

SURVEY OF CURRENT BUSINESS



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the BUSINESS SITUATION

REVISED (45-day) estimates show that real GNP was unchanged in the third quarter of 1982, compared with the 1-percent annual rate increase shown by the preliminary (15-day) estimates (table 1). The downward revision in real GNP was more than accounted for by a large—\$5 billion—downward revision in net exports.¹ The revision reflected a \$3 billion downward revision in merchandise exports in combination with a \$1½ billion upward revision in merchandise imports. In prior quarters in 1982 and 1981, revisions in exports and imports happened to be partially offsetting. The downward revision in merchandise exports reflected revisions to the August trade data and an overestimate of September exports. The unexpectedly low level of exports reflected the persistence of weak economic activity world-wide, particularly acute economic and financial problems of some major trading partners, and the continued strength of the dollar in exchange markets. The upward revision in merchandise imports largely reflected an underestimate of September imports; these estimates have been affected by increased volatility in the underlying monthly source data.

Revisions in the other major components of GNP were small: upward for nonresidential fixed investment (in producers' durable equipment) and change in business inventories (down for manufacturing and up for trade), and downward for personal consumption expenditures (down for goods and up for services). The increase in prices as measured by the GNP fixed-weighted price index was revised down from 6 to 5½ percent.

1. Quarterly estimates of the national income and product accounts are expressed at seasonally adjusted annual rates, and quarterly changes in them are differences between these rates.

The revisions in the real GNP estimates do not alter the picture of lackluster economic performance described in the October "Business Situation." Business inventories accumulated in the third quarter after liquidation in the second, but that positive contribution to the change in GNP was offset by a decline in final sales. Personal consumption expenditures and residential investment increased only slightly. Nonresidential fixed in-

vestment dropped substantially: Producers' durable equipment fell for the fourth consecutive quarter, and structures declined for the first time. Net exports registered a huge decline—exports dropped sharply as both goods and services declined, and imports were up as goods, both petroleum and nonpetroleum, increased. Government purchases increased substantially due to increases in defense purchases and purchases of the Commodity Credit Corporation.

Table 1.—Revisions in Selected Component Series of the NIPA's, Third Quarter of 1982

	Seasonally adjusted at annual rates			Percent change from preceding quarter at annual rates	
	15-day estimate	45-day estimate	Revision	15-day estimate	45-day estimate
Billions of current dollars					
GNP.....	3,091.4	3,080.7	-10.7	6.2	4.7
Personal consumption expenditures.....	1,989.5	1,987.5	-2.0	8.8	8.4
Nonresidential fixed investment.....	341.6	341.2	-.4	-11.5	-11.9
Residential investment.....	97.4	97.2	-.2	7.9	7.0
Change in business inventories.....	-.5	2.9	3.4		
Net exports.....	13.2	2.7	-10.5		
Government purchases.....	650.2	649.2	-1.0	12.8	12.1
National income.....		2,457.6			5.5
Compensation of employees.....	1,867.8	1,868.2	.4	3.7	3.8
Corporate profits with inventory valuation and capital consumption adjustments.....		165.9			29.2
Other.....	425.7	423.4	-2.3	6.8	4.5
Personal income.....	2,597.8	2,596.0	-1.8	7.3	7.0
Billions of constant (1972) dollars					
GNP.....	1,481.2	1,478.4	-2.8	.8	0
Personal consumption expenditures.....	958.4	957.7	-.7	1.4	1.1
Nonresidential fixed investment.....	161.0	162.0	1.0	-12.9	-10.8
Residential investment.....	40.5	40.7	.2	4.2	6.3
Change in business inventories.....	.7	2.3	1.6		
Net exports.....	30.7	25.7	-5.0		
Government purchases.....	290.0	290.0	0	6.8	6.8
Index numbers, 1972=100 ¹					
GNP implicit price deflator.....	208.71	208.38	-.33	5.4	4.7
GNP fixed-weighted price index.....	216.1	215.9	-.2	6.1	5.6
GNP chain price index.....				6.1	5.8

1. Not at annual rates.

NOTE.—For the third quarter of 1982, the following revised or additional major source data became available: For *personal consumption expenditures*, revised retail sales for August and September, and sales and inventories of used cars of franchised automobile dealers for August; for *nonresidential fixed investment*, manufacturers' shipments of equipment for August (revised) and September, construction put in place for August (revised) and September, and a partial tabulation of business expenditures for plant and equipment for the quarter; for *residential investment*, construction put in place for August (revised) and September; for *change in business inventories*, book values for manufacturing and trade for August (revised) and September; for *net exports of goods and services*, merchandise trade for August (revised) and September; for *government purchases of goods and services*, Federal unified budget outlays for September, and State and local construction put in place for August (revised) and September; for *wages and salaries*, revised employment, average hourly earnings, and average weekly hours for August and September; for *corporate profits*, domestic book profits for the quarter; for *GNP prices*, the Consumer and Producer Price Indexes for September, unit value indexes for exports and imports for September, and residential housing prices for the quarter.

Corporate profits

Corporate profits from current production—profits with inventory valuation and capital consumption adjustments—increased \$10½ billion to \$166 billion in the third quarter, following a decrease of \$1½ billion in the second. The increase followed three consecutive quarters of decrease. An increase in the domestic profits of nonfinancial corporations accounted for most of the increase; domestic profits of financial corporations increased and profits from the rest of the world decreased.

Domestic profits of nonfinancial corporations increased \$9 billion to \$124 billion in the third quarter, following a decrease of \$5½ billion in the second. The increase resulted from both an increase in real product of nonfinancial corporations and a more rapid increase in unit prices than in unit costs. The relatively low growth in unit costs reflected the third consecutive quarter of decline in the growth rate of unit labor costs.

The third-quarter increase in the domestic profits of nonfinancial corporations was largely due to an increase in the profits of manufacturing corporations. The increase in manufacturing profits was, in turn, largely due to a sharp increase in the profits of petroleum manufacturing corporations. Refineries' margins increased as wholesale prices for petroleum products increased sharply while their costs for crude oil increased only slightly. Increases and decreases in the profits of other manufacturing industries largely offset each other. The pattern generally mirrored the pattern of increases and decreases in constant-dollar sales in the industries, but in several industries price developments were significant as well. Food manufacturers' profits increased, despite a decrease in their constant-dollar sales. Their increased margins were probably related to the fact that prices for processed foods increased very slightly while costs as measured by prices for farm products decreased sharply. Conversely, chemicals manufacturers' profits fell despite an increase in constant-dollar sales, reflecting a fall in producer prices for chemicals. Smaller losses

were registered by primary metals manufacturers, reflecting increases in prices of many nonferrous metals within the third quarter.

Profits of nonfinancial nonmanufacturing corporations also increased in the third quarter, although within the total several industries' profits continued to reflect depressed economic conditions. Profits of mining corporations decreased again, reflecting production cutbacks. Airlines' losses continued as a sharp decrease in revenue-passenger miles offset a substantial increase in fares and continuing attempts to reduce labor costs. Auto dealers' profits decreased; they were adversely affected by the cost of carrying large inventories of unsold cars.

Profits of domestic financial corporations increased \$2½ billion in both the second and third quarters, reaching \$25 billion. In the third quarter, commercial banks' profits increased and losses registered by mutual savings banks and by savings and loan associations decreased. The reduced losses reflected the impact of decreasing interest rates, which lowered the costs of attracting deposits. Mutual savings banks and savings and loan associations have registered seven consecutive quarters of losses.

Profits from the rest of the world decreased \$1½ billion to \$17 billion in the third quarter, following an increase of \$1½ billion. The decrease was due to nonpetroleum foreign operations of U.S. corporations and reflected depressed economic conditions in most other industrial nations.

Other measures of profits.—Profits before tax increased \$8 billion to \$180 billion in the third quarter, after having been unchanged in the second. These profits exclude the inventory valuation adjustment (IVA) and capital consumption adjustment (CCAdj).² Inventory profits—the IVA with sign reversed—increased \$½ billion to \$10 billion in the third quarter, following an increase of \$5 billion. Profits attributable to underdepreciation—the CCAdj with sign reversed—decreased

\$3 billion in both the second and third quarters, reaching \$4 billion. Somewhat more than \$2 billion of each decrease in the CCAdj was due to provisions of the Economic Recovery Tax Act of 1981, which have progressively reduced profits attributable to underdepreciation. The decreases were also consistent with rates of inflation in prices for fixed nonresidential investment that were lower than those experienced over the service lives of the assets: Such lower rates of inflation lead to less negative values for the portion of the CCAdj that values fixed capital used up in production at replacement costs rather than at historical costs.

Disposition of profits.—Corporate profits taxes, which are levied on profits including inventory profits and profits attributable to underdepreciation, increased \$5½ billion to \$61 billion in the second quarter, following a decrease of \$1½ billion. The increase resulted from both higher profits and an increase in the share going to Federal taxes. Only a small portion of the increase in profits taxes resulted from provisions of the Tax Equity and Fiscal Responsibility Act of 1982. The increased share reflected reduced importance of tax credits relative to pretax profits.

Dividends continued their uptrend in the third quarter, increasing \$1 billion to \$70½ billion, following an increase of \$½ billion in the second quarter. Undistributed profits increased \$1½ billion to \$48½ billion in the third quarter, following an increase of \$1 billion.

The government sector

The fiscal position of the government sector in the national income and product accounts (NIPA's) deteriorated significantly in the third quarter, as the combined deficit of the Federal Government and the State and local governments increased \$33 billion. Compared with a year earlier, the combined deficit increased substantially, from \$24½ billion to \$120½ billion. Virtually all of this deterioration occurred at the Federal level, where the deficit increased \$95 billion.

2. The IVA and CCAdj are defined in *National Income and Product Accounts of the United States, 1929-1976: Statistical Tables*, U.S. Department of Commerce, Bureau of Economic Analysis (Washington, D.C.: U.S. GPO, 1981).

The Federal sector.—The Federal government deficit increased \$33½ billion in the third quarter, to \$153 billion, reflecting a decline in receipts and an increase in expenditures.

Receipts declined \$3½ billion, compared with a \$7 billion increase in the second quarter. In the third quarter, a decline in personal tax and nontax receipts more than offset increases in all other categories of receipts. The decline in personal taxes—\$10 billion—was the result of the second round of cuts in withholding rates provided for by the Economic Recovery Tax Act of 1981 (ERTA). The July 1 cut in withholding rates reduced withheld income taxes \$25 billion; this reduction was partly offset by a \$7½ billion increase due to higher incomes. Declarations and net settlements also increased—\$8 billion—reflecting the absence of temporary tax reductions that occurred in the first half of the year. (See page 2 of the September SURVEY OF CURRENT BUSINESS for details on the temporary reductions.) Corporate profits tax accruals increased \$4 billion, reflecting some recovery in corporate profits. Contributions for social insurance increased \$1½ billion, including about \$½ billion for an increase in the monthly premium for supplementary medical insurance to \$12.20 from \$11.00. Indirect business tax and nontax accruals increased \$1 billion, including about \$½ billion each for the windfall profit tax and for the increased airport and airway taxes provided for by the Tax Equity and Fiscal Responsibility Act of 1982.

Expenditures increased \$30 billion, compared with \$8 billion in the second quarter. Transfer payments to persons were up \$14½ billion. Of that amount, \$12 billion was for various cost-of-living adjustments, including a 7.4 percent increase in social security benefits that accounted for \$11 billion. Unemployment benefits increased \$2 billion, the net result of a small decline in extended benefits and a large increase in regular benefits. Purchases of goods and services increased \$12 billion, following a decline of \$5½ billion in the second quarter. National defense purchases continued to increase, but not as strongly as in the second quarter.

However, in contrast to the second quarter, when the increase was concentrated in military hardware (aircraft and missiles), the third-quarter increase was mainly in services other than compensation, such as for depot maintenance and for research and development. The accompanying Special Note discusses national defense purchases in more detail and an article later in this issue presents new detailed quarterly estimates.

Nondefense purchases rebounded strongly in the third quarter, increasing \$6 billion following a decline of \$15½ billion in the second. The third-quarter increase, as well as the large second-to-third-quarter swing, was concentrated in agricultural purchases by the Commodity Credit Corporation (CCC). The CCC rebound was mainly in transactions relating to corn, wheat, and cotton. In the third quarter, acquisitions were \$11 billion and dispositions were \$5½ billion, for net purchases of \$5½ billion. In the second quarter, dispositions slightly outpaced acquisitions, and net purchases were about -\$1 billion. All other nondefense purchases also rebounded: Although purchases of crude petroleum for the strategic petroleum reserve continued to decline, others increased slightly following a large decline in the second quarter.

Net interest paid increased \$6 billion, and subsidies less the current surplus of government enterprises increased \$½ billion. The latter increase was the net result of a \$1 billion decline in payments to farmers, a \$1 billion increase in the Postal Service deficit, and a \$½ billion increase in the CCC deficit. The increase in the Postal Service deficit was due to the second of three annual lump-sum payments to employees under a contract signed last year. Grants-in-aid to State and local governments declined \$3 billion, mainly for public assistance, food and nutrition, and education.

On a high-employment budget basis, the Federal fiscal position moved from deficit of \$6 billion in the second quarter to a deficit of \$27 billion in the third (table 3 on page 11). The high-employment deficit as a percentage of potential GNP increased from 0.2 percent in the second quarter to 0.8 percent in the third—a

move toward a more expansionary fiscal position. As percentages of potential GNP, high-employment receipts continued to decline and high-employment expenditures increased from the second quarter to the third.

For fiscal year 1982, on the basis of seasonally adjusted quarterly data, the Federal Government recorded a deficit of \$123½ billion, up from \$51 billion in fiscal year 1981. Receipts amounted to \$616½ billion, up only \$1 billion. Expenditures amounted to \$739½ billion, up \$73½ billion. The small increase in receipts reflects the impact of the recession and tax reductions provided for by ERTA. The tax reductions lowered receipts \$3½ billion in fiscal year 1981 and \$37½ billion in fiscal year 1982.

The State and local sector.—The State and local government surplus increased \$½ billion, as receipts increased more than expenditures. The increase in the surplus was more than accounted for by a continued increase in the surplus of the social insurance funds; the "all other" deficit increased after declining in the second quarter.

Receipts increased \$6½ billion, compared with \$10 billion in the second quarter. The \$3 billion dollar decline in Federal grants-in-aid mentioned earlier explains the smaller third-quarter increase. Indirect business tax and nontax accruals increased \$4 billion and personal tax and nontax receipts increased \$3½ billion. The third-quarter change in personal taxes was boosted by tax increases, mainly in Ohio and New York City. Ohio imposed a temporary 6-month increase of 50 percent in withholdings to collect for a tax increase that was passed in midyear, retroactive to January. Corporate profits tax accruals and contributions for social insurance each increased about \$1 billion.

Expenditures increased \$6 billion, slightly more than in the second quarter. Purchases of goods and services accounted for all the increase; all other expenditures, on balance, were unchanged. Within purchases, compensation increased \$1 billion less than in the second quarter, reflecting a decline in employment, and construction purchases increased about \$1 billion following a slight decline in the second quarter.

Special Note.—National Defense Purchases

IN recent quarters, spending for national defense, in contrast to other types of government spending, has been on an uptrend as a result of the administration's policy of 8.7 percent average annual growth in real defense outlays over fiscal years 1981-84. This uptrend has heightened interest in the several series that can be used to track defense spending. One such series is the national defense *purchases* series, a subcomponent of Federal Government purchases of goods and services in the national income and product accounts (NIPA's). This series consists of the compensation of military and civilian employees, purchases of goods and services from business and abroad, and net purchases of used goods. Another NIPA series is defense *expenditures*, which consists of, in addition to purchases, small amounts for grants-in-aid to State and local governments and for subsidies less the current surplus of government enterprises. The expenditures series is broken down into the functional subcategories of military activities, civil defense, foreign military assistance, and other expenditures (see annual NIPA table 3.16). A more comprehensive series is *outlays*—the unified budget series in terms of which the administration's policy is expressed. It consists of, in addition to expenditures, military retirement pay, loans, and net interest paid. A further distinction between purchases and outlays is that outlays are on a checks-issued basis, and purchases are on a delivery basis. (For a reconciliation of outlays and purchases, see table 10, page 23, of the March 1982 SURVEY OF CURRENT BUSINESS.)

The national defense purchases series will be the focus of this Special Note. Within the NIPA's, national defense purchases are a subcomponent of GNP and, as just noted, a subcomponent of expenditures in presentations of government receipts and expenditures. These purchases, which

are made largely by the Department of Defense (DOD), are shown in the usual four-fold NIPA major-type-of-product categories: durable goods (those with a normal life expectancy of 1 year or more), largely consisting of military equipment, such as aircraft and ships; nondurable goods, largely bulk petroleum products and ammunition; services, largely compensation of employees; and structures, largely military facilities. Substantial detail by type of purchase—for current dollars, constant dollars, and associated implicit price deflators—is shown annually beginning with 1972 in NIPA tables 3.9, 3.10, and 7.15. Quarterly estimates, at a summary level of detail, are in NIPA tables 3.7B, 3.8B, and 7.14B. Quarterly estimates for 1977-82, at an intermediate level of detail, are introduced later in this issue of the SURVEY, along with percent changes in a new fixed-weighted price index.

Sources and methods.—A basic source of information for current-dollar estimates is the *Monthly Treasury Statement of Receipts and Outlays of the United States Government* (MTS). As shown in the reconciliation table mentioned earlier, purchases are derived from defense outlays in the MTS by subtracting outlays for transfer payments to retired military personnel, grants-in-aid, net interest paid, and other outlays, such as for loans. A timing adjustment is also made to adjust outlays from a checks-issued basis to a delivery basis. The timing adjustment is derived from DOD reported deliveries of major weapons systems. This procedure provides a control total for national defense purchases. Detail for purchases by type of good or service is obtained from a variety of DOD reports.

Constant-dollar estimates are prepared by the standard NIPA procedure for final goods and services: At the finest possible level of product detail, divide current-dollar estimates by appropriate price indexes, and sum

the results to the published level of detail. For defense purchases, implementation of this procedure is especially difficult because much of defense spending is for unique products that change radically and are otherwise difficult to price. Further, until recent years, information was not available on product breakdowns or on prices paid by Government, which may move very differently from prices paid by the private sector.

A project to remedy the inadequacy of product and price information was started in the mid-1970's by BEA in cooperation with DOD. It involved the development of price series at a very detailed level, along with parallel development of product detail, using data largely from DOD records. The technique used to obtain the price series was specification pricing: Price-determining characteristics of an item are defined, and these are then held constant for successive pricings of the item. For example, in the case of combat boots, the type and quality of sole and upper material—rather than size and color—are price-determining characteristics. For each period, the price of an item with these characteristics is divided by its price in the base year; the result is the price index needed to divide into current-dollar purchases. For many reasons, it may not be possible to price successively an item with the given specifications, and in this case the price is adjusted for the cost of a change in specification. The price adjustment for the specification change is obtained by assuming that the production cost associated with the change is the appropriate measure. In the example of combat boots, if a change in the sole material from leather to rubber lengthens the life of the boot, the difference in the cost of the leather and rubber sole is taken as the price of the specification change. Price series for a sample of products in each of about 100 categories were prepared in this way. The categories

Table A.—National Defense Purchases of Goods and Services

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
	Billions of 1972 dollars										
National defense purchases.....	73.1	68.3	66.9	66.4	64.9	65.4	65.7	67.4	70.1	73.5	78.9
Compensation	35.7	33.8	33.3	32.9	32.3	32.0	32.2	32.0	32.2	32.8	33.3
All other	37.5	34.6	33.6	33.5	32.6	33.4	33.5	35.4	37.9	40.7	45.6
	Percent change from preceding period										
National defense purchases (Billions of 1972 dollars).....		-6.6	-2.0	-.8	-2.3	.8	.5	2.6	4.0	4.9	7.3
Compensation		-5.3	-1.5	-1.3	-1.8	-.9	.6	-.6	.6	1.9	1.5
All other		-7.7	-2.9	-.3	-2.7	2.5	.3	5.7	7.1	7.4	12.0
National defense purchases (Index, 1972=100)											
Implicit price deflator.....		6.6	8.0	8.5	6.0	7.1	7.6	8.7	12.9	11.5	8.4
Fixed-weighted price index.....		6.9	10.0	8.8	6.0	7.3	7.5	9.7	14.5	11.8	8.6

* Projection.

ranged from aircraft to depot maintenance services to compensation of employees. (For the latter, the price-determining characteristics were education and training.)¹

As a result of this project, estimates of constant-dollar defense purchases and implicit price deflators—the result of dividing a current-dollar estimate by a constant-dollar estimate—were first introduced into the NIPA's in 1980 for the period beginning in 1972. Further, the current-dollar estimates, by type, were improved, because of the work on product detail.

Real purchases and prices, 1972-82.—National defense purchases, measured in 1972 dollars, declined from \$73 billion in 1972 to \$65 billion in 1976 (table A). Following this period of continued winding down of U.S. operations in Vietnam, they increased moderately in 1977-78 before they began to accelerate in 1979. They are estimated to be \$79 billion in 1982. In 1972, compensation was roughly one-half of total defense purchases, and in 1982 it was only 42 percent. Although compensation had declined less than the "all other" component in the early part of the decade, it increased much less later. In 1982, it was still below its level of a decade earlier, largely because the size of the armed forces was down about 300,000. "All other" purchases declined at annual rates that averaged 3½ percent from 1972 to 1976. Thereafter, with one exception, each

year's increase was larger than in the preceding year; the 1982 increase was about 12 percent.

The acceleration in 1979 was a reflection of a policy to strengthen NATO forces in Europe, to strengthen strategic forces, and to increase the overall combat readiness of U.S. forces. Further acceleration in mid-1982 was a reflection of the administration's policy to increase defense spending substantially over the next few years. This acceleration was not due to the introduction of new major weapons systems, but to a higher rate of spending for all defense activities, particularly for weapons systems currently in production, such as the F-16 and F-18 fighter aircraft. All types of purchases other than compensation contributed to the acceleration. In durables, although purchases of aircraft slowed, purchases of missiles and ships were stepped up. In nondurables, the acceleration was widespread, and in services, it was concentrated in research and development and in maintenance.

Throughout the 1979-82 period, the pattern of quarterly changes often appeared erratic. However, the pattern can be traced largely to the changes in the deliveries of aircraft, missiles, and vehicles, and in the purchases of services other than compensation. Deliveries may change abruptly for several reasons: (1) the introduction of a new weapons system, as in mid-1980 when initial deliveries of the F-18 were small and larger deliveries of the A-7—which the F-18 replaced—stopped; (2) changes in the number of aircraft or missiles to be delivered, as when scheduled deliveries of the F-14 were reduced because of budget constraints; (3) diversion of deliveries to

foreign buyers, as when F-15's were diverted to Israel; and (4) production problems or bottlenecks. Fluctuations in the purchases of services other than compensation were mainly due to discretionary purchases at military installations. Large increases in these purchases early in 1980 were the result of large existing backlogs in the maintenance and repair of facilities and equipment; purchases declined as these backlogs were reduced.

Two measures of price change for national defense purchases are also shown in table A—the implicit price deflator and the fixed-weighted price index. The implicit price deflator reflects shifts in weights as well as price changes (except when the comparison of change is from the base period), whereas the fixed-weighted price index does not reflect weight shifts, but only price change. Throughout most of the 1972-82 period, annual increases in defense prices (as reflected in the fixed-weighted price index) did not differ much from those in total GNP prices. In 1980 and 1981, however, defense price increases were much higher—in the range of 11½-14½ percent, compared to 9½-10 percent for GNP. Defense prices increased more mainly because of large increases in the prices of bulk petroleum products in those years. A large—14.3 percent—military pay raise also contributed to the 1981 increase (pay raises are reflected as price increases). Like most other price increases, defense price increases show a substantial deceleration in 1982, to about 8½ percent.

Throughout most of the period, the differences between changes in the fixed-weighted price index and in the implicit price deflator were small—no

1. A detailed description of the work done appears in *Price Change of Defense Purchases of the United States*, U.S. Department of Commerce, Bureau of Economic Analysis (Washington, D.C.: U.S. GPO, 1979).

more than 0.3 percentage points. There were three exceptions, and in each year the increase in the fixed-weighted price index was larger: in 1974, by 2.0 points, in 1979, by 1.0 point, and in 1980, by 1.6 points. The major reason for these large differences was the price and weight of bulk petroleum products. In 1974, the prices of petroleum products accelerated sharply following the 1973 OPEC oil embargo. Because the weight of bulk petroleum was higher in the fixed-weighted price index than in the implicit price deflator, the fixed-

weighted price index registered a larger increase. In 1979-80, prices for bulk petroleum products were continuing to increase substantially more than other defense prices on average. Because, by this time, the weight for bulk petroleum products was twice as large in the fixed-weighted index as in the implicit price deflator, it again recorded larger increases.

On a quarterly basis, significant price increases occur in the fourth quarters, when Federal pay raises are effective. Other than these large increases, price changes appear erratic.

The sharp movements are partly due to inherent characteristics of prices for defense purchases. For example, when a transaction does not occur in a given quarter, the price is held unchanged at the last observed price until there is a new transaction; the new transaction's price may be significantly higher or lower. Also, the contracting procedures of DOD can cause sharp changes. Many goods and services are purchased under fixed-price contracts, which are for 1 year; their effective dates tend to be clustered at certain times of the year.

Reconciliation and Other Special Tables

Table 1.—Reconciliation of Changes in Compensation Per Hour in the Business Economy Other Than Farm and Housing and Average Hourly Earnings in the Private Nonfarm Economy, Seasonally Adjusted

	1982		
	I ^r	II ^r	III ^p
1. Compensation per hour of all persons in the business economy other than farm and housing (percent change at annual rate) ¹	7.8	6.7	6.4
2. Less: Contribution of supplements.....	1.3	.1	.2
3. Plus: Contribution of housing and nonprofit institutions.....	0	-.1	.3
4. Less: Contribution of employees of government enterprises and self-employed and unpaid family workers.....	0	.2	.5
5. Equals: Wages and salaries per hour of employees in the private nonfarm economy (percent change at annual rate).....	6.5	6.4	5.9
6. Less: Contribution of nonproduction workers in manufacturing.....	.6	.1	-.2
7. Less: Contribution of non-BLS data, detailed weighting, and seasonal adjustment.....	.8	.6	1.5
8. Equals: Average hourly earnings, production and nonsupervisory workers in the private nonfarm economy (percent change at annual rate).....	5.1	5.8	4.6

^r Revised. ^p Preliminary.
1. BLS estimates of changes in hourly compensation in the nonfarm business sector for the three quarters are 7.7, 6.1 and 6.6 percent.

Table 2.—Reconciliation of Changes in the Implicit Price Deflator for Personal Consumption Expenditures and the Consumer Price Index for All Urban Consumers, Seasonally Adjusted

	1982	
	II ^r	III ^p
1. Implicit price deflator for personal consumption expenditures (percent change at annual rate).....	3.5	7.2
2. Less: Contribution of shifting weights in PCE.....	-.1	.4
New autos.....	-.1	-.2
Gasoline and oil.....	-.6	-.5
Electricity, gas, fuel oil, and coal.....	-.9	.4
Furniture and household equipment.....	-.2	-.2
Food purchased for off-premise consumption.....	0	.3
Purchased meals and beverages.....	-.1	.4
Clothing and shoes.....	-.1	0
Housing.....	-.2	0
Other.....	.3	.5
3. Equals: PCE chain price index (percent change at annual rate).....	3.6	6.7
4. Less: Contribution of differences in weights of comparable CPI and PCE expenditure components.....	1.2	-.5
Gasoline and oil.....	.9	-.5
Electricity, gas, fuel oil, and coal.....	-.1	-.3
Furniture, appliances, floor coverings, other household furnishings.....	0	0
Food at home.....	-.1	-.1
Food away from home.....	-.1	0
Apparel commodities.....	0	0
Rent.....	-.2	-.3
Other.....	.6	.6
5. Less: Contribution of PCE expenditure components not comparable with CPI components.....	.6	.5
New autos.....	0	0
Net purchases of used autos.....	.1	0
Owner-occupied nonfarm and farm dwelling—space rent.....	.4	.4
Services furnished without payment by financial intermediaries except life insurance carriers.....	-.1	-.1
Current expenditures by nonprofit institutions.....	.3	.5
Other.....	-.1	-.2
6. Plus: Contribution of CPI expenditure components not comparable with PCE components.....	2.7	.8
New autos.....	0	-.1
Used autos.....	0	.1
Homeownership.....	2.5	.5
Other.....	.2	.3
7. Less: Contribution of differences in seasonal adjustment ¹	-.1	.1
8. Equals: Consumer Price Index For All Urban Consumers (CPI-U), all items (percent change at annual rate).....	4.6	7.6
Addendum: Consumer Price Index For All Urban Consumers (CPI-U-X1), all items (percent change at annual rate) ²	3.0	8.2

^r Revised. ^p Preliminary.
1. These differences arise because component price indexes that are used in the BEA measures and in the CPI are seasonally adjusted at different levels of detail.
2. The CPI-U-X1 is the BLS experimental index in which a rental equivalence method is substituted for the present method in measuring the cost of owner-occupied housing. The PCE measures of price change also use a rental equivalence method.

Table 3.—High-Employment Federal Receipts and Expenditures

(Billions of dollars; quarters at seasonally adjusted annual rates)

Year and quarter	Receipts					Expenditures					Surplus or deficit (-)				
	Level	Percent- age of potential GNP	Change from preceding period			Level	Percent- age of potential GNP	Change from preceding period			Level	Percent- age of potential GNP	Change from preceding period		
			Total	Due to automatic inflation effects	Due to discre- tionary policy and other factors			Total	Due to automatic inflation effects	Due to discre- tionary policy and other factors			Total	Due to automatic inflation effects	Due to discre- tionary policy and other factors
1980.....	576.8	20.8	71.9	58.7	13.2	594.0	21.5	87.1	29.7	57.4	-17.1	-0.6	-15.2	29.0	-44.2
1981.....	678.5	21.8	101.7	65.2	36.5	674.0	21.6	80.0	35.9	44.1	4.5	.1	21.6	29.3	-7.6
1980: I.....	543.0	20.6	18.4	17.2	1.2	561.4	21.3	25.0	4.0	21.0	-18.4	-.7	-6.5	13.2	-19.8
II.....	559.8	20.6	16.8	17.2	-.3	580.1	21.3	18.7	3.3	15.3	-20.3	-.7	-1.9	13.8	-15.6
III.....	586.1	20.9	26.3	16.3	10.0	605.3	21.6	25.2	19.1	6.1	-19.3	-.7	1.0	-2.8	3.8
IV.....	618.4	21.3	32.3	18.1	14.2	629.0	21.7	23.7	11.6	12.1	-10.6	-.4	8.7	6.5	2.2
1981: I.....	657.9	22.0	39.5	20.0	19.5	647.5	21.6	18.5	4.4	14.1	10.4	.3	21.0	15.6	5.4
II.....	674.6	22.0	16.7	9.9	6.8	652.6	21.3	5.1	.8	4.2	22.0	.7	11.6	9.0	2.6
III.....	690.3	21.9	15.7	15.4	.3	684.4	21.7	31.8	19.2	12.6	5.9	.2	-16.1	-3.8	-12.3
IV.....	691.1	21.3	.8	16.3	-15.5	711.4	21.9	27.0	8.7	18.3	-20.3	-.6	-26.2	7.6	-33.8
1982: I.....	692.8	21.0	1.7	5.0	-3.3	708.4	21.4	-3.0	-1.0	-2.0	-15.6	-.5	4.7	6.0	-1.3
II.....	704.0	20.9	11.2	5.6	5.6	710.1	21.1	1.7	3.0	-1.2	-6.2	-.2	9.4	2.6	6.9
III.....	708.1	20.6	4.1	7.6	-3.5	735.4	21.4	25.3	12.8	12.4	-27.3	-.8	-21.1	-5.3	-15.9

National Defense Purchases: Detailed Quarterly Estimates, 1977-82

THIS article presents for the first time quarterly estimates of national defense purchases of goods and services at a level of detail between what is now available annually and what is now available quarterly. The new estimates are of current- and constant-dollar purchases and of implicit price deflators for 1977-82. (Annual estimates now available are in National Income and Product Accounts (NIPA) tables 3.9, 3.10, and 7.15; quarterly estimates are in NIPA tables 3.7B, 3.8B, and 7.14B.) In addition, percent changes for a new fixed-weighted price index are introduced at the same level of detail; this index will be described below. Previously, the only fixed-weighted price index for national defense purchases had been the one for total purchases shown in NIPA table 7.2.

Tables 1 and 2 below present annual estimates at the same level of detail as the new quarterly estimates; tables 3-6 present the new quarterly estimates. Hereafter, current quarterly estimates will appear regularly in the SURVEY OF CURRENT BUSINESS in

the "Reconciliation and Other Special Tables."

The new fixed-weighted price index for national defense purchases differs in two ways from the one shown in NIPA table 7.2. First, the new index incorporates significantly more product detail. Second, the new index is based on 1977 weights, rather than on 1972 weights. The two differences are interrelated: Because sufficient detail was lacking prior to 1977, that year was used as the base year. Only percent changes at annual rates are shown for the new index.

The data base for the new index is the same as that used in preparing current- and constant-dollar estimates of national defense purchases. (See the Special Note in this issue of the SURVEY.) Two standard conventions—the treatment of missing observations and the introduction of new products—should be highlighted because of their particular relevance in working with defense goods and services.

Quarterly observations are sometimes missing at the detailed product level because Department of Defense

purchases of many items are sporadic. This problem is dealt with by carrying forward the price from the quarter preceding the missing observation to the next quarter for which an observation is available. This convention assumes that the price of an item is unchanged until a transaction for that item recurs. If an item is not to be purchased again, and it is not replaced, it is linked out of the series.

Products that are purchased for the first time in a period subsequent to the base year require special treatment. In this index, as in many others, new products are introduced when they become a significant part of the current-period "market basket" and their prices stabilize. To do this, a linking procedure is used to generate a base-period price for the new product. The weight given to a new product (e.g., JP-8, a new type of jet fuel) is taken from other products within a related group of products (jet fuel in the case of JP-8); the total weight for the group of products is not changed. A modification of this procedure is made for major weapons systems, for

Table 1.—National Defense Purchases of Goods and Services

	Billions of dollars					Billions of 1972 dollars					Implicit price deflator, 1972=100				
	1977	1978	1979	1980	1981	1977	1978	1979	1980	1981	1977	1978	1979	1980	1981
National defense purchases	92.8	100.3	111.8	131.4	153.7	65.4	65.7	67.4	70.1	73.5	141.9	152.7	166.0	187.4	209.0
Durables	22.3	24.1	29.0	33.6	40.1	16.5	16.2	17.7	18.3	19.7	135.4	148.2	164.3	183.5	203.5
Aircraft.....	6.9	7.2	9.1	11.0	12.7	5.3	4.8	5.5	5.8	6.1	130.3	149.6	167.0	187.7	209.5
Missiles.....	2.2	2.6	3.2	3.7	4.6	1.9	2.0	2.0	2.1	2.2	115.4	127.2	155.7	177.6	206.1
Ships.....	3.3	3.5	3.7	4.3	4.9	2.0	2.0	2.0	2.0	2.2	167.4	177.2	190.7	209.2	223.5
Vehicles.....	1.0	1.4	1.7	1.9	1.7	.7	.9	1.0	1.0	.8	148.3	157.6	172.0	193.9	231.7
Other durables.....	8.9	9.5	11.2	12.8	16.0	6.6	6.6	7.2	7.4	8.4	134.3	143.9	156.3	173.3	190.6
Nondurables	5.0	5.5	6.6	10.7	12.6	2.2	2.2	2.2	2.4	2.6	225.6	243.4	298.1	437.2	486.9
Bulk petroleum.....	2.9	3.2	4.0	7.6	9.0	.9	0.9	.8	.9	.9	339.3	364.1	502.4	857.8	983.5
Other nondurables.....	2.1	2.3	2.6	3.1	3.6	1.3	1.4	1.4	1.6	1.7	153.7	166.2	183.4	199.2	217.5
Services	63.1	68.3	73.8	84.1	98.0	45.1	45.6	46.1	47.9	49.9	139.9	149.5	159.9	175.7	196.5
Compensation.....	42.8	46.1	48.7	53.2	60.8	32.0	32.2	32.0	32.2	32.8	134.0	143.1	152.2	165.3	185.3
Services less compensation.....	20.3	22.1	25.1	30.8	37.2	13.2	13.4	14.2	15.7	17.1	154.2	165.0	177.1	197.0	217.9
Travel.....	1.3	1.3	1.3	1.6	2.1	.9	.9	.8	.8	.9	141.2	146.5	153.4	191.1	236.4
Transportation.....	2.0	2.1	2.2	2.6	2.9	1.3	1.3	1.2	1.2	1.2	157.0	162.9	186.1	223.7	236.4
Communications.....	.6	.7	.7	.7	.9	.6	.6	.6	.6	.6	115.9	119.5	120.4	122.9	149.5
Other services.....	16.3	18.1	20.9	26.0	31.4	10.4	10.7	11.6	13.1	14.4	157.0	169.2	180.7	198.3	217.9
Structures	2.4	2.5	2.5	3.0	3.0	1.6	1.6	1.4	1.5	1.4	150.5	160.9	183.5	203.8	221.5
Addenda:															
Total purchases less compensation.....	50.0	54.2	63.2	78.1	92.9	33.4	33.5	35.4	37.9	40.7	149.5	161.9	178.5	206.3	228.1
Total purchases less compensation and bulk petroleum.....	47.1	51.0	59.2	70.5	84.0	32.6	32.6	34.6	37.0	39.8	144.5	156.5	171.1	190.7	210.9

Table 2.—Percent Change From Preceding Period

	Implicit price deflator, 1972=100				Fixed-weighted price index, 1977=100			
	1978	1979	1980	1981	1978	1979	1980	1981
National defense purchases	7.6	8.7	12.9	11.5	7.4	8.6	12.7	11.5
Durables	9.5	10.8	11.7	10.9	9.0	9.7	11.4	10.1
Aircraft.....	14.8	11.6	12.4	11.6	11.5	11.6	13.7	9.9
Missiles.....	10.3	22.3	14.1	16.1	8.8	10.0	9.1	15.2
Ships.....	5.8	7.6	9.7	6.8	5.8	9.3	11.0	7.1
Vehicles.....	6.2	9.2	12.7	19.5	16.5	5.8	6.8	11.5
Other durables.....	7.1	8.7	10.9	10.0	7.4	8.8	10.8	9.8
Nondurables	7.9	22.5	46.6	11.4	7.4	24.8	49.5	13.7
Bulk petroleum.....	7.3	38.0	70.7	14.7	6.5	36.1	73.1	15.4
Other nondurables.....	8.1	10.4	8.6	9.2	8.7	9.4	9.3	9.2
Services	6.9	6.9	9.9	11.8	6.8	6.8	9.7	12.0
Compensation.....	6.8	6.4	8.6	12.1	6.7	6.3	8.6	12.2
Services less compensation.....	7.0	7.3	11.2	10.6	7.1	7.9	12.1	11.5
Travel.....	3.8	4.7	24.5	23.7	3.6	4.2	25.6	22.5
Transportation.....	3.8	14.2	20.2	5.7	3.4	15.0	19.0	7.2
Communications.....	3.2	.7	2.1	21.7	4.1	.2	2.9	14.2
Other services.....	7.7	6.8	9.7	9.9	8.0	7.6	10.5	11.1
Structures	6.9	14.0	11.1	8.7	5.8	11.0	12.8	6.5
Addenda:								
Total purchases less compensation.....	8.3	10.2	15.5	10.6	7.9	10.5	16.0	11.0
Total purchases less compensation and bulk petroleum.....	8.3	9.3	11.5	10.6	8.0	9.0	11.7	10.5

Table 3.—National Defense Purchases of Goods and Services by Type

(Billions of dollars; seasonally adjusted at annual rates)

	1977				1978				1979			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
National defense purchases	90.6	92.7	93.5	94.5	95.3	99.7	101.7	104.4	106.6	109.0	112.7	119.0
Durables	22.2	23.1	22.3	21.6	22.3	24.0	24.4	25.6	26.6	28.0	29.4	32.0
Aircraft.....	6.9	7.1	6.9	6.5	5.8	7.1	7.0	8.7	8.3	8.3	9.0	11.0
Missiles.....	2.3	2.3	2.3	2.0	2.2	2.7	2.7	2.7	2.5	3.0	3.4	3.7
Ships.....	3.3	3.5	3.3	3.1	3.2	3.8	3.3	3.5	3.8	4.0	3.6	3.7
Vehicles.....	.9	1.1	1.1	.9	1.2	1.2	1.5	1.6	1.5	1.4	2.2	2.0
Other durables.....	8.8	9.1	8.7	9.1	9.8	9.2	9.9	9.1	10.6	11.4	11.2	11.7
Nondurables	4.6	4.8	5.6	4.9	4.6	5.6	6.5	5.2	5.8	5.7	6.9	8.1
Bulk petroleum.....	2.5	2.7	3.5	2.9	2.5	3.3	3.9	3.1	3.4	3.1	4.1	5.4
Other nondurables.....	2.1	2.1	2.1	2.0	2.1	2.3	2.6	2.1	2.4	2.6	2.7	2.7
Services	61.3	62.0	63.2	65.9	66.4	67.3	68.1	71.1	72.0	73.0	73.7	76.4
Compensation.....	42.1	42.2	42.3	44.8	45.1	45.5	45.9	47.8	47.8	47.9	48.1	50.9
Services less compensation.....	19.2	19.9	21.0	21.1	21.3	21.8	22.2	23.3	24.2	25.1	25.6	25.5
Travel.....	1.2	1.3	1.3	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.4	1.3
Transportation.....	1.9	2.0	2.0	2.1	1.8	2.0	2.2	2.3	2.2	2.3	2.3	2.0
Communications.....	.6	.6	.7	.6	.6	.6	.7	.7	.7	.7	.7	.7
Other services.....	15.5	16.0	16.9	17.0	17.5	17.9	18.0	19.1	20.0	20.9	21.2	21.5
Structures	2.5	2.7	2.4	2.1	2.0	2.8	2.7	2.5	2.2	2.3	2.8	2.5
Addenda:												
Total purchases less compensation.....	48.5	50.5	51.2	49.7	50.2	54.2	55.7	56.6	58.8	61.1	64.7	68.1
Total purchases less compensation and bulk petroleum.....	46.1	47.8	47.7	46.8	47.7	50.9	51.9	53.5	55.4	58.0	60.5	62.7
	1980				1981				1982			
	I	II	III	IV	I	II	III	IV	I	II	III	
National defense purchases	126.8	130.0	130.5	138.1	143.1	150.5	154.4	166.9	166.2	176.2	182.2	
Durables	33.7	33.3	32.6	34.6	36.1	40.0	41.6	42.7	43.1	48.9	49.3	
Aircraft.....	11.4	10.5	10.3	11.6	11.8	11.8	12.6	14.8	14.2	15.4	15.5	
Missiles.....	3.5	3.5	3.9	3.8	4.1	4.8	5.0	4.7	5.2	6.5	6.1	
Ships.....	4.3	4.3	4.4	4.1	3.9	5.4	5.4	5.2	5.2	5.9	5.8	
Vehicles.....	1.8	2.2	1.8	1.7	1.5	1.8	1.9	1.7	2.1	2.6	2.7	
Other durables.....	12.7	12.7	12.2	13.3	14.9	16.2	16.7	16.3	16.4	18.4	19.2	
Nondurables	10.0	10.5	10.8	11.5	12.1	13.2	11.9	13.2	13.6	13.4	13.1	
Bulk petroleum.....	7.2	7.4	7.5	8.2	8.4	9.5	8.3	9.5	9.3	9.1	9.1	
Other nondurables.....	2.8	3.1	3.3	3.3	3.6	3.7	3.5	3.7	4.3	4.3	4.0	
Services	80.3	83.4	83.4	89.2	92.2	94.4	98.0	107.6	106.0	110.7	115.8	
Compensation.....	51.3	51.6	52.2	57.8	58.5	59.2	59.8	65.6	66.3	66.5	66.8	
Services less compensation.....	29.0	31.8	31.2	31.4	33.7	35.1	38.1	42.0	39.8	44.1	49.0	
Travel.....	1.4	1.5	1.6	1.8	1.8	2.1	2.1	2.3	2.4	2.5	2.4	
Transportation.....	2.4	2.5	2.7	2.8	2.8	2.6	3.1	3.0	3.2	3.1	3.1	
Communications.....	.7	.7	.7	.7	.8	.8	.9	1.0	1.0	1.2	1.3	
Other services.....	24.5	27.1	26.1	26.1	28.4	29.6	32.0	35.6	33.1	37.4	42.3	
Structures	2.8	2.8	3.7	2.8	2.7	2.9	2.9	3.4	3.5	3.3	3.9	
Addenda:												
Total purchases less compensation.....	75.5	78.4	78.3	80.3	84.6	91.2	94.5	101.3	99.9	109.6	115.4	
Total purchases less compensation and bulk petroleum.....	68.2	70.9	70.9	72.1	76.2	81.7	86.2	91.8	90.6	100.5	106.3	

Table 4.—National Defense Purchases of Goods and Services by Type in Constant Dollars

[Billions of 1972 dollars; seasonally adjusted at annual rates]

	1977				1978				1979			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
National defense purchases	65.5	65.9	65.8	64.5	64.1	66.0	66.4	66.2	66.4	67.1	67.7	68.2
Durables	16.9	17.0	16.4	15.6	15.5	16.4	16.4	16.6	16.8	17.4	17.7	18.8
Aircraft.....	5.5	5.5	5.2	4.9	4.0	4.9	4.6	5.6	5.2	5.1	5.2	6.4
Missiles.....	2.1	2.1	2.0	1.7	1.9	2.2	2.1	1.9	1.8	2.0	2.2	2.1
Ships.....	2.0	2.1	2.0	1.8	1.9	2.1	1.9	1.9	2.0	2.1	1.9	1.9
Vehicles.....	.6	.8	.7	.6	.8	.8	.9	1.0	.9	.8	1.3	1.1
Other durables.....	6.7	6.7	6.5	6.6	7.0	6.5	6.8	6.2	6.9	7.4	7.1	7.2
Nondurables	2.2	2.2	2.4	2.1	2.0	2.3	2.6	2.1	2.2	2.2	2.3	2.2
Bulk petroleum.....	.8	.8	1.0	.8	.7	.9	1.1	.8	.9	.7	.8	.8
Other nondurables.....	1.4	1.4	1.3	1.3	1.3	1.4	1.6	1.3	1.4	1.4	1.5	1.4
Services	44.7	44.9	45.5	45.4	45.3	45.6	45.7	46.0	46.2	46.3	46.3	45.9
Compensation.....	32.0	31.9	32.0	32.0	32.1	32.2	32.3	32.2	32.0	31.9	32.0	31.9
Services less compensation.....	12.8	12.9	13.5	13.4	13.2	13.3	13.4	13.8	14.1	14.4	14.3	13.9
Travel.....	.9	.9	.9	1.0	.9	.9	.9	.8	.8	.8	.9	.8
Transportation.....	1.2	1.3	1.3	1.3	1.1	1.2	1.4	1.4	1.3	1.3	1.2	1.0
Communications.....	.6	.5	.6	.5	.5	.5	.6	.6	.6	.6	.6	.6
Other services.....	10.1	10.2	10.7	10.6	10.6	10.6	10.6	11.0	11.5	11.7	11.6	11.6
Structures	1.7	1.8	1.5	1.4	1.3	1.8	1.7	1.5	1.3	1.3	1.5	1.3
Addenda:												
Total purchases less compensation.....	33.5	34.0	33.8	32.5	32.0	33.8	34.1	34.0	34.4	35.2	35.7	36.2
Total purchases less compensation and bulk petroleum.....	32.8	33.2	32.8	31.7	31.3	32.9	33.0	33.2	33.5	34.5	35.0	35.4
	1980				1981				1982			
	I	II	III	IV	I	II	III	IV	I	II	III	
National defense purchases	70.3	70.4	70.0	69.6	71.0	72.9	74.3	76.1	74.5	78.2	80.5	
Durables	19.1	18.1	17.7	18.2	18.6	19.9	20.2	20.1	19.9	21.7	21.6	
Aircraft.....	6.4	5.5	5.5	6.0	6.0	5.7	6.0	6.7	6.1	6.3	6.1	
Missiles.....	2.1	2.0	2.1	2.0	2.1	2.4	2.4	2.1	2.5	2.7	2.6	
Ships.....	2.1	2.0	2.1	2.0	1.8	2.4	2.4	2.3	2.2	2.5	2.4	
Vehicles.....	1.0	1.1	.9	.8	.7	.8	.8	.7	.9	1.0	1.0	
Other durables.....	7.6	7.4	7.0	7.4	8.0	8.6	8.6	8.3	8.3	9.2	9.5	
Nondurables	2.4	2.4	2.5	2.5	2.6	2.7	2.4	2.6	2.8	2.8	2.7	
Bulk petroleum.....	.9	.9	.8	.9	.9	.9	.8	1.0	1.0	1.0	1.0	
Other nondurables.....	1.4	1.6	1.7	1.6	1.7	1.7	1.6	1.7	1.9	1.9	1.7	
Services	47.4	48.5	48.0	47.5	48.5	49.0	50.3	51.8	50.3	52.3	54.5	
Compensation.....	32.0	32.1	32.3	32.3	32.5	32.7	33.0	33.1	33.2	33.3	33.3	
Services less compensation.....	15.4	16.4	15.6	15.2	16.0	16.3	17.3	18.8	17.1	19.1	21.1	
Travel.....	.8	.8	.9	.7	.8	.9	.9	1.0	1.0	1.0	1.0	
Transportation.....	1.1	1.1	1.2	1.2	1.2	1.1	1.3	1.3	1.3	1.3	1.3	
Communications.....	.6	.6	.6	.6	.6	.6	.6	.6	.6	.7	.7	
Other services.....	12.9	13.8	13.0	12.6	13.4	13.7	14.5	16.0	14.2	16.1	18.1	
Structures	1.4	1.4	1.8	1.4	1.3	1.3	1.3	1.5	1.5	1.4	1.7	
Addenda:												
Total purchases less compensation.....	38.3	38.3	37.6	37.3	38.5	40.2	41.3	43.0	41.3	44.9	47.1	
Total purchases less compensation and bulk petroleum.....	37.4	37.4	36.8	36.4	37.6	39.2	40.5	42.0	40.4	44.0	46.1	

Table 5.—Percent Change From Preceding Period in Implicit Price Deflators [1972=100]

[Seasonally adjusted at annual rates]

	1977				1978				1979			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
National defense purchases.....	7.6	6.5	4.3	12.8	6.1	6.5	5.7	12.7	7.0	4.8	10.5	20.9
Durables.....	17.1	12.8	2.0	5.9	16.1	7.9	6.9	15.6	11.4	8.2	11.7	10.8
Aircraft.....	32.7	9.1	11.0	5.5	38.9	2.4	13.1	7.0	13.2	12.7	24.8	-1.8
Missiles.....	4.6	.7	4.3	14.6	-7.9	27.5	10.1	52.4	9.0	20.5	7.9	51.1
Ships.....	22.9	15.8	-2.2	2.2	5.9	10.4	-1.7	27.5	6.5	-5	.1	16.2
Vehicles.....	-24.6	12.7	10.5	-5.0	9.6	6.1	7.8	9.1	8.9	11.4	13.9	-9
Other durables.....	12.8	16.0	-4.3	6.1	13.7	4.9	7.1	7.4	13.0	6.1	7.4	11.3
Nondurables.....	13.4	22.5	35.4	-8.6	-3.5	25.5	3.8	6.5	18.1	1.9	80.9	103.9
Bulk petroleum.....	38.9	17.7	17.0	8.4	2.9	6.1	5.0	4.6	23.8	44.5	134.0	138.8
Other nondurables.....	16.0	11.4	6.1	1.0	15.4	9.6	.1	14.8	17.7	.9	13.3	13.8
Services.....	6.2	3.3	1.8	19.1	4.2	3.4	3.4	15.7	3.9	3.8	4.4	20.0
Compensation.....	1.8	.7	.2	25.8	1.8	2.0	2.5	19.2	2.3	1.3	1.4	26.2
Services less compensation.....	19.7	8.4	3.4	6.7	10.3	6.2	5.4	7.1	6.1	7.9	10.8	9.8
Travel.....	1.4	3.3	-8	10.0	4.6	1.9	3.1	.5	7.3	1.3	6.8	20.2
Transportation.....	.2	5.6	8.3	1.3	4.8	2.1	.8	7.6	27.7	10.8	18.7	38.1
Communications.....	32.6	6.0	5.0	7.8	-1.4	.5	4.6	6.9	-3.4	1.0	-5.0	2.9
Other services.....	23.8	8.9	3.2	6.7	11.8	7.1	6.6	6.6	3.9	8.0	11.5	7.3
Structures.....	7.2	3.7	7.9	1.4	8.5	5.8	8.9	15.3	13.8	18.1	16.6	10.6
Addenda:												
Total purchases less compensation.....	12.9	11.3	8.0	3.5	10.6	9.5	8.3	7.4	10.7	7.0	17.5	16.7
Total purchases less compensation and bulk petroleum.....	15.0	10.4	3.9	6.2	12.9	6.8	6.2	11.6	9.5	8.0	11.6	9.6
	1980				1981				1982			
	I	II	III	IV	I	II	III	IV	I	II	III	
National defense purchases.....	13.8	9.8	4.3	28.0	6.8	9.6	3.0	24.2	6.5	4.1	2.1	
Durables.....	14.2	18.1	2.2	12.0	8.8	15.4	9.2	14.3	7.5	17.6	4.8	
Aircraft.....	17.3	32.0	-9.0	14.1	8.4	22.6	6.5	17.8	26.5	21.5	15.8	
Missiles.....	-8.9	16.4	17.3	22.7	5.8	26.4	2.8	36.8	-17.8	64.6	-9.5	
Ships.....	19.2	6.9	6.5	.3	8.6	11.8	3.1	10.1	2.0	7.0	6.8	
Vehicles.....	15.5	35.3	-2.8	25.5	31.6	3.1	26.0	26.9	-5.0	28.8	13.5	
Other durables.....	16.4	10.0	6.4	11.8	11.9	7.3	13.1	5.6	4.3	5.7	2.8	
Nondurables.....	88.8	2.3	4.1	27.6	-2	35.2	-5.6	12.2	-17.4	-6.0	11.3	
Bulk petroleum.....	104.8	38.0	19.0	4.1	9.8	50.7	-4.3	-11.1	-9.3	-11.7	-10.9	
Other nondurables.....	6.4	1.2	13.6	13.2	9.8	1.9	15.4	7.6	12.9	-3.2	12.4	
Services.....	6.4	7.0	3.9	35.8	6.0	4.4	5.2	28.6	6.6	1.3	2.2	
Compensation.....	2.5	1.1	1.4	50.3	3.4	1.7	1.4	43.0	2.2	.8	.8	
Services less compensation.....	9.7	14.9	11.1	15.1	8.9	8.6	9.0	5.8	17.7	-1.8	.6	
Travel.....	30.3	14.1	12.5	198.4	-10.1	2.4	7.4	-6	-2.4	4.3	-2.9	
Transportation.....	14.6	27.9	8.2	-.1	7.7	10.3	-10.4	14.8	2.3	-4.6	2.6	
Communications.....	1.9	9.7	-1	-9	10.6	59.1	66.7	22.2	2.3	5.7	-11.4	
Other services.....	6.9	14.1	11.4	10.8	10.4	7.4	9.0	5.1	21.5	-2.0	1.3	
Structures.....	17.4	6.5	1.9	7.0	12.4	11.2	8.7	6.1	7.0	7.2	.7	
Addenda:												
Total purchases less compensation.....	20.5	16.2	7.3	14.9	8.4	13.8	3.3	12.1	10.9	3.6	1.5	
Total purchases less compensation and bulk petroleum.....	12.6	16.3	6.8	12.3	9.2	11.2	9.6	10.5	11.8	7.4	3.3	

Table 6.—Percent Change From Preceding Period in Fixed-weighted Price Indexes [1977=100]

[Seasonally adjusted at annual rates]

	1977				1978				1979			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
National defense purchases		5.3	2.0	15.4	7.2	4.0	4.8	13.9	5.3	7.4	9.2	21.7
Durables		12.2	0	6.7	17.4	6.9	6.2	10.7	7.5	13.5	11.0	11.4
Aircraft.....		5.8	7.5	8.3	25.2	6.8	8.7	3.9	3.5	26.7	26.4	7.5
Missiles.....		14.3	-3.2	8.5	12.9	5.4	4.1	35.4	-10.1	30.0	1.8	8.9
Ships.....		12.1	.6	3.3	3.3	10.2	2.7	22.4	10.8	4.3	-2.9	21.0
Vehicles.....		11.8	5.2	.8	62.4	5.6	5.9	-1.0	9.7	4.0	8.3	11.6
Other durables.....		17.0	-5.3	7.1	13.7	6.4	6.1	8.1	14.4	4.8	7.2	11.9
Nondurables		8.6	7.7	11.3	8.8	2.1	6.0	7.8	15.4	27.4	76.2	82.4
Bulk petroleum.....		10.1	9.6	14.4	5.5	-1.8	4.7	8.0	18.2	42.9	138.0	129.4
Other nondurables.....		6.5	5.1	7.1	13.7	7.9	7.9	7.6	11.7	8.1	8.0	16.4
Services		2.7	2.0	19.5	3.7	3.1	3.9	15.7	3.6	3.5	3.8	21.1
Compensation.....		.7	.2	25.8	1.6	1.8	2.5	19.2	2.2	1.3	1.4	26.3
Services less compensation.....		7.2	5.9	7.3	8.3	5.8	7.0	8.7	6.5	8.3	9.0	10.9
Travel.....		2.2	.9	9.2	5.2	.3	3.3	-1.5	8.2	.9	4.1	23.2
Transportation.....		6.3	8.8	.4	-1.0	4.1	4.0	13.8	20.8	14.1	14.5	33.4
Communications.....		7.2	3.2	8.3	1.2	.6	11.4	-1.8	-1.8	-1.8	-3.0	4.9
Other services.....		7.7	6.1	8.0	10.0	6.7	7.5	9.3	5.2	8.6	9.2	7.7
Structures		3.2	6.6	1.5	6.1	5.4	11.2	9.2	8.5	14.9	13.9	14.2
Addenda:												
Total purchases less compensation.....		9.4	3.4	7.1	12.2	5.9	6.7	9.5	7.9	12.8	16.0	18.2
Total purchases less compensation and bulk petroleum.....		9.3	3.1	6.7	12.7	6.4	6.9	9.6	7.3	11.1	10.2	11.5
		1980				1981				1982		
		I	II	III	IV	I	II	III	IV	I	II	III
National defense purchases		10.8	11.0	5.6	26.8	6.5	9.5	5.6	20.4	5.7	4.6	2.9
Durables		11.8	16.6	4.9	7.4	9.2	17.6	9.2	5.9	12.5	15.0	5.4
Aircraft.....		7.7	25.0	7.7	3.3	5.6	23.1	3.4	14.1	17.4	36.4	11.1
Missiles.....		-4.8	32.2	4.2	12.9	15.5	45.5	-1.1	-12.5	27.6	10.6	11.1
Ships.....		20.7	7.0	5.2	6.0	9.4	6.8	5.3	9.6	8.8	6.8	5.1
Vehicles.....		24.2	8.8	-27.8	4.7	7.6	38.7	62.6	-10.6	4.1	.3	-17.9
Other durables.....		15.2	11.0	7.2	10.4	10.8	8.6	13.3	5.5	7.2	4.1	1.9
Nondurables		7.4	30.7	17.1	4.8	13.0	37.2	0	-9.2	-7.9	-3.5	-2.2
Bulk petroleum.....		114.8	41.5	20.2	2.8	13.4	49.7	-3.0	-14.0	-12.8	-6.7	-5.2
Other nondurables.....		7.5	5.9	9.2	10.4	11.7	6.9	9.5	5.9	6.6	5.3	5.6
Services		4.6	6.9	4.3	39.0	5.0	3.7	5.0	31.5	5.0	2.0	2.2
Compensation.....		2.5	1.1	1.5	50.7	3.4	1.6	1.4	43.7	2.2	.8	.8
Services less compensation.....		9.3	19.7	10.0	18.3	8.3	7.9	12.7	9.9	11.2	4.7	5.0
Travel.....		33.3	12.9	10.1	197.8	-10.5	2.3	10.4	-1.8	-2.5	2.8	-3.6
Transportation.....		18.6	23.0	11.2	1.4	9.6	8.5	-1.3	8.1	4.5	-1.5	2.5
Communications.....		3.6	11.1	-4.5	2.3	10.8	50.3	13.4	13.5	.5	2.4	1.9
Other services.....		6.7	20.1	10.3	11.8	10.1	7.2	14.8	11.1	13.7	5.7	6.2
Structures		18.6	6.9	8.1	9.4	2.6	7.1	7.4	6.0	7.4	1.2	15.1
Addenda:												
Total purchases less compensation.....		18.0	19.2	8.7	11.1	9.1	16.0	8.9	5.0	8.7	7.7	4.6
Total purchases less compensation and bulk petroleum.....		10.9	16.9	7.4	12.2	8.6	12.3	10.6	7.6	11.4	9.4	5.7

Stock of Plant and Equipment for Air and Water Pollution Abatement in the United States, 1960-81

THIS article introduces annual estimates of the stock of nonfarm business plant and equipment (P&E) for air and water pollution abatement (PA) in the United States for 1960-81 (chart 1). This stock consists of fixed reproducible tangible capital (except motor vehicle emission abatement devices) owned by nonresidential nonfarm business and employed in the abatement of air and water pollutant emissions.¹ Both gross and net stock estimates are presented, valued at constant cost and at current cost. The PA P&E stock estimates are useful in interpreting economic performance measures—output, productivity, and price change as conventionally measured and aggregate economic well-being as variously defined—and in modeling economic behavior utilizing these measures. Analyses of these kinds often involve separating the PA P&E stock from that of conventional capital.

Constant-cost stock estimates value identical assets at the same price (in this article, the 1972 price) regardless

of their actual prices in their year of acquisition (i.e., historical prices). These constant-cost estimates are referred to as “real” estimates in this article. Current-cost stock estimates value assets at prices that would have been paid for them if they had been produced in the year to which the stock estimates refer.²

Annual estimates of the stock of PA P&E are derived from PA P&E expenditures using the perpetual inventory method. The PA P&E expenditures estimates for 1960-81 are shown in this article.³ They are of interest in their own right, and, as well, facilitate the interpretation of the stock estimates.

Highlights of the article are:

- The real gross stock of nonfarm business air and water PA P&E at yearend 1981 was \$56.6 billion, 2.8 percent of the real gross stock of all fixed nonresidential nonfarm business capital.

- The real gross stock of nonfarm business air and water PA P&E increased at an average annual rate of 13 percent during 1960-81, compared with an average annual increase of only 4 percent for the real gross stock

of fixed nonresidential nonfarm business capital excluding PA P&E.

- Real spending for air and water PA P&E—which determines the growth of the gross stock of PA P&E—grew at an average annual rate of 11 percent during 1960-81, compared with 4 percent for P&E spending excluding PA.

The first section of this article focuses on real estimates of nonfarm business air and water PA P&E (referred to as PA P&E unless otherwise noted). Growth rates of PA P&E stocks and expenditures for 1960-81 are examined. A subsection on industry trends relates growth rates of stocks to those for expenditures for PA P&E and for P&E excluding PA. The second section briefly discusses current-cost stock estimates. The methodology used in estimating stocks is summarized in the final section and detailed in the technical notes. Major elements of the context in which the rapid growth in the gross stock of PA P&E occurred are summarized in the box accompanying the article (p. 22).

Real Stock

The real gross stock of PA P&E at yearend 1981 was \$56.6 billion, two-thirds, or \$37.8 billion, in manufacturing industries and one-third, or \$18.8 billion, in nonmanufacturing (table 1). The total was 2.8 percent of the real gross stock of all fixed nonresidential non-farm business capital (hereinafter referred to as business capital).⁴ In

1. Although stock estimates for air PA P&E and for water PA P&E are not shown separately in this article, the definition of PA P&E is the same as that used in Gary L. Rutledge and Betsy D. O'Connor, “Plant and Equipment Expenditures by Business for Pollution Abatement, 1981 and Planned 1982,” *SURVEY OF CURRENT BUSINESS*, 62 (June 1982): 17-21 and 72. Plant and equipment for solid waste collection and disposal by means acceptable to Federal, State, and local authorities are excluded from the estimates in the present article due to deficiencies in source data.

Pollution abatement is the reduction or elimination of emissions of pollutants that is brought about by human activity directed to that purpose. Pollutants are defined as substances and other emissions (e.g., noise) that degrade the quality of common-property media (e.g., the atmosphere).

Fixed reproducible tangible capital consists of equipment and structures owned by business, government and government enterprises, and households and institutions. For further information, see U.S. Department of Commerce, Bureau of Economic Analysis (BEA), *Fixed Reproducible Tangible Wealth in the United States, 1925-79*, pp. T-1 through T-40. The present article discusses the PA portion of fixed reproducible tangible capital owned by nonfarm nonresidential business.

NOTE.—The stock series presented in this article represent several years' research. Frederick J. Dreiling conducted the early phases. Gerald Silverstein provided advice during the later phases. Richard J. Martucci did the computer programming, and Tracy K. Leigh and Saundria W. Carter provided statistical assistance.

2. For example, the 1981 stock at current cost values assets at 1981 prices and the 1980 stock values assets at 1980 prices.

3. Expenditures estimates for PA P&E for 1973-81 are from the BEA survey on new P&E expenditures. See Rutledge and O'Connor, “Plant and Equipment,” p. 18. The estimates for years prior to 1973 were developed from a variety of data sources, discussed later. The scarcity of sources prior to 1967 adversely affects the quality of the estimates.

4. The denominator of the percentage given is a tentative estimate; published estimates of the real gross stock of business capital are for 1925-79 only. See BEA, *Fixed Reproducible Tangible Wealth*, pp. T-1 through T-40 and 1, 4, 55, and 58. The real gross stock of business capital is derived from investment series that are part of the national income and product accounts. For a summary of differences in definition be-

1981, the real gross stock of PA P&E was 14 times its size in 1960.

The difference between the gross and net stock is accumulated depreciation, i.e., the portion of the gross stock's value lost through physical deterioration and obsolescence.⁵ The real net stock of PA P&E at yearend 1981 was \$38.1 billion, \$24.0 billion in manufacturing and \$14.0 billion in nonmanufacturing (table 2). The total was 3.3 percent of the real net stock of all business capital. In 1981, the value of the real net stock of PA P&E was 10 times its size in 1960.

The real gross stock of PA P&E increased at an average annual rate of 13 percent during 1960-81 (table 3). It increased at an 18-percent annual rate during 1970-75, when the stimulus of Federal legislation was strongest (see accompanying box). In contrast, the real gross stock of business capital excluding PA P&E increased at an average annual rate of 4 percent during 1960-81 and at the same rate during 1970-75 (table 4). The net stock of PA P&E increased at an average annual rate of 11 percent during 1960-81, and at 19 percent during 1970-75. Growth rates for the net stock of business capital excluding PA P&E were 4 percent and 3 percent, respectively, for these periods.

Relatively large growth rates in stocks of PA P&E are traceable to trends in PA P&E spending. Real spending for PA P&E grew at an average annual rate of 11 percent during 1960-81 and 15 percent during 1970-75 (tables 5 and 6). Real spending for P&E excluding PA grew at a rate of 4 percent and less than 1 percent, respectively.

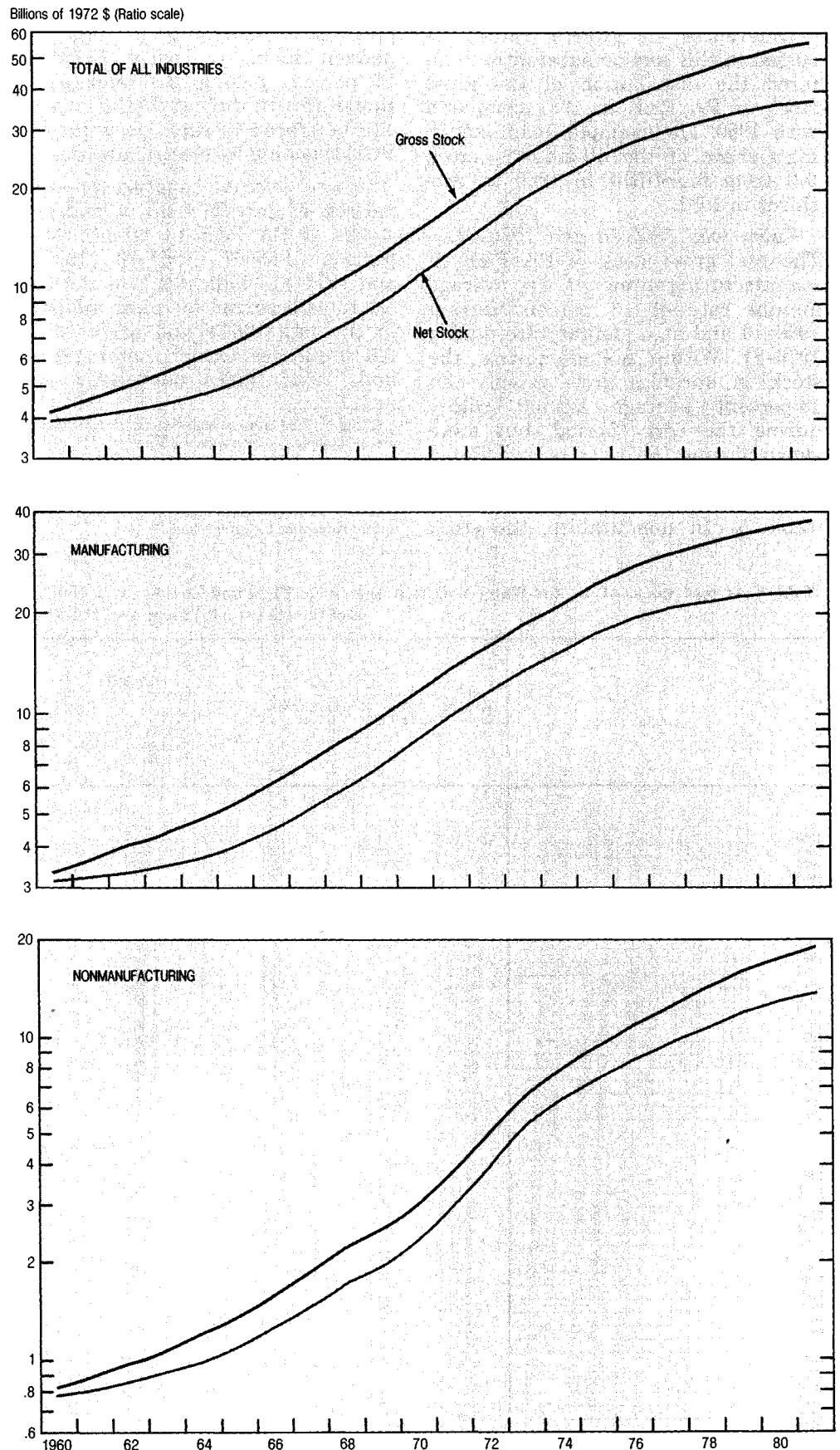
Industry trends

The real gross stock of PA P&E in manufacturing grew at an average annual rate of 12 percent during 1960-81. Within manufacturing, the stock in durables grew more rapidly

tween new P&E expenditures and national income and product account estimates of investment, see George R. Green and Marie P. Hertzberg, "Revised Estimates of New Plant and Equipment Expenditures in the United States, 1947-77," *SURVEY* 60 (October 1980): 24-59. No adjustments for differences in definition were made to PA P&E stocks in comparing them with stocks of business capital.

5. Depreciation, as estimated when deriving the net stock, also includes value lost due to some accidental damage but excludes large-scale (i.e., disaster) damage.

Gross and Net Stocks of Pollution Abatement Plant and Equipment CHART 1



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than in nondurables. The stock in nonmanufacturing grew at an average annual rate of 16 percent.

Differences in growth rates discussed in this section substantially altered the distribution of the gross stock of PA P&E in 1981 compared with 1960. For example, manufacturing's share of the all-industry stock fell from four-fifths in 1960 to two-thirds in 1981.

Subperiods 1960-70 and 1970-81.—The real gross stock of PA P&E in manufacturing grew at an average annual rate of 13 percent during 1960-70 and at a similar rate during 1970-81. Within manufacturing, the stock in durables grew rapidly—an 18-percent average annual rate—during the early period, but more slowly during the later period. Rapid growth in the early period reflects rapid growth in PA P&E spending (table 6). In nondurables, the stock

grew at a rate of 11 percent during both subperiods.

The stock in nonmanufacturing grew at average annual rates of 14 percent during the early period and 18 percent during the later period. Rapid growth during the later period can be traced to rapid growth in PA P&E spending by electric utilities.

Other selected subperiods.—Comparison of growth rates of real gross stocks of PA P&E in other selected periods—1960-67, 1967-70, 1970-75, and 1975-81—indicates that the highest rates occurred for most industries in the late 1960's and early 1970's.⁶ All industries except motor vehicles and "nondurables not shown separately"

had higher growth rates during 1967-70 than during 1960-67; high growth rates for the stocks for most industries continued during 1970-75.

Growth rates of industry spending for PA P&E are themselves influenced by growth rates of P&E spending (excluding PA), because PA and other capital are complementary goods.⁷ Moderate growth rates of P&E spending by most industries boosted growth rates in PA P&E spending during 1960-67 relative to other periods; low and negative rates of P&E spending dampened rates of PA P&E spending during 1967-70 and during 1970-75. Despite widespread boosts from P&E spending, PA P&E spending fell during 1975-81.

6. Subperiods were selected with critical years in the development and implementation of U.S. pollution abatement policy (1967, 1970, and 1975) as end points. Also, 1967 is the first year for which a variety of source data on PA P&E expenditures are available, so that the quality of estimates for years prior to 1967 differs from that for later years.

7. Spending for PA normally accompanies that for production facilities and fluctuates with P&E spending; however, the two types of spending are not perfect complements and the mix of the two types purchased varies over time with changes in PA programs.

Table 1.—Gross Stocks of Air and Water Pollution Abatement Plant and Equipment in Nonfarm Business, by Major Industry Group, Current-Cost and Constant-Cost Valuation, 1960-81

	All nonfarm industries	Manufacturing	Nonmanufacturing	Manufacturing									
				Durables				Nondurables					
				Total	Blast furnaces	Motor vehicles	Durables not shown separately	Total	Chemicals	Petroleum	Paper	Food including beverages	Nondurables not shown separately
Billions of current dollars													
1960	3.02	2.44	0.58	0.62	0.15	0.21	0.26	1.82	0.64	0.85	0.19	0.13	0.02
1961	3.28	2.66	.63	.69	.18	.23	.27	1.97	.69	.92	.20	.14	.02
1962	3.58	2.89	.69	.76	.20	.26	.31	2.13	.75	1.00	.22	.15	.02
1963	3.92	3.16	.76	.86	.23	.29	.34	2.30	.81	1.07	.24	.16	.03
1964	4.37	3.52	.85	1.01	.27	.33	.40	2.51	.88	1.16	.26	.18	.03
1965	5.00	4.01	.99	1.21	.32	.39	.50	2.80	.98	1.27	.30	.19	.05
1966	5.89	4.71	1.18	1.51	.39	.46	.66	3.20	1.11	1.44	.35	.22	.08
1967	7.07	5.63	1.44	1.91	.49	.52	.90	3.73	1.29	1.66	.42	.24	.12
1968	8.61	6.82	1.78	2.46	.62	.57	1.27	4.37	1.49	1.94	.51	.27	.15
1969	10.62	8.43	2.19	3.22	.79	.66	1.76	5.21	1.73	2.30	.64	.35	.19
1970	13.42	10.61	2.81	4.25	1.02	.77	2.46	6.36	2.02	2.74	.83	.47	.30
1971	17.01	13.28	3.74	5.36	1.24	.90	3.22	7.91	2.40	3.47	1.05	.63	.36
1972	21.37	16.25	5.12	6.57	1.50	1.04	4.03	9.68	2.92	4.07	1.38	.83	.48
1973	28.25	20.72	7.53	8.66	1.83	1.28	5.56	12.06	3.55	4.93	1.80	1.14	.64
1974	36.97	26.45	10.53	11.23	2.27	1.53	7.43	15.22	4.41	6.08	2.37	1.50	.86
1975	46.29	33.02	13.28	13.89	2.86	1.72	9.31	19.13	5.46	7.70	3.02	1.88	1.07
1976	55.62	39.32	16.30	16.37	3.49	1.88	11.00	22.96	6.64	9.15	3.66	2.27	1.25
1977	65.91	46.00	19.91	19.06	4.20	2.10	12.76	26.94	7.88	10.68	4.28	2.66	1.45
1978	78.27	53.76	24.51	22.21	4.97	2.44	14.80	31.55	9.14	12.62	4.88	3.20	1.72
1979	93.05	62.74	30.31	26.07	6.02	2.89	17.15	36.67	10.39	14.91	5.64	3.72	2.00
1980	110.32	73.77	36.56	30.88	7.22	3.54	20.12	42.89	11.88	17.86	6.46	4.35	2.34
1981	128.41	85.78	42.64	35.84	8.41	4.20	23.23	49.93	13.62	21.22	7.32	5.07	2.71
Billions of 1972 dollars													
1960	4.18	3.36	.82	.84	.21	.28	.35	2.52	.88	1.18	.26	.17	.02
1961	4.56	3.67	.90	.94	.25	.32	.38	2.73	.96	1.28	.28	.19	.02
1962	4.97	4.07	.97	1.04	.28	.35	.42	2.95	1.03	1.38	.30	.21	.03
1963	5.43	4.36	1.07	1.18	.31	.40	.47	3.18	1.12	1.48	.33	.22	.04
1964	6.02	4.82	1.20	1.37	.37	.46	.54	3.45	1.21	1.60	.36	.24	.05
1965	6.75	5.39	1.36	1.62	.43	.53	.66	3.77	1.32	1.72	.41	.26	.07
1966	7.73	6.16	1.58	1.96	.51	.60	.86	4.19	1.46	1.89	.46	.28	.10
1967	9.00	7.15	1.85	2.40	.63	.65	1.13	4.75	1.64	2.11	.53	.30	.15
1968	10.48	8.29	2.19	2.97	.75	.69	1.53	5.32	1.82	2.37	.63	.33	.18
1969	12.20	9.69	2.51	3.68	.91	.76	2.02	6.01	2.00	2.64	.74	.40	.22
1970	14.47	11.46	3.01	4.58	1.11	.83	2.64	6.89	2.19	2.96	.90	.51	.32
1971	17.38	13.57	3.81	5.48	1.27	.92	3.29	8.09	2.46	3.55	1.07	.64	.37
1972	20.77	15.78	4.99	6.39	1.46	1.01	3.92	9.39	2.83	3.95	1.34	.80	.47
1973	24.88	18.33	6.56	7.65	1.61	1.13	4.91	10.68	3.14	4.36	1.60	1.01	.57
1974	28.94	20.95	7.99	8.84	1.79	1.21	5.84	12.11	3.52	4.83	1.89	1.19	.68
1975	33.58	24.25	9.32	10.13	2.09	1.26	6.78	14.12	4.05	5.67	2.23	1.39	.79
1976	38.04	27.22	10.81	11.26	2.41	1.30	7.55	15.96	4.63	6.35	2.54	1.58	.86
1977	42.16	29.80	12.36	12.29	2.72	1.36	8.22	17.51	5.13	6.93	2.78	1.73	.94
1978	46.11	32.05	14.06	13.20	2.96	1.45	8.79	18.85	5.47	7.53	2.91	1.91	1.02
1979	49.91	34.09	15.81	14.12	3.27	1.57	9.28	19.97	5.67	8.11	3.07	2.03	1.09
1980	53.56	36.14	17.41	15.05	3.53	1.73	9.79	21.09	5.86	8.76	3.18	2.14	1.15
1981	56.60	37.79	18.81	15.68	3.69	1.85	10.15	22.11	6.06	9.37	3.24	2.25	1.19

Stock Valued at Current Cost

The gross stock of PA P&E valued at current cost at yearend 1981 was \$128.4 billion, \$85.8 billion in manufacturing and \$42.6 billion in non-manufacturing. The total was 2.8 percent of the gross stock of all business capital.

During 1960-81, the current-cost gross stock of PA P&E grew at an average annual rate of 20 percent. The gross stock of other business capital grew at one-half that rate. Although price changes for PA P&E and for other business capital were similar during this period, only one-third of the growth rate in the stock of PA P&E was due to price change, whereas most of the growth rate in the stock of other business capital was due to price change.

The current-cost net stock of PA P&E at yearend 1981 was \$86.2 billion, \$54.4 billion in manufacturing and \$31.8 billion in nonmanufacturing. The total was 3.3 percent of the net stock of all business capital.

During 1960-81 the current-cost net stock grew at an average annual rate of 18 percent, compared with 10 percent for the net stock of other business capital. The effect of price change on growth rates of net stocks was similar to that for gross stocks.

Summary Methodology

Gross stocks of PA P&E by industry were estimated using the perpetual inventory method. In the method, past investment is cumulated and discards are deducted in accordance with the lifetimes of capital goods. Net stocks are calculated by subtracting accumulated depreciation from gross stocks to reflect the decrease in the usefulness of existing capital.

The perpetual inventory method requires three data elements:

- (1) Current-dollar capital spending over an extended period, or, in the absence of an extended series, the initial capital stock;
- (2) Price indexes; and

(3) Lifetimes of assets, or, in the absence of detail on lifetimes, average lifetimes and typical retirement patterns.

Estimates of PA P&E spending are available for 1973-81 from BEA's survey on new P&E expenditures. Initial stocks by industry in 1959 of PA P&E were developed from several sources; the most important was a survey by the National Association of Manufacturers (NAM). The linking of the 1959 information to that for 1973 was done in two steps. Spending in 1973 was extrapolated back to 1967 using similar spending estimates from trade associations and the McGraw-Hill Publications Company. Second, PA P&E spending for 1960-66 was estimated by multiplying total P&E spending each year by the 1959 stock ratio of PA P&E to total P&E.⁸

Price indexes were developed using components of the Bureau of Labor

8. This stock ratio was assumed to equal the ratio of PA P&E spending to total P&E spending for 1960-66. The ratio of spending probably remained constant until the mid-1960's.

Growth in the Stock of Plant and Equipment for Pollution Abatement: The Context

With the extensions of the series on plant and equipment for pollution abatement presented in this article, the stock and expenditure series begin in 1959. That year roughly dates the beginning of the period in which pollution abatement spending became a significant enough issue to warrant the collection of national data related to it. The context in which the rapid growth in the stock, as described in the article, occurred is complex, but a 20-year period provides perspective that helps delineate the major elements. Among these elements are:

—The political process by which decisions about pollution abatement were made was put in motion by an economic problem: how to provide increased collective consumption of clean air and water not voluntarily forthcoming or directly purchasable.

—The increased demand for clean air and water first took the form of controversy over the importance of reducing pollution between U.S. business, on the one hand, and citizens and their governments at all levels, on the other. The prevalence and intensity of controversy increased dramatically in the 1960's.

—The increased demand for clean air and water is traceable to several interrelated factors. Among them are: (1) the widespread perception that the magnitude of the pollution problem was growing rapidly; (2) heightened public awareness of pollution, stemming from well-publicized environmental disruptions such as oil spills, severe smog, and releases of dangerous chemicals, and from increasing scientific knowledge of, and capability for measuring, health hazards; and (3) rising real income (i.e., disposable personal income per capita), which affected political and economic priorities. Specifically, rising real income boosted demand for clean air and water as well as private goods that were most income elastic.

—High growth rates of real PA P&E spending, especially after 1965, indicate that many businesses responded relatively quickly to concern about pollution by undertaking or enlarging pollution abatement programs. Underlying this response was the growing acceptance of their necessary role as primary providers of clean air and water. In part, this response was stimulated by the growing political power of environmental groups and spreading support for environmental causes.

—The political process in which business, government, and the public engaged to resolve the economic problem led to the formulation and evolution of policies at all levels of government. The Federal role in pollution abatement policy formation grew throughout the 1960's. It became dominant with the passage of the Clean Air Act Amendments of 1970 and the Water Pollution Control Act Amendments of 1972. These amendments constituted the largest increase in legislated requirements for pollution abatement during the 1960-81 period.

Statistics Producer Price Index, the *Chemical Engineering Plant Cost Index*, the Environmental Protection Agency (EPA) Large City Advanced Wastewater Treatment Plant Cost Index, and the Handy-Whitman Index of Public Utility Construction Costs. Indexes were calculated separately for

air and for water PA P&E spending, for manufacturing, electric utilities, and nonmanufacturing (excluding electric utilities).

Estimates of lifetimes by industries for air and for water PA facilities were obtained by consulting with industry specialists and trade groups. The retirement pattern assumed was the modified Winfrey S-3 retirement pattern used in BEA's estimates of business capital.⁹

1. Stock in 1959 and spending during 1960-81

The earliest data useful in estimating the PA P&E stock are for manufacturing only and are from a survey by NAM (*Water In Industry*, New York: National Association of Manufacturers, 1965). Sample data from this survey of the gross stock (valued at current cost in 1959) of waste water treatment facilities were increased to a total (i.e., universe) level using ratios of sample to universe data for a reference variable (e.g., water treated prior to discharge or plant production capacity). Data for construction of industry sample-to-universe ratios are either from NAM (*Water In Industry*) or the Census Bureau (*United States Census of Manufactures, 1958*, vol. I., *Summary Statistics*, pt. 11, Industrial Water Use).

For manufacturing, the air PA P&E stocks by industry in 1959 were estimated as the water PA P&E stocks in 1959 multiplied by air-to-water ratios

Table 4.—Growth Rates for Gross and Net Stocks of Fixed Nonresidential Nonfarm Business Capital (Excluding Pollution Abatement Plant and Equipment), Selected Periods

[Average annual percent change]

	Gross stock		Net stock	
	Valued in current dollars	Valued in 1972 dollars	Valued in current dollars	Valued in 1972 dollars
1960-81	9.8	3.9	9.9	4.0
1960-1970	7.2	4.1	7.9	4.8
1960-1967	5.7	3.9	6.5	4.7
1967-1970	10.8	4.6	11.2	4.9
1970-1981	12.3	3.7	11.8	3.2
1970-1975	12.4	3.8	12.0	3.5
1975-1981	12.2	3.5	11.6	3.0

Technical Notes

These technical notes describe the sources and procedures used in estimating gross and net stocks of PA P&E and are organized according to the three data elements required by the perpetual inventory method.

⁹ BEA, *Fixed Reproducible Tangible Wealth*, p. T-23.

Table 5.—Expenditures for Air and Water Pollution Abatement New Plant and Equipment in Nonfarm Business, by Major Industry Group, in Current and Constant Dollars, 1960-81

Year	All nonfarm industries	Manufacturing	Nonmanufacturing	Manufacturing									
				Durables				Nondurables					
				Total	Blast furnaces	Motor vehicles	Durables not shown separately	Total	Chemicals	Petroleum	Paper	Food including beverages	Nondurables not shown separately
Billions of current dollars													
1960	0.28	0.24	0.05	0.09	0.04	0.03	0.02	0.15	0.05	0.07	0.02	0.01	0
1961	.27	.22	.05	.07	.03	.02	.02	.15	.05	.07	.01	.01	0
1962	.29	.23	.06	.08	.02	.03	.03	.16	.05	.07	.02	.01	0
1963	.33	.26	.07	.10	.03	.03	.04	.17	.06	.07	.02	.01	0
1964	.43	.34	.09	.14	.04	.04	.06	.20	.07	.08	.02	.01	.01
1965	.55	.44	.12	.18	.05	.05	.09	.25	.10	.09	.03	.01	.01
1966	.76	.60	.16	.26	.06	.05	.15	.33	.11	.13	.04	.02	.03
1967	1.04	.82	.21	.35	.09	.04	.22	.48	.16	.19	.06	.02	.04
1968	1.25	.98	.27	.46	.10	.03	.33	.52	.18	.22	.08	.02	.02
1969	1.55	1.28	.27	.62	.14	.06	.42	.66	.20	.25	.11	.06	.04
1970	2.22	1.75	.47	.83	.18	.06	.58	.92	.23	.34	.16	.10	.09
1971	2.95	2.17	.78	.89	.16	.10	.63	1.28	.33	.60	.17	.13	.05
1972	3.60	2.41	1.19	.95	.20	.10	.66	1.46	.42	.49	.28	.17	.10
1973	4.61	2.92	1.69	1.39	.19	.13	1.07	1.53	.41	.50	.30	.23	.11
1974	5.30	3.49	1.81	1.53	.24	.11	1.18	1.97	.53	.69	.37	.23	.14
1975	6.58	4.69	1.89	1.81	.43	.08	1.30	2.88	.78	1.21	.48	.27	.14
1976	6.78	4.54	2.24	1.71	.49	.08	1.14	2.84	.92	1.06	.47	.28	.11
1977	6.84	4.36	2.48	1.69	.50	.13	1.06	2.68	.87	1.03	.40	.25	.12
1978	7.02	4.12	2.90	1.62	.45	.18	1.00	2.50	.69	1.11	.26	.31	.14
1979	7.71	4.40	3.31	1.87	.61	.26	1.00	2.53	.56	1.25	.36	.23	.12
1980	8.35	4.97	3.38	2.11	.60	.37	1.15	2.86	.64	1.52	.32	.25	.13
1981	8.01	4.79	3.22	1.78	.47	.31	1.00	3.01	.74	1.61	.27	.27	.11
Billions of 1972 dollars													
1960	.39	.33	.06	.12	.05	.03	.03	.21	.08	.09	.02	.01	0
1961	.38	.31	.07	.10	.03	.03	.03	.21	.08	.10	.02	.02	0
1962	.41	.32	.08	.10	.03	.03	.04	.22	.08	.10	.02	.02	0
1963	.46	.36	.10	.13	.04	.04	.05	.23	.08	.10	.03	.02	.01
1964	.60	.47	.13	.19	.06	.06	.08	.28	.10	.11	.03	.02	.01
1965	.76	.59	.16	.25	.06	.07	.12	.34	.13	.13	.05	.02	.02
1966	1.01	.79	.22	.35	.07	.07	.20	.44	.15	.18	.06	.02	.03
1967	1.35	1.06	.28	.45	.12	.05	.28	.62	.21	.25	.08	.02	.05
1968	1.57	1.23	.34	.58	.13	.04	.41	.65	.23	.27	.10	.03	.03
1969	1.83	1.51	.32	.73	.16	.07	.50	.78	.24	.30	.13	.07	.04
1970	2.47	1.95	.52	.92	.20	.07	.65	1.02	.26	.38	.18	.11	.10
1971	3.08	2.27	.81	.93	.17	.10	.66	1.34	.34	.63	.18	.13	.05
1972	3.60	2.41	1.19	.95	.20	.10	.66	1.46	.42	.49	.28	.17	.10
1973	4.37	2.77	1.60	1.32	.18	.13	1.01	1.45	.38	.47	.28	.21	.10
1974	4.35	2.89	1.45	1.26	.20	.09	.97	1.63	.44	.58	.31	.19	.12
1975	4.89	3.53	1.36	1.35	.32	.06	.97	2.18	.60	.91	.36	.21	.10
1976	4.79	3.25	1.54	1.21	.35	.06	.81	2.04	.66	.76	.34	.20	.08
1977	4.52	2.93	1.59	1.13	.33	.09	.71	1.80	.59	.70	.27	.17	.08
1978	4.32	2.57	1.74	1.01	.28	.11	.62	1.56	.43	.69	.16	.19	.08
1979	4.32	2.50	1.82	1.06	.35	.15	.56	1.44	.32	.71	.20	.13	.07
1980	4.26	2.58	1.68	1.09	.31	.19	.59	1.48	.33	.79	.17	.13	.07
1981	3.68	2.22	1.47	.82	.21	.15	.46	1.39	.34	.75	.13	.12	.05

of PA P&E cumulative spending (or, in a few cases, stocks). Data for these ratios are for selected years prior to 1973, and were obtained from several manufacturing companies, trade associations, and McGraw-Hill.

For nonmanufacturing, stocks by industry of PA P&E in 1959 were estimated as manufacturing stocks in 1959 multiplied by nonmanufacturing-to-manufacturing ratios of cumulative PA P&E spending for 1967-69. The results were allocated to air and water PA, respectively, using air-to-water ratios of cumulative PA P&E spending for 1970-71.

The stocks (for manufacturing and nonmanufacturing industries) in 1959 derived as indicated above were valued, like the NAM sample data, at current cost in 1959 (referred to by NAM as replacement cost). This valuation basis allows 1959 stocks to be treated in calculations of later stocks like initial investments in PA P&E. BEA's calculations linked information for 1959 to that for 1973 in two steps: spending for 1960-66, and spending for 1967-72. Data on PA P&E spend-

ing for 1960-66 are unavailable for most industries, and spending was estimated as total P&E spending each year multiplied by the 1959 stock ratio of PA P&E to total P&E. Numerators for the stock ratios, by industry, are 1959 PA P&E stock estimates; denominators are Internal Revenue Service data on gross book value of depreciable assets of corporations as of December 31, 1959. When the assumption of a constant relationship between PA P&E spending and total P&E spending for 1960-66 was not supportable, the ratio of spending was estimated to increase.

For the steel, paper, and petroleum industries, fragmentary data are available prior to 1967. For the steel industry, data on cumulative spending for 1951-65 for air and for water PA P&E are available from the American Iron and Steel Institute (Steel Institute); beginning in 1966, annual spending data are available from this source. To obtain annual spending before 1966, cumulative spending for air and for water PA, respectively, were divided by cumula-

tive total P&E spending for 1951-65; the resulting ratios (air and water) were multiplied by total P&E spending in each year. For paper, additional data on the stocks of water PA P&E in 1963 and 1965 are available from the National Council of the Paper Industry for Air and Stream Improvement (Paper Council). For petroleum, PA P&E spending for 1966 is available from the American Petroleum Institute (Petroleum Institute).

PA P&E spending estimates for 1967-72 are extrapolations back to 1967 from 1973. The extrapolations were based on PA P&E spending reported by the Ford Motor Company, General Motors Corporation, the Steel Institute, the Paper Council, the Petroleum Institute, and McGraw-Hill; data from these sources begin in 1967 and overlap with BEA data for 1973 forward. For most industries, the ratio of cumulative spending for 1973-80 from BEA data to that from the overlapping data source was multiplied by annual spending before 1973 (on the assumption that definitional and sampling differences between

Table 6.—Growth Rates for Expenditures for Pollution Abatement New Plant and Equipment (PA P&E) and New Plant and Equipment (Excluding PA P&E), Selected Periods

(Average annual percent change)

	All nonfarm industries	Manufacturing	Non-manufacturing	Manufacturing									
				Durables				Nondurables					
				Total	Blast furnaces	Motor vehicles	Durables not shown separately	Total	Chemicals	Petroleum	Paper	Food including beverages	Nondurables not shown separately
Pollution abatement plant and equipment (Valued in current dollars)													
1960-1981	17.3	15.4	22.4	15.6	12.5	12.7	20.5	15.3	13.2	16.3	14.2	16.6	22.9
1960-1970	22.9	22.1	26.2	25.6	16.6	9.6	40.1	19.7	15.6	17.4	25.0	25.0	49.7
1960-1967	20.4	19.5	24.6	22.4	13.3	6.5	40.4	17.7	17.1	16.0	20.9	6.1	58.7
1967-1970	28.7	28.4	29.9	33.5	24.7	17.0	39.5	24.5	12.4	20.9	35.1	83.4	30.8
1970-1981	12.4	9.6	19.1	7.2	8.9	15.6	5.0	11.4	11.0	15.2	5.2	9.4	2.7
1970-1975	24.3	21.8	32.1	16.8	18.5	5.5	17.3	25.8	27.4	28.9	25.0	21.9	10.3
1975-1981	3.3	4	9.3	-2	1.5	24.7	-4.2	7	-1.0	4.9	-8.9	-1	-3.2
(Valued in 1972 dollars)													
1960-1981	11.3	9.6	16.1	9.8	6.8	7.0	14.5	9.4	7.5	10.4	8.3	10.6	16.6
1960-1970	20.2	19.6	23.1	23.1	14.3	7.3	37.5	17.2	13.2	15.0	22.3	22.3	46.5
1960-1967	19.3	18.4	23.4	21.4	12.4	5.6	39.5	16.6	16.0	14.9	19.6	5.0	57.1
1967-1970	22.4	22.4	22.5	27.2	18.8	11.5	33.0	18.5	7.0	15.1	28.8	74.6	24.6
1970-1981	3.7	1.2	10.0	-1.1	.4	6.8	-3.0	2.8	2.5	6.3	-3.0	1.0	-5.2
1970-1975	14.7	12.6	21.3	7.9	9.4	-2.2	8.3	16.3	18.0	19.1	15.4	13.0	1.8
1975-1981	-4.6	-7.5	1.4	-7.9	-6.4	14.9	-11.6	-7.2	-8.9	-3.3	-16.0	-8.1	-10.7
Plant and equipment excluding pollution abatement plant and equipment (Valued in current dollars)													
1960-1981	9.3	10.1	8.9	10.0	3.5	9.5	10.9	10.3	10.7	10.9	10.8	8.8	9.4
1960-1970	7.9	8.1	7.8	8.8	1.1	7.5	10.3	7.5	7.5	5.5	7.7	9.2	9.0
1960-1967	7.9	10.0	6.8	11.4	4.8	9.9	13.1	8.4	9.6	7.4	9.6	6.2	10.1
1967-1970	7.9	3.9	10.2	2.8	-7.1	2.0	4.2	5.3	2.6	1.2	3.3	16.5	6.4
1970-1981	10.6	12.0	9.8	11.0	5.8	11.4	11.4	12.9	13.7	16.1	13.6	8.6	9.7
1970-1975	7.9	7.3	8.2	5.3	12.4	1.3	5.1	9.6	16.8	11.7	9.6	3.1	3.8
1975-1981	12.9	15.9	11.3	16.1	.6	20.0	16.9	15.8	11.1	19.9	17.1	13.3	14.9
(Valued in 1972 dollars)													
1960-1981	4.1	4.8	3.8	5.0	-1.8	4.4	5.9	4.6	5.4	4.4	5.5	3.8	4.3
1960-1970	5.5	5.7	5.3	6.4	-1.4	5.2	7.9	5.0	5.0	3.1	5.2	6.8	6.3
1960-1967	6.5	8.5	5.4	9.9	3.3	8.5	11.6	6.9	8.1	6.1	8.1	4.8	8.3
1967-1970	3.1	-6	5.1	-1.5	-11.4	-2.1	-1	6	-1.9	-3.5	-1.4	11.5	1.9
1970-1981	2.9	4.0	2.3	3.7	-2.2	3.7	4.2	4.2	5.7	5.5	5.9	1.1	2.5
1970-1975	3	-2	6	-1.5	4.6	-4.5	-1.6	1.3	8.7	1.4	2.1	-3.9	-3.1
1975-1981	5.1	7.6	3.8	8.3	-7.5	11.2	9.2	6.8	3.3	9.1	9.2	5.5	7.4

Note.—Growth rates of PA P&E expenditures are calculated from estimates in table 5.

sources are stable over time). The calculations can be viewed as either extrapolations or as adjustments of data from overlapping sources to a consistent basis. For the chemicals industry, extrapolation was based on a linear relationship indicated by a simple regression of BEA data on McGraw-Hill data.

2. Price indexes

The manufacturing air PA P&E price index is a weighted average of the fans and blowers component of the Producer Price Index (fans and blowers are an integral part of many types of air pollution abatement facilities) and the *Chemical Engineering Plant Cost Index*. The *Chemical Engineering* index is itself a weighted average of components of the Producer Price Index. Weights (before adjustments) are based on profiles of spending to construct chemicals plants. Adjustments were made by BEA for differences between chemicals plants and air pollution abatement facilities.

The manufacturing water PA P&E price index is a weighted average of the *Chemical Engineering* index and the EPA Large City Advanced Waste Water Treatment Plant Cost Index or, prior to the 1973, the EPA Sewerage Treatment Plant Cost Index. For water PA P&E, adjustments to the *Chemical Engineering* index were made by BEA for differences between chemicals plants and water pollution abatement facilities.

For electric utilities, the air PA P&E price index is a weighted average of the *Chemical Engineering* index and the Handy-Whitman index. The latter is an index for public utility construction costs and contains component indexes for buildings, equipment, and materials of electric utilities. Components applicable to air

Table 7.—Average Lifetimes for Air Pollution Abatement Plant and Equipment

	Years ¹
Manufacturing	
Blast furnaces	15.0
Nonferrous	14.0
Motor vehicles	20.0
Machinery	20.0
Other durables ²	20.0
Chemicals	10.8
Paper	12.0
Petroleum	14.0
Food	16.8
Other nondurables ²	18.0
Nonmanufacturing	
Communication, commercial, other ³	15.0
Electric utilities	30.0
Other nonmanufacturing ²	15.0

1. The estimates are averages for types of equipment such as baghouses, electrostatic precipitators, and wet scrubbers. Lifetimes also vary by region, plant, and process.

2. These are residual categories.

3. "Other" consists of construction; social services and membership organizations; and forestry, fisheries, and agricultural services.

pollution abatement were selected. For example, the coal and ash handling equipment component was selected for fly ash removal from electrostatic precipitators. The water PA P&E price index is a weighted average of components of the same two major indexes (as for air) and components of the Producer Price Index. Components applicable to water pollution abatement were selected. For example, the Handy-Whitman index component for reinforced concrete buildings was selected for concrete cooling tower construction costs.

The nonmanufacturing nonelectric utilities air and water indexes are weighted averages of the air and water PA indexes described above. Price changes for the PA P&E purchased were assumed to equal, on average, price changes for similar purchases by other industries.

Use of price indexes.—Constant-cost gross stocks by industry were obtained by dividing current-dollar spending by price indexes, cumulating the resulting real spending, and sub-

tracting discards. (Discards were estimated using an assumed retirement pattern, indicated below.) To obtain net stocks, depreciation was also subtracted. Current-cost stocks were obtained by multiplying constant-cost stocks by yearend price indexes.

3. Service lives and retirement pattern

Straight-line depreciation, i.e., depreciation at a constant rate over the life of an asset, is used in calculating net stocks. Rates of depreciation are derived from assumed average lifetimes.

The air PA P&E lifetimes, shown in table 7, are from discussions with staff of the Industrial Gas Cleaning Institute and the Environmental Elements Corporation (subsidiary of the Koppers Corporation). The lifetimes are average physical lifetimes for types of equipment such as baghouses, electrostatic precipitators, and wet scrubbers. These lifetimes and the revised equipment lifetimes used by the EPA to provide estimates of annualized capital cost for the *Cost of Clean Air and Water Report to Congress, 1979* are of similar length.

For water PA P&E, a lifetime estimate of 30 years has been assumed for all industries. This estimate is from discussions with staff of the Koppers Corporation, the Water Pollution Control Federation, the Potomac Electric Power Company, and other industry sources. The 30-year estimate is appropriate for many mixes of equipment and structural components found in waste water treatment systems.

Data are not available on discards of PA P&E. Discards were assumed to occur symmetrically about the average lifetime, according to the modified Winfrey S-3 nonresidential retirement pattern.

Editor's note

In 1980, BEA, in cooperation with the Council of Economic Advisers, the Office of Management and Budget, and several other Federal agencies, prepared new estimates for 1955-80 of the high-employment budget for the Federal Government. These estimates, along with an analysis of the results and a description of the improved methodology, were published in the November 1980 *SURVEY OF CURRENT BUSINESS*. With that publication, BEA assumed responsibility for the maintenance and improvement of the current and historical high-employment budget estimates. Subsequently, an article in the April 1982 issue of the *SURVEY* presented revised estimates. The revisions were primarily due to the most recent comprehensive revision of the national income and product accounts, but also

incorporated statistical updating and some small improvements in methodology. In addition, the April article introduced estimates of changes in the high-employment budget due to the automatic response of Federal receipts and expenditures to inflation. The inability to separate the inflation-induced changes in the high-employment budget from other changes had been a major limitation of the previously published estimates as a measure of discretionary fiscal policy.

In what follows, William Fellner, of the American Enterprise Institute, presents a critique of the high-employment budget and of potential output—an integral part of the methodology of the high-employment budget—that takes off from the two *SURVEY* articles. Frank de Leeuw and Thomas M. Holloway, of BEA, respond.

The High-Employment Budget and Potential Output

A Critique

By WILLIAM FELLNER

I. Introduction and Summary

THIS note is motivated in part by dissent from basic premises underlying many writings on the high-employment budget, including Frank de Leeuw and Thomas M. Holloway's article in the April 1982 issue of the *SURVEY OF CURRENT BUSINESS*. The de Leeuw-Holloway article is a sequel to that published in the November 1980 issue and written by the same authors and by Darwin G. Johnson, David S. McClain, and Charles A. Waite. Some of the reasons for my dissent from the approach used by these authors as well as by earlier contributors were explained in the 1978 volume of the American Enterprise Institute's *Contemporary Economic Problems* series, and the present note develops that critique further.¹

However, the motivations of this note are not entirely critical. There exists an area of overlap between the approach with the premises of which I disagree and approaches that have been gaining ground over the past years and that will, I hope, continue to gain ground. The existence of this overlap needs to be stressed all the more because the recent contributions of the authors named above have advanced their approach in such a way that various improvements they have made will prove valuable to researchers regardless of their macroeconomic orientation. I will, therefore, first comment on what I regard as the merits of their contributions.

Given the effective tax rates on the incomes of various types and sizes accruing in a country, and given the fiscal commitment of its government, fiscal receipts and expenditures—hence deficits or surpluses—are significantly influenced by the level of economic activity. It is clearly useful to try to obtain good estimates of this effect. Such information is indeed needed, if for no other reason, because it is impossible to estimate the consequences of discretionary changes

in tax or expenditure provisions without forming an opinion of how budgetary outcomes were influenced in the past and may be influenced in the future by changes in the activity level.

In their contribution of April 1982, de Leeuw and Holloway have rightly stressed that the determinants of the budgetary outcome *other than the level of economic activity*—hence the determinants of the budgetary outcome at any *given* level of activity—include not only the legal-institutional provisions on which the tax intake and the expenditures depend at any given price level, but also the rates of price change. Quite aside from changes in relative income shares usually brought about by inflation, the inflationary bracket creep and underdepreciation—which, for good reason, have received much attention recently—tend to raise fiscal revenues

NOTE.—The author is Resident Scholar at the American Enterprise Institute and Sterling Professor of Economics, Emeritus, Yale University. The views expressed are those of the author and should not be ascribed to the Institute or to the U.S. Department of Commerce.

1. See in that volume my "Structural Problems Behind Our Measured Unemployment Rates," particularly the section on "The Conventional Concept of Potential Output and the Problem of Rigidities," pp. 84-95.

in relation to expenditures. It is a merit of the de Leeuw-Holloway contribution that it suggests a method for quantifying the effect of inflation on the budget deficits and surpluses of successive periods. The de Leeuw-Holloway method makes it possible to divide changes in the fiscal receipts and expenditures of successive quarters into two components for levels of output described as "high-employment levels" or "potential levels." These two components are (a) the change that is brought about by changes in effective tax rates and/or in fiscal commitments at an unchanging inflation rate, given the assumed high-employment (potential) level of output, and (b) the change that is brought about by the observed changes in the inflation rate.

An admitted imperfection of the de Leeuw-Holloway method is that the inflation effect on the budget is estimated using the observed inflation rate, and this rate is not the same as the one that would develop at other activity levels, such as the level that the authors assume to be the level of potential output. But this imperfection I consider inevitable, as apparently do the authors, because there exists no reasonably sound method for estimating the inflation rate corresponding to alternative levels of economic activity.

In the foregoing paragraphs I placed the emphasis on what I regard as a common ground. I will now turn to two points of disagreement with the usual presentations, including that of de Leeuw and Holloway.

The first point relates to the significance attributed to the potential output, in terms of which the high-employment budget is defined. This is the output of which it is assumed that it would have become the actual output if the demand for goods and services had been kept sufficiently high, but not so high as to generate inflationary instability.

I will argue that the concept of an output path so described is unhelpful and is apt to become a source of confusion. In the real world, the size of an economy's output potential depends on a large number of variables, including supply-side variables, which are not specified in the models used to obtain the output path for which the high-employment budget is de-

finied. Behavior on the supply side is strongly influenced by the demand-policy posture, and hence it is not a given to those in charge of these policies. Researchers employing the concept of a potential output to be brought about by demand policies can merely give the superficial appearance of deriving that concept from the characteristics of the real world. It is impossible to get around this difficulty by directing attention mostly to period-to-period changes in the high-employment budget, rather than to its level in any one period, because the potential levels of output, and hence the levels of the high-employment budget, are not well-defined magnitudes for any period. Thus, the same arbitrariness that attaches to levels also attaches to changes.

As I see it, providing useful quantitative information to policymakers about budgetary outcomes requires, in addition to estimates of the actual outcome, estimates of how, given all statutory measures and the institutional setting in general, the budgetary outcomes vary within ranges of activity levels and of inflation rates considered to be of interest. The subjective judgment of the expert would then be limited to deciding the width of the range in which the users of the estimates are apt to be interested; even in this decision he would receive some guidance from political decision-makers and others using the estimates. Within such a reasonably defined range, it would presumably be necessary to select discrete levels of activity and of inflation, although the possibility exists that relations would be found that indicate how the budgetary outcome changes when a move is made from one level to another within the range.

The view I am expressing is consistent with the conviction that orienting demand policies directly to specific "real" results—such as a politically acceptable high-employment path or real GNP—is not a useful policy objective. Under a demand policy known to set itself such "real" objectives, it becomes necessary to accommodate inflationary cost-setting practices developing from the expectation that the authorities will not abandon their "real" objectives even if the price level should rise. Thus, the cost trend will soon start steepening, but the ac-

commodation of this steepening must occasionally be interrupted in order to prevent its getting out of hand at an early stage, and the environment so created is one of significant uncertainty and of low efficiency. Over any reasonable time horizon, a much better output performance is apt to develop under a policy that conditions price expectations, and thus wage and other cost trends, to a consistent average rate of nominal demand creation over cycles as a whole and that thus achieves a reasonable degree of general price stability. Even such a policy is based on the belief that, *once market expectations have become geared to a given rate of nominal demand creation over the cycle*, there will correspond to that path of nominal GNP a path of real GNP that leaves room merely for a price trend that can reasonably be regarded as practically noninflationary. This belief implies that even policymakers oriented to nominal demand expect the trend in real output to fall in a range of moderate width. Yet there exists an essential difference between a policy so described and one based on the assumption that the characteristics of a specified potential output path are known and that it is possible to estimate the demand that will call that path into being.

A policy oriented to nominal demand creation over the cycle as a whole can serve notice to the market participants that the size of the real output for the marketing of which demand will be made available depends on the cost trends and that, hence, the marketable output depends on the behavior of the market participants. Conveyance of this message is an essential property of such a policy. In contrast, while a policy oriented to a real output objective such as potential output is assumed to be compatible with the avoidance of inflationary instability, the assumed compatibility rests on guesswork that is apt to prove wrong once market participants have figured out that the decision-makers are guided by those objectives. This statement assumes a political environment in which wage and price controls are recognized to be inefficient means of reconciling policy objectives.

The second point of disagreement concerns the reasons why budgetary

outcomes are significant. I will suggest that any statement about these reasons—particularly why deficits and surpluses at alternative activity levels deserve attention—would have to be based on analysis of greater complexity than that implied in most of the recent presentations. These presentations, including de Leeuw and Holloway's, overemphasize macroeconomic expansionary or restraining effects as reasons why deficits and surpluses matter, and the analysis then loses sight of the effect on the consumption-investment mix.

II. Failure of the Potential Path To Represent a "Normalized" Version of Reality

ALL estimates of the path of potential output—the path for which the high-employment budget is defined—must be based on personal judgment of a distinctly subjective kind, and the judgment is no less subjective if reached by the reconciliation of the views of cooperating researchers or decisionmakers. Usually two types of such judgment are made in tracing the path of the potential output, which, it is claimed, would be the actual path if the final demand for goods and services were continuously held at the level inducing a movement along that path.

One of these judgments relates to the period (quarter or year) in which conditions are such that the researcher is led to set potential output equal to actual output. The other relates to the rate of increase of potential output over a span beginning or ending with a period of the assumed equality. The rate of increase of potential output is conceived of as determined by the growth of the quantity of inputs and of their productivity in circumstances in which the inputs and their productivity grow at *their* potential rate.² Given that the path of

2. Researchers frequently focus on increases in labor hours and in output per labor hour, on specific assumptions concerning other inputs and concerning technological progress.

potential output is assumed to be the actual path if demand is kept growing at the appropriate rate, the potential increase in the quantity and the productivity of the inputs are also regarded as those that would materialize if demand were kept as high as possible without destabilizing the economy through price pressures. But the difficulty is that this is an exceedingly hazy conception, one behind which there are vague implications rather than elements of a consistent analytical system.

The potential paths—those of inputs, productivity, and output—that are consistent with the foregoing description depend on a substantial number of determinants of supply behavior in input markets and in markets for final goods and services. These determinants include (1) the preference functions of individuals on the supply side of the markets, (2) the tax structure, (3) the system of transfer payments, (4) the network of regulations, (5) the degree and types of competition in all markets, and, equally important, (6) the public's perception of the basic posture of the authorities in matters of demand-policy. No one in our profession claims to have a reasonably dependable quantitative estimate of the significance of each of these determinants, and these may not even make up a complete list. Yet estimates of potential output are used by the official agencies of the United States and other Western countries as well as by the staffs of important international organizations, and these estimates tacitly imply the effect on supply behavior of the determinants I have listed.

The last of these determinants, market participants' perception of the authorities' demand-policy posture, is important because the question whether a demand policy succeeds in avoiding inflationary instability, which along the path of the potential output *is* supposed to be avoided, depends significantly on the interpretation placed by the markets on the authorities' demand-policy posture. A high-employment path, initially assumed to avoid inflationary instability, will usually turn out to result in such instability once the authorities are known to be committed to promoting that path.

As a result of the difficulties I stressed, the researcher employing the concept of potential output and its budgetary corollary is driven to rely on makeshifts. Given the available information on trends in the various demographic classes, he seeks to "correct" the observed output for the distorting effect of "abnormalities" caused by insufficiencies and excesses of demand. Because of the inevitable vagueness of the judgments involved in this procedure, the resulting "potential" threatens to become a pure figment of the imagination, and hence attempts are made to link the path of potential output, at least in some respects, to objectively ascertainable properties of reality. This need for a link typically expresses itself in the suggestion that the path of potential output is a cycle-neutral path, that is, a path capable of being constructed by removing the cyclical disturbances from the actual path.³ But this, too, is a much less well-defined concept than the words would suggest. The data listed in table 1 can hardly be said to suggest any convincing link between the de Leeuw-Holloway series of potential output and a cycle-neutral or "normalized" version of reality.

For the entire period covered by the table—a period including four business cycles—the growth of the potential GNP does indeed equal that of the actual GNP.⁴ But this is the only respect in which the potential path is anchored successfully to a conception of "normalized" reality—and this is not very much. Even for the period as a whole, the average unemployment rate along the potential path was 1 percentage point lower than the actual rate. Moreover, for three of the four business cycles in the table, there are substantial differences not only between the unemployment rate along the potential path and the actual unemployment rate, but also between the growth rates of potential real GNP and of actual real GNP.

3. "Cycle neutrality" is explicitly claimed for the concept of the "potential" in the analysis developed by the International Monetary Fund. See the reference in footnote 12. De Leeuw and Holloway call the potential GNP "the trend level of output from which cyclical deviations are measured in calculating the high-employment budget."

4. Rounded to the first decimal, both growth rates are 7.7 percent. For the entire period covered by de Leeuw and Holloway (1955-81), the two rates also round to the same number (7.3 percent).

Table 1.—Measures of the Actual and the Potential Path, 1957-79

[Percent]

Business cycle ¹	Annual compound rates of increase ²				Average unemployment rate ³	
	Current dollars		1972 dollars		Along potential path	Actual
	Actual GNP	Potential GNP	Actual GNP	Potential GNP		
	(1)	(2)	(3)	(4)	(5)	(6)
1957-60	4.4	5.3	2.5	3.4	4.0	5.5
1960-69	6.9	6.2	4.3	3.6	4.3	4.9
1969-73	8.5	8.5	3.6	3.6	4.8	5.0
1973-79	10.0	10.5	2.8	3.3	5.1	6.7
1957-79	7.7	7.7	3.5	3.5	4.5	5.5

1. Years shown are years of cyclical peak.

2. Rates of increase are from each year of cyclical peak to next.

3. Last year of each cycle is excluded from average to avoid double counting of peak years.

4. Includes 4 years, 1966-1969, during which the actual unemployment rate fell short of the unemployment rate along the potential path. During these 4 years actual GNP exceeded potential GNP, as it did also in 1965 and 1973.

NOTE.—The de Leeuw-Holloway series cover 1955-81. During these years actual GNP is assumed to equal potential GNP in the second quarter of 1956 and in the fourth quarter of 1969. (The first of these quarters falls outside the span covered by this table because it covers only year-of-peak to year-of-peak periods.) The actual unemployment rate is assumed to equal the unemployment rate along the potential path in the year 1955. (As it turned out, the actual rate was equal to the rate along the potential path also in the first quarter of 1956, the first quarter of 1957, and the second quarter of 1973.)

Thus, in no usual sense of the term is it convincing to speak of the "cycle neutrality" of the potential GNP. The construction of the potential series, and hence of the corresponding high-employment budget, involves a substantial degree of arbitrariness.

It is possible to go even a step further in this criticism by pointing out that, if by common-sense criteria the concept of the potential touches on characteristics of the real world in some respects, then it is very unlikely to do so in many others. These inconsistencies occur because the concept of potential lacks an analytical structure that would anchor it to the real world in a systematic fashion. To illustrate: By criteria that are largely intuitive but reasonably convincing, it does "make sense" to assume, as de Leeuw and Holloway do, that in the second quarter of 1956 the real GNP was at its potential level (see note to table 1). Yet it makes very little sense to say that in 1973-79, a significantly inflationary period, the path of potential real GNP was rising at an annual rate of 3.3 percent while that of actual real GNP was rising at a rate of 2.8 percent, or that in the same period the potential path would have been associated with a 5.1-percent average unemployment rate in contrast to an actual rate of 6.7 percent. At the end of that period, in the cyclical peak year 1979, the potential output is said to have been 1.4 percent higher than the actual output, and the corresponding unemployment rate is said to have been 0.7 percentage point lower than the actual rate,

although from 1978 to 1979 the GNP deflator rose 8.5 percent and the Consumer Price Index no less than 11.3 percent. It is very difficult to relate to reality a "potential" that exhibits this behavior, or even to attach any essential meaning whatever to such a "potential."

III. Survival of a Concept Despite Its Deficiencies

THERE are several signs of awareness of these difficulties—perhaps even of the legitimacy of the objections I am expressing—on the part of experts estimating and employing the concept of potential output and of the high-employment budget.

De Leeuw and Holloway call the reader's attention to the fact that "there is a wide range of plausible estimates of the potential GNP." They illustrate this very convincingly by providing specific figures in the text (not in their tables) for what the potential output and high-employment budget would have been if for 1975-81 they had assumed that the unemployment rate associated with the potential output was 6.0 percent instead of the 5.1 percent underlying their series. The reader learns that the difference would have been large.

Similarly noteworthy are the discussions of ambiguities contained in the Council of Economic Advisers' explanations of various revisions of the estimated path of potential GNP. The

latest revision accompanied by a somewhat detailed discussion of the reasons for it appeared in the January 1979 Report of the Council (pp. 72-76), and it is impossible to go through that discussion without becoming conscious of the amount of personal judgment involved in the procedure by which the revised figures were obtained.

The question arises why, in spite of these acknowledged difficulties and in spite of frequent ex post facto revisions of official estimates of the potential output, that concept and its budgetary and other corollaries have so far survived. I think the answer is that all these concepts fit in rather well with a particular view of macroeconomics my dissent from which was expressed on earlier occasions and was repeated in the introductory section of the present paper. This was for some time the dominant view—a view that had become frozen into the orthodoxy of several decades; I think this view is about to lose its dominance, although it is still held by many economists.

As I have argued, the concept of the potential output and its corollaries fit into a macroeconomic view that takes for granted a supply-side trend compatible with reasonable price stability, although such stability is exceedingly unlikely to develop under a policy focused on the achievement of a specified high-employment output path. I consider it fortunate that there is much more appreciation of this criticism than there was a few years ago, and also more understand-

ing of the undesirability of wage and price controls as a means of circumventing the basic difficulty. Yet for the time being these issues remain hotly debated, and scrapping the apparatus employed on one side of the debate—i.e., the apparatus of potential output and its corollaries—would not meet (or not *yet* meet?) with general approval among economists.

IV. The Expansionary and Contractionary Effects and the Effect on the Consumption-Investment Mix

IN addition to being critical of the concept of potential output and of the high-employment budget, I want to express the conviction that, aside from a few exceptions, the usual presentation of these concepts directs attention far too exclusively to expansionary and contractionary effects as the relevant criteria for appraising the significance of deficits and surpluses. I shall suggest at the end of this note that several decades ago the originators of the high-employment budget concept seem to have had different criteria.

The opening statement of the de Leeuw-Holloway article reads: "The high-employment budget provides a summary measure of the effects of a Federal fiscal program on aggregate demand. It is a better measure for this purpose than the actual budget because it excludes the changes in receipts and expenditures that are automatic responses to fluctuations in economic activity." The suggestion here clearly is that, on implied "other things equal" assumptions, to which I will return, a move to a *high-employment deficit* or toward a higher such deficit tends to raise aggregate demand in an economy conceived of as initially placed on the path of the potential output, while a move toward a *high-employment surplus* or toward a higher such surplus, tends to have the contrary effect, and that the emphasis belongs on these consequences of the high-employment budget.

On the same implied "other things equal" assumptions, an *actual* deficit, such as develops even in the event of a balanced high-employment budget when output falls short of the potential, also has a demand-raising effect; and an *actual* surplus, such as develops even in the event of a high-employment balance when output exceeds the potential, also has a demand-moderating effect. But these built-in (automatic) stabilizing effects of the difference between the actual and the high-employment budget merely reflect existing deviations from the potential output level.

This overemphasis on expansionary and contractionary budgetary effects detracts attention from the restrictive nature of the implied "other things equal" assumption, and it detracts attention also from the effect of deficits on the consumption-investment mix.

The "other things equal" assumption implied in the analysis placing all the emphasis on expansionary and contractionary budgetary effects relates to monetary policy. The assumption involves regarding the money supply as *given*, because in normal circumstances expansionary or contractionary effects of deficits or surpluses can be offset by reduced or stepped-up money creation. The circumstances in which this is not the case are those of the Keynesian "liquidity trap" (*absolute* liquidity preference).⁵ These circumstances may arise in some phases of depressions, but they command little interest in the analysis of typical relations in a present-day economy.

Moreover, even on the implied assumption of a given money supply, the demand-raising (or reducing) effects of budgetary deficits (or surpluses), on which the usual presentations place all the emphasis, can result only from reduced (or increased) money holdings per unit of expenditure, that is, from increased (or reduced) velocity. Thus, focusing on the demand-raising (or reducing) effects of the budget involves concentrating on what in terms of the equation of exchange are money-velocity effects.

5. These are circumstances in which the demand for money is infinitely elastic to interest rates, and all increases (or decreases) in the money supply result merely in increased (or decreased) money holdings per unit of expenditure rather than in increased (or decreased) expenditures.

Such effects are likely to develop from deficit-financed government expenditures to the extent that the public regards the government securities by which deficits are financed as money substitutes, that is, as assets for which money is obtainable promptly at very little cost when needed. But there is reason to be critical of a procedure that stresses these velocity effects assuming that they are *not* offset by adjustments of money creation, and that does not even mention the strong presumption that, given the level of activity, deficits reduce and surpluses increase private investment. In the United States, although not in all Western countries, private investment includes practically all investment of enterprises.

The proposition that deficits are financed by saving that would otherwise be available for financing private investment, and the analogous proposition for surpluses, are subject to qualifications that should not be overlooked; I will briefly consider them in the next section. But the burden of proof remains on those who might attribute decisive importance to these qualifications and therefore might suggest disregarding the effect of deficits and surpluses on the consumption-investment mix. This effect has been receiving increasing attention, and I think rightly so.

To simplify the analysis of budgetary effects on the consumption-investment mix, it is advisable to assume that the overall macroeconomic expansionary or contractionary effects of the budget are offset by monetary policy. By thus setting a given level of aggregate output, it is possible to avoid dealing with two problems at the same time and to concentrate on the consumption-investment mix at that output level. The proposition that, for a given output level, deficits reduce private investment in relation to consumption (and surpluses increase investment) has strong foundations in general observations and common-sense reasoning.

The proposition rests on the view that members of the public consider themselves savers to the extent that they refrain from consumption in order to buy government securities. Hence, to the extent that they behave in this way, the public is "saving" in a form that takes the place of forms

that would make the saving available to private investors. Indeed, it may be asserted firmly that the public does put part of its conventionally defined saving—that is, income after taxes minus consumption—into government securities.⁶ Qualifications of the conclusion that deficits diminish the saving available for private investment imply, therefore, that if the saving as conventionally defined is partly used up for financing deficits, then the public will save more than it would otherwise save in order to achieve the objectives for which it is saving.

V. Qualifications of the Investment-Reducing Effect of Deficits

IF the qualifications to be considered in this section were completely disregarded, government deficits would have to be viewed as displacing private investment by the full amount of the deficits. However, it would be wrong to disregard these qualifications, the more relevant of which emphasize the fact that the purchase of the government securities representing the deficit may occur jointly with a downward revaluation of components of the purchaser's net worth in terms of goods and services (his "real" net worth). This downward revaluation may, in turn, induce the buyers

6. To be precise, in addition to consumption, the interest paid by consumers to business and transfer payments to foreigners are also to be deducted from income after taxes to arrive at personal saving. Moreover, if one wished to include corporate saving, one would have to add to personal saving the difference between corporate profits after taxes (with the inventory valuation and capital consumption adjustments) and dividend payments. I will explain in this footnote why, for the present specific purpose, it is preferable not to add corporate saving defined in this way to personal saving.

The reason is that much of the discussion in the next section will be concerned with qualifications of the proposition that deficits fully divert saving from private investment, and an analysis of this problem needs to focus on the difference between saving in the conventional sense and changes in net worth, including "real" revaluations. A discussion of the effect of revaluations on saving in the conventional sense calls for valuing and revaluing corporate assets on the basis of the judgment of stockholders, rather than by reference to any of the valuation methods that are implied in the corporate saving concept. This conclusion speaks for interpreting changes in net worth as resulting from personal saving plus asset revaluations, including stock-market revaluations.

of government securities to save more in the conventional sense (current income minus consumption) to make up for the loss.⁷ If there is more saving, there is an offset to the investment-reducing effect of deficits.

To be specific, one reason given by some economists for qualifying the proposition concerning the saving-absorbing (investment-reducing) effect of deficits is that deficits increase the future flow of tax liabilities, and that, therefore, a public fully aware of this should not regard government securities as sources of a future flow of benefits. Hence, a well-informed public should not, on balance, interpret its acquisitions of government securities as true saving in the sense relevant to its behavior, that is, as relevant to the objectives it is pursuing by its saving decisions. This is essentially David Ricardo's "equivalence theorem" as formulated, for example, in chapter XVII of his *Principles*. According to this theorem, the appropriate insights on the part of the public would prevent the emergence of a difference between the effects of tax-financed and deficit-financed public expenditures: In the event of deficit-financing, the present value of the future flow of the resulting tax liabilities merely takes the place of what the present tax liabilities would be in the event of tax-financing.⁸ But Ricardo, who called attention very clearly to the logical foundations of this theorem, did not believe that the public really behaved in this fashion. He believed—rightly, I think—that given the public's actual behavior, deficits do channel saving away from investment.

As I see it, the "equivalence theorem" disregards at least two aspects of the problem of deficit-financing. One of these is that the future flow of

7. See footnote 6 for the conventional definition of saving.

8. Even if the public had the insights here assumed, this theorem would not imply that private investment, which in the United States includes almost all investment of enterprises, suffers no reduction. Tax-financed government expenditures, unless they are of specific types that are complementary with private investment, also reduce private investment to some extent. This is because they reduce disposable income at any given level of GNP, and this normally reduces not only consumption, but to some extent also the saving of the public. But this is, of course, a far cry from suppression of investment by the full amount of tax-financed government expenditures.

tax liabilities, which the theorem stresses, will become largely a burden of future generations, and, in the appraisal of the present savers, the interests of those generations are not truly equivalent to their own. The other is that, within limits, the servicing of the public debt can be undertaken by issuing additional government securities, rather than by taxation. The point here is that, if in a growing economy the servicing of the public debt by issuing additional government securities does not exceed specifiable limits, interest on the debt will not show a rising trend in relation to income, and a sustainable path may develop. So much for the equivalence theorem and its limitations.

The proposition concerning the investment-reducing effects of deficits has recently been said to be subject to limitations for a different reason. Although unrelated to the equivalence theorem, and suggesting a less sweeping qualification, this argument also builds on the assumption that a public placing part of its conventionally defined saving in government securities does not regard the entire amount so "saved" as saving in the sense relevant to its own behavior. Assume that in an inflationary era the public is promised and receives, say, 15 percent interest on government securities purchased out of its income. Even if the public considers 10 percentage points of the 15 an inflation premium, in the conventional sense it still will have saved the equivalent of the entire amount of the security purchase. According to this argument, however, the public will behave as if it were a true saver only to the equivalent of 90 percent of the security purchase; the remaining 10 percent is needed to avoid a loss in real terms. Consequently, while the conventional definition of saving—income after taxes minus consumption—includes in the public's saving the entire nominal value of these securities, the public will be found to save more in the conventional sense than it would have if there had not been a 10-percent inflation premium. In the sense of the conventional saving concept, the public will save the 10 percent in question *additionally*. Hence, to the extent of the inflation premium included in the nominal interest on government securities,

the deficit will, according to this argument, not cut into the saving available.

However, as Phillip Cagan has stressed, this qualifying argument should at any rate draw a distinction between allowances for anticipated inflation rates expressing themselves in the nominal interest rates and unexpected losses in the real value of assets suffered by security holders subsequently.⁹ It is convincing to suggest that income recipients firmly expecting to suffer a loss on the real value of a security that they are acquiring will compensate for this by saving more from the outset in the conventional sense of the term, in order to achieve their true saving objective. Yet, even if they do behave in this fashion when they expect the loss, they are very likely to give themselves quite a bit of time for gradually (and perhaps only partially) making up by additional saving any *unexpected* real loss of which they may become aware at some subsequent stage in the later course of events.

We have now considered the two analytically significant qualifications to which the proposition concerning the investment-reducing effect of deficits is subject. A third qualification often referred to is sufficiently different from the two qualifications just discussed to justify, in the present context, its relegation to a footnote.¹⁰

As to the first of the analytically significant qualifications of the investment-reducing effect, I gave reasons for believing that Ricardo's judgment was sound when he suggested that, in the mind of the public, the acquisition of new government securities does not

typically become associated with the need to deduct from the private wealth the discounted value of an additional flow of future tax liabilities. And as to the other qualification—the qualification based on the assumption that saving in the conventional sense will rise if inflation reduces the real value of the government securities that finance the deficit—this does not suggest that, on balance, deficits do *not* cut into the saving available for private investment; it merely suggests that the *extent* to which deficits cut into such saving is reduced by the public's awareness of a loss in the real value of government securities due to inflation. Furthermore, I agree with Cagan that the magnitude of any such effect depends on how much of the inflationary decline in real value is expected, that is, has become incorporated in the nominal rates of interest.

The real problem so posed is part of the more general problem of the effect of the real revaluation of assets—not just of government debt—on saving as conventionally defined. Most economists would rightly be reluctant to base strong assertions about this effect on the quantitative information now available. My own very tentative reading of the data suggests the likelihood that downward real revaluations of assets have exerted a moderate positive effect on saving ratios (and that upward real revaluations have exerted the opposite effect), and this reading would leave a modest amount of room for one of the qualifications of the investment-reducing effect of deficits. But any suggestion about the size of the revaluation effects on saving ratios must indeed be described as tentative. These suggestions must remain tentative even in cases in which the real revaluations do not simply reflect changes in the real rate of interest, that is, in cases in which downward revaluations do clearly express a loss and upward revaluations a gain to the saver owning the assets. Even in these cases, serious difficulties stand in the way of quantitative appraisals of the effects of the revaluations on saving behavior partly because, in the long run, cumulative real revalu-

ations of all household assets jointly considered are small—and are probably also expected to remain small—as compared with cumulative incomes and partly because there is a very large discrepancy between the saving ratios derived from the national income and product accounts and those derived from the flows of funds. This discrepancy is disturbing because it remains large even after allowance for the differences in the concepts underlying the two series.

It follows that some questions had better be left open at this stage, in part because more help is needed from the statistical agencies. But it also follows from the foregoing analysis that these open questions relate not to whether at given levels of activity deficits divert saving from investment, but merely to the possibility that the extent of this diversion is reduced by the behavior described in the discussion of qualifications. It is safe to conclude that the *main thrust* of a reasonable argument lies in the proposition that deficits divert saving from investment, not in the qualifications that the net-worth effect of an expected flow of future tax payments and the inflationary reduction of real asset values induce an increase in saving. This is the reason why, in addition to being critical of the concept of potential output and of the corresponding concept of the high-employment budget, I do not favor placing almost exclusive emphasis on expansionary and contractionary effects of the budget. Instead, I favor calling attention to the relation of deficits and of surpluses to the saving available for investment. The conceptual and statistical difficulties involved in doing this satisfactorily must not be underrated, but promising new beginnings have been made in this direction in various quarters.¹¹

In fact, as concerns the recognition of the bearing that deficits and sur-

9. Phillip Cagan, "The Real Federal Deficit and Financial Markets," *AEI Economist*, November 1981.

10. This qualification expresses itself in the proposition that deficits in any one country need not channel away from investment the saving of the same country, because the interest-raising effect of the deficits may generate a capital inflow from abroad. This is true but is of doubtful significance in the present context. If capital is sufficiently mobile, the absorption of domestic saving by deficits may not greatly reduce the accumulation of physical capital in the domestic economy, but there will be an accumulation of foreign claims against the domestic economy. Secondary advantages may nevertheless develop to the domestic economy from such capital formation even if the resulting capital involves foreign ownership. These secondary advantages to the domestic economy are apt to result from complementarity effects of other inputs (particularly of labor) with capital.

11. See the International Monetary Fund, *World Economic Outlook*, Occasional Paper No. 9 (Washington, D.C.: International Monetary Fund, 1982), pp. 105-07, and tables 55-57. See also the observations in the *Annual Report of the Council of Economic Advisers*, in *Economic Report of the President* (Washington, D.C.: U.S. GPO, 1982), p. 95 ff.

pluses have on the consumption-investment mix at given levels of economic activity, it is less appropriate to speak of new beginnings than of a return to the viewpoint of those who pioneered the concept of the high-employment or "full-employment"

12. Herbert Stein, *The Fiscal Revolution in America* (Chicago and London: University of Chicago Press, 1969), especially pp. 220 ff.

budget. In their November 1980 article, de Leeuw et al. rightly assign this pioneering role to the Committee for Economic Development (CED), and they do so by reference to Herbert Stein's account and analysis of the CED's deliberations in the years immediately following World War II.¹² From Stein's analysis, it appears that the CED's view of the problem recognized the possibility of achieving any

level of economic activity, including a high-employment or "full-employment" level, with different receipt-expenditure relations, depending on the monetary policy. From the same analysis it also appears that, when proposing emphatically a fiscal policy resulting in a surplus at what it considered a feasible "full-employment" level, the CED was motivated largely by the desire to promote investment.

A Response

By FRANK de LEEUW and THOMAS M. HOLLOWAY

FELLNER'S central points, we believe, are his criticism of using potential GNP as a policy target and his criticism of overemphasizing the shortrun expansionary and contractionary effects of fiscal policy. We agree with much of what Fellner has to say about these central points.

However, we will argue that these points have more to do with how the high-employment budget is used—and, even more, with how potential GNP is used—than with how the high-employment budget is constructed. Furthermore, the uses that Fellner criticizes are much less in evidence today than they were a decade or more ago. One possible implication of his criticisms is that potential GNP should be revised or replaced by an alternative trend. As far as we can see, there are no implications for the rest of the high-employment budget methodology—the gross-up method, the elasticity estimates, the treatment of automatically indexed expenditure programs, and all the other steps that constituted the subject matter of our two articles.¹

We begin with some observations on the various uses of potential GNP and of the high-employment budget. Next, we comment on Fellner's points

about potential GNP. We then comment on his points about the overemphasis on the expansionary-contractionary effects of the Federal budget. Finally, we draw some conclusions about the measurement of the Federal Government impact on the economy.

Uses of potential GNP and of the high-employment budget

Potential GNP has been used in two principal ways: as a target for policy and as a trend from which cyclical movements in GNP are measured. The policy-target use was important in early discussions of the high-employment budget by the Committee for Economic Development (CED) and in *Economic Reports of the President*.² The 1962 *Economic Report*, for example, defined potential GNP as the level of real GNP corresponding to a 4-percent unemployment rate, and stated that "an unemployment rate of about 4 percent is a reasonable and prudent full employment target for stabilization policy."³

Recent discussions of potential GNP have emphasized its use as a trend

rather than as a policy target. The 1978 *Economic Report of the President*, for example, stated that "the use of high-employment GNP as the level of activity underlying this hypothetical budget [i.e., the high-employment budget] is a convenient but arbitrary convention. The purpose is to adjust the budget for cyclical changes in the economy, and this could as well be accomplished using any other trend path of GNP."⁴ Denison has defined potential GNP as output corresponding to a 4-percent unemployment rate and certain other conditions, and emphatically stated that "potential output each year would not represent a target for demand management policy."⁵ Our articles on the high-employment budget also used potential GNP as a trend rather than as a policy target.⁶

Parallel to this shift in the use of potential GNP has been a shift in the

4. *Economic Report of the President* (Washington, D.C.: U.S. GPO, 1978), p. 54.

5. Edward F. Denison, "Changes in the Concept and Measurement of Potential Output in the United States of America," in Joachim Frohn and Reiner Stäglin, eds., *Empirische Wirtschaftsforschung: Konzeptionen, Verfahren und Ergebnisse* (Berlin: Duncker & Humblot, 1980), p. 23. Italics are Denison's.

6. Frank de Leeuw, Thomas M. Holloway, Darwin G. Johnson, David S. McClain, and Charles A. Waite, "The High-Employment Budget: New Estimates, 1955-80," *SURVEY OF CURRENT BUSINESS* 60 (November 1980): 16, 18. Frank de Leeuw and Thomas M. Holloway, "The High-Employment Budget: Revised Estimates and Automatic Inflation Effects," *SURVEY* 62 (April 1982): 21.

1. The articles did not discuss potential GNP in any detail, noting that the Council of Economic Advisers, rather than BEA, provides the estimates of potential GNP.

2. *Taxes and the Budget: A Program for Prosperity in a Free Economy* (New York: Committee for Economic Development, 1947), pp. 31-32. *Fiscal and Monetary Policies for Steady Economic Growth* (New York: Committee for Economic Development, 1969), pp. 60-61.

3. *Economic Report of the President* (Washington, D.C.: U.S. GPO, 1962), p. 46.

use of the high-employment budget. Early CED discussions emphasized the use of the full-employment budget, as it was then called, in setting targets for fiscal policy. The CED "stabilizing budget policy" called for a small surplus in the full-employment budget.⁷ The *Economic Reports of the President* have only occasionally used the high-employment budget in this way. The 1973 *Economic Report* was the last one in which the level of the high-employment budget was used for setting targets; it stated that a balanced high-employment budget "is the best single guide to a budget policy that neither pushes the economy above its desired growth rate nor holds the economy below it."⁸

More recent discussions of the high-employment budget have used it merely as a cyclically adjusted indicator of changes in fiscal policy, without any implication that a given surplus or deficit is too low or too high. The 1974 *Economic Report* stated that, despite serious limitations in the measurement of potential output, "the full-employment surplus calculation based on the traditional concept of the potential GNP that is consistent with 4 percent unemployment is useful in the long run for evaluating changes in fiscal policy."⁹ Later *Economic Reports* continued to use the high-employment budget as an indicator of changes in fiscal policy. Our articles also clearly emphasize this use.

Potential GNP

Fellner's central criticism of potential GNP is that its use as a policy target is unwise. Defining potential GNP as "the output of which it is assumed that it would have become the actual output if the demand for goods and services had been kept sufficiently high, but not so high as to generate inflationary instability," he states that it is difficult to measure, and

clearly believes that recent estimates have been too high.¹⁰ Even if the estimates of potential GNP are correct, furthermore, Fellner argues that trying to move the economy along the potential GNP path would be inflationary because policymakers would be tempted "to accommodate inflationary cost-setting practices developing from the expectation that the authorities will not abandon their 'real' objectives even if the price level should rise." We agree with Fellner that a policy of closing the gap between actual and potential GNP (as he defines it) through demand management is often hazardous—a position that an increasing number of economists have come to take in the last few years.

However, we do not feel that much follows from all this for the measurement of the high-employment budget. If potential GNP and the high-employment budget are used merely as indicators—as has been the case in recent years—then we see no harm in the present method of measurement, even when potential GNP exceeds the path of GNP consistent with no inflationary instability. As long as no inferences are drawn about the desirable level of the high-employment surplus or deficit, the high-employment budget remains a useful indicator.

The only implication of Fellner's criticism for measurement of the high-employment budget, as far as we can see, is that when the high-employment budget is used merely as an indicator of fiscal policy, then there is no special argument for basing it on potential GNP rather than on some other measure of trend. Recognizing that potential GNP is difficult to define and measure, our initial article compared the high-employment budget based on potential GNP with an alternative cyclically adjusted budget based on a 5-year moving average of GNP (and a 5-year moving

average of the unemployment rate).¹¹ Apart from selecting a trend, the method of constructing a cyclically adjusted budget was exactly the same in the two cases. The article included a chart comparing the two budgets, and noted that quarter-to-quarter movements in the two were similar, but that there were differences over longer spans, such as the degree to which fiscal policy shifted toward a deficit from the 1950's to the 1960's.

Possibly the attractive name "potential GNP," associated with the attractive condition "high employment," might tempt policymakers to pursue unwise policies. We doubt that this temptation is an important factor; if it is, it advances the case for using some other measure of—or at least some other name for—the trend level of GNP.

Expansionary-contractory effects of fiscal policy

Another central point in Fellner's critique is that discussions of fiscal policy have overemphasized its expansionary-contractory effects and underemphasized its investment-substitution, or crowding-out, effects. Fellner considers some objections to the proposition that crowding-out is important but decides that these objections have only limited validity. We agree with much of what he has to say as it applies to the long run.

If discussions of fiscal policy have overemphasized expansionary-contractory effects and underemphasized crowding-out effects, however, the remedy is simple; it is to discuss crowding-out more and/or expansionary-contractory effects less. Our first article referred briefly to the expansionary-contractory effects of fiscal policy and not at all to the crowding-out effects. We concede that this emphasis was probably one-sided; but we do not see that anything follows about the gross-up method, the estimation of elasticities, or any of the other technical steps in constructing the high-employment budget.

7. *Taxes and the Budget*, pp. 22-27.

8. *Economic Report of the President* (Washington, D.C.: U.S. GPO, 1973), p. 74.

9. *Economic Report of the President* (Washington, D.C.: U.S. GPO, 1974), p. 79.

10. We note that Fellner's definition of potential GNP is not the usual one. For a review of alternative definitions and a criticism of the one Fellner chooses, see Denison, "Changes in the Concept and Measurement of Potential Output," pp. 21-23.

11. de Leeuw, et al., "High-Employment Budget: New Estimates," pp. 30-31.

Conclusions

Fellner has raised some important issues about certain of the uses of potential GNP and the high-employment budget. We agree with some of his central criticisms of these uses; but we do not feel that these criticisms have important implications for the construction of the high-employment budget. At most, they may strengthen the case for moving away from a potential GNP series to some

other method of representing the trend component of GNP.

Any summary indicator of the effects of the Federal Government on the economy has its limitations, and the high-employment budget is no exception. Some of the limitations were discussed in the first of our articles.¹² Other limitations stem from the fact

12. de Leeuw et. al., "High-Employment Budget: New Estimates," pp. 21-22.

that the high-employment budget is restricted to Federal receipts and expenditures, and does not reflect the impacts of Federal credit programs or of changes in the real value of Federal debt and assets. In spite of these limitations, we think that at present the high-employment budget is a useful tool of analysis for economists of many viewpoints, and not—in Fellner's words—"the apparatus employed on one side of the debate" about economic policies.

Integrated Economic Accounts: Reply

In what follows, Richard and Nancy D. Ruggles, of Yale University, continue the discussion of prospects and problems of integrated economic accounts. The May issue of the SURVEY OF CURRENT BUSINESS presented the set of integrated economic accounts they prepared and their discussion of them; comments by producers and users of economic accounts, inside and outside of BEA; and background information.

Introduction

IN the May 1982 issue of the SURVEY OF CURRENT BUSINESS, a set of national income and product accounts and balance sheets was presented by the authors under the title "Integrated Economic Accounts for the United States, 1947-80." These experimental accounts were followed by eight comments by reviewers who had had substantial experience in the construction and/or use of the national accounts.¹ This article responds to the issues raised by the reviewers, clarifies or amends some of the arguments advanced in the original presentation, and in general continues the dialogue on this topic.

The discussion is divided into three sections. The first section is concerned with the issue of integration of economic accounts: the role of the national accounts, the implications of integration for the sectoring of the accounts, and how microdata can be related to the macroaccounts. The second section deals with more de-

tailed questions relating to the definition and use of the transactor approach, the treatment of specific transactions, and the form of presentation of the accounts. A concluding section summarizes the views of the reviewers with respect to the proposed modifications and extensions and evaluates the role of the national accounts in the future development of the U.S. statistical system.

I. Integration of the Economic Accounts

A. *The role of the national accounts in integration*

1. *The nature of integration.*—Carson and Jaszi indicated in their comments that, although integration has long been recognized as a desirable objective, the presentation of the integrated economic accounts (IEA's) did not clearly specify what it meant by the term, either with respect to coverage or with respect to the kinds of linkages an integrated system's parts must exhibit. The point is very relevant—integration may be as respected as motherhood, but it is much more difficult to define. In one sense, the present national income and product accounts (NIPA's) and their supplementary tables constitute an integrated system of core accounts and related data. As Denison observed, the great strength of the NIPA's lies in their use of a few simple formal accounts that are supplemented by many supporting tables tied to these accounts. The supporting tables disaggregate the summary accounts in various ways and provide details of their composition.

In another sense, however, there is a broader role for the national accounts that suggests that they, because of their comprehensive nature,

can and should provide a coordinating and integrating framework for all economic statistics. In this broader sense, the economic statistics of the United States cannot be considered to be well integrated, and the NIPA's do not play a large part. Integration in this broader sense would require using common definitions and classification systems consistent with the national accounts for related data from different sources, and establishing the major economic constructs of the national accounts as control totals to which various parts of the statistical system must be related. The United Nations System of National Accounts (SNA) envisages such a role for the national accounts in the integration of all economic statistics, and many other countries do use their national accounts to serve this purpose. But the NIPA's do not function this way in the U.S. statistical system. Rather, BEA considers its task to be primarily one of drawing upon a large number of fragmentary, diverse, and uncoordinated sources obtained from different government agencies, in order to piece together a set of core national accounts and supporting tables. Feedback, in terms of influence upon the basic data, is limited and in many instances nonexistent.

In both of these senses, integration is a matter of degree. There is, of course, no one point at which a statistical system becomes "integrated." Integration in the first sense can be increased by extending the comprehensiveness of the core system of accounts. In the second sense, it can be increased by utilizing the national accounts more fully as the framework for the wider statistical system. The IEA's attempted to move in both of these directions, by (1) expanding the NIPA core accounts to include financial transactions and stocks, and (2)

1. The reviewers were Hans J. Adler and Preetom S. Sunga, Statistics Canada; Carol S. Carson and George Jaszi, BEA; Edward F. Denison, formerly at BEA; John A. Gorman, BEA; Martin L. Marimont, formerly at BEA; Stephen P. Taylor, Board of Governors of the Federal Reserve System; Helen Stone Tice, BEA; and James Tobin, Yale University.

redesigning the accounts to serve more adequately as a coordinating framework for economic and social data at different levels of aggregation.

2. *Enlarging the national accounts.*—With respect to the first of these directions, that of expanding the scope of the NIPA core accounts, the reviewers did not disagree with the objective. It was noted by Tobin that the very essence of an accounting system—for a household, an enterprise, or a Nation—is a consistent joint evaluation of stocks and flows; the national accounting system should show how changes in balance sheets from one date to another arise from incomes, outgoes, and revaluations in the intervening period. The United Nations SNA calls for such an arrangement, as was pointed out by Adler and Sunga, but no country (including Canada) has ever previously published a full set of such integrated accounts. As Taylor observed, the flow of funds (FOF) accounts of the Federal Reserve Board are at an aggregate level both statistically and conceptually integrated with the NIPA's of BEA as a logical deconsolidation of the NIPA gross saving and investment account. However, most users do consider that NIPA and the FOF accounts are separate and distinct, rather than integral parts of the same system. This perception is reinforced by the differences in sectoring and classifications used in the two systems. The IEA presentation combined the two sets of data into a common framework with a single system of sectoring, and provided the capital accounts and balance sheets for the government sector as well as for the sectors covered by the FOF accounts.

3. *National accounts as a statistical framework.*—With respect to the second objective, that of redesigning the national accounts so that they can serve as a framework for a system of economic and social data at different levels of aggregation, a number of reviewers expressed substantial dissent. The dissent took two forms: Some felt that the objective was mistaken, and others that it was impractical of achievement.

Both Marimont and Denison felt that this objective imposed features that were irrelevant or harmful to the analytic usefulness of the ac-

counts. Marimont did not specify what these features are. Denison felt that the GNP account in the IEA's is not appropriate for the measurement of production, because it employs gross rather than net concepts. Although it is true that the IEA's are centered around the concept of GNP rather than that of national income, this feature of the system is based on the belief that GNP is analytically a more useful concept for many purposes than national income; it is, of course, unrelated to the use of the national accounts as a framework for microdata. The rationale underlying the design of the IEA's was that the analysis of macroaccounts requires an understanding of microeconomic behavior, and as a consequence it is important to use the same concepts at both the macrodata and microdata levels. It would have been equally possible to build both the national income and product account and the enterprise sector accounts around net concepts, which in turn could be related to microaccounts also constructed on a net basis.

Carson and Jaszi did not so much question the objective as express skepticism about the possibility of achieving it. They doubted, for instance, that it would be possible—or could seriously be proposed—to develop the accounts in such a way that they would embrace the broad spectrum of data included in the Census Bureau's *Social Indicators*. Whether such data could in practice be integrated into the IEA framework depends upon whether microdata sets exist that contain the basic information and can be adjusted to fit (both conceptually and statistically) the major economic constructs of the IEA's. It is our belief that such microdata sets do exist, and that they can be integrated with the macroaccounts. It seems worth examining this question more closely.

Appendix A to *Social Indicators III* describes in some detail the 27 major sources of data that were used in compiling this volume.² Approximately 14 of the sources relate to households or individuals and contain microdata that could in principle be fitted into the household sector of the national

accounts. These include, for example, the Census of Population and Housing, the Current Population Survey, the Health Interview Survey, the National Crime Survey, Statistics of Income, the Survey of Income and Education, Social Security Benefit Data, and the National Travel Survey. Indeed, many of these sources have already provided microdata for "exact matched" or "statistically matched" files used in conjunction with the existing national accounts. Another seven of the sources of data listed were reports containing microdata from governmental units (e.g., Annual Surveys of State and Local Governments) and surveys of health and educational institutions; it should be possible to relate all of these to the government sector and its subsectors in the national accounts. In some instances the device of satellite accounts suggested by Adler and Sunga might prove to be useful for breaking out the more detailed information (e.g., data relating to the health subsector or to institutions of higher learning). As might be expected in a volume on social indicators, relatively few (four only) of the listed sources referred to enterprises, but these, including the Current Business Survey, the Consumer Price Index, and the Producer Price Index, could all usefully be developed as microdata sets integrated with the national accounts. In the case of both the consumer and producer price data this would require using classification systems for the price data that are consistent with the classifications used in the national accounts—something that, somewhat incredibly, is not now done.

Of all the sources of data for *Social Indicators* listed in Appendix A, only one—the Uniform Crime Reporting Program—appears to be inappropriate for integration with the national accounts. The reporting units in this case are law enforcement agencies in various localities, and the data reported are various types of crime committed. There are a few more sources of this type among the less important sources not listed in Appendix A, which reported automobile accidents, deaths by fire, and atmospheric pollution; the microdata in these sources also consist of reports by specific localities. These location-specific types

2. U.S. Department of Commerce, Bureau of the Census (Washington, D.C.: U.S. GPO, 1980).

of information suggest the desirability of including locational attributes in the microdata for households, enterprises, and governments. Localities could then be treated as reporting units providing data on crime, accidents, and environmental conditions occurring within them. Such linkages to the national accounts would be extremely useful for examining the costs and benefits of programs carried out by different levels of government or for evaluating the welfare of individuals living in a given area.

4. National accounts as a measure of welfare.—Adler and Sunga asked why the rationale for both the established and new treatments of national accounts were not viewed with some welfare consideration in mind. We would argue that the IEA's were specifically designed to take several important aspects of welfare measurement into account. The literature on welfare economics has made it clear that the presently existing macroeconomic constructs of the national accounts, which are primarily composed of transactions data, cannot provide an adequate basis for the measurement of welfare. In the first place, welfare is not merely a function of the total amount of income and wealth in a Nation; it is obviously related to the distribution of that income and wealth. In the second place, the boundary established by transactions omits many elements that are directly relevant to welfare, such as nonmarket activities, environmental conditions, and other factors affecting the quality of life. The IEA's attempted to be responsive to both of these dimensions of welfare measurement in their effort (1) to establish linkages between the aggregates of the macroaccounts and the economic and social microdata for households and individuals, in order to permit the analysis of distributions of income and wealth, and (2) to separate market transactions data from nonmarket information, in order to allow for the expansion of nonmarket imputations without impairing the usefulness of the accounts for analyzing the behavior of the market economy.

5. The establishment-firm dichotomy.—Adler and Sunga and also Carson and Jaszi expressed disap-

pointment that the problems of integrating input-output into the accounts were not considered. In particular, they were concerned with the lack of comparability between the establishment-based industry classifications used for input-output analysis and the firm-based industry classifications used for saving, financial transactions, and balance sheets.

Both the NIPA's and the United Nations SNA view input-output as a deconsolidation of the production account for the Nation, and IEA's adopt this same approach. Although there are problems of execution, these problems were felt to be too technical, too detailed, and too well recognized to merit specific consideration in the discussion of the IEA's.

We would argue, furthermore, that the specific establishment-firm problem raised by the reviewers is not properly a question of integration in the sense that this term has been used in the discussion to this point. It does not arise from lack of statistical coordination, but from the inherent situation. A single firm may own establishments in different industries, and it, therefore, is not possible to choose a single industry classification for the firm that is the same as the industry classification of its establishments. The fact of the matter is that it is really inappropriate to classify a firm's activity in a single industry if it is actually engaged in several industries. The firm can be, and in the NIPA's is, classified into the industry accounting for the largest share of its output, but this cannot be expected to lead to the same distribution as a classification of establishments. Indeed, the "establishment-firm dichotomy" as it was raised by Carson and Jaszi has a direct parallel in the "individual-household dichotomy" in the household sector. As is true in the case of the firm, the household may cover a number of subunits (individuals) who have diverse characteristics (e.g., age, sex, education, occupation). Although it is possible to classify the household subunits into groups based on these characteristics, it is not possible to classify households in these terms. Nevertheless, such classifications of households are often made. For instance, all households whose head owns a business may be classi-

fied as entrepreneurial even if other household members are wage earners. The concern for establishment-firm classification problems and the neglect of individual-household classification problems are, of course, direct reflections of the production focus of the NIPA's.

As Adler and Sunga suggest, the establishment-firm classification problem can only be resolved by utilizing information at a more disaggregated level, where data are available for (1) production and capital formation at the level of the individual establishments owned by the firm and (2) financial transactions and balance sheets at the level of the firm itself. Such microdata sets can, in fact, be constructed, and we are at the present time developing, in conjunction with the Bureau of the Census, a longitudinal file for manufacturing establishments and firms at the microunit level for the period 1972-80. One of the immediate questions for which this microdata set is being used is the one raised by Carson and Jaszi—i.e., analysis of how the activities of the individual establishments contribute to savings of firms and how in turn these savings are related to capital formation at the establishment level. This sort of question obviously cannot be answered satisfactorily by the highly aggregated data in the macroaccounts, and requires the use of microdata. But in order to use the microdata on firms and their establishments to explain the behavior of aggregates in the macroaccounts, the same concepts of saving and capital formation must be used at the microdata and macrodata levels, and the microdata, when combined, must aggregate to the same constructs in the macroaccounts.

B. Sectoring of the economy and integration

1. NIPA sectoring and IEA modifications.—The NIPA sectoring of the economy grew out of the measurement of income originating in the different parts of the economy. The sector accounts in the original 1947 version of the NIPA's were drawn up to show the derivation of national income originating in (1) business, (2) households and nonprofit institutions, (3) government, and (4) the rest of the

world. Nonprofit institutions were grouped with households not only because on a conceptual level they were, like households, considered to be final consumers of goods and services, but also because on a statistical level final consumption was estimated by the commodity flow method, which resulted in a total that could not be broken down between households and nonprofit institutions.

The 5-account system introduced in 1958 dropped the account for the business sector, and reorganized the other sector accounts to display all of their income and outlays, rather than focusing on the derivation of the national income originating in each sector. Nevertheless, the present NIPA's retain the 1947 sector definitions. They continue to provide information on gross product, net product, and income originating in the business sector (BEA tables 1.5, 1.6, 1.9, 1.10, and 1.12), even though they do not include an explicit business sector account. In the industrial breakdowns of product, income, and employment (BEA tables 6.1-6.26), the concept of "private domestic industries" is also introduced; this is broader than the concept of "business sector" in that it includes nonprofit institutions and domestic service workers but it is narrower in that it excludes government enterprises. Neither of these NIPA concepts is fully satisfactory, and the differences between them can result in confusion. On the one hand, the BEA business sector does not in fact represent production units motivated by profit, because it includes government enterprises and the imputed services of owner-occupied housing. On the other hand, the exclusion of government enterprises from the BEA industrial breakdowns of product, income, and employment (despite the fact that these units are included in the BEA business sector) results in underreporting of those industries where government enterprises are important, and the industrial composition of government enterprises remains a mystery. With respect to the household sector, the inclusion of nonprofit institutions reduces the usefulness of the household sector account for those concerned with analyzing household income, consumer expenditure, and saving. It is especially diffi-

cult to relate the household account to more disaggregated data, such as the size of distribution of income and the socio-economic composition of the household sector.

For these reasons, the IEA's made the following modifications in the NIPA sectoring:

IEA Concepts	NIPA Concepts
Enterprise Sector	
= Business Sector	
+ Nonprofit institutions	
+ Domestic service workers	
- Owner-occupied housing	
or alternatively—	
Enterprise Sector	
= Private Domestic Industries	
+ Government enterprises	
- Owner-occupied housing	
and—	
Housing Sector	
= Households and Institutions	
- Nonprofit institutions	
- Domestic service workers	
+ Owner-occupied housing	

These sectoring modifications met with considerable opposition from the reviewers. Only Tobin unqualifiedly stated that moving nonprofit institutions out of the household sector was an improvement. Taylor approved, in general, of the modification of the household sector account, but questioned whether charities and foundations should not be treated as financial rather than nonfinancial enterprises. Adler and Sunga agreed that removing nonprofit institutions would improve the household sector, but feared that placing them in the enterprise sector would blur the character of the enterprise sector as being composed of production units motivated primarily by profit. Tice agreed that the changes in sectoring improve the homogeneity of the household sector, but felt that this is at great expense to the usefulness of the enterprise sector. Carson and Jaszi indicated that putting nonprofit institutions in the enterprise sector would increase the heterogeneity of that sector and would have a high cost in terms of the number of additional items required to implement the move. Deni-

son felt that nonprofit institutions are consuming units akin to both households and governments, and, furthermore, that combining them with the producing units in the business sector whose output is normally sold to other sectors, and can therefore be independently measured, would be unsatisfactory for the measurement of productivity.

The majority of the objections to the IEA sectoring modifications centered on their impact on the enterprise sector. The sections below discuss first this general question, and then take up some of the specific points.

2. *Heterogeneity of the enterprise sector.*—Although one can understand the almost universal desire to define the enterprise sector as a homogeneous grouping of production units motivated primarily by profit, the reviewers' comments seem somewhat incongruous in the context of present BEA practices. In view of the concern for the business sector expressed by many of the reviewers, one would have expected to find that it played an important role in NIPA's. As already noted, however, the NIPA's do not contain an account for the business sector and restrict its role to the presentation of a few summary aggregates. Even there, the NIPA business sector, despite protestations of Denison and of Adler and Sunga, is not restricted to producers selling to other sectors or profit-making producers because it includes both government enterprises and the imputed rental value of owner-occupied housing. In all the tables that present breakdowns by industry, BEA abandons the concept of the business sector and uses instead the concept of private domestic industries, which does include both nonprofit institutions and domestic service workers. Thus, neither of the concepts that are now used in the NIPA's meets the criterion of "purity" set forth by the reviewers. Furthermore, both NIPA categories are already very heterogeneous, covering a wide variety of nonfinancial and financial enterprises organized as cooperatives, mutuals, public authorities, or public corporations. Such organizations may operate primarily for the mutual benefit of the groups they represent by providing goods and

services at lower cost, rather than by maximizing profit. To limit the enterprise sector to a homogeneous group of private profit-motivated organizations would reduce its coverage well below that of either of the present NIPA concepts, and the problem of the treatment of the excluded enterprises would remain.

3. Nonprofit institutions.—Although Carson and Jaszi are quite correct in indicating that additional entries are needed to move nonprofit institutions from the household to the enterprise sector, the information provided by these entries would be useful and is long overdue. It is not merely clutter in the accounts. More information needs to be provided about the operation of the nonprofit subsector of the economy, especially if, with the reduction of the government sector, it is expected to take on expanded functions. Even by BEA's own measure, the gross product originating in nonprofit institutions is equal to or larger than that of the farm subsector, and for the farm subsector, BEA goes to the length of publishing a complete table on farm output, gross product, and income.

The view put forth by Denison that nonprofit institutions are consuming units like households seems to be inappropriate for many nonprofit organizations, such as Blue Cross and Blue Shield, major private universities, and nonprofit private hospitals. These organizations receive their funds from a variety of sources including the sale of their services. In their manner of operation, they are much closer to other private organizations in the same industry than to individual households. Perhaps, as Taylor suggests, some of the nonprofit organizations such as foundations might more appropriately be classified as financial rather than nonfinancial enterprises, but they are clearly enterprises and not households.

4. Owner-occupied housing.—The transfer of owner-occupied housing from the business sector to the household sector caused relatively little comment. Both Taylor and Tice approve of the treatment of owner-occupied housing as a household activity rather than an activity of the busi-

ness sector—a treatment that, as they point out, is incorporated in the FOF accounts. Taylor commends it as being more in accord with institutional realities. Adler and Sunga were somewhat concerned that the transfer would blur the traditional concept of the household as a consumption unit. This is indeed true, and intentional; the IEA's explicitly recognize that nonmarket production does take place in the household sector.

Carson and Jaszi question whether this change in classification results in saving and investment patterns for the household and enterprise sectors that are more meaningful than those in the NIPA's. From a theoretical point of view, we would argue that the explicit IEA treatment is more informative, because it records the household's costs of homeownership (repair and upkeep, property taxes, and mortgage interest) as household outlays, where they can be analyzed in the context of household behavior. In addition, the IEA treatment is consistent with a balance sheet for the household sector that shows the value of the house as an asset and the mortgage as a liability; to exclude these items from the household balance sheet—as the present BEA treatment requires—is surely unrealistic.

Denison opposes treating owner-occupied housing differently from tenant-occupied housing; he is primarily concerned with the situation where dwelling units are sometimes occupied by their owners and sometimes rented, with the consequence that each time an owner-occupied house is rented it would, strictly speaking, have to be shifted to the enterprise sector. We agree with Denison that frequent shifting would be undesirable, and in such cases of temporary or seasonal rental we would suggest that the house be retained as a household asset. This treatment would mean that only those housing units whose rental is undertaken primarily as a business activity would be recorded in the enterprise sector.

5. Domestic service workers.—The treatment of domestic service workers in the NIPA's is both a triviality and an anomaly. Domestic service, measured by the compensation of domestic service workers, is in the NIPA's the

only production taking place in the household. This figure does not, however, reflect all the purchases of domestic services by households. If house cleaners, gardeners, carpenters, trash removers, or babysitters are hired on a fee-for-service basis, these transactions are treated as purchases of goods and services, and those involved in providing the services are considered to be self-employed; it is only when their compensation is considered to be "wages" that they are treated as household employees. The proposal in the IEA's was to treat all such providers of domestic services to households as self-employed. Although Denison considers this to be unnecessary and artificial, it seems to us to represent a tidying up of messy detail that has long been overdue. There would be no significant change in the household account; the compensation paid to domestic service workers would still be recorded as a purchase of domestic services by households. In the enterprise account, domestic service workers would be included together with other self-employed persons providing household services.

6. The need for subsectoring.—The logical conclusion to be drawn from the discussion of sectoring is that, in view of the heterogeneous nature of productive activity, subsectoring of the enterprise sector is needed. Such subsectoring was carried out in the fuller version of the IEA's, although space limitations precluded printing data for the subsectors in the SURVEY article, and these data are available on computer tape from BEA. The subsectors of the enterprise sector presented are as follows:

Enterprise sector

- Nonfinancial enterprises
 - Corporate nonfarm
 - Noncorporate nonfarm
 - Farm
 - Government enterprises
 - Nonprofit institutions
- Financial enterprises
 - Monetary authority
 - Commercial banking
 - Other banking
 - Pension and insurance funds
 - Government financial agencies
 - Other financial institutions

C. Microdata and their integration with the accounts

In the IEA presentation, considerable emphasis was placed on the desirability of using the national accounts not only as a conceptual framework for economic data in general, but specifically as a statistical framework for microdata sets related to the sectors and subsectors of the accounts. Only a few of the reviewers commented on this feature of the IEA's. Those who did, raised questions concerning the difficulties of developing appropriate microdata sets, and expressed considerable skepticism as to its practicality. At the same time, one comment noted that this is a "growth industry," and another concluded that this is intuitively the way to go, in spite of its difficulties.

1. *Microdata for the household sector.*—Denison states that the IEA's not only fail to meet the objective of providing a framework for household microdata, but the objective itself is a chimera. This view is based on two arguments. First, there will be differences among microdata sets in the definition of the reporting unit—households, families, dwelling units, individuals, taxpayers, etc.—so that there is no general concept they can follow. At best the household account can be consistent with only one microdata set, and for all others a bridge table would be needed; therefore, why not use a bridge table for all sets? Second, Denison points out that bridge tables will also be needed because aggregates of microdata treat on a combined or gross basis items that are netted or consolidated in the national accounts.

We would argue that this view reflects a fundamental misunderstanding of our objective. Just as the aggregate national accounts do not conform to any specific raw tabulation, there is no expectation that the microdata sets underlying them should conform to any specific single survey or other source. Rather, the principle is that the macroaccounts should be viewed conceptually as the aggregation (including consolidation or netting where appropriate) of a theoretical set of microaccounts. Given appropriate data sources, the national accountant or others should be able to construct, by appropriate adjustment of the

available microdata from many different sources, microdata sets approximating the theory that would underlie each sector of the national accounts. A relatively modest household microdata set that is integrated with (i.e., consolidates to) the household sector of the national accounts could yield useful disaggregations of the major items of income and expenditure, and provide related social and demographic information. The fact that there exists a variety of other unadjusted microdata sets is aside from the issue, just as is the existence of unadjusted aggregate data.

In terms of reporting unit, the important issue is that the microdata set that is to underlie the household sector have the same coverage as the household sector of the national accounts. Some of the reporting units mentioned by Denison, such as taxpayers, would clearly be inappropriate as the basis for constructing a microdata set to represent the household sector, because they cover only part of the population included in the household sector of the national accounts. A comprehensive microdata set for the household sector containing data relating to all individuals in the population, in which the attributes of the individuals are specified, would permit the extraction of data on the basis of any reporting unit for which information exists (e.g., taxpayers, wage earners, school children), and users would be able to analyze the relation of various reporting units to each other. As previously noted, the problem here is directly analogous to the establishment-firm relation for enterprises. One of the functions of the microdata set is to clarify the relations among all of the attributes of the microunits involved.

Carson and Jaszi and also Denison raised questions about institutional populations such as soldiers and residents of prisons and sanitariums. These people do not really cause any conceptual problems; to the extent that such groups receive income and purchase goods and services, their income is included in household income and their purchases are included in household expenditures. They should, therefore, be included as identifiable units in the household microdata. The goods and services provided to them free of charge should,

of course, be recorded as part of the expenditures of the governments or nonprofit institutions providing them.

Bridge tables are useful and appropriate in many circumstances. Thus, for example, BEA Table 3.18B, showing the relation of Federal Government receipts and expenditures in the NIPA's to the Unified Budget, establishes important linkages between these two kinds of information. Where there are different uses of data calling for different tabulations, such bridge tables showing the relation between the aggregate tabulations are often useful. But this is quite different from using bridge tables to adjust raw tabulations of microdata at the aggregate level. As is noted below in connection with establishment microdata for the Census of Manufactures, adjustments made to tabulations of microdata at the aggregate level are not as satisfactory as incorporating such adjustments into the microdata itself. The reason for this is that different aggregations of the microdata will add up to the correct control totals only if the adjustments are made at the microdata level; if the adjustments are not carried back to the microunits they will have to be done over again whenever a new tabulation is made.

With respect to Denison's second point, bridge tables would in general not be required in those instances where the aggregated data are shown on a consolidated or net basis and the microdata provide gross data. The present government sector in the NIPA's is on a consolidated basis, whereas the subsector accounts for the Federal Government and for State and local governments show the transfers between these levels of government on a combined basis, and no bridge table is provided or required. It is easy to move from a more to a less gross basis as data are aggregated. What is not possible is to go the other way; if flows are shown combined or gross at the aggregate level, it is necessary that they also be available on this basis at the microdata level.

2. *The enterprise sector and statistical consistency.*—Adler and Sunga cite the difficulties even in a fully integrated statistical agency like Statistics Canada of linking microdata originating from differently defined units of collection (i.e., establishments

and firms), and suggest that the resource costs are more than can be faced with equanimity. They note that even such seemingly simple steps as ensuring that establishments or firms in sets of data originating from different surveys are always classified in the same industry and location are often frustrating and always time- and resource-consuming.

These problems, however, are not problems that are restricted to the development of microdata sets. Although the problems become glaringly obvious in the microdata context, they are equally important, and equally present, in the context of the aggregate accounts. Thus, for instance, if one source is used to make estimates of output by industry and another source is used for employment and hours, inconsistency in the industrial classification of establishments or firms will result in errors in the measurement of productivity by industry. It is not true, as the observations of Adler and Sunga might imply, that merely because the errors

caused by inconsistent classification of industry and location in different sources are not obvious in macrodata, such errors can be swept under the rug. Nor can it be assumed that they will somehow average out. What is required for coordinating different sources of data is, of course, a complete industrial register that lists all firms, their establishments, and the location and industrial classification of each establishment. Most countries have come to recognize that such a register is a prerequisite not only for providing adequate sample frames, but also for coordinating statistics from different sources. The U.S. Census Bureau has begun to develop such a register, but confidentiality restrictions have so far prevented its use by other statistical agencies. The development of proper statistical procedures may be frustrating and even costly, but the confusion that results from the lack of coordination is even more frustrating and far more costly to users as well as producers of statistics.

3. *The availability of microdata.*— Consistent with their skepticism concerning the possible integration of the data in *Social Indicators* with the national accounts, Carson and Jaszi do not believe that the quantity of usable microdata is as large as we suggested, and, given the substantive difficulties and costliness, they are less optimistic about the prospects for integrating microdata and macrodata. While conceding that the possibility may exist for households, they state that if the prospects and problems of the use of microdata for the enterprise and government sectors had been examined more thoroughly (e.g., the previously noted establishment-firm dichotomy and also differences in business accounting practices), the provision of a framework for microdata might have been given a smaller weight in the redesign.

With respect to the general question of the quantity of usable microdata available, it is, of course, true that all national accounting estimates

Computer Tape for IEA Tables

The complete set of IEA tables are available on computer tape. To order, send a check, payable to the Bureau of Economic Analysis/U.S. Department of Commerce, for \$150.00 to the Budget Office, Bureau of Economic Analysis, U.S. Department of Commerce, Washington, D.C. 20230. Request "Integrated Economic Accounts for the United States" (BEA CBA 82-001). Specify whether you want internal labels and whether the tape should be 800 or 1600 bpi.

National and sector accounts, 1947-80	Subsector accounts	1.53 State Governments (1959-75)
1.1 Gross National Product	Gross product accounts	1.54 Local Governments (1959-75)
1.2 Relation of National Income, Net National Product, and Gross National Product	1.20 Nonfinancial Enterprise (1959-77)	Capital accounts
1.3 Gross National Product (1972 Dollars)	1.21 Corporate Nonfarm (1959-77)	2.20 Nonfinancial Enterprise (1959-77)
1.10 Enterprise Gross Product Account	1.22 Noncorporate Nonfarm (1959-77)	2.21 Corporate Nonfarm (1959-77)
1.40 Household Current Income and Outlay Account	1.23 Farm (1959-77)	2.22 Noncorporate Nonfarm (1959-77)
1.50 General Government Receipts and Current Outlay Account	1.24 Government Enterprise (1959-77)	2.23 Farm (1959-77)
1.60 Rest of the World Current Account	1.25 Nonprofit Institutions (1959-77)	2.24 Government Enterprise (1959-77)
2.1 Capital Accounts for the Nation	1.30 Financial Enterprise (1959-75)	2.25 Nonprofit Institutions (1959-77)
2.2 Stock of Reproducible Goods in Constant Prices (1972 Dollars)	1.31 Monetary Authority (1959-75)	2.30 Financial Enterprise (1959-75)
2.3 National and Sector Capital Accounts in Constant Purchasing Power (1972 Dollars)	1.32 Commercial Banking (1959-75)	2.31 Monetary Authority (1959-75)
2.10 Enterprise Capital Accounts	1.33 Other Banking (1959-75)	2.32 Commercial Banking (1959-75)
2.40 Household Capital Accounts	1.34 Pension and Insurance Funds (1959-75)	2.33 Other Banking (1959-75)
2.50 Government Capital Accounts	1.35 Government Financial Agencies (1959-75)	2.34 Pension and Insurance Funds (1959-75)
2.60 Rest of the World Capital Accounts	1.36 Other Financial Institutions (1959-75)	2.35 Government Financial Agencies (1959-75)
	Receipts and current outlay accounts	2.36 Other Financial Enterprises (1959-75)
	1.51 Federal Government (1947-80)	2.51 Federal Government (1947-80)
	1.52 State and Local Governments (1947-80)	2.52 State and Local Governments (1947-80)
		2.53 State Governments (1959-75)
		2.54 Local Governments (1959-75)

are in large degree based on tabulations of microdata, and these basic sources are prime candidates for the construction of microdata sets that are integrated with the national accounts. In some cases, these may be administrative data provided by the Internal Revenue Service, the Social Security Administration, or other regulatory or statistical agencies. The raw tabulations are not usually incorporated directly into the national accounts estimates, because adjustments for conceptual differences, underreporting, or incomplete coverage are generally needed. It is, of course, necessary that the same adjustments also be introduced into the microdata if they are to be coordinated with the accounts, but the experience of the statistical collection agencies has indicated that such procedures are both feasible and highly useful for the data collection process itself. Thus, in connection with the Census of Manufactures, it is now customary to introduce into the records of the individual establishments the necessary edit corrections, imputations for missing data, and other adjustments so that the final computer tabulation will be exactly consistent with what is published.³

With respect to the specific question of microdata for establishments, because of the relatively small number of large enterprises and establishments that account for most of the production taking place in the United States, it is both feasible and desirable to build comprehensive microdata sets by using exact matching. As already noted in the discussion of the establishment-firm classification problem, a longitudinal microdata file for firms and establishments has been developed for the manufacturing sector for the period 1972-80. This file utilized exact matching and contains data for approximately half a million manufacturing establishments for the census years 1972 and 1977, and about 80,000 establishments for the other years covered by the Annual Survey of Manufactures.⁴ A micro-

data base being developed by the Small Business Administration covers all firms and establishments in the economy (including nonprofit organizations and family businesses). A number of publicly available sources, such as the Dun and Bradstreet Market Identifier File (credit listings) and the Market Data Retrieval File (yellow pages listings), have been merged and matched to produce a Master Establishment List of approximately 8 million establishments. Further research has been done to develop an Establishment and Enterprise Microdata File (about 4.7 million establishments), which provides information on the relation between enterprises and establishments.⁵ The file is being validated by making comparisons, within the proper confidentiality safeguards, with government administrative files relating to corporate and noncorporate tax returns and employer social security and unemployment insurance files. Finally, more detailed financial data (income accounts and balance sheets) are being merged into the file on an exact match basis for all those businesses for which such data are available (about 800,000 cases). All publicly traded companies (approximately 10,000) are, of course, included. The objective of this research is the development of a totally integrated and weighted sample of 200,000 to 300,000 enterprises that will provide employment, sales, and financial data on a longitudinal basis.

With respect to the government sector, the feasibility of the development of microdata has also been demonstrated. John Quigley and James Trask at Yale University, with National Service Foundation support (and BEA assistance), undertook to develop microdata sets for government units that were fully integrated with the government sector of the NIPA's. The basic source for the microdata set was the data tape from the Census of Governments for 1972, which provided individual accounts for 75,000 budgetary units; these units included not only Federal, State, and local governments, but also other public bodies such as public authori-

ties, regional agencies, and school and water districts. The microaccounts covered the sources of revenue by type and the outlays by function, and also provided capital accounts for (1) the Federal Government, by States and the District of Columbia (51); (2) State governments (5); (3) county aggregates of local governments (3,118); (4) standard metropolitan statistical areas (100 largest); (5) separate accounts for central cities, suburban rings, and regional governments (for largest 100 standard metropolitan statistical areas).⁶ This project established the feasibility in terms of cost and validity of using the Census of Governments data to develop a microdata set of government units that is integrated with the national accounts.

With respect to household microdata, the view of Carson and Jaszi that the development is substantively difficult and costly stems, no doubt, from BEA's experiences in the development of the estimates of the size distribution of personal income using both exact and statistically matched microdata. This experience underscored the need for a household sector in the national accounts that is conceptually compatible with microunit information. Much of the difficulty BEA encountered arose, first, because it was necessary to develop, within the personal income concept, another concept of family income, which could be distributed by size. Second, it should be borne in mind that the microdata effort in which BEA engaged was pioneering research, and much was learned in the process; certainly those who were directly involved in that research have a much more positive view of the level of success achieved and the future potentiality of integrating household microdata and the national accounts. Finally, the question of cost should be kept in perspective. In absolute terms, the microdata work in BEA was quite modest, and relative to the total of all BEA activities it was almost imperceptible.

6. John Quigley, "The Spatial Distribution of Public Sector Activity: A Preliminary Report," *Proceedings of the 1976 General Conference of the Society of Government Economists* (Washington, D.C.: Society of Government Economists, 1977). John Quigley (with Gail Trask and James Trask), "Income and Product Accounts for the Local Public Sector," *Institution for Social and Policy Studies, Working Paper 795*, Yale University, 1977.

3. Preston J. Waite, "Imputation Methodology, Economic Censuses and Surveys," prepared for the Census Advisory Committee Meeting, October 8, 1982.

4. Richard and Nancy D. Ruggles, "The Development and Use of Longitudinal Establishment Data," report on workshop held in Reston, Va., January 14-15, 1982.

5. *The State of Small Business: A Report of the President*, March 1982, Appendix B, The Small Business Data Base and Other Sources of Business Information: Recent Progress.

II. The Recording of Transactions

A. The transactor approach

THE IEA's view the national accounts as being composed of sets of sector accounts, which in turn represent aggregations or consolidations of sets of microaccounts for individual transactors. At the sector level of aggregation, the transactors are classified into enterprises, households, government, and the rest of the world. The accounts for both the individual transactors and for the sectors of the economy relate to productive activity, current income and outlays, capital transactions, revaluations of balance sheet items, and balance sheets. This is the basic framework used for the recording of transactions in the IEA's.

This view of the accounting system is strongly opposed by Marimont, who argues that the national accounting structure should be designed in accordance with what is needed for a comprehensive understanding of how the economy operates. After the total system is designed, Marimont suggests, the national accountant can then develop methods for adapting the data for individual transactors. Marimont does not, however, suggest how a system developed in the way he suggests would differ from one conceptually based on individual transactor accounts, nor does he indicate what criteria he would use. The history of the development of the BEA accounts suggests that he may have had in mind constructing the system around the derivation of a few aggregates such as national income, and saving and investment. This was the original basis of the 1947 NIPA's, and still plays a large role. The transactor approach of the IEA's subscribes to Marimont's principle that the accounting system should be designed in terms of what is needed for a comprehensive understanding of how the economy operates, but it suggests that this can best be accomplished by providing organized and systematic information on the transactions and balance sheets of different groups of transactors. As Tobin points out, the existing NIPA's do not in fact provide a satisfactory conceptual framework for the tracking and consistent evaluation of stocks and flows needed for understanding economic behavior.

In implementing the transactor approach, the IEA's made a sharp distinction between actual market transactions and imputations for nonmarket activity. Many of the reviewers raised questions about the definition of imputations, as well as about the usefulness of this separation. In the discussion of financial intermediaries, Annex 1 of the IEA presentation leaned heavily upon how the transactors themselves viewed the transactions. Carson and Jaszi, Denison, and Marimont all questioned this "transactor approach." Denison pointed out that different transactors may view the same or similar transactions quite differently, and Carson and Jaszi and also Marimont commented that the IEA's did not consistently embody this principle.

In view of the questions that have been raised about the definitions and principles that underlie the transactor approach, a reexamination of the treatment of specific imputations and transactions is in order. It was certainly not our intention, in introducing the transactor approach, to record the same or similar transactions differently based on how individual transactors view them.

B. Imputations

Carson and Jaszi, Denison, and Marimont raised many objections to the IEA treatment of imputations. Carson and Jaszi felt that there are conceptual problems in determining what should be considered to be an imputation. Denison objected to assigning the market transactions aggregate a central role because he felt that there is no simple and noncontroversial concept of money income and expenditure. Marimont found the treatment of imputations troublesome and indicated that there is a need to define more precisely what kinds of transactions are to be classified as imputations. Finally, all of these reviewers agreed that the separation of nonmarket imputations resulted in more complex accounts, which were less convenient and informative than the NIPA presentation.

In the IEA's, *nonmarket* imputations relate to activity that is not measured by actual market transactions; a clear example of a nonmarket imputation is the services of owner-occupied housing, which BEA values at its equivalent space rental value. This

IEA definition of nonmarket imputation contrasts with the more comprehensive BEA definition of imputation, which includes, in addition, some activities (e.g., financial services) that are measured in terms of the (market) costs of providing them.

Carson and Jaszi suggest that the separation of market transactions and nonmarket imputations in the IEA's was primarily motivated by the belief that, compared to actual market transactions, the estimates for nonmarket imputations were relatively speculative. This is a very considerable oversimplification of our position. We recognize (1) that there are actual transactions in the accounts that are speculative because reliable data are not available for estimating them, but we would not favor classifying these transactions as nonmarket imputations. We also recognize (2) the controversial nature of the treatment of certain actual transactions, such as the cost of financial services, but again this is no reason to group such transactions with nonmarket activity. We agree (3) that the concepts of economic depreciation and household capital consumption are conceptually somewhat shaky, quite apart from the question of the availability of data; in this case we feel that these are nonmarket imputations for which there is no transactions counterpart, and they should be embodied in the accounts in a way that does not impinge upon market transactions measurements. We do not feel, however, (4) that food and fuel produced and consumed on farms should be classed as market and included in farm market production and consumption expenditures by households, merely because it is considered to be a "hard" estimate. Finally, we would argue (5) that the separation of nonmarket imputations is not particularly complex and that it is analytically useful.

1. *The accounts as a framework for market transactions.*—The primary function of the national income and product accounts has been to provide a framework for displaying the interactions of different sectors of the economy with one another in terms of the market transactions in which they engage. For analyzing the behavior of prices, output, and employment, it is this network of market transactions that is the prime focus of attention. There are, of course, a great

many transactions for which it is difficult to obtain sound statistical data. In such instances, the national accountant attempts to make the best estimate possible, recognizing that omission of a legitimate entry in a full set of market transactions would result in a greater error than including an inaccurate estimate. Thus, BEA does include estimates of such items as tips paid to waiters and waitresses, and the payments made to babysitters. It was not the intention of the IEA's, and we agree that it would be quite inappropriate, to classify transactions as market or nonmarket on the basis of reliability.

2. *Market imputations in the accounts.*—Market imputations are defined in the IEA's as activities that are valued in terms of their costs of production rather than in terms of the market value of their sale. Examples of market imputations are the measurement of the value of (1) financial services provided by banks, (2) the change in inventories, and (3) final consumption expenditures of the government.

With respect to the treatment of financial services, the problem is more one of where to draw the boundary between intermediate and final product than of market versus nonmarket activity. The decisions may be controversial, but the measurements involved are all market-determined. In the United Nations SNA, all financial services are treated as an intermediate product, whereas BEA treats part of them as final product. Financial services are not the only example of this sort of problem. As was suggested in the discussion of the IEA's, there are other kinds of expenditures that BEA currently treats as intermediate that might be considered final expenditures; these include research and development, radio and television, and other consumption provided by enterprises. Conversely, as Tobin suggests, some of the current expenditure of government might be considered to be intermediate rather than final. Such shifts in the production boundary may well occur within the framework of a system of accounts drawn up in terms of market transactions, without involving any nonmarket imputation.

Denison does not consider inventory change to be based on market transactions, and he states that including

it in income results in abandoning the market transactions concept. From the point of view of the IEA's, however, inventory change is based on market transactions, because it is the difference between costs of production and sales, both measured by market transactions. Even the inventory valuation adjustment is merely a correction in the application of accounting methods—presumably there are accounting records, and there are market transactions on which the correction is based.

Carson and Jaszi and also Denison took the position that government consumption expenditures should not be considered an imputation, but rather should be viewed as final purchases. This seems very reasonable, and IEA's do not preclude such a treatment because government expenditures are considered to be market transactions. The United Nations SNA does set up a production account for government, in which its purchases from business and the compensation of government employees are considered to be inputs that in turn are used to produce government outputs. United Nations SNA thus treats the purchases from business as intermediate goods, and government final consumption is treated as an imputed purchase by the government of the output it has itself produced. While technically correct, this United Nations SNA approach is awkward and for most government final consumption unnecessary, and the alternative BEA explanation is simpler. The BEA interpretation is not, however, in conflict with IEA.

3. *Economic depreciation.*—The IEA's do not consider that economic depreciation is a market transaction, and recognizes this by building the national income and product account and the sector current accounts around gross market transactions. Thus, gross saving in each sector account is the balancing item, representing the difference between total current market receipts and total current market outlays. As a balancing item, it is independent of the estimate for economic depreciation. This does not mean, as Marimont suggests, that capital consumption is treated as a market transaction in the household account; rather, in this context, capital consumption and net saving are essentially memorandum items at-

tached to total gross saving in each account, showing its possible division into these two components.

4. *Food and fuel produced and consumed on farms.*—Carson and Jaszi indicate that the estimate of food and fuel produced and consumed on farms is not so speculative that it requires a different kind of statistical estimate. The IEA's classed it as a nonmarket imputation for two reasons. First, it is production and consumption that does not go through the market, and it is not at all clear either conceptually or statistically just what is or should be included under this rubric. For example, should kitchen gardens and poultry raised by farmers be included? If not, on what grounds should they be excluded if other food and fuel is included? If they are included, why should not the kitchen gardens and poultry raised by nonfarmers also be covered? (The latter figure really would be speculative!) Should the processing of the food, i.e., the slaughtering and curing of meat and canning of fruits and vegetables, also be included? If farm wives' canning activity is covered, should that of other housewives not also be included? Second, it is not clear what value should be placed on such home-consumed production—the opportunity cost that could be obtained by selling the product, the input costs, the price the farmer would have to pay for the product if he bought it, and the value which the farmer would himself assign to the output as a consumption good all are possibilities. Although farm income in kind is less than 1 percent of farm gross output (under \$1 billion in 1980) and its estimation may seem to be a trivial matter, these questions of valuation are precisely the same as those that arise in connection with the valuation of owner-occupied housing, and that estimate is not trivial in size.

5. *The separation of nonmarket imputations.*—It is true that separating market transactions and nonmarket activity increases the complexity of the accounts and makes them more difficult for those who are accustomed to the NIPA's. But this increase in complexity can easily be exaggerated, and it is the market transactions accounts that represent the core of the system; these accounts record all transactions between different transactors. The imputations for nonmar-

ket activity are estimates of the production and consumption activity that is internal to a sector and does not go through the market. The NIPA's can neglect the distinction between market and nonmarket activity because they postulate a single correct specification of the production boundary—one that includes exactly the correct amount of nonmarket activity. Many proposals are now being made, however, to extend the conventional production boundary to include such things as the services of government and consumer durables and the nonmarket activity of the household. If consideration is given to any of these, it will become increasingly important to preserve intact the core set of transactions relating to market activity. It is, perhaps, better to build in the possibility of some flexibility, rather than to be forced to cling to an outmoded definition of the production boundary beyond its useful life.

C. Benefits in kind

Certain benefits in kind provided by business are treated in the NIPA's as income received by the beneficiaries, and correspondingly, as expenditures by them. Thus, some of the financial services provided by banking institutions are considered to be income in kind received by households and government and also expenditures by them for these services. Similarly, fringe benefits in kind that employers provide to their employees are included both in other labor income and in expenditures and personal saving of households. In the IEA system, however, benefits in kind are treated as final expenditures of the provider of the benefit, and no attributions of income and expenditure are made to the accounts of those who theoretically benefit. Both financial services provided by banking institutions and the fringe benefits in kind provided by private employers are treated in the IEA's as enterprise final consumption expenditures.

Part of the rationale for this treatment is that the recipients might not recognize these benefits in kind as income. In light of the comments of the reviewers, this rationale requires reexamination. Carson and Jaszi argue that the significance of many fringe benefits in collective bargaining is *prima facie* evidence that employees not only recognize them, but

also attach considerable importance to them. It is apparent, however, that workers may recognize and attach value to many other improvements in working conditions, such as safety, working environment, and hours, and yet BEA does not treat these amenities as part of personal income. Nor does BEA treat benefits in kind provided by government, such as education, public health, and community services, as part of personal income and personal consumption expenditures, although again individuals receiving them may recognize them as benefits. In view of this murkiness, there is much to be said for considering all benefits in kind to be final expenditure of those making the expenditures, irrespective of whether individuals recognize or attach importance to their receipt. The analyst can then make further attributions to the groups he considers to be the beneficiaries, if he wishes. The United Nations SNA, for instance, includes a supplementary concept called "total consumption of the population," in which all of these attributions are made. But this is provided in addition to, not instead of, household consumption expenditure.

D. Pensions and insurance

In the IEA's, the assets of pension funds and life insurance companies are attributed to their prospective beneficiaries only to the extent that they have a cash surrender or loan value. Otherwise, households are not credited with "wealth" representing the capital value of future pension benefits. Although Taylor and Tobin find this general treatment useful and satisfactory, Denison and Gorman take issue with it.

1. *Revised estimates.*—Since the publication of the "Integrated Economic Accounts," Gorman has correctly pointed out that, in transferring fringe benefits in kind from household to enterprise consumption, the IEA's should have deducted from household consumption expenditures only the cost of services provided by pension and insurance funds. What the IEA's did deduct was not only these services but also the net addition to pension and insurance reserves. These corrections affect enterprise consumption, household consumption, and household gross and net saving. The published and the re-

vised estimates are given in table 1.⁷ These revisions do not affect the balance sheet estimates for either enterprises or households, because the balance sheets were based on FOF data. They do, of course, affect the residual discrepancy between net saving as derived from the balance sheet and as derived from the current account, which was given as part of the addenda to the household balance sheet.

2. *Pensions and life insurance.*—Denison considers that all private pension and life insurance reserves (as well as the saving of nonprofit institutions) belong in the household sector, because they are all of value to households as prospective beneficiaries. Even term policies or unvested pension plans with no cash surrender value, he feels, may be currently valuable to the holder because they may make it possible to obtain further insurance without examination or at lower cost. The IEA view, in contrast, is that households do not in fact own or control the noncashable portion of private pension and insurance reserves, and therefore this part of the reserves should be excluded from their balance sheets. Although the households may be beneficiaries of pensions or insurance in the future, the IEA's do not record this as household income until such time as it is actually received. As for the view that term insurance and unvested pension plans may be currently valuable to the owner from the point of view of buying insurance, so is being a veteran, young, or female, and these factors are not reflected in the accounts.

Gorman opposes the proposed change on the grounds (1) that life insurance carrier saving, and therefore corporate profits, would be increased by the excess of the increase in aggregate reserves over the increase in cash surrender values; and (2) that he

7. BEA does not prepare estimates of pension fund operating expenses, because they are not needed for the NIPA's. Preparation of reliable estimates at the present time is not possible because (1) insured pension fund operating expenses are buried in the data for life insurance carriers, and (2) there is evidence of a massive shortfall in the existing Securities and Exchange Commission data on noninsured pension plans. Under these circumstances, the estimates of pension fund operating expenses for the IEA's were based on a simple-minded extrapolation of the 1977 ratio of pension fund operating expenses to employer contributions; data for the ratio are from an Internal Revenue Service tabulation of Form 5500 published in the *Statistics of Income Bulletin*, Volume 1, No. 4 (Spring 1982).

Table 1.—Revised Estimates Resulting From Correcting Pension and Insurance Data

[Billions of dollars]

	Enterprise consumption expenditures		Household consumption expenditures		Household gross saving		Household net saving	
	Published	Revised	Published	Revised	Published	Revised	Published	Revised
1969	39.8	34.9	386.3	391.2	129.5	124.6	58.2	53.3
1970	46.0	40.9	418.0	423.1	143.2	138.1	65.1	60.0
1971	52.0	46.2	443.6	449.4	164.1	158.3	79.3	73.5
1972	59.7	52.6	477.5	484.6	173.1	166.0	80.3	73.2
1973	67.0	58.2	521.4	512.6	212.5	203.7	111.6	102.8
1974	79.2	69.0	576.2	586.4	218.2	208.0	104.3	94.1
1975	92.6	80.1	628.5	641.0	240.8	228.3	111.9	99.4
1976	101.1	86.2	688.4	703.3	251.6	236.7	109.0	94.1
1977	120.8	103.7	749.2	766.3	271.2	254.1	112.6	95.5
1978	139.2	120.2	829.4	848.4	298.1	279.1	120.1	101.1
1979	154.9	135.3	935.3	954.9	319.4	299.8	118.6	99.0
1980	174.8	154.1	1,052.7	1,073.4	324.5	303.8	97.9	77.2

is not aware of any aggregate data on cash surrender value. With respect to the first point, there is no necessity for increasing corporate profits by the excess in aggregate reserves; if indeed the excess aggregate reserves are actuarially or legally required, they represent a legitimate ear-marked reserve that would not be available for distribution as profits to the stockholders, although they would still constitute part of gross saving. With respect to the second point, although there may be no readily available aggregate data on cash surrender value, insurance companies do provide their policyholders with this information, and this can be used to develop the necessary aggregate estimates.

Denison questioned the transfer of government pension reserves from the government to the enterprise sector. These reserves largely pertain to State and local government employees, and the transfer reflected the fact that the employee pension funds of State and local governments are generally held by government financial enterprises. It is debatable whether these pension funds should be classified with other pension funds or with other government financial institutions, but they should clearly be a part of the enterprise sector rather than of government. The IEA's did not intend to mediatize the Federal Government's retirement system through the pension and insurance sector, and Taylor's point in this case is well taken.

Taylor raised a question about the possibility of estimating unfunded liabilities of retirement systems, i.e., the difference between the present value of future payments due from re-

tirement systems and the capital value of the assets of the systems. He recognized the asymmetrical nature of such estimates; they have important implications for employer groups supporting such systems but may have little meaning for workers covered by the plans because they are illiquid and are fairly abstract concepts. For this reason, he suggested including such estimates as peripheral or memorandum information without incorporating them fully into the accounts. Furthermore, he felt that Social Security plays a role for individuals parallel to that of retirement systems, and its capitalized liabilities might be included in the memo table even though Social Security wealth is not capitalized in the household account. At first glance, such an approach seems both reasonable and attractive, but the highly speculative nature of the estimates becomes evident when one recognizes the extent to which assumed future changes in the price level and the interest rate dominate the results. In the case of Social Security liabilities, it would also be necessary to forecast the ages at which people will retire in the future, the effect of other related government programs and private pension plans, and probable changes in entitlements. Furthermore, it would not be appropriate to capitalize Social Security liabilities without at the same time capitalizing the future stream of Social Security revenues, and this would involve forecasting Social Security tax rates, wage rates, and employment. One needs only to refer to past estimates relating to the future of the Social Security System to see that such estimates are differ-

ent in kind from the reporting of past events with which the accounts are concerned.

3. *Fire and casualty insurance.*—IEA Annex 1 considered the treatment of fire and casualty insurance in the accounts. The IEA's agree with the NIPA's that the value added of fire and casualty insurance companies is correctly measured by net premiums (gross premiums minus claims paid). Annex 1 raises the question, however, as to whether this is also the correct measure for computing value added of a firm purchasing fire and casualty insurance, or whether this cost should be measured by the gross premium. Gorman emphasizes that all accidental damage to fixed capital, whether insured or not, is included in the BEA accounts in capital consumption allowances. This means, in fact, that what are capital losses to individual firms are written off at the aggregate level as capital consumption. If there were no insurance at all in the economy, this practice would be equivalent to including in each firm's capital consumption allowance a charge equivalent to self-insurance against accidental damage, which for the economy as a whole would equal the accidental damage actually occurring. In an economy where all firms were fully insured, BEA's allowance for accidental damage plus net premiums paid would be equal to gross premiums paid. The net premiums paid by firms to insurance companies would then appropriately represent the cost of the services of the insurance industry for spreading these risks. The question that remains, however, is whether the BEA treatment, which was designed for consolidated aggregate income and product accounts, is also appropriate for the IEA system, which is based upon production accounts and balance sheets drawn up at the firm and establishment levels. From this point of view, it would seem more suitable that the actual gross premiums paid by a firm be treated like any other item of current cost, and that the losses due to accidental damage and the reimbursement for such losses paid by insurance companies be treated as adjustments to the balance sheets rather than to the production account.

4. *Health insurance.*—With respect to health insurance, Gorman indi-

cates that the BEA procedure is based on the principle that medical consumption should be shown in the personal income and outlay account when the consuming individual decides which doctor or hospital shall provide the service. For this reason, BEA includes medical expenditures financed by the government under the Medicare program in the personal income and outlay account. The IEA's, in contrast, take the position that when the government sets the standards, circumstances, or conditions under which expenditures are to be made and requires accounting for reimbursement, the reimbursements should be considered to be government expenditures and treated as the provision of benefits in kind. In the IEA's, transfer payments from government to households are restricted to cash payments that do not require evidence of expenditure for reimbursement. On this basis, the medical expenditures financed under the Medicare program were considered to be government expenditures. In the case of medical care paid for by an insurance policy purchased by a household, only the premium is considered in the IEA's to be a household expenditure. Similarly, the premium paid by employers for health insurance for their employees is treated as a benefit in kind included in enterprise consumption expenditures. Gorman suggested that this would lead to double counting of final consumption, but it does not. The sum paid to the medical provider by the insurance company would be an intermediate product.

E. Interest

Although the IEA's retained the BEA net interest approach, in Annex 1 on financial intermediaries we raised a question as to whether that approach is really appropriate for the measurement of output and in the treatment of interest payments by households and government. We suggested that consideration be given, instead, to treatment of interest as the purchase and/or sale of a service, similar to BEA's treatment of rent. Adler and Sunga indicate that they would not be averse to seeing the logic of such a treatment followed to its conclusion.

Denison does have some misgivings about the BEA treatment of consumer interest, but he does not believe that its inclusion in personal consumption expenditures and output would help; in particular he raised a question about deflation, wondering how in a constant-dollar series the inclusion of consumer interest would resolve the trouble introduced by prices that are raised to cover implicit credit costs. As Denison implies, the implicit credit costs are already included in the price indexes. The price a consumer pays for a product covers a variety of conditions of sale, including credit arrangements, delivery, and refund policy. Under these conditions it does seem appropriate also to take explicit interest costs into account.

Gorman notes that the treatment of interest as a cost of production would have the consequence that the measure of a firm's output would be a function of the distribution between borrowed funds and equity capital. A firm that borrowed part of its capital would, other things being equal, have a lower value added than a firm that operated entirely on equity funds. Gorman does not believe that such a measure of value added would be interesting. Yet the question of borrowing versus the use of equity capital is directly analogous to that of producers who rent the buildings and equipment they use instead of owning them; those who rent will have a relatively smaller value added than those who own their buildings and equipment. The distinction, in both cases, seems entirely proper.

Gorman also, like Denison, has difficulty with the concept of deflation of interest as a service. If interest were treated as a cost, a rise in the interest rate would, *ceteris paribus*, reduce current-dollar value added, but the constant-dollar value added would be unchanged. Consequently, the implicit price deflator of value added would fall. Gorman says that he does not understand what such a decline in the implicit deflator would mean. This is, however, not really an anomaly. When interest is treated as a cost of production, a change in its price would have the same effect on deflation as a change in the price of any other element of cost. For example, if the price of raw materials rose, other

things being equal, value added would decline but constant-dollar value added would remain the same, leading to a decline in the implicit deflator of value added. This outcome is the result of using double deflation methods and is to be expected.

Perhaps for most users the most questionable aspect of treating interest as a payment for a service relates to government interest. Government deficits that require borrowing—and therefore the payment of interest—may result from a decline in revenues due to recession, and may have no observable counterpart in the physical output of goods and services. In such a situation, however, payments of interest may be more in the nature of a government expenditure not dissimilar to a public works program, designed to stimulate the economy. When government borrowing is an element of fiscal policy, such as borrowing funds from producers and consumers in wartime in order to reduce the volume of their expenditures in the economy, it can be argued that those lending the money are indeed performing a service by refraining from spending some of the income they have received. If governments borrow for the purpose of capital formation, they are operating in the same manner as business firms, and those providing the necessary funds to permit the capital formation can be viewed as contributing a service for which interest represents a legitimate payment.

F. Gross capital formation and saving

The IEA's expanded the NIPA concept of gross capital formation by including government purchases of structures and durable goods, personal consumption expenditures for durable goods, and the nondurable goods that are added to household and government inventories. Surprisingly, the inclusion of government capital formation elicited relatively little comment. Tice pointed out that the United Nations SNA recognizes government capital formation, and that it might be useful for the NIPA's to do so. Tobin went further and stated that crediting governments for the value of their physical assets is an accounting reform long overdue in this country.

The IEA treatment of household purchases of durable goods as capital formation is in accord with the FOF treatment, and is generally approved of by Taylor and Tice. Marimont, in commenting that the IEA's did not consistently embody the transactor approach, remarked that the IEA treatment of household durables leads to household saving that few households are likely to recognize and that even fewer lending institutions would give much weight to in evaluating the credit worthiness of a householder applying for a loan. But the purchase of durable goods such as an automobile or house furnishings is often recognized as a capital expenditure by householders. The saving for such a purchase may occur in advance as the householder accumulates the required funds, or the purchase may be financed by a loan. When there is a loan, the lending institution does indeed recognize that it is for a capital expenditure, and it is shown in the household accounts as saving when it is paid off. As has been pointed out above, however, the recording of transactions in the accounts should not depend solely on how individuals view the transactions, but rather on what is appropriate for the analytical usefulness of the accounts. The primary reason for treating household durable goods as capital assets on the balance sheets of households and depreciating them over the period of their economic life is that they last for more than one accounting period.⁵

Whether an estimate of net imputed income should be included for consumer durables, as it is for owner-occupied housing, is a somewhat more debatable issue. Denison questions such an imputation on the ground, among other reasons, that it differs from the treatment of government durables. There is much to be said for this position—but this same argument also applies to the net imputed income estimate for owner-occupied housing. Elimination of both of these imputations would make the treatment of owner-occupied housing and consumer durables consistent with the imputation used for government structures and equipment in the accounts.

With respect to saving, Denison feels that the IEA expanded net

saving is much less interesting for the analysis of economic growth and fluctuations than NIPA net saving. The IEA's net saving shows what each sector contributes toward financing all capital formation, whereas NIPA net saving shows what each sector contributes toward financing private business sector investment (including owner-occupied housing). Which of these is the more interesting figure is a function of one's model of economic behavior. It may be noted, however, that much of the difference between IEA and NIPA sector net saving does not arise from the expansion of the gross capital formation concept but from the IEA modifications of NIPA sectoring, the largest contributing factors being owner-occupied housing, nonprofit institutions, and pension and insurance reserves. Without these changes, NIPA household and government sector net saving could be derived from IEA net sector saving for these sectors by simply subtracting their respective net capital formation.

G. The form of the accounts

In her comments, Tice points out that, by and large, what the IEA's have done is move existing pieces into a new configuration, and she therefore considers it legitimate to ask whether all this rearrangement makes us any better off: Are the IEA's more precisely estimated and more illuminating than the existing NIPA's and FOF accounts? By definition, of course, the IEA's are exactly as precisely estimated as the NIPA's and FOF accounts, because they are merely a reorganization of the data provided by the two systems. This has some drawbacks. As Tice noted, reliance on the FOF accounts resulted in two major deficiencies in the IEA's: (1) the omission of revaluations for fixed claim assets, and (2) the placing of all changes in land value in the revaluation accounts.

Those with the most extensive comments on the form of presentation were Tice and Tobin. Denison's comment was limited to the point that a gross saving and investment account such as BEA provides is very useful and its absence from the IEA's makes it much more difficult to obtain an overview. All the information that would be shown in such an account is

already included in each sector's capital transaction account, but nevertheless, we agree with Denison that a combined gross saving and investment account would be useful and should be presented.

1. *IEA's and the FOF accounts.*—Tice finds the IEA presentation difficult, unclear, and confusing for the user of the FOF accounts, for three reasons. First, she feels that it is unfortunate that the IEA current accounts stress gross saving and investment while the capital accounts for the Nation use net concepts; as a result, she considers it difficult to relate the current and capital accounts conceptually or empirically. At the same time, she considers that too much information is provided in the sector capital accounts, where net concepts of capital stock are derived from gross investment flows. Second, she cites the lack of enterprise sector discrepancies between net saving as measured in the current and capital accounts as a severe limitation of the IEA system. Finally, she feels that, in terms of presentation, the IEA's are not as convenient for the analysis of financial markets as the FOF system because, in that system, time series are typically given for each of the component accounts separately—capital transactions, revaluations, and balance sheets. Her conclusion is that clearly the specialist user of the FOF system probably will not find the IEA's to his liking and not really appropriate for his purposes, but for the NIPA user the IEA's are a useful introduction to this financial information. But even here she finds problems, considering that the asset detail that is retained may be overwhelming for the NIPA user at the same time it is insufficient for the FOF specialist.

On the gross/net question, the IEA income and product accounts—like those in the NIPA's—are centered around gross capital formation and gross product, but the IEA balance sheets are based on current market values, which, of course, reflect net values. The only way to use the same concepts in both forms of accounts would be to adopt net capital formation and net product as the basis for the current accounts. While some might feel that this would be desirable, a majority of users, as indicated by the practices of most countries,

have shown a preference for gross concepts in the current accounts. This does not, of course, preclude relating the current and capital accounts, because full details are given in the sector capital accounts on gross capital formation and capital consumption.

With respect to Tice's desire to have the discrepancies of net saving in the enterprise sector shown as an addendum item, this is simply done and the more recent versions of the IEA's do incorporate this item. As Tobin observed, the unexplained discrepancies are disturbingly large and a concerted effort is needed to diagnose and remedy these inconsistencies.

With respect to the form of the IEA's, it is true that their design is not based on the FOF system, and FOF specialists may ask the reason for this. Although the FOF system presents detailed data on financial transactions, it contains only very rudimentary information on other aspects of the national accounts, and it could not very well serve as the basis for a comprehensive framework. It was considered more appropriate for the IEA's to extend the NIPA's along

the lines suggested by the United Nations SNA to comprehend capital transactions, revaluations, and balance sheets.

Tice observes that the IEA method of consolidating net worth for the enterprise and household sectors is different from the FOF consolidation. The IEA's subtract the equity owned by households (including the market value of corporate stock held by households) from enterprise net worth, whereas the FOF presentation leaves enterprise net worth intact and reduces household net worth correspondingly. Tice points out that the FOF treatment suggests a more important role in wealth owning for enterprises and may lead to useful insights about the control and likely use of this wealth. Tobin, however, notes that the IEA consolidation results in a consistent way of handling deviations of "q" from 1. Such a measure is, of course, not available in the FOF treatment, and it is not readily apparent what theoretical meaning or analytic use can be attributed to the FOF measure of household net worth reduced by enterprise net worth. Furthermore, because the unconsolidated enterprise net worth is also explicitly

given in the IEA sector accounts, it can be used when this concept is analytically appropriate.

Taylor objected to the sharp division in the IEA's between the current and capital accounts. He felt that this tends to obscure profoundly the definitional connections between these two accounting forms in ways that are not helpful to the inexpert user and that can easily lead to error. The same sharp division is, however, also found in the Summary of Flow of Funds Accounts table presented in the May 1982 SURVEY. Indeed, the capital transactions account of the IEA's contains essentially the same transaction flows as are shown in that table. Even in the more detailed sector statements of saving and investment published by the Federal Reserve Board only summary totals are provided for current income and outlays.

The sharp division between current and capital transactions could be avoided by listing all transactions together in terms of sources and uses of funds—as the FOF accounts once did. The sources and uses approach is quite appropriate where the focus of interest lies in the analysis of a limit-

Errata: May 1982 Survey of Current Business

- | Page | Correction |
|-----------|---|
| 6 | Account 1: The line numbers 36-45 should be moved up so that 36 appears as the line number for "Residential," not "Exports," and 45 appears as the line number for "State and local." |
| 7 | Account 1, line 1: The numbers in parentheses should read (1-31), not (1-39). |
| 25 | Table 8, line 68: The figure 328.1 should appear in the "Enterprise" column, not in the "Government" column. |
| 26-29 ... | Annex 2. Reconciliation Tables. Table A shows corrections for the "Source" column of these tables. |
| 73 | Column 2: Insert "and constant" before "dollars.," which is the first word in the column. |

Table A.

Item	Line number	Billions of dollars		Source	
		BEA	IEA's	Published	Correct
Reconciliation Table 1:					
B. Other structures	14B.....	*93.5	93.5	BEA5.2L10 + BEA5.2L16 - LINE 14A.	BEA5.2L10 + BEA5.2L16 - BEA8.8L99
Owner-occupied houses...	18.....		94.7	BEA8.8L99 - BEA8.8L100	BEA8.8L99
Net exports of goods and services (BEA).	following 24.....	- .6		BEA1.1L18 - LINES(26A-27A).	BEA1.1L18 = LINES(26A-27A)
Exports (BEA).....	following 24.....	219.8		BEA1.1L19 - LINE 26A	BEA1.1L19 = LINE 26A
Less: Imports (BEA).....	following 24.....	220.4		BEA1.1L20 - LINE 27A	BEA1.1L20 = LINE 27A
Rental income	46.....	27.3	17.5	BEA2.1L22 - BEA8.8L79	BEA2.1L12 - BEA8.8L79
Reconciliation Table 2:					
A. Payments	14A.....	91.4	91.4	BEA2.1L16 - BEA3.12L5	BEA2.1L16 - BEA3.11L5
Reconciliation Table 3:					
Enterprises	13.....	64.3	64.3	BEA3.6L2 - BEA3.13(5+26) + IEA1.1L3D.	BEA3.6L2 - BEA3.13L(5+16) + IEA1.1L3D
Government.....	15.....	27.9	27.9	BEA3.13L(5+6) - IEA1.1L3D.	BEA3.13L(5+16) - IEA1.1L3D
Less: Wage accruals less disbursements.	Z.....	.2		BEA3.1L25	BEA3.1L22

* A corrected estimate, published as 95.2.

ed number of transactions over a period of time. The distinction between current and capital is really quite arbitrary, and for different purposes different classifications may be desired. However, this approach becomes more awkward as increased detail is given, and it does not solve the problem of relating capital transactions to the revaluation and balance sheet items. The FOF presentation avoids these problems by limiting the income and expenditure flows to a few summary measures, and providing completely separate revaluation and balance sheet information.

Adler and Sunga made a similar point in suggesting that, as is done in Canada, the capital finance account might directly follow each sector's income and outlay account. This is appropriate in Canada, however, primarily because Canada does not have either revaluation accounts or balance sheets, and so does not need to find a place for them.

2. *A matrix presentation.*—Tobin suggests that the IEA's could be displayed somewhat more informatively if a matrix presentation were used. For balance sheets, there would be a matrix for each date with a row for each asset and debt category and a column for each sector. Each cell (ij) would display the net position (positive, negative, or zero) of the sector (i) in the asset (j). When information permits, the gross positions, positive and negative, could be shown in the cell with the net holding equaling their difference. The same matrix format can, of course, record the changes in sector holdings of assets from one date to another. Within each cell there would be, as in the IEA tables, two entries, one for the sector's net purchases or sales of the assets at the prices of the period, and one for revaluation of assets previously acquired. For any sector, the sum of all these entries is the change in the net worth, similarly split between the value of net acquisitions (which is the net saving of the sector) and revaluation of existing holdings. Finally, a second flow matrix can be constructed that will also lead to the same estimates of sectoral net saving. In this matrix, the columns are the same, but the rows represent transactions other than the purchase or sale of assets.

The row categories are types of transactions like taxes, transfers, income payments, consumption outlays, and labor compensation. If the list is exhaustive, their net sums will be the saving figures. Tobin indicates that the format he is advocating is like that used in the European System of Accounts of the European Economic Community (its Table T2) except that he would like to consolidate the rows for assets and liabilities of the same type.

Such a matrix approach does have the advantage that it provides an overview of the structure of the economy at a given point of time and of its changes from one date to another. As Tobin observes, it can be carried out at different levels of aggregation. At more detailed levels of aggregation where many sectors and subsectors are shown and assets, financial instruments, and current transactions are classified in some detail, the matrixes would become quite large, however. Like large input-output tables, they would then be difficult to present or use in table form.

3. *The need for alternative forms.*—The matrix approach to the presentation of data is diametrically opposite to the time series approach recommended by Tice for financial analysis, and, like the IEA system, it maintains the sharp difference between current and capital transactions to which Taylor has raised objections. It is thus apparent that different uses may call for different forms of presentations.

Whatever the form of presentation, the summary accounts should have the function of providing an overview of the economy and defining the framework of the economic accounting system, much in the same way BEA's 5-account system provides an overview of production, distribution, and use of the Nation's output and a formal accounting framework for more detailed supporting tables. As the system of economic accounts is extended, however, the task of interrelating all of its component elements becomes more complex. It may, therefore, be useful to display a number of alternative (but, of course, consistent) presentations at a fairly summary level, including time series, matrixes, and related accounts, so that users can choose the forms that suit them

best. The FOF presentation has adopted this sort of approach in providing accounts not only for transactors, but also for specific transactions.

For the more detailed data, it is apparent that for the research analyst this is best made available in machine readable form so that it can be processed and analyzed by computer. The IEA tables published in the May 1982 SURVEY represented only the tip of the iceberg—data were presented only for the period 1969–80, and only for the four major sectors of the economy. Data for these sectors are available for the full period 1947–80, and data for 14 subsectors are available for the period 1958–75, all on computer tape obtainable, as noted earlier, from BEA. (See the box on page 42 for information about the computer tape.)

Summary and Conclusions

A. *IEA objectives and the reviewers' responses*

1. *The modifications and extensions proposed by the IEA's.*—The IEA's proposed both to modify the existing NIPA's and to extend their scope. The modifications were based on the principle that the aggregate accounts for the Nation and the sector accounts should be viewed conceptually as combinations and consolidations of the accounts of individual transactors. This principle led to three specific types of modification. First, the NIPA sectoring of the economy was altered, removing nonprofit institutions from the household sector and setting up an enterprise sector. Second, some modifications were introduced in the treatment of specific flows in the NIPA's, including such items as owner-occupied housing, government and consumer durables, and pensions. Finally, market transactions and imputations for nonmarket activity were separated so that additional imputations could be introduced without impairing the usefulness of the system for the analysis of the market economy.

Two types of extension of the NIPA's were envisioned. First, the IEA's introduced accounts for stocks—balance sheets—and integrated them with the flow accounts

within its modified framework of aggregate national accounts and sector accounts. This entailed construction of the revaluation accounts needed to show how balances at the end of a period are derived from those at the beginning of the period. Second, the IEA's proposed extending the national accounting framework to embrace microdata as well as macrodata. It is our view that it is now feasible, statistically as well as conceptually, to construct composite microdata sets for households, enterprises, and governmental units that would consolidate to the sector accounts of the Nation. Such microdata sets can accommodate a wide variety of economic, social, demographic, and locational information relating to individual microunits.

2. The BEA response.—The IEA proposals for modification and extension of the national accounts encountered substantial opposition from those who had been intimately involved in the original design or more recent implementation of the NIPA's. The proposed sectoring changes were rejected, on the grounds that the objective of establishing sectors compatible with the accounts of individual transactors is a chimera, and that the removal of nonprofit institutions from the household sector would complicate the accounts and increase the heterogeneity of the enterprise sector. The IEA modifications in the recording of transactions were opposed on the grounds that the principles on which these changes were made were neither consistent nor valid. Specifically, strong support was voiced for retaining the BEA treatment of owner-occupied housing, consumer durables, and pensions. One comment did, however, recognize that the question of consumer and government capital formation has long been a controversial topic and that the proposed IEA treatment seemed sensible. The proposed separation into market transactions and nonmarket imputations was rejected both because it was considered to increase the complexity of the accounts and because the imputations contained in the NIPA's were not considered to be more speculative or different in kind from market transactions.

The extension of the NIPA's to embrace balance sheets was discussed by

only one BEA staff member. A detailed examination of the IEA capital accounts was provided, and the question was posed as to whether the IEA's were more illuminating than the existing accounts. The general conclusion was that the IEA presentation was clearly not as convenient for the analysis of financial markets as FOF accounts, and the specialist user of that system would not find it to his liking. For the NIPA user, however, the IEA's were considered to be a useful introduction to this financial information. The proposed IEA extension involving the development of microdata underlying the accounts was generally regarded by all the BEA staff who commented as both impractical and too costly.

3. The response of outside reviewers.—The outside reviewers were, on the whole, more receptive to the modifications and extensions proposed by the IEA's, although the viewpoints they represent are quite varied. In the comments relating to the modifications of sectoring, there was considerable support for removing nonprofit institutions from the household sector, but one comment expressed concern for the effect this would have in blurring the profit-motivated character of the enterprise sector. With respect to modifications in the recording of transactions, strong approval was given to the alteration in the treatment of owner-occupied housing, government and consumer durables, and pensions, although in relation to owner-occupied housing and consumer durables one comment noted that the proposed treatment would alter the traditional concept of the household as a consumption unit. There was some support for, and no opposition to, the separation of nonmarket imputations from market transactions; it was felt that this would permit the future expansion of estimates, if desired, into other nonmarket areas.

With respect to the extension of the NIPA's to embrace balance sheets, all of the outside reviewers were strongly in favor of such a development, but they differed in their views on the form of presentation of this information. There was agreement that capital accounts showing stocks of durables should be developed for the government sector, and that owner-occu-

pled housing and consumer durables should be included in the balance sheets of households. There was relatively little discussion of the incorporation of microdata. One comment noted, however, that although the development of microdata was both difficult and costly, the micro-macro data methodology intuitively points in the right direction.

B. The national accounts as a framework for the statistical system

One of our major purposes in developing the IEA's was to demonstrate that, with some modifications and extensions, the NIPA's could be used as a comprehensive framework for the U.S. statistical system. Although our presentation of the IEA's strongly emphasized this objective, this topic was not commented upon by either the BEA staff or the outside reviewers. Nevertheless, we would argue that it is this aspect of an integrated and expanded system of accounts that is most fundamental and important for the future development of both the national accounts and the U.S. statistical system.

The Bonnen Report on "Improving the Federal Statistical System" pointed out that there are over 100 Federal agencies with statistical programs, and the statistics that are produced in smaller statistical units or as a by-product of administrative and regulatory data are often unreliable and poorly designed for their purposes.⁸ Restrictions on interagency sharing of data for statistical purposes result in lack of comparability of data produced by different agencies as well as failure to exploit fully data bases developed at substantial costs. There is not enough interaction between data producers and data users, including policy analysts and policymakers, largely because they are in different agencies. As a result, producers are insufficiently informed about the utility of the data they provide, and ana-

8. "Improving the Federal Statistical System: Report of the President's Reorganization Project for the Federal Statistical System," *Statistical Reporter*, May 1980.

lysts are often unaware of important limitations of the data they use. As these conclusions of the Bonnen Report clearly imply, the term "statistical system" as applied to the United States is indeed a misnomer. The statistical resources that exist in the United States are highly fragmented and uncoordinated.

Prior to the 1970's, the Office of Statistical Standards of the Bureau of the Budget and its predecessor organizations made an effort to improve the quality of statistics through forms review and review of the budgets of the statistical agencies, and by establishing outside review committees. Although such efforts were useful and in some degree successful, they were quite inadequate to deal with the highly decentralized statistical system. Since that time, however, the situation has steadily deteriorated. In 1971, the function of statistical coordination was assigned to the Statistical Policy Division of the Office of Management and Budget. By 1977, the staff had been reduced to 29, from the level of 69 its predecessor had had in 1947. In 1978, the Statistical Policy Division was abolished and the coordination function was moved to the Office of Federal Statistical Policy and Standards in the Department of Commerce, with further reduction of staff. That office has now been abolished, and at the present time the only statistical coordination function that remains in the Federal Government is in the Office of Information and Regulatory Affairs of the Office of Management and Budget—which is primarily concerned with meeting the mandates of the Paperwork Reduction Act, not with improving statistics.

In the context of the fragmentation and decentralization of statistical activities coupled with the abandonment of serious efforts to achieve substantive coordination, the attempt to develop a comprehensive framework

for the statistical system may seem to be an exercise in futility. Certainly BEA itself is in no position, in terms of either authority or budget, to bring about an integrated statistical system, and the Office of Management and Budget has neither the required staff nor the inclination to be concerned with this topic.

Nevertheless, some things can still be accomplished. Perhaps the most obvious and immediate step that could be undertaken would be a joint effort by BEA and the Federal Reserve Board to develop a system of accounts that would embrace the NIPA's, FOF accounts, and balance sheets, using common classifications of transactions and of sectors and sub-sectors. In such a common system, it would, of course, be reasonable that BEA would produce more detailed and expanded information relating to the current accounts and reproducible capital stocks, and the Federal Reserve Board would specialize in producing the financial information. The two agencies might indeed present different levels of detail in their respective publications, but it would be most useful if both sets of information were recognizable as parts of the same system of accounts.

There are also other areas where interagency cooperation would be desirable. There would, for example, be considerable advantage in having common classifications for the price information collected by the Bureau of Labor Statistics and for the industry and final product information in the national accounts. The fact that these systems differ reflects in large part the periods in which they originated, not present needs. Similarly, much would be gained by allowing all agencies providing data classified by industry to use the Standard Statistical Establishment List as the basis for assigning industrial classifications to their reporting units.

These partial and ad hoc measurements cannot, however, be expected to achieve the type of integrated statistical system here being proposed. To achieve this, it would be necessary to formulate in some detail an overall accounting system that is capable, not only of integrating all economic data, but also as serving as a framework for social, demographic, environmental, and regional information. Such a system would need to provide for the interrelation of macro- and micro-data.

The required system cannot be expected to emerge without consideration of many of the important specific issues involved. The National Accounts Review Committee, which was convened by the Office of Statistical Standards a quarter of a century ago, was a useful device in setting forth the major issues of national accounting as viewed at that time. Similarly, in the development of the revised United Nations SNA, major issues were reviewed by those concerned with national accounting from many different countries, who met regularly over a period of years. The time may now be appropriate to assemble a new group of producers and users of statistics embracing not only those concerned with the national economic accounts but those involved in a wider spectrum of other types of information. In this connection, consideration should be given to the experiences of other countries in the development of their statistical systems, and to the emerging international statistical standards. Even if no immediate action is contemplated, such an effort to design an integrated set of national accounts and related data would be extremely important in helping to determine the future architecture of the statistical system. Without some overall plan to follow, the U.S. statistical system will remain fragmented and uncoordinated.

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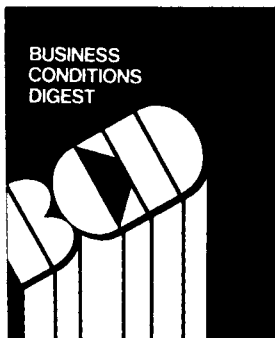


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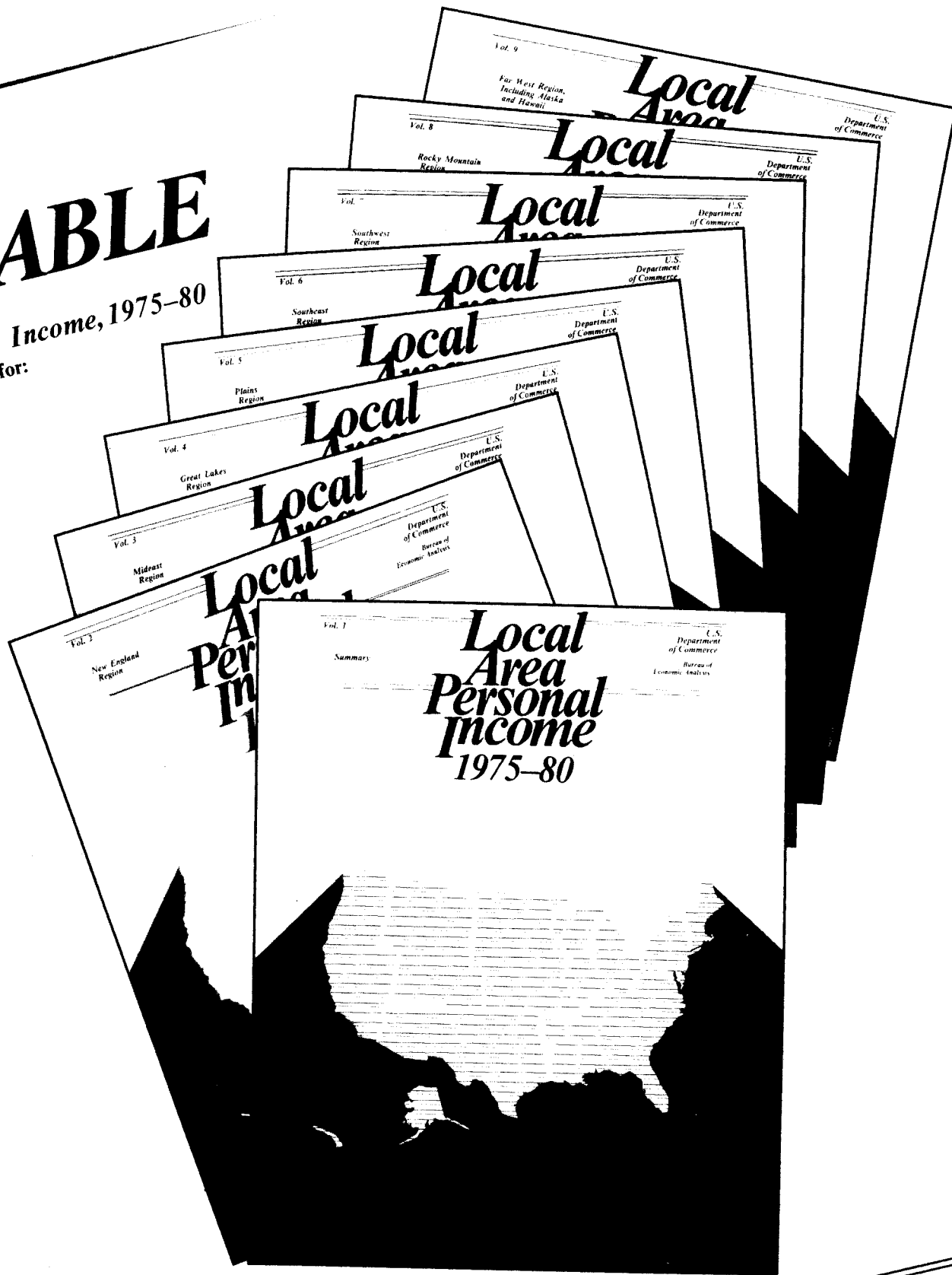
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Table with columns for years: 1980, 1981, 1981 (with sub-columns for Sept, Oct, Nov, Dec), and 1982 (with sub-columns for Jan, Feb, Mar, Apr, May, June, July, Aug, Sept, Oct).

GENERAL BUSINESS INDICATORS—Continued

Main data table containing Industrial Production, Business Sales, and various sub-categories with their respective values for each month from 1980 to 1982.

See footnotes at end of tables.

Table header with columns for years 1980, 1981, and 1982, and months from Annual to Oct.

FINANCE-Continued

BANKING-Continued

Table containing banking data: Commercial bank credit, money and interest rates, open market rates, and yield on U.S. Government securities.

CONSUMER INSTALLMENT CREDIT

Table containing consumer installment credit data: Total extended and liquidated, seasonally adjusted, and total outstanding by major holder and credit type.

FEDERAL GOVERNMENT FINANCE

Table containing federal government finance data: Budget receipts and outlays, budget financing, gross amount of debt outstanding, and budget receipts by source and outlays by agency.

GOLD AND SILVER:

Table containing gold and silver data: Monetary stock and price at New York for gold and silver.

See footnotes at end of tables.

Unless otherwise stated in footnotes below, data through 1978 and descriptive notes are as shown in the 1979 edition of BUSINESS STATISTICS

Table with columns for years: 1980, 1981, 1981 (Sept, Oct, Nov, Dec), 1982 (Jan, Feb, Mar, Apr, May, June, July, Aug, Sept, Oct). Sub-columns for 1981 and 1982 are labeled 'Annual'.

FOREIGN TRADE OF THE UNITED STATES—Continued

Table with columns for years: 1980, 1981, 1981 (Sept, Oct, Nov, Dec), 1982 (Jan, Feb, Mar, Apr, May, June, July, Aug, Sept, Oct). Rows include Exports (U.S. mdse., excl. military grant-aid), General imports, and Shipping Weight and Value (Waterborne trade, General imports).

TRANSPORTATION AND COMMUNICATION

Table with columns for years: 1980, 1981, 1981 (Sept, Oct, Nov, Dec), 1982 (Jan, Feb, Mar, Apr, May, June, July, Aug, Sept, Oct). Major sections include TRANSPORTATION (Air Carriers, Domestic operations, International operations, Urban Transit Systems, Motor Carriers, Freight carried, Class I Railroads) and Travel (Hotels and motor-hotels, Foreign travel, National parks, visits).

See footnotes at end of tables.

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Table with columns for years 1980, 1981, 1981 (Sept, Oct, Nov, Dec), and 1982 (Jan, Feb, Mar, Apr, May, June, July, Aug, Sept, Oct).

STONE, CLAY, AND GLASS PRODUCTS

Main data table for Stone, Clay, and Glass products, including sub-sections for Portland Cement, Clay Construction Products, Glass and Glass Products, and Gypsum and Products.

TEXTILE PRODUCTS

Main data table for Textile Products, including sub-sections for Fabric and Cotton.

See footnotes at end of tables.

FOOTNOTES FOR PAGES S-1 THROUGH S-32

General Notes for all Pages:

- r Revised.
- p Preliminary.
- e Estimated.
- c Corrected.

Page S-1

† Revised series. See Tables 2.6 - 2.9 in the July 1982 SURVEY for revised estimates back to 1977. Pre-1977 estimates are available in *The National Income and Product Accounts of the United States, 1929-76: Statistical Tables*.

- ‡ Includes inventory valuation and capital consumption adjustments.
- * New series. Detailed descriptions begin on p. 18 of the Nov. 1979 SURVEY. See note "†" for this page for information on historical data.
- § Monthly estimates equal the centered three-month average of personal saving as a percentage of the centered three-month moving average of disposable personal income.

Page S-2

- 1. Based on data not seasonally adjusted.
- # Includes data not shown separately.
- ‡ Revised series. For wholesale see note "‡" for p. S-8. For manufacturing see note "†" for p. S-3. For retail see note "†" for p. S-8.
- † See note "†" for p. S-3.
- § See note "†" for p. S-8.
- @ See note "‡" for p. S-8.
- * New series. Data back to 1967 are available from the National Income and Wealth Division, Bureau of Economic Analysis.

Page S-3

- ‡ Revised series. For wholesale see note "‡" for p. S-8. For manufacturing see note "†" for this page. For retail see note "†" for p. S-8.
- † Revised series. Data have been revised back to 1972. A detailed description of these revisions and historical data appear in the reports "Manufacturers' Shipments, Inventories, and Orders" M3-1.10 (1972-1980) and M3-1.11 (1977-81), available from the Bureau of the Census, Washington, D.C. 20233.
- § See note "†" for p. S-8.
- @ See note "‡" for p. S-8.
- * New series. Data back to 1967 are available from the National Income and Wealth Division, Bureau of Economic Analysis.
- # Includes data for items not shown separately.

Page S-4

- 1. Based on data not seasonally adjusted.
- † See note "†" for p. S-3.
- # Includes data for items not shown separately.
- ‡ Includes textile mill products, leather and products, paper and allied products, and printing and publishing industries; unfilled orders for other nondurable goods industries are zero.
- ¶ For these industries (food and kindred products, tobacco, apparel and other textile products, petroleum and coal, chemicals and allied products, and rubber and plastics products) sales are considered equal to new orders.

Page S-5

- 1. Based on unadjusted data.
- † See note "†" for p. S-3.
- @ Compiled by Dun & Bradstreet, Inc.
- # Includes data for items not shown separately.
- § Ratio of prices received to prices paid (parity index).
- ¶ Revisions, back to 1975 for some commodities, are available upon request.
- ‡ See note "‡" for p. S-4.

Page S-6

- § For actual producer prices of individual commodities see respective commodities in the Industry section beginning p. S-19. All data subject to revision four months after original publication.
- † Revised series. Stage-of-processing producer price indexes have been revised back to 1976 to reflect updated industry input-output relationships and improved classification of some products.
- # Includes data for items not shown separately.
- ‡ Effective Feb. 1982, data have been revised back to 1977 to reflect new seasonal factors.

Page S-7

- 1. Computed from cumulative valuation total.
- 2. Index as of Nov. 1, 1982: building, 334.5; construction, 362.3.
- # Includes data for items not shown separately.
- § Data for Oct. 1981, and Jan., Apr., July, and Sept. 1982 are for five weeks; other months four weeks.

Page S-8

- 1. Advance Estimate.
- ¶ Home mortgage rates (conventional first mortgages) are under money and interest rates on p. S-14.
- § Data include guaranteed direct loans sold.
- ‡ Effective Oct. 1982 SURVEY, seasonally adjusted wholesale trade data have been revised for Jan. 1981-March 1982. Effective April 1982 SURVEY, wholesale trade data have been revised for Jan. 1972-Dec. 1981. Revised data are available upon request.
- † Effective April 1982 SURVEY, retail trade data have been revised for the years 1972-1981. Revised data and a summary of the changes are available from the Census Bureau, Washington, D.C. 20233.
- # Includes data for items not shown separately.

Page S-9

- 1. Advance estimate.
- 2. Effective Jan. 1979 data, sales of mail-order houses are included with department store sales.
- 3. As of July 1.
- # Includes data for items not shown separately.
- ‡ Revisions for Jan. 1977-Oct. 1979 appear in "Current Population Reports," Series P-25, No. 870, Bureau of the Census.
- ¶ Effective with the February 1982 SURVEY, the labor force series have been revised back to 1970 to reflect the 1980 Census of Population. Seasonal adjustment factors were revised accordingly. Revised monthly series appear in the February 1982 issue of *Employment and Earnings*. Revised annual series will appear in the March 1982 issue of *Employment and Earnings*, U.S. Department of Labor, Bureau of Labor Statistics.
- * New series. The participation rate is the percent of the civilian noninstitutional population in the civilian labor force. The employment-population ratio is employment as a percent of the total noninstitutional population, 16 years and over.
- † See note "†" for p. S-8.

Page S-10

- † Effective June 1982 SURVEY, data have been revised back to 1977 based on March 1981 benchmark levels and updated seasonal adjustment factors. See "BLS Establishment Estimates Revised to March 1981 Benchmarks," in the June 1982 issue of *Employment and Earnings*. Effective July 1981 SURVEY, data have been revised back to 1974 to reflect new benchmarks and new seasonal adjustment factors. See "BLS Establishment Estimates Revised to March 1980 Benchmarks," in the July 1981 issue of *Employment and Earnings*.
- ¶ See note "¶" for p. S-9.

Page S-11

- † See note "†" on p. S-10.
- ‡ This series is not seasonally adjusted because the seasonal component is small relative to the trend-cycle and/or irregular components and consequently cannot be separated with sufficient precision.
- ¶ Production and nonsupervisory workers.

Page S-12

- 1. This series has been discontinued.
- † See corresponding note on p. S-10.
- ¶ Production and nonsupervisory workem.
- ‡ Earnings in 1977 dollars reflect changes in purchasing power since 1977 by dividing by Consumer Price Index.
- § Wages as of Nov. 1, 1982: Common, \$14.69; Skilled, \$19.10.

Page S-13

- 1. Average for Dec.
- ¶ Effective April 1982 SURVEY, the series for work stoppages involving six or more workers have been discontinued and have been replaced by series for work stoppages involving 1,000 or more workers.
- # Includes data for items not shown separately.
- § For demand deposits, the term "adjusted" denotes demand deposits other than domestic commercial bank and U.S. Government, less cash items in process of collection; for loans, exclusive of loans to and Federal funds transactions with domestic commercial banks and include valuation reserves (individual loan items are shown gross; i.e. before deduction of valuation reserves).
- * New series. Beginning Dec. 1978, data are for all investment account securities; comparable data for earlier periods are not available.
- @ Insured unemployment (all programs) data include claims filed under extended duration provisions of regular State laws; amounts paid under these programs are excluded from state benefits paid data.
- @@ Insured unemployment as a percent of average covered employment in a 12-month period.

Page S-14

1. Data are for fiscal years ending Sept. 30 and include revisions not distributed to the months.
 2. Average for the year.
 3. Daily average.
 4. Beginning Jan. 1981, data are for top-rated only. Prior data cover a range of top-rated and regional dealer closing rates. See also note 3 for this page.
 5. Beginning Oct. 1981, data represent the total surplus or deficit (budget surplus or deficit plus off-budget surplus or deficit).
 6. Interest rate charged as of Nov. 1, 1982 was 12.48.
- # Includes data for items not shown separately.
- § The Department of Health, Education, and Welfare was redesignated as the Department of Health and Human Services by the Department of Education Organization Act.
- ¶ Adjusted to exclude domestic commercial interbank loans and Federal funds sold to domestic commercial banks.
- ‡ Rates on the commercial paper placed for firms whose bond rating is Aa or the equivalent. Data through Oct. 1979 show a maturity for 120-179 days. Beginning Nov. 1979, maturity is for 180 days.
- @ Data through Oct. 1979 show a maturity for 150-179 days. Beginning Nov. 1979, maturity is for 180 days.
- ‡‡ Courtesy of *Metals Week*.
- @@ Average effective rate.

Page S-15

1. M1-A has been discontinued. M1-B will now be designated "M1."
- † Effective Feb. 1982 SURVEY, the money stock measures and components have been revised back to 1959. The Federal Reserve has redefined the monetary aggregates. The redefinition was prompted by the emergence in recent years of new monetary assets—for example, negotiable order of withdrawal (NOW) accounts and money market mutual fund shares—and alterations in the basic character of established monetary assets—for example, the growing similarity of and substitution between the deposits of thrift institutions and those of commercial banks. Monthly data from 1959 to date are available from the Banking Section of the Division of Research and Statistics at the Federal Reserve Board, Washington, D.C. 20551.
- ‡ Composition of the money stock measures is as follows:
- M1.—This measure is currency plus demand deposits at commercial banks and interest-earning checkable deposits at all depository institutions—namely NOW accounts, automatic transfer from savings (ATS) accounts, and credit union share draft balances—as well as a small amount of demand deposits at thrift institutions that cannot, using present data sources, be separated from interest-earning checkable deposits.
- M2.—This measure adds to M1 overnight repurchase agreements (RP's) issued by commercial banks and certain overnight Eurodollars (those issued by Caribbean branches of member banks) held by U.S. nonbank residents, money market mutual fund shares, and savings and small-denomination time deposits (those issued in denominations of less than \$100,000) at all depository institutions. Depository institutions are commercial banks (including U.S. agencies and branches of foreign banks, Edge Act corporations, and foreign investment companies), mutual savings banks, savings and loan associations, and credit unions.
- M3.—This measure equals M2 plus large-denomination time deposits (those issued in denominations of \$100,000 or more) at all depository institutions (including negotiable CD's) plus term RP's issued by commercial banks and savings and loan associations.
- L.—This broad measure of liquid assets equals M3 plus other liquid assets consisting of other Eurodollar holdings of U.S. nonbank residents, bankers acceptances, commercial paper, savings bonds, and marketable liquid Treasury obligations.
- ‡‡ Includes ATS and NOW balances at all institutions, credit union share draft balances, and demand deposits at mutual savings banks.
- * Overnight (and continuing contract) RP's are those issued by commercial banks to the nonbank public, and overnight Eurodollars are those issued by Caribbean branches of member banks to U.S. nonbank customers.
- @ Small time deposits are those issued in amounts of less than \$100,000. Large time deposits are those issued in amounts of \$100,000 or more and are net of the holdings of domestic banks, thrift institutions, the U.S. Government, money market mutual funds, and foreign banks and official institutions.
- # Includes data for items not shown separately.
- § Number of issues represents number currently used; the change in number does not affect the continuity of the series.

Page S-16

1. Beginning Jan. 1981 data, U.S. Virgin Islands trade with foreign countries is included.
- § Number of issues represents number currently used; the change in number does not affect the continuity of the series.
- ‡ For bonds due or callable in 10 years or more.
- # Includes data for items not shown separately.
- @ Data may not equal the sum of the geographic regions, or commodity groups and principal commodities, because of revisions to the totals not reflected in the component items.

Page S-17

1. See note 1 for p. S-16.
 2. Beginning Jan. 1982 data, the Customs value is being substituted for the f.a.s. value.
- # Includes data not shown separately.
- § Data may not equal the sum of geographic regions, or commodity groups and principal commodities, because of revisions to the totals not reflected in the components.

Page S-18

1. See note 1 for p. S-16.
 2. Annual total; quarterly or monthly revisions are not available.
 3. Before extraordinary and prior period items.
 4. For month shown.
 5. Domestic trunk operations only (averaging about 90 percent of domestic total).
 6. See note 2 for p. S-17.
- # Includes data for items not shown separately.
- § Total revenues, expenses, and income for all groups of carriers also reflect nonscheduled service.
- ‡ Beginning Jan. 1977, defined as those having operating revenues of \$50 million or more.
- @ Average daily rent per room occupied, not scheduled rates.
- ¶ Effective January 1, 1980, contract carriers are not included because the data filed by these carriers were substantially reduced in scope, in accordance with the ICC revised reporting regulations.

Page S-19

1. Reported annual total; monthly revisions are not available.
 2. Data withheld to avoid disclosing operations of individual companies.
 3. Beginning Jan. 1981, data represent gross weight (formerly phosphoric acid content weight) and are not comparable with data shown for earlier periods.
 4. A portion of data is being withheld to avoid disclosing information for individual companies; not comparable with other published data.
 5. Beginning Jan. 1980 data, another company is included.
 6. Data for carbon dioxide gas are being suppressed because they do not meet publication standards.
 7. Less than 500 short tons.
- # Includes data for items not shown separately.
- § Data are reported on the basis of 100 percent content of the specified material unless otherwise indicated.
- ‡ Revisions, back to 1977 for some commodities, are available upon request.
- ¶ Data for Jan. 1977-June 1979 exclude potassium magnesium sulfate; not strictly comparable with data shown for other periods.

Page S-20

1. Reported annual total; monthly revisions are not available.
 2. Annual total includes Hawaii; not distributed to the months.
 3. Beginning 1982, the reporting frequency has been changed from a monthly to a quarterly basis. Revised quarterly data for 1979 through 1981 are available upon request.
 4. Reported annual total, including Hawaii; monthly data are preliminary and subject to change.
- § Data are not wholly comparable from year to year because of changes from one classification to another.
- ‡ Revisions back to 1977 are available upon request.

Page S-21

1. Average for three months, price not available for Apr.-Dec.
 2. Crop estimate for the year.
 3. Stocks as of June 1.
 4. Stocks as of June 1 and represents previous year's crop; new crop not reported until June (beginning of new crop year).
 5. Previous year's crop; new crop not reported until Oct. (beginning of new crop year).
 6. See note "@@" for this page.
 7. Data are no longer available.
 8. See note 4 for p. S-22.
 9. October 1 estimate of the 1982 crop.
 10. November 1 estimate of the 1982 crop.
- § Excludes pearl barley.
- # Bags of 100 lbs.
- ¶ Revised crop estimates back to 1975 are available upon request.
- @ Revisions, back to 1977, for some commodities, are available upon request.
- ‡ Revisions back to 1975 are available upon request.
- @@ Data are quarterly except for June (covering Apr. and May) and Sept. (covering June-Sept.).

Page S-22

1. Average for 11 months; price not available for Dec.
 2. Average for nine months; index not available for Apr.-June.
 3. Data are no longer available.
 4. Effective with this reporting, data are for three-month intervals.
- § Cases of 30 dozen.
- ¶ Bags of 132.276 lbs.
- ‡ Revisions for Jan.-July 1979 (back to 1975 for grindings of wheat) are available upon request.
- @ Revisions back to 1977 are available upon request.
- # Effective Apr. 1981 SURVEY, the wholesale price of smoked hams has been discontinued and has been replaced with the comparable price index. Annual indexes prior to 1979 and monthly indexes prior to Feb. 1980 are available upon request.

Page S-23

1. Crop estimate for the year.
 2. Average for seven months; price not available for July, Aug., and Oct.-Dec.
 3. Annual total; monthly revisions are not available.
 4. Data are no longer available.
 5. October 1 estimate of the 1982 crop.
 6. November 1 estimate of the 1982 crop.
- § Monthly data reflect cumulative revisions for prior periods.
 ‡ Revisions back to 1975 are available upon request.
 * New series. Source: Bureau of Labor Statistics.
 # Totals include data for items not shown separately.

Page S-24

1. Annual data; monthly revisions not available.
2. Less than 500 short tons.

Page S-25

1. Annual data; monthly revisions are not available.
2. For month shown.
3. Effective Jan. 1981, data are revised back to Jan. 1980. Inventory data formerly calculated by the Bureau of the Census are now based on the Steel Service Center Institute monthly Business Conditions report.

Page S-26

1. Annual data; monthly revisions are not available.
 2. Less than 50 tons.
- ¶ Includes secondary smelters' lead stocks in refinery shapes and in copper-base scrap.
 @ All data (except annual production figures) reflect GSA remelted zinc and zinc purchased for direct shipment.
 ‡ Source for monthly data: American Bureau of Metal Statistics. Source for annual data: Bureau of Mines.
 # Includes data not shown separately.
 † Effective July 1980 SURVEY, data are revised and shown on a new base. The sample size has been restored to 100 firms and the base has been changed to 1977=100. The revised series are not comparable to previously published data.
 * New series. These indexes are based on shipments of hydraulic and pneumatic products reported by participating members of the National Fluid Power Association. Data back to 1959 are available upon request.

Page S-27

1. Effective Jan. 1980, total stocks for bituminous coal and lignite exclude residential and commercial stocks and are not comparable with data shown for earlier periods.
 2. Data are for five weeks; other months 4 weeks.
 3. Based on new 1981 stock level. See also note "‡" for this page.
 4. For month shown.
- # Includes data for items not shown separately.
 @ Beginning July 1977, data are representative of those manufacturers reporting and are not an average of the total industry; they are not directly comparable with earlier data.
 * New series. Annual data prior to 1978 and monthly data prior to April 1979 are available upon request.
 § Includes nonmarketable catalyst coke.
 ¶ Includes small amounts of "other hydrocarbons and alcohol new supply (field production)," not shown separately.
 † Revisions for 1978 are available upon request.
 ‡ Effective with 1981 petroleum data, the Energy Information Agency has changed some definitions and concepts to reflect recent developments in refining and blending practices. These changes include adding a category for gasohol production to motor gasoline production and accounting more precisely for distillate and residual fuel oil processed further after initial distillation. A description of these changes appears in the May 1981 issue of *Monthly Energy Review*, U.S. Department of Energy, Energy Information Administration.

Page S-28

1. Based on new 1981 stock level. See also note "‡" for p. S-27.
 2. See note 5 for p. S-29.
 3. Reported annual totals; revisions not allocated to the months.
 4. Simple averages of prices are no longer available.
- ¶ Prices are mid-month, include taxes, and represent full service; comparable prices prior to Jan. 1979 are not available.
 # Includes data for items not shown separately.
 * New series. See note "¶" for this page.
 ‡ Except for price data, see note "‡" for p. S-27.

Page S-29

1. Reported annual total; revisions not distributed to the months.
 2. Effective Jan. 1980, data are no longer available.
 3. Average for 11 months; no price for Aug. 1980 or June 1981.
 4. Average for 11 months; no price available for Nov. 1980 or for Oct. 1981.
 5. Monthly data will be discontinued as of April 1982 SURVEY, due to budgetary limitations. The related annual report, MA26A, will continue to be published.
- ¶ Source: American Paper Institute. Total U.S. estimated consumption by all newspaper users.
 § Monthly data are averages of the 4-week periods ending on the Saturday nearest the end of the month; annual data are as of Dec. 31.
 ‡ Data are monthly or annual totals. Formerly weekly averages were shown.

Page S-30

1. Reported annual total; revisions not allocated to the months.
 2. Crop for the year.
 3. Data cover five weeks; other months, four weeks.
 4. Data are not available prior to Jan. 1980.
 5. Shipments of wide-mouth containers for "chemical, household and industrial" are included in shipments for "medicinal and toilet" containers.
 6. See note "‡" for this page.
 7. For the period November and December 1981, shipments of wide-mouth containers for "chemical, household and industrial" are included in shipments for "medicinal and toilet" containers.
- * New series. Data for finishing mills have replaced data for weaving mills, which are no longer available.
 # Includes data for items not shown separately.
 ¶ Cumulative ginnings to the end of month indicated.
 § Bales of 480 lbs.
 ‡ Beginning Jan. 1982, shipments include those for direct export; such shipments for 1980-81 were (thous. gross): 2,316 and 2,165 respectively.

Page S-31

1. Effective Jan. 1, 1978, includes reexports, formerly excluded.
 2. Annual total includes revisions not distributed to the months.
 3. Average for crop year; Aug. 1-Jul. 31.
 4. For five weeks; other months four weeks.
 5. Monthly average.
 6. Less than 500 bales.
- § Bales of 480 lbs.
 ¶ Based on 480-lb. bales, preliminary price reflects sales as of the 15th; revised price reflects total quantity purchased and dollars paid for the entire month (revised price includes discounts and premiums).
 # Includes data not shown separately.

Page S-32

1. Annual total includes revisions not distributed to the months.
 2. Estimates of production, not factory sales.
 3. Beginning Jan. 1979, data reflect the inclusion of Volkswagens produced in the U. S. Beginning Jan. 1980, passenger vans (previously reported as passenger cars) are included with trucks.
 4. Monthly data for 1980 as published in earlier issues of the SURVEY, exclude exports for off-highway trucks; not strictly comparable with data shown for other periods.
 5. Based on unadjusted data.
 6. See note "†" for this page.
 7. Effective with the September 1982 SURVEY, retail sales of trucks have been restated back to Jan. 1982 to include U.S.-built Mercedes-Benz trucks (19,501 - 33,000 lbs.); comparable stock data, prior to Aug. 1982, are not available.
- # Total includes backlog for nonrelated products and services and basic research.
 § Domestic comprise all cars assembled in the U.S. and cars assembled in Canada and imported to the U.S. under the provisions of the Automotive Products Trade Act of 1965. Imports comprise all other cars.
 ¶ Courtesy of R.L. Polk & Co.; republication prohibited. Because data for some states are not available, month-to-month comparisons are not strictly valid.
 ‡ Excludes railroad-owned private refrigerator cars and private line cars.
 † Revisions, back to 1967 for some commodities, are available upon request. Effective with the July 1982 SURVEY, seasonally adjusted data for passenger cars have been revised back to Jan. 1977 and are available upon request.
 @ In the 1979 BUSINESS STATISTICS, 4th Qtr. 1977 should read "13,946" mil. \$.
 ‡‡ In the 1979 BUSINESS STATISTICS, annual data for 1977 should read "2,604.8" mil. \$.
 ## Revisions back to 1977 are available upon request.

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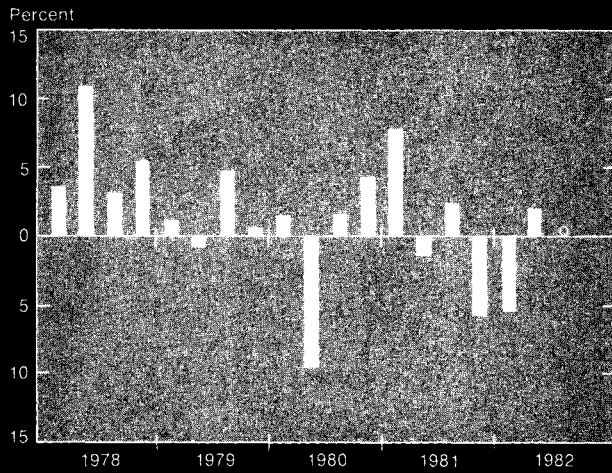
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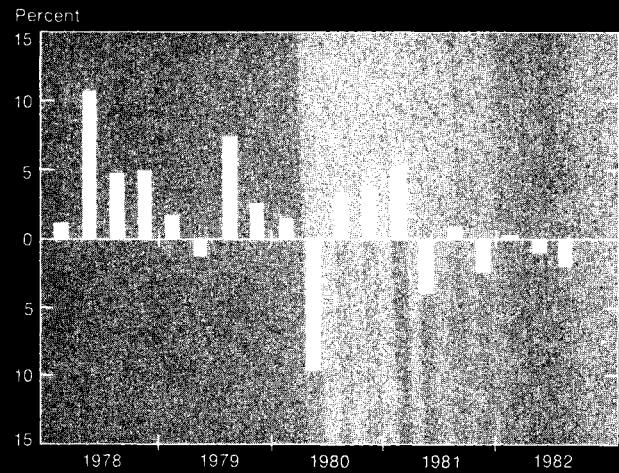
In the third quarter

- Real GNP was unchanged
- Real final sales declined 2 percent
- GNP fixed-weighted price index increased 5½ percent
- Real disposable personal income increased 2½ percent

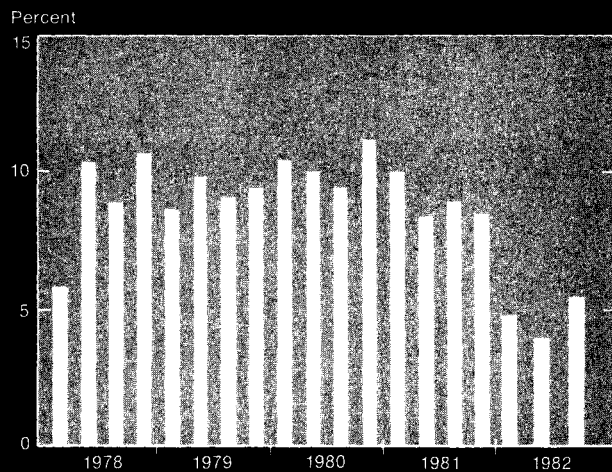
Real GNP



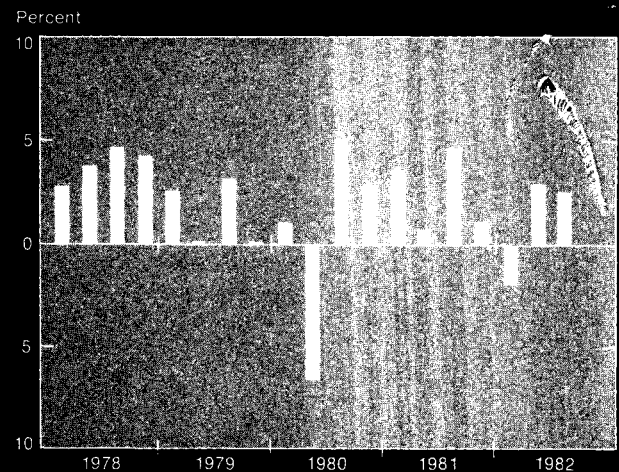
Real Final Sales



GNP Fixed-Weighted Price Index



Real Disposable Personal Income



Percent change from preceding quarter — seasonally adjusted at annual rates.