from 1948 forward.

APPENDIX

Statistical Discrepancies in Sector Saving Estimates

The text mentions that flow of funds accounting yields estimates of personal and other forms of saving that are statistically independent of the NIPA. Using consistent definitions, flow of funds sector net totals of investment less borrowing are conceptually equivalent to the NIPA forms of saving and differ from them only by statistical discrepancies between the NIPA and the data and procedures used in flow of funds compilations. The discrepancies that emerge from the calculation have a complex structure which cannot be well described within the scope of this paper, but in broadest outline the experience for recent years is summarized in the following table.

Discrepancy Structure of Saving Estimates in Flow of Funds and NIPA, 1971-75.

(billions of dollars)

	Households (1)	Business (2)	Financial Other sectors (3)	NIPA discrepancy (4)	Discrepancies (5)
1971	−11.1	13.9	−1.9	1.3	2.2
1972	−14.0	16.4	.2	1.7	4.3
1973	−9.2	16.1	.5	2.6	10.0
1974	−24.6	11.9	4.4	6.6	−1.7
1975	025.0	14.3	2.5	4.4	−3.8

Note: Columns 1-3 = sources of funds minus uses of funds in the flow of funds accounts.

Column 4 = statistical discrepancy in the national income and product accounts.

Column 5 = sum of columns 1 through 4.

Source: Federal Reserve Board and Bureau of Economic Analysis.

This table is a summary of a more detailed statement that appears in the standard quarterly publication. It has a simple structure in that column (5) is the arithmetic sum of the first four columns. Column (5) is by no means the residual of the system, and any one of the five columns might have been used here as the balancing item by changing signs suitably. The table merely pictures in one way the accounting constraint that all of the discrepancies in the system are interrelated in this way and can be discussed in terms of one another.

The principal feature of flow of funds discrepancies is plainly the chronic offset between negative household discrepancies and positive business discrepancies. The signs of the numbers in the table state that household net investment in capital goods and financial assets less borrowing in flow of funds accounts virtually always come out larger than the NIPA-based estimate of household saving required to finance that net investment. That is, within the household capital account, measured uses of funds typically are larger than measured sources of funds. For business the relation is the opposite, with sources larger than uses. It is interesting that this relation between household and business discrepancies appears to hold in most countries around the world that have flow of funds accounts detailed enough to

distinguish households and business and to relate the NIPA to financial data.

There are one or two highly probable sources for some of this household-business relation, of which the most important may be real estate transactions, sales of patents, and the like. These are not covered in the investment totals in the NIPA, because they are not part of goods and services production, and the information available for estimating them is too thin for useful flow of funds estimates. If in general the business sector is a net buyer of land from other sectors, both households and governments, while households are net sellers to both business and government, the omission of these transactions from the accounts would tend to produce discrepancies of the signs that appear in the table. The same would arise from business purchases of mining and timbering rights that are also omitted from the accounts. Another possible source of discrepancies is through incorporation of noncorporate business or, statistically the same thing, purchases of noncorporate businesses by corporations. The relation of such transactions to discrepancies is statistically more complicated than for real estate trading, but the effect is likely to be the same.

While real estate and the like probably account for several billion dollars of discrepancies, available data give no hint that such transactions could explain most of the household-business discrepancy pattern. Many other errors and omissions are plainly present in the system. There are far too many to discuss in this context. If the NIPA data contribute to the problem, one possibility is that methods for distributing production put too much into consumption and not enough into corporate business investment. There are also many uncertainties in financial asset distributions between individuals and corporations which need to be explored. It is for inquiry into both questions that the preceding text has emphasized the need for better business data, both in capital investment and in financing.

CHAPTER 10

SIX-YEAR PROGRAM OF DATA IMPROVEMENT

The purpose of the priority rankings is to develop a schedule for implementing the Committee's recommendations and to serve as a guideline for agencies and the Statistical Policy Division in assessing budget priorities and program development. As mandated in the Committee's charter the schedule focuses on the six years 1978-1983. The years indicate when the projects should begin. The general concept used in ranking is that improvements scheduled in the earlier part of the period have a greater priority than those in the latter years. There are several programs of lesser importance which are included in the early years because they are relatively easy to implement and involve little or no additional budget.

Three criteria were used in assessing the priorities for each of the quarterly and annual data improvements: (a) the size of the dollar transactions and the effect on the level of the data item; (b) the impact on the quarterly and annual movements—i.e., period-to-period changes in the dollar transactions of the data item; and (c) the feasibility of implementing the recommendation, including the technical difficulty and the burden on survey respondents. Judgmental values of 1, 2, and 3 (3 being the highest value) were assigned to each criterion. These yielded an initial distribution for scheduling the improvements over the 6 years.

Budgetary costs of the recommended improvements were not included as a factor in the priority rankings because the cost information available to the Committee was of very general magnitudes, and for several programs were not provided by the data producing agencies.

The ranking and scheduling was first done by chapter. The yearly scheduling was then compiled for all chapters. This comprehensive scheduling was reviewed in order to avoid a concentration in 1 or 2 years of difficult projects for a single agency or division within an agency. In this review, no bunching was apparent that would create excessive workload problems for individual agencies.

For the quinquennial economic censuses, a more summary method was used because some of the Committee's recommendations are planned for incorporation in the forthcoming 1977 economic censuses. Those improvements not adopted in the 1977 censuses are recommended for the 1982 censuses, and in one case for 1987, because the data item is not typically maintained in company records. The recommendations for the economic censuses are keyed to the reference year of the census—1977, 1982, or 1987.

1977 RECOMMENDATIONS
(For economic censuses or census year)

Recommendation	Bureau	Estimate	Page
DEPARTMENT OF COMMERCE			
Expand application of I-O table to cross-check increased number of GNP components.	BEA	Benchmark	32
Collect in economic censuses data on communications, repairs, rentals, energy & advertising services purchased by establishments.	Census	Quinquennial I-O table.	18
Expand census of selected services to all services for profit.	Census	Quinquennial I-O table	19
Conduct census of not-for-profit organizations excluding religious organizations.	Census	Quinquennial I-O table	19
In census of construction, collect new and maintenance and repair receipts by type of construction.	Census	Quinquennial I-O table	21
Collect data on force account construction and transportation payrolls in economic censuses.	Census	Quinquennial I-O table	23
Collect and tabulate dollar value of shipments by 4-digit SIC shipping and receiving industries from Commodity Transportation Survey.	Census	Quinquennial I-O table	24
Tabulate sales by class of customer in census of retail trade.	Census	Quinquennial I-O table	24
Collect in all economic censuses book value beginning and end-of-year inventories by method of valuation.	Census	Quinquennial I-O table	26
Collect in all economic censuses mandatory separate from voluntary wage supplements.	Census	National income benchmark	30
DEPARTMENT OF DEFENSE			
Tabulate total tonnage of domestic shipments by water carriers at 4-digit SIC level every quinquennial economic census year.	Corps of Engineers	Quinquennial I-O table	28
INTERSTATE COMMERCE COMMISSION			
Tabulate class II motor carrier data at same level of detail as for Class I carriers every quinquennial census year.		Quinquennial I-O table	28

1978 RECOMMENDATIONS

DEPARTMENT OF COMMERCE			
Prepare and publish handbook on methodology used in the national income and product accounts.	BEA	All NIPA estimates	8
Institute 75-day GNP estimate.	BEA	Current quarterly estimates	116
Provide more complete & timely statement on judgments used for estimating major GNP components.	BEA	15 day quarterly estimate	117

PROGRAM OF DATA IMPROVEMENT

Recommendation	Bureau	Estimate	Page
Expand monthly personal income estimates to encompass broad aggregates for the disposition of personal income.	BEA	Monthly personal income	117
Conduct periodic reconciliations of GNP by industry and industrial production index (with FRB).	BEA	Real GNP by industry	142
Work more closely with BLS to increase concordance of expenditure classes in CPI with PCE components.	BEA	Real personal consumption expenditures	144
Consider possible introduction of productivity measures for deflating Federal Government employee compensation.	BEA	Real government purchases	154
Use partial BLS export and import prices until more complete data are availble.[1]	BEA	Real net exports	152
Examine feasibility of up-dating quinquennial I-O coefficients to current year being estimated using the annual I-O tables.	BEA	GNP by industry	56
Review present procedure of deferring use of information from special reports until benchmark estimates.	BEA	Mainly annual estimates	48
Review detailed annual components presently published to assess if they meet reliability standards appropriate for publication and for the detailed components that are published, provide an indication of recent errors in estimation.	BEA	Annual NIPA estimates	39
Institute quarterly survey of expenditures and nontax revenue of State and local governments.	Census	State and local government purchases	103
Provide preliminary tabulations of local government tax revenues from Quarterly Summary of State & Local Tax Revenue by 60 days after reference quarter.	Census	Indirect business taxes	115
DEPARTMENT OF LABOR			
Work more closely with BEA to increase concordance of classes in CPI with PCE components.	BLS	Real personal consumption expenditures	144
Adhere to schedule to provide unemployment claims & payments data in time for 75-day GNP estimate.	ETA	Federal government expenditures	119
DEPARTMENT OF TREASURY			
Adhere to schedule of providing monthly data on withdrawals from bonded warehouses in time for 75 day GNP estimate.	BATF	Indirect business taxes	115
FEDERAL RESERVE BOARD			
Conduct periodic reconciliation on GNP by industry and industrial production index (with BEA).		Real GNP by industry	142

Recommendation	Bureau	Estimate	Page
In deciding on continuation of demand deposit ownership survey, give priority to use in NIPA estimates.		Net interest	46
FEDERAL HOME LOAN BANK BOARD			
Provide quarterly estimates of income and expenses of savings and loan associations.		Corporate profits and net interest	112
INTERSTATE COMMERCE COMMISSION			
Assure continued tabulation of water carrier data.		Quinquennial and annual I-O tables	28
OFFICE OF MANAGEMENT AND BUDGET			
Coordinate continuing studies of seasonality by major statistical agencies.	SPD	Monthly and quarterly estimates	118
Implement Federal Data Procurement System.	OFPP	Federal government purchases	27

1979 RECOMMENDATIONS

DEPARTMENT OF AGRICULTURE			
Conduct more conceptual research on seasonal phenomena.	ERS	Quarterly farm income	137
Speed up collection of data on the movement of crops to market for soybeans, corn, wheat, cotton, and sorghum to 60-65 days after reference quarter.	SRS	Farm income	129
Refine the existing quarterly data on farm crops owned by farmers but stored in off-farm elevators and warehouses.	SRS	Farm inventory change	137
DEPARTMENT OF COMMERCE			
Refine instructions to Shippers' Export Declarations (SED's) relating to Foreign Military Sales (with Census).	DIBA	Net exports	168
Refine definitions for inventories and final output to distinguish structures and equipment under construction/ production from those that have been completed.	BEA	Nonfarm inventory change	26
Prepare benchmark NIPA estimates within one year of completion of quinquennial I-O table.	BEA	Quinquennial benchmark	32
Comprehensive examination of the sampling procedure & statistical methodology used in the Plant & Equipment Survey.	BEA	Quarterly producers' durable equipment	92
Establish developmental project on defense prices as permanent part of BEA program.	BEA	Real Federal government purchases	154
Provide current quarterly unadjusted income & product estimates.	BEA	Flow of funds	184

PROGRAM OF DATA IMPROVEMENT

Recommendation	Bureau	Estimate	Page
Analyze reasons for revisions in detailed NIPA components in successive annual revisions.	BEA	Quinquennial benchmark	40
Publish analyses of revision changes with each quinquennial benchmark comparable to that in DIP study.	BEA	Quinquennial benchmark	40
Speed up revised price index of single family homes to be available 65-70 days after the reference quarter.[1]	Census	Real construction	148
Collect annual data on oil and gas drilling and exploration classified by footage drilled and depth of wells (with FEA).	Census	Real construction	149
Study feasibility & impact of collecting revised data for preceding month in monthly retail trade survey.	Census	Quarterly personal consumption expenditures	86
Exclude sales & amusement taxes in Monthly Selected Services Receipts Survey.[1]	Census	Quarterly personal consumption expenditures	88
Tabulate industry-product shipments in annual survey of manufactures as is done in census of manufactures.	Census	Annual I-O tables	52
Restore bilateral merchandise trade reconciliation program with Canada.	Census	Net exports	166
Study quality of reporting on SED's for merchandise exports.	Census	Net exports	165
Refine instructions to SED's relating to Foreign Military Sales (with DIBA).	Census	Net Exports	168
Collect monthly data on the value of structures and large equipment under construction/production and the amount that has been completed.	Census	Nonfarm inventory change	27
DEPARTMENT OF LABOR			
Tabulate data from new pension reporting system in national industry aggregates by mid-May following the plan year (with IRS).		Annual supplements to wages and salaries	46
Conduct labor and material requirements studies more frequently and for more construction types.	BLS	Quinquennial Input-Output table	21
Conduct broad-based research program for monthly establishment survey of employment and earnings (BLS 790).	BLS	Monthly wages and salaries	107
Request adequate funding for price index improvement program.	BLS	Real gross national product	142
Calculate monthly indexes of tenant rentals separately for single and multi-family homes.[1]	BLS	Real personal consumption expenditures	145
Speed up collection of 4th Quarter wage data from the unemployment insurance system so that the data are available by mid-May following the reference period.	BLS	Annual wages and salaries	46

GNP DATA IMPROVEMENT PROJECT REPORT

Recommendation	Bureau	Estimate	Page
DEPARTMENT OF TREASURY			
Tabulate data from new pension reporting system in national industry aggregates by mid-May following the plan year (with DOL).	IRS	Annual supplements to wages and salaries	46
Specify and tabulate method of valuing inventories on IRS business tax forms.	IRS	Inventory valuation adjustment	26
FEDERAL ENERGY ADMINISTRATION			
Collect annual data on oil & gas drilling & exploration classified by footage drilled & depth of wells (with Census).		Real construction	149
FEDERAL POWER COMMISSION			
Speed up monthly data on electric & gas utilities.		Quarterly corporate profits	112
FEDERAL TRADE COMMISSION			
Conduct annual survey of audited corporate profits and other selected financial items as supplement to Quarterly Financial Report with tabulations available to BEA by mid-May following the reference year.		Annual corporate profits	47
OFFICE OF MANAGEMENT AND BUDGET			
Provide budgetary reserve for carrying out essential survey on short notice.	SPD	Mainly quarterly estimates	118
Establish interagency task force to reconcile definitions on international transactions.	SPD	Flow of funds	188
SECURITIES AND EXCHANGE COMMISSION			
Explore feasibility of tabulating on a consistent basis selected financial information from the quarterly & annual reports of all registered nonfinancial corporations.	Office of Economic Research	Flow of funds	185

1980 RECOMMENDATIONS

DEPARTMENT OF AGRICULTURE			
Collect quarterly data on interstate sales and purchases of feeder and stocker cattle.	SRS	Farm inventory change	130
Speed up annual Economic Survey of Agriculture.	SRS	Farm income	132
DEPARTMENT OF COMMERCE			
Study feasibility of providing supplementary inventory measures of goods and structures separately for those in production from those completed but not sold.	BEA	Nonfarm inventory change	27
Conduct systematic analysis of FTC manufacturing inventory data.	BEA	Quarterly change in business inventories	99
Conduct basic research for developing direct measures of export and import services in constant dollars (with BLS).	BEA	Real net exports	152

PROGRAM OF DATA IMPROVEMENT

Recommendation	Bureau	Estimate	Page
Collect & tabulate broad product detail on sales of new car dealers and department stores in Annual Retail Trade Survey in time for 2nd July revision.	Census	Annual personal consumption expenditures	50
Speed up tabulations of governmental finances to be available by mid-May following the reference period.	Census	Annual State and local government expenditures & revenue	48
Update every 5 years progress patterns & adjustment factors for single family value of construction put in place.	Census	Construction	89
Update study of coverage of F.W. Dodge reports.	Census	Construction	90
Explore feasibility of using screened sample of firms with actual retail inventory records in monthly retail trade survey.	Census	Nonfarm inventory change	100
Tabulate existing industry sales data from industrial directory programs, and collect through annual survey program of all non-agriculture industries aggregate costs of goods & services purchased from others.	Census	Annual I-O tables	54
Tabulate value of transportation freight charges separately from insurance and other handling charges for merchandise imports by country.	Census	Net exports	173
DEPARTMENT OF DEFENSE			
Speed up progress payments data.	OASD	Federal purchases	102
Provide to BEA quarterly data on value of defense purchases from foreign suppliers divided between goods imported into the U.S. and those goods and services used abroad.	OASD	Net exports	168
DEPARTMENT OF LABOR			
Increase coverage of equipment items in WPI.	BLS	Real producers' durable equipment	145
Conduct basic research for developing direct measures of export and import services in constant dollars (with BEA).	BLS	Real net exports	152
DEPARTMENT OF TREASURY			
Tabulate wage and FICA data from probability sample of Employer's Quarterly Federal Tax Returns (form 941) in time for 75 day GNP estimate.	IRS	Employee compensation	108-109
FEDERAL TRADE COMMISSION			
Collect data on employer contributions to private pension, health and welfare employee benefit plans as part of QFR.	Bureau of Economic.	Supplements to wages and salaries	109
OFFICE OF MANAGEMENT AND BUDGET			
Organize interagency task force on possible uses of census of nonprofit organizations.	SPD	National income and product accounts and flow of funds accounts	187

GNP DATA IMPROVEMENT PROJECT REPORT

1981 RECOMMENDATIONS

Recommendation	Bureau	Estimate	Page
DEPARTMENT OF AGRICULTURE			
Speed up annual reports of production, disposition, and gross income to the 1st Quarter of the calendar year following the crop year.	SRS	Farm income	129
Institute a survey to collect quarterly data on farm production expenses for major cost items.	SRS	Farm income	132
Collect quarterly national inventory data for cattle and calves.	SRS	Farm income	137
DEPARTMENT OF COMMERCE			
Make continuing efforts to improve distribution of international travel questionnaire by Customs Bureau.	BEA	Quarterly net exports	170
Prepare historical time series on the U.S. international investment position.	BEA	Flow of funds	188
Introduce full probability sample for monthly survey of Manufacturers' Shipments, Inventories, & Orders (M3-1).	Census	Producers' durable equipment and change in business inventories	93 & 98
Include inventories of sales branches and auxiliary establishments in the M3-1.	Census	Change in business inventories	98
Study feasibility of collecting revised data on shipments & inventories in the M3-1.	Census	Producers' durable equipment and change in business inventories	93 & 98
Study feasibility of collecting revised data on inventories for previous month in Monthly Wholesale Trade Survey.	Census	Change in business inventories	100
Collect through annual survey program of all nonagricultural industries capital expenditures separately for plant & equipment depreciated or amortized.	Census	Annual I-O tables	54
Collect quarterly data on cash & security holdings of State & local governments.	Census	Flow of funds	184
Speed up tabulations of Annual Retail Trade Survey by mid-May following the reference period.	Census	Annual personal consumption expenditures and change in business inventories	44 & 50
Develop quarterly construction output price indexes excluding land costs for nonresidential buildings.	Census	Real construction	149
Conduct annual surveys of not-for-profit organizations.	Census	Annual personal income and consumption expenditures	50

PROGRAM OF DATA IMPROVEMENT

Recommendation	Bureau	Estimate	Page
DEPARTMENT OF HEALTH, EDUCATION & WELFARE			
Speed up medical vendor payments data.	Social & Rehabilitation Service	Government purchases	104
Collect quarterly data on premiums, benefits & operating expenses from Blue Cross-Blue Shield.	SSA	Personal consumption expenditures	88
DEPARTMENT OF LABOR			
Prepare quarterly price indexes of Federal government procurement consistent with the proposed Federal Procurement Data System classifications.	BLS	Real government purchases	155
DEPARTMENT OF TREASURY			
Institute research program to collect direct data on "other private income" transactions from banks and nonbanks.	OASIA	Net exports	176
Specify and tabulate business expenses associated with farm business receipts on IRS corporate and partnership forms.	IRS	Farm income	134
Tabulate annual income data for detailed categories of professions.	IRS	Annual personal consumption expenditures	50

1982 RECOMMENDATIONS

DEPARTMENT OF AGRICULTURE			
Collect annual survey data on output and marketings of greenhouse and nursery products.	SRS	Farm income	129
Institute research program for measuring intrastate sales and purchases of meat animals.	SRS	Farm income	130
Collect annual data in Economic Survey of Agriculture for cash and in-kind share rental payments divided between dwellings and land.	SRS	Farm income	132
Tabulate income and expense data in Economic Survey of Agriculture by legal form of organization.	SRS	Farm income	134
Collect quarterly data on new farm construction.	SRS	Construction	91 & 132
DEPARTMENT OF COMMERCE			
Collect total purchased services in economic censuses.	Census	Quinquennial I-O table	18
Expand census of selected services to include purchases of commodities for resale.	Census	Quinquennial I-O table	19
Extend census of not-for-profits to religious organizations.	Census	Quinquennial I-O table	19
Expand census of construction industries to collect intermediate purchases separately for materials and services.	Census	Quinquennial I-O table	21
Conduct census of transportation industries.	Census	Quinquennieal I-O table	22

Recommendation	Bureau	Estimate	Page
Expand census of retail trade to collect data on gross margins and operating expenses by kind of business.	Census	Quinquennial I-O table	22
Review merchandise and commodity lines in censuses of retail and wholesale trade to conform more closely with SIC codes.	Census	Quinquennial I-O table	22
If recommended CTS tabulation of shipments not feasible, collect sales by class of customer in every quinquennial census of manufactures.	Census	Quinquennial I-O table	24
Study feasibility of collecting itemized data on purchased goods and services of State and local governments.	Census	Quinquennial I-O table	24
Conduct census of real estate industry.	Census	Quingennial I-O table	25
Collect in manufacturing and trade censuses the commodity composition of inventories by turnover period.	Census	Quinquennial I-O table	26
Improve reporting of wages and salaries in economic censuses.	Census	National income benchmark estimates	29
Collect in all economic censuses detail on type of program for mandatory and voluntary wage supplements.	Census	National income benchmark estimates	30
Collect in economic censuses (except governments) depreciation charges on establishment basis from firms of all sizes.	Census	National income benchmark estimates	30
Study feasibility and impact of collecting revised data for preceding month in Monthly Selected Services Receipts Survey.	Census	Personal consumption expenditures	88
Expand Monthly Selected Services Receipts Survey to include private for-profit commercial & vocational schools.	Census	Personal consumption expenditures	88
Expand SORAR sample size and restore quarterly tabulations of data on a more timely basis.	Census	Construction	90
Refine reporting of shipments by defense-oriented industries to insure uniform timing in monthly survey of Manufacturers' Shipments, Inventories, and Orders (M3-1).	Census	Producers' durable equipment and nonfarm inventory change	93 & 98
Explore collection of inventory data by stage of fabrication for military hardware in M3-1.	Census	Nonfarm inventory change	98
Tabulate data on wholesalers' inventories in annual wholesale trade survey by mid-May following the reference period.	Census	Nonfarm inventory change	44
Explore feasibility of constructing price index for residential additions and alterations.	Census	Real construction	148
Collect through annual survey program of all nonagricultural industries:	Census	Annual I-O tables	54
—depreciation allowances & accidental damage to fixed capital			
—yearend value of inventories by method of valuation.			
Expand bilateral merchandise trade reconciliation program to other countries.	Census	Net exports	166

PROGRAM OF DATA IMPROVEMENT

Recommendation	Bureau	Estimate	Page
DEPARTMENT OF DEFENSE			
Study feasibility of refining financial accounting required to identify exports under FMS whose transportation was arranged by DOD.	OASD	Net exports	168
DEPARTMENT OF LABOR			
If wholesale equipment prices at time of shipment cannot be collected, conduct periodic surveys of pricing practices in the equipment industries.	BLS	Real producers' durable equipment	146
DEPARTMENT OF TREASURY			
Modify new subannual survey of commercial banks to provide tabulations 65-70 days after reference quarter & to distinguish income from domestic & foreign entities (with FRB & FDIC).	Comptroller of the currency	Corporate profits and net interest	112 & 113
Improve bank trust department reporting (with FRB & FDIC).	Comptroller of the currency	Flow of funds	186
Tabulate from corporate tax returns Schedule M which reconciles tax returns and stockholder reports.	IRS	Annual corporate profits	47
FEDERAL DEPOSIT INSURANCE CORPORATION			
Modify new subannual survey of commercial banks to provide tabulations 65-70 days after reference quarter & to distinguish income from domestic & foreign entities (with FRB & Treasury).		Corporate profits and net interest	112 & 113
Improve bank trust department reporting (with FRB & Treasury).		Flow of funds	187
FEDERAL RESERVE BOARD			
Modify new subannual survey of commercial banks to provide tabulations 65-70 days after reference quarter & to distinguish income from domestic & foreign entities (with FDIC & Treasury).		Corporate profits and net interest	112 & 113
Improve bank trust department reporting (with FDIC & Treasury).		Flow of funds	187
OFFICE OF MANAGEMENT AND BUDGET			
Establish interagency task force on personal wealth estimates.	SPD	Flow of funds	188

1983 RECOMMENDATIONS

DEPARTMENT OF AGRICULTURE			
Collect secondary type income every third year for both livestock & crop farming.	SRS	Farm income	129 & 131
Collect annual survey data relating to rents & expenses of farm dwellings.	SRS	Farm income	131
Collect every 5 years separate figures for value of residential and non-residential buildings at replacement costs.	SRS	Farm income	131

Recommendation	Bureau	Estimate	Page
Collect annual data in Economic Survey of Agriculture on market value of non-residential buildings and other depreciable improvements separately from land.	SRS	Farm income	133
Consider modifying Economic Survey of Agriculture questions on gross sales and net income and possibly collecting gross and net income from same source.	SRS	Farm income	134
DEPARTMENT OF COMMERCE			
Conduct benchmark survey on private international transactions for miscellaneous services of U.S. business.	BEA	Net exports	174
Conduct bilateral reconciliation program for international service and income transactions.	BEA	Net exports	177
Prepare quarterly measures of fixed capital outlays, stocks & capital consumption charges by sector & type of capital.	BEA	Flow of funds	186
Collect separate data on capital shipments to governments in monthly survey of Manufacturer's Shipments, Inventories and Orders.	Census	Producers' durable equipment	93
Collect supplements to wages & salaries through annual survey program of all nonagricultural industries.	Census	Annual I-O tables	54
Explore feasibility of developing output price indexes for electric power, sewer, water supply and railroad construction.	Census	Real construction	149
If recommended expansion of Commodity Transportation Survey is successful, provide these expanded data annually.	Census	Annual consumption expenditures and producers' durable equipment	47 & 51
Conduct annual survey of real estate industries.	Census	Annual structures estimate	43
DEPARTMENT OF HEALTH, EDUCATION & WELFARE			
Explore collection of nonfarm self-employment income data in proposed quarterly household income survey.[2]	ASPE	Proprietors' income	110
Collect gross (and if possible net) rental income separately for nonfarm residential & nonresidential properties in proposed quarterly household income survey.[3]	ASPE	Rental income	114
Collect quarterly data on premiums & benefits of large for-profit commercial health insurance.	SSA	Personal consumption expenditures	88
DEPARTMENT OF LABOR			
Price household items of increasing importance not presently covered in consumer price index.	BLS	Real personal consumption expenditures	144
DEPARTMENT OF TREASURY			
Use industrial directory every 3 years to update. Treasury/Federal Reserve coverage of nonbank firms.	OASIA	Net exports	176
FEDERAL TRADE COMMISSION			
Review possible speedup of working capital quarterly survey.		Change in business inventories	101

Recommendation	Bureau	Estimate	Page
NATIONAL BUREAU OF ECONOMIC RESEARCH			
Conduct session on land & intangible assets as part of U.S. Conference on Research in Income & Wealth.		Flow of funds	187

1987 RECOMMENDATION

DEPARTMENT OF COMMERCE			
[1] Distinguish receipts from primary and secondary output by class of customer in census of selected services.	Census	Quinquennial I-O table	19

[1]Little or no money involved. Easily implemented.
[2]Survey not to be implemented until 1982.

GLOSSARY

AFDC	Aid to families with dependent children
ARTS	Annual Retail Trade Survey
ASM	Annual Survey of Manufacturers
AT&T	American Telephone and Telegraph
BATF	Bureau of Alcohol, Tobacco and Firearms (Dept. of the Treasury)
BCS	Business Conditions Survey
BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
BOP	Balance of payments
CBI	Change in business inventory
CCC	Commodity Credit Corporation
CCES	Continuing Consumer Expenditure Survey
CD	Certificate of deposit
CIF	Cost-insurance-freight
CPI	Consumer Price Index
CPS	Current Population Survey
CSC	Civil Service Commission
CTS	Commodity Transportation Survey
DIP	Data Improvement Project
DOD	Department of Defense
DSAA	Defense Security Assistance Agency
E&O	Errors and omissions
ERISA	Employee Retirement Income Security Act
ERS	Economic Research Service
ESA	Economic Survey of Agriculture
FAS	Free alongside ship
FHA	Federal Housing Administration
FHLBB	Federal Home Loan Bank Board
FICA	Federal Insurance Contribution Act
FIFO	First in, first out
FMS	Foreign military sales
FPC	Federal Power Commission
FPDS	Federal Procurement Data System
FTC	Federal Trade Commission
FY	Fiscal year
GDP	Gross domestic product
GNP	Gross national product
GPO	Gross product originating
GSA	General Services Administration
HEW	Department of Health, Education and Welfare
I-O	Input-output
ICC	Interstate Commerce Commission
INS	Immigration and Naturalization Service
IRS	Internal Revenue Service
ISPI	Industry Sector Price Indexes

IVA	Inventory valuation adjustment
LIFO	Last in, first out
LMSA	Labor Management Services Administration
MTS	Monthly Treasury Statement
NBER	National Bureau of Economic Research
NIPA	National income & product accounts
OBE	Office of Business Economics
OFPP	Office of Federal Procurement Policy
OFSPS	Office of Federal Statistical Policy and Standards
OMB	Office of Management and Budget
P&E	Plant and Equipment Survey
PCE	Personal consumption expenditures
PDE	Producers' durable equipment
PPS	Probability proportionate to size
QFR	Quarterly Financial Report
R&D	Research and development
SD	Statistical discrepancy
SEC	Securities and Exchange Commission
SED	Shipper's export declaration
SIC	Standard Industrial Classification
SMSA	Standard Metropolitan Statistical Area
SORAR	Survey of Residential Alterations and Repairs
SPD	Statistical Policy Division (Office of Management and Budget)
SRS	Statistical Reporting Service
SSI	Supplemental security income
TDI	Temporary disability insurance
UCFE	Unemployment compensation for Federal employees
USDA	United States Department of Agriculture
WPI	Wholesale Price Index

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