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Part III

The Basic Industry Product Estimates

Comparison of Federal Reserve and OBE Measures of Real Manufacturing Output, 1947–64

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Annual estimates of gross product originating in manufacturing industries and the subgroups, durable and nondurable goods industries, for the postwar period were first published in the October 1962 issue of the *Survey of Current Business*. These OBE measures have been compared with those of the Federal Reserve Board (FRB) and differences in growth rates and in year-to-year changes noted.

Although the two series differ conceptually and statistically the broad pattern of manufacturing output reflected by both the OBE and FRB series has been similar for the postwar period. As discussed in

NOTE: The following abbreviations are used in this article:

OBE = Office of Business Economics
FRB = Federal Reserve Board
GPO = Gross product originating; an industry's contribution to GNP
Real Product = Gross product originating in constant (1958) prices.

Similar comparisons for the mining industries and for the utilities industries, the remaining components of the FRB's "Index of Industrial Production," are not made for the following reasons. The OBE indexes for mining are based on the indexes for the separate mining activities as computed by the Federal Reserve Board. The utility industry, as defined by the SIC, determines the industry composition for purposes of compiling GNP data. The latter (Major Group 49) includes only privately owned companies engaged in the generation, transmission, and/or distribution of electricity or gas or steam and also those operating water and irrigation systems, and sanitary systems engaged in collecting and disposing of garbage, sewage, and other wastes. In contrast, the output of utilities as measured by the FRB indexes relates to the production and distribution of only electricity and gas by both privately owned and publicly owned utilities as well as by power plants which are auxiliary units or departments of manufacturing and mining establishments.

more detail below, both series exhibit a sharp rate of increase from 1948–53, a slower rate of gain until 1960, and rapid gains since 1960 (Chart 1). However, manufacturing output has increased more rapidly from 1948–64, when measured by the FRB series. Higher growth rates reflected by the latter measures, compared with the indexes of real product, also prevail during the 1953–60 period. The FRB and OBE series for the durable (Chart 2) and nondurable (Chart 3) manufacturing industries also show similar movements.

A detailed examination of the relationship between the manufacturing components of the FRB index and the OBE gross-product-originating measures has been postponed until the latter could be revised to reflect the statistical and definitional revisions which were incorporated into the national accounts in August 1965. The revised GPO series also incorporate information from more recent and comprehensive sources including the 1958 input–output study, as well as improvements in estimating methods, and reflect changes in industry classifications as provided by the 1957 edition of the *Standard Industrial Classification (SIC) Manual.* It is recognized that some of the observations indicated below may not apply when the FRB revisions are completed, but explanations of the fundamental relationships, particularly at a detailed manufacturing industry level, are possible.[1]

Conceptual Differences and Measurement Problems

While the annual production indexes prepared by both OBE and FRB and those developed from the Census data are designed to measure changes in real output for manufacturing industries, they differ with respect to concepts and methods of measurement.

GPO AND FRB MEASURES

Gross product originating in an industry is a measure of an industry's contributions to the nation's total output of goods and services as

[1] The revised FRB series are planned for release in 1968. They will be adjusted to the Census-Federal Reserve Benchmark Indexes of Manufacturing for 1958 and 1963. (The authors are indebted to Mr. C. Gehman and Mrs. C. J. Motheral, Federal Reserve Board, for their cooperation and assistance in providing information on procedures and making available unpublished FRB data including some of the tabulations prepared for *Industrial Production Measurement in the United States: Concepts, Uses and Compilation Practices,* Board of Governors of the Federal Reserve System, February 1964.)

defined in the national income and product accounts. An industry's gross product or value added may be measured as the amount by which the total value of its output exceeds the cost of purchased intermediate products (materials and business services) used in production. The gross product is also equal to the sum of the industry's factor payments (employee compensation, profits, net interest, etc.) and of its nonfactor costs of production (indirect business taxes, depreciation, etc.). OBE uses the latter procedure to measure an industry's output (value added) in current dollars. The constant-dollar total is calculated by deflating the current-dollar total by an implicit deflator derived by the "double deflation" procedure.[2] The constant-dollar series represents an industry's value added for the given year's composite of output minus purchases, valued in base-year prices.

The FRB indexes for a two-digit SIC industry are also designed to be measures of its value added in constant prices. In these indexes, however, the Census value-added concept is used and this value added, as discussed below,[3] differs from the GPO concept principally by including the value of purchased services. The Census value added for a base year is extrapolated by quantity series representative of an industry's total output.

Changes in total output may differ from changes in value added (also called net output or gross product). Such differences will arise when, for any number of reasons, the material requirements per unit of output vary over time. Such variations may occur, for example, because: (a) improved production techniques result in savings of materials or in substituting less expensive materials; (b) changes in the degree of integration of production processes or in the kinds of products produced result in a shift to the use of more (or less) highly fabricated materials; and (c) the proportion of products within an industry with higher value added per unit of output increases (or decreases) relative to those with lower unit value added.

In principle, the OBE data on real product should reflect the "true" movements in net output. In practice, however, the OBE series may not, because of imperfections, for example, in the data for price changes or the lack of this information. The price index problems arise primarily because of limitations in sample coverage, the markets

[2] See Appendix A for description.
[3] See Census value added and GPO, p. 230.

in which prices are measured, the differences between quoted and transaction prices, and their adequacy to account for quality changes (the quality issue is mentioned again in the paragraph below which refers to the quantity series on output used in the FRB calculations). Even when individual price indexes are available, there may be difficulties because adequate information is unavailable on weights needed to calculate composite indexes for deflating outputs and inputs. (See Appendix A.) Furthermore, the current-dollar measures of value of production, cost of materials, purchased services, and gross product originating in a manufacturing industry have statistical limitations.

The FRB series, in principle, also represent changes in net output if the ratio of value added per unit of output remains constant at the detailed level selected by the FRB for estimating output. If stability at this level, which is generally a SIC three-digit level, does not occur, the movements of value added and total output are not parallel. Similarly, the relationship for a major (two-digit SIC) industry is dependent upon the value-added–output ratios for the component series. (The FRB indexes will, however, reflect changes in the value added for a major industry if output shifts occur only among the component industries at the measured level with different value-added–output ratios.)

Like the OBE measures, the FRB measures are affected by inadequacies of data sources. Series on the quantity of output may not be representative or adequate in coverage.[4] The available quantity series may also not be sufficiently detailed and thus not reflect properly changes in the composite of output or in the quality of goods produced. Where the deflation method is used by FRB, the shortcomings of the price data, which are a consideration in the constant-dollar OBE data, must be considered as well. For those industries where labor inputs (or, in a few cases, material inputs) are used to estimate output, there may also be a question of reliability.

The FRB indexes for manufacturing industries are calculated by using about 200 series. These 200 series include, for a number of industries, a man-hour or employment series adjusted for estimated productivity as measures of physical volume of output. About 9 per

[4] The issue frequently is whether the production movements of a given product follow more closely that of another product or whether the price movements of the products are more closely related.

cent of manufacturing activity through 1957 and 55 per cent since 1958 is represented by such labor-input series. The remainder are represented primarily by physical units of output. The productivity estimates used with man-hour or employment figures are derived from a wide variety of data including productivity patterns based on the FRB physical product series.[5]

The constant-(1958) dollar GPO for a given two-digit industry is calculated by deflating the current-dollar totals by an implicit deflator derived by a "double deflation" procedure. In this procedure, the output of each four-digit manufacturing industry (about 425 industries) is derived from Census Bureau data on the value of shipments and of inventory change; these are deflated separately, and then aggregated to about sixty subgroups represented in the manufacturing segment of OBE's 1958 input–output study. The Census cost-of-materials data for each of these groups are also deflated separately, and subtracted from deflated output to yield "Census" value-added figures in constant prices. The current- and constant-dollar totals for output, materials input and value added of the sixty groups are then aggregated to the SIC two-digit level. At this level the current-dollar totals for value added are divided by the corresponding constant-dollar totals to yield the value added or GPO implicit deflator. In this deflation process, more than 1200 price indexes, about 70 per cent of which are specially tabulated by the U.S. Bureau of Labor Statistics, are used by OBE. Limitations of these price indexes have been indicated above.

The GPO implicit deflator has the quality that small differences in the level of output or input prices yield larger differences in the GPO deflator since the latter is derived as a residual—that is, the output price index has a positive weight but the input price index has a negative weight.[6] In addition, the GPO price index does not explicitly include representation of prices for purchased business services. Some preliminary tests, however, indicate that even for industries where such purchases are large, an approximation of an all-inclusive GPO deflator differs little from the ones actually used by OBE.[7]

[5] See Appendix A for the proportion of each SIC two-digit industry's output that is based on measures of labor input. These measures are also discussed in *Industrial Production Measurement in the United States: Concepts, Uses and Compilation Practices,* Board of Governors of the Federal Reserve System, February 1964, p. 13.

[6] See *GNP by Major Industry,* Methods and Concepts, p. 3.

[7] See Appendix A.

CENSUS VALUE ADDED AND GPO

The OBE gross product totals exclude all intermediate purchases by the industry and include the excise taxes for which the industry has legal responsibility. Census value added excludes excise taxes paid by the industry and is net only of purchased goods including fuels and electricity consumed in the production processes but not purchased services other than contract work done on reported output.

In addition, the Census value-added total does not include an adjustment for inventory valuation (IVA), which is included in the GPO figures. Census value added is currently derived by subtracting the cost of materials consumed, energy used, and the cost of resales from the value of output. The latter is determined by the value of shipments (including receipts for resales and other activities) adjusted for change in inventories of finished goods and work in process valued at beginning of the year and end-of-the-year prices.[8]

According to the basic concepts of national income accounting, the value of current production is only truly reflected when the change in inventories is valued at average prices during the period. Reported corporate profits and income of unincorporated enterprises is adjusted for inventory profit or loss. The adjustment to reported book value of inventories results in having the change in the physical volume of inventories valued at average prices during the current year instead of in book values.[9] When an industry's ratio of changes in inventory valuations to value added is relatively large, which occurs when prices fluctuate greatly, the inventory valuation adjustments can affect significantly the current-dollar totals of GPO.

Furthermore, gross-product-originating data and Census value-added figures for a specified industry differ for other reasons. The Census data exclude intermediate purchases of materials and services used by administrative and auxiliary establishments associated with the manufacturing establishments; classification differences arise from independent decisions made by the Census Bureau and by the Internal Revenue Service, and State Unemployment Insurance Agencies, which are the principal sources of data for GPO; total compensation used by OBE differs from the Census sources; value added is derived by the Census

[8] Census value of production as computed by OBE differs slightly.

[9] For further explanation and procedures which vary with the method of inventory valuations (FIFO or LIFO), see *National Income,* 1954 edition, supplement to the *Survey of Current Business,* pp. 44–45 and 135–138.

Bureau from reported values of shipments, inventories and cost of materials, supplies, and energy consumed, while OBE derives this total by adding the factor and nonfactor charges, which involves estimating from companies' total profits and capital consumption allowances for all establishments classified in an industry; since 1954, the procedure for calculating Census value added has been changed and there is undercoverage in the 1947 and 1949–64 Census data as well as sampling errors for some years.

Statistical Framework for Analysis

Disparities between the OBE and FRB measures of manufacturing output stem from differences in weighting patterns, in the data and methods used to measure output for the component manufacturing series, and in the definitions of output. The OBE series is a measure of the manufacturing industries' contributions to total GNP. A current-dollar series, representing at market prices the increase in value resulting from the industry's activity, is deflated so that this total (real product) may be expressed in base-year prices. The FRB indexes are based on detailed quantity (pounds or number produced) or proxy (man-hours or materials consumed) measures of the total output, which are aggregated to industry and group levels by using as weights Census value added for a base period.

The statistical framework for analyzing the relationship between the OBE and FRB indexes is shown in Table 1. The 1964 FRB indexes as published, but on a 1958 rather than 1957–59 base, are shown in column 1. These indexes reweighted by 1958 GPO and by 1958 Census value of production appear respectively in columns 2 and 3. The next four columns contain indexes based on a constant-dollar (1958) series for Census measures showing total output, material inputs, net output, and net output including the appropriate federal excise taxes for which the manufacturer has legal responsibility. The GPO indexes appear in column 8. These statistics provide the necessary information so that among other comparisons, the following become evident:

1. The difference between the published FRB and OBE indexes, when disparities due to base periods are removed (column 1 minus column 8 or column 9).

TABLE 1

Selected Indexes of Manufacturing Activity, 1964

Industry	Indexes (1958 = 100)								Point Differences in Indexes[a]					
	FRB			Deflated Census Data				OBE						
	As Pub. (1)	Re-weighted GPO (2)	Re-weighted VP (3)	VP (4)	Cost of Materials (5)	VA (6)	VA Plus Excise (7)	Gross Product (8)	Total (FRB Minus OBE) (9)	FRB (Net Minus Gross Wtd.) (10)	Total Output (Quantity Minus Deflated) (11)	Total Minus Net Output (12)	Excise Tax (13)	Net Output (Census Minus OBE) (14)
All manufacturing industries	142.8	143.1	141.3	136.6	134.0	140.0	139.5	140.4	2.4	1.5	4.7	-3.4	.5	-.9
Nondurable goods industries	137.0	135.8	133.4	130.9	128.2	135.0	133.5	132.0	5.0	3.6	2.5	-4.1	1.5	1.5
Food and kindred products	121.7	121.8	121.4	121.3	123.1	116.9	117.3	117.1	4.6	.3	.1	4.4	-.4	.2
Tobacco manufacturers	120.4	118.8	114.5	116.3	116.3	116.3	115.0	119.0	1.4	5.9	-1.8	.0	1.3	-4.0
Textile mill products	130.3	130.2	130.1	138.7	142.7	132.6	132.6	130.1	.2	.2	-8.6	6.1	.0	2.5
Apparel and other fabricated textile products	140.7	140.6	141.6	126.7	128.3	124.7	124.7	128.1	12.6	-.9	14.9	2.0	.0	-3.4
Paper and allied products	137.2	137.2	137.8	135.4	131.9	139.9	139.9	140.0	-2.8	-.6	2.4	-4.5	.0	-.1
Printing, publishing, and allied industries	127.2	127.2	127.5	126.3	128.0	125.4	125.4	125.7	1.5	-.3	1.2	.9	.0	-.3
Chemicals and allied products	166.6	165.9	165.5	155.3	149.0	160.8	160.8	152.0	14.6	1.1	10.2	-5.5	.0	8.8
Petroleum refining and related industries	124.2	125.5	123.1	126.4	116.6	174.7	152.5	144.3	-20.1	1.1	-3.3	-48.3	22.2	8.2
Rubber and miscellaneous plastic products	169.5	170.9	172.3	159.8	154.3	165.4	162.8	163.4	6.1	-2.8	12.5	-5.6	2.6	-.6
Leather and leather products	106.9	107.0	106.7	104.3	102.7	105.9	105.9	112.8	-5.9	.2	2.4	-1.6	.0	-6.9
Durable goods industries	147.8	148.8	149.4	142.4	140.8	144.1	144.9	146.9	.9	-1.6	7.0	-1.7	-.8	-2.0
Lumber and wood products, except furniture	117.8	119.2	119.0	126.1	123.1	130.1	130.1	128.9	-11.1	-1.2	-7.1	-4.0	.0	1.2
Furniture and fixtures	154.7	155.0	155.7	128.6	134.1	123.1	123.1	128.7	26.0	-1.0	27.1	5.5	.0	-5.6
Stone, clay, and glass products	135.2	135.6	136.2	132.1	132.2	132.1	132.1	131.2	4.0	-1.0	4.1	.0	.0	.9
Primary metal industries	147.5	148.2	147.8	140.2	144.9	133.7	133.7	130.2	17.3	-.3	7.6	6.5	.0	3.5
Fabricated metal products	142.8	142.5	140.5	126.5	126.2	126.8	126.8	135.2	7.6	2.3	14.0	-.3	.0	-8.4
Machinery, except electrical	161.7	162.0	161.3	145.4	145.6	145.2	145.2	153.3	8.4	.4	15.9	.2	.0	-8.1
Electrical machinery	156.2	154.6	153.8	166.7	150.6	179.9	179.1	167.1	-10.9	2.4	-12.9	-13.2	.8	12.0
Transportation equipment and ordnance, except motor vehicles	124.4	124.6	125.7	108.6	101.7	115.2	115.2	123.8	.6	-1.3	17.1	-6.6	.0	-8.6
Motor vehicles and motor vehicle equipment	181.1	182.1	181.7	179.4	173.3	192.6	192.6	213.0	-31.9	-.6	2.3	-13.2	.0	-20.4
Instruments	148.1	147.8	147.5	159.5	149.5	165.5	165.5	139.1	9.0	.6	-12.0	-6.0	.0	26.4
Miscellaneous manufacturing industries	141.9	141.9	141.9	134.3	133.4	135.1	135.1	119.3	22.6	.0	7.6	-.8	.0	15.8

Note: VP = value of production; VA = value added. For other abbreviations see note at beginning of Appendix C.

[a]Col. 9 = col. 1 minus 8; col. 10 = col. 1 minus 3; col. 11 = col. 3 minus 4; col. 12 = col. 4 minus col. 6; col. 13 = col. 6 minus col. 7; col. 14 = col. 7 minus col. 8.

2. The difference when the underlying FRB output series are combined with Census gross rather than with net value weights (column 1 minus column 3 or column 10).

3. The difference between total real output when measured by quantity (column 3) and by deflation (column 4), which appears in column 11.

4. The difference between deflated total (column 4) and net output (column 6) which is shown in column 12.

5. The difference in real net output resulting from the exclusion or inclusion of excise taxes in the calculation of this measure. Column 13 is derived by subtracting column 7 from column 6.

6. The difference (column 14) between Census value added with tax (column 7) and OBE net value-added series (column 8).

While in principle the differences between the measures compared are conceptual, a portion of the disparities may actually be due to data inconsistencies. For example, comparisons between columns 3 and 4 imply that the same outputs are reflected by both the FRB quantity series and data derived from Census shipments and changes in inventories of finished goods and goods in process. For some industries, such as foods, the coverage of the FRB and Census total-output series differs markedly and for years prior to 1958 Census data were adjusted to reflect SIC changes. Limitations of the various series are described in Appendix C, which also contains a more detailed description of the indexes shown in columns 1 through 8 of Table 1 and of similar tables shown in this article. The procedures, weights, and data sources used to construct the FRB and OBE indexes are briefly discussed in Appendix A. The GPO current-dollar totals and their components as well as the GPO constant-(1958) dollar totals by industry (1947–64) are shown in Appendix B. Lastly, the implicit price deflators for total output, cost of materials, value added, and GPO, by industry are listed in Appendix D.

Conclusions

The OBE and FRB indexes may be compared from many viewpoints. Although the magnitudes of the difference and an industry's contribution to the spread between the two indexes may vary when trends, year-to-year changes, or other stated periods are compared, the under-

lying causes for disparities between the two series may be illustrated by a comparison of the 1964 OBE and FRB indexes—the most recent year for which the data are available.

If both the FRB and OBE indexes had the same (GPO) weights, then the 2.4 points excess of the 1964 FRB index over the OBE figure for total manufacturing would have been increased to 2.7 points. This small change arises from a relatively larger decrease in the reweighted FRB indexes for nondurables, which is offset by an increase in the FRB reweighted indexes for durables. Weighting patterns account for 1.2 points of the 5.0 points spread between the OBE and published FRB series for the nondurables. For the durable goods industries, weighting differences increase the FRB and OBE gap from 0.9 to 1.9 points. Weighting the 1964 FRB relatives by 1958 Census value of production also results in reducing the point spread for nondurables and increasing the gaps for durables.

The influence of the weights stems principally from the inclusion of excise taxes in the GPO weights and their exclusion from the Census value-added weights used by FRB. For total manufacturing, weights reduced the point spreads because the tax incidence is associated with industries whose 1964 output increased less rapidly since 1958 than the average. This applies particularly to the nondurables, where the influence of these taxes almost halved the spread due to other weighting differences.

The FRB indexes reweighted by 1958 Census value of production exceeds the deflated Census value of production series by 4.7 points for total manufacturing. The spread however is 2.5 points for the nondurables and 7.0 points for the durables. The point difference due to measuring total output by quantity or man-hour series rather than by deflation is 4 points or more for four of ten nondurable industries accounting for 18.4 per cent of the 1964 all manufacturing total (based on deflated Census value of production). For durables, the corresponding figures are ten of the eleven industries, which account for 46.6 per cent of the 1964 manufacturing total. The point differences at the aggregate levels—total durable and nondurable manufacturing industries—are reduced because of offsetting movements. The FRB total-output weighted indexes are higher than the deflated Census value of production figures by 4 points or more for ten industries (54.1 per cent of total manufacturing) and lower by 4 points or more for four industries (14.7 per cent of the 1964 manufacturing total).

TABLE 2

Frequency Distribution of 1964 Point Differences Resulting from Measuring Total Output by Quantity Versus Deflation

Class Interval	Number of Industries	Percentage of Total Manufacturing (1957–59 = 100)	
		Quantities	Man-Hours
Less than -12.1	1	2.1	5.3
-8.1 to -12.0	2	2.8	2.5
-4.1 to - 8.0	1	1.6	0.4
-0.1 to - 4.0	2	3.2	0.0
0 to 3.9	5	16.8	11.2
4.0 to 7.9	3	9.1	4.2
8.0 to 11.9	1	3.7	5.0
12.0 and more	6	5.7	26.4
Total	21	45.0	55.0

About 55 per cent of the 1964 FRB index is based on a man-hour or employment series adjusted for estimated changes in productivity and the remainder by a physical quantity series (Table 2). For durables, where the larger gap between the two measures of total output occurs, about 70 per cent of the output is measured by man-hour series in contrast to about 37 per cent for the nondurables.[10] However, the largest positive difference in the 1964 FRB reweighted index and deflated Census value of production occurred for the furniture and fixtures industry where FRB measures the entire output by a man-hour series and the largest negative difference occurred in electrical machinery where 77.8 per cent, based on 1957–59 proportions, are based on man-hours adjusted for productivity. As shown in Table 2, those industries which FRB measures primarily on quantity data generally show less disparity with deflated Census value of production in 1964 than those whose total output is measured by a man-hour series.

As previously indicated, the difference between the published FRB and OBE indexes is 2.7 points if only movements between the two indexes are considered. The 2.7 points difference when distributed by

[10] See Appendix A for weights and types of series used by FRB.

categories which show changes between the Census measures of total (VP) and net (VA) output is as follows:

As indicated in Table 3, the following may be concluded:

(1) Of the 2.7 points discrepancy due to movements between the FRB and OBE series for total manufacturing, 3.9 points are contributed by industries whose 1964 Census total-output index (1958 = 100) exceeded net output. Based on 1957–59 proportions, these industries accounted for 44.4 per cent of total manufacturing.

(2) Offsetting the increase for the above series by 1.4 points are the contributions from twelve industries which fall into the category of larger 1958–64 increases in value added than in value of production.

TABLE 3

Frequency Distribution of 1964 Point Differences Between FRB and OBE Indexes, Classified by Movements of Census Measures of Total and Net Output

	Number of Industries	Percentage of Total Manufacturing (1957–59 = 100)		
		Quantities	Man-Hours	Point Contributions
VP = VA	2	2.0	2.4	0.2
OBE higher than FRB	0	0.0	0.0	0.0
FRB higher than OBE	2	2.0	2.4	0.2
VA higher than VP	12	20.5	30.7	-1.4
OBE higher than FRB	6	14.3	8.1	-3.7
FRB higher than OBE	6	6.2	22.6	2.3
VA smaller than VP	7	22.5	21.9	3.9
OBE higher than FRB	0	0.0	0.0	0.0
FRB higher than OBE	7	22.5	21.9	3.9
Totals	21	45.0	55.0	2.7

Note: VP = Value of production; VA = Value added. For other abbreviations see note at the beginning of Appendix C.

For six industries, which account for about 22 per cent of total manufacturing, the OBE indexes are higher; for six industries, contributing about 29 per cent, the FRB indexes are higher.

(3) The remaining two industries fall into the category where, since 1958, the 1964 indexes of gross and net output are identical. These industries, accounting for 4.4 per cent of total manufacturing, contribute only 0.2 points to the 2.7 point spread between the published FRB and OBE indexes.

(4) The FRB use of a man-hour series rather than a quantity series to measure output predominates only in one category, namely where net output has increased faster than total output. Differences in 1964 levels again appear to arise almost as much from quantity measures (pounds of plastics, number of tires, tons of steel) as from the use of a man-hour series, when compared with the deflation procedure.

This should not suggest, however, that deflated Census value added or GPO are necessarily correct, despite the fact that movements of these two indexes for total manufacturing are almost identical. There are of course, the limitations noted below with respect to deflated outputs. In addition, the deflation of the inputs depends not only on the validity of the price indexes but also on the weights used to aggregate them.

Table 4 below summarizes differences between the FRB and OBE indexes for 1964 (1958 = 100) for total manufacturing, durable, and nondurable goods industries and also isolates the differences by SIC two-digit industries. Summary figures indicating the point spread arising from weights and movements are shown separately. Because the industry weights in the FRB and OBE series differ, the sums of the industry point contributions do not equal the respective durable and nondurable point contributions. The weight differences between the two series also explain why the point contributions for the durables and nondurables do not add to the total for all manufacturing industries.

For the nondurable goods industries, the 1964 gap principally arises from the food, apparel, chemicals, and petroleum industries. For the food and petroleum industries, the FRB indexes approximate the indexes of Census deflated value of production and the OBE indexes reflect the Census deflated value-added levels. For the chemicals industry the FRB index, which is 14.6 points higher than the OBE index, is closer to the Census value-added index and the OBE series

TABLE 4

FRB and OBE Indexes, Point Spreads and Contributions to Total Manufacturing Spread for 1964

(1958 = 100)

	Point Spreads			Point Contributions		
		Due to			Due to	
	Total	Movements	Weights	Total[a]	Movements	Weights
Total manufacturing[a]	2.4	2.7	-.3	2.4	2.7	-.3
Durables and nondurables sum[b]	n.a.	n.a.	n.a.	2.6	2.7	-.1
Two-digit sum[c]	n.a.	n.a.	n.a.	2.7	2.7	0
Nondurable goods[a]	5.0	3.8	1.2	2.2	1.7	.5
Two-digit sum[c]	n.a.	n.a.	n.a.	1.8	1.7	.1
Food and kindred products	4.6	4.7	-.1	.6	.6	(*)
Tobacco manufactures	1.4	-.2	1.6	(*)	(*)	(*)
Textile mill products	.2	.1	.1	(*)	(*)	(*)
Apparel and other fabricated textile products	12.6	12.5	.1	.5	.5	(*)
Paper and allied products	-2.8	-2.8	0	-.1	-.1	0
Printing, publishing, and allied industries	1.5	1.5	0	.1	.1	0
Chemicals and allied products	14.6	13.9	.7	1.1	1.0	.1
Petroleum refining and related industries	-20.1	-18.8	-1.3	-.5	-.5	(*)
Rubber and miscellaneous plastic products	6.1	7.5	-1.4	.2	.2	(*)
Leather and leather products	-5.9	-5.8	-.1	-.1	-.1	(*)

(continued)

TABLE 4 (concluded)

	Point Spreads			Point Contributions		
		Due to			Due to	
	Total	Move-ments	Weights	Total[a]	Move-ments	Weights
Durable goods[a]	.9	1.9	-1.0	.4	1.0	-.6
Two-digit sum[c]	n.a.	n.a.	n.a.	.9	1.0	-.1
Lumber and wood products, except furniture	-11.1	-9.7	-1.4	-.3	-.3	(*)
Furniture and fixtures	26.0	26.3	-.3	.4	.4	(*)
Stone, clay, and glass products	4.0	4.4	-.4	.2	.2	(*)
Primary metal industries	17.3	18.0	-.7	1.5	1.6	-.1
Fabricated metal products	7.6	7.3	.3	.5	.5	(*)
Machinery, except electrical	8.4	8.7	-.3	.7	.7	(*)
Electrical machinery	-10.9	-12.5	1.6	-.8	-.9	.1
Transportation equipment and ordnance, except motor vehicles	.6	.8	.2	(*)	(*)	(*)
Motor vehicles and motor vehicle equipment	-31.9	-30.9	-1.0	-1.9	-1.8	-.1
Instruments	9.0	8.7	.3	.2	.2	(*)
Miscellaneous manufacturing industries	22.6	22.6	0	.4	.4	0

Note: The following symbols are used in this table: * = less than .05. n.a. = not applicable. For other abbreviations see note at the beginning of Appendix C.

[a]FRB series with FRB weights throughout; GPO series with GPO weights throughout.

[b]FRB durable and nondurable series with FRB two-digit weights and GPO weights for durable and nondurable goods; GPO series with GPO weights throughout.

[c]FRB series with two-digit GPO weights and FRB weights within two-digits; GPO series with GPO weights throughout.

is closer to the Census measure of total output (the gap between these two Census measures is 5.5 points). For the apparel industry, whose relative importance is about one-half that of the chemicals industry, the published 1964 FRB index exceeds both Census measures as well as the OBE index. For both the chemicals and the apparel industry, the OBE and Census value-added series differ markedly and move in opposite directions.

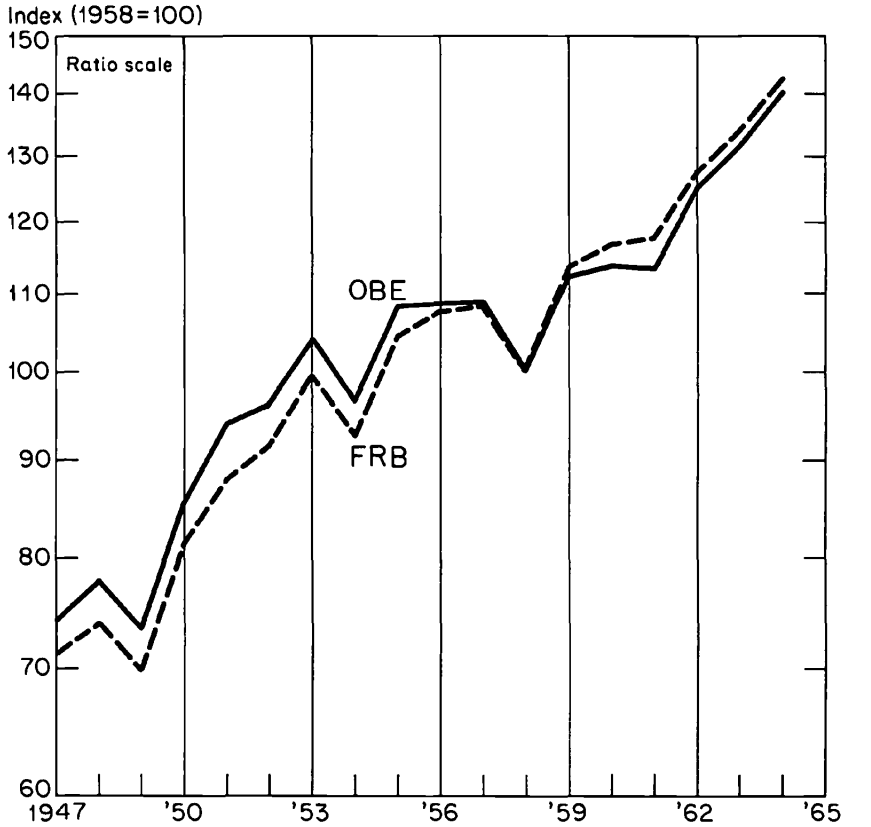
If signs are ignored, the movement differences for durables are approximately 7 points and not 1 point. About one-half of the absolute difference of 7 points in movements within the durable group is accounted by the indexes for primary metals (1.6 points) and for motor vehicles and equipment (1.8 point). For both of these industries, the 1964 published FRB indexes approximate the movement of total Census deflated output; and the OBE indexes, net output. About 26 per cent of the difference occurs in four industries (SIC 32, 34, 35, 39) where total and net output are approximately the same, but the FRB series is consistently higher than the OBE indexes. For the stone, clay, and glass products industry (SIC 32) the OBE index approximates the Census value-added figure. The gaps between the OBE and Census value-added series for the remaining three industries approximate the same magnitude as between the OBE and FRB series. About 16 per cent of the difference for durables occurs in the lumber and electrical machinery industries where Census net exceeds total output and the OBE series are higher than the FRB indexes. The 1964 OBE and Census value-added indexes reflect about the same change from 1958 for the lumber industry, but the electrical machinery figure for Census value added is considerably higher than for the OBE series. Lastly, about 9 per cent of the gap is accounted for by two industries where the FRB exceeds OBE. For the furniture industry Census deflated net output is less than total output, and for instruments the converse is true.

Comparison Between the OBE and Published FRB Series

The broad pattern of manufacturing output as reflected by the two measures has been similar during the postwar period (Chart 1). As summarized in the table below (Table 5), both series exhibit a sharp rate of increase from 1948 to 1953, a slower rate of gain until 1960, and a large percentage gain since 1960.

CHART 1

All Manufacturing Industries: OBE and FRB Indexes of Real Output, 1947–64



Despite these similarities, a larger growth rate is reflected by the FRB than by the OBE series. For 1948–64, the average annual growth for manufacturing is 3.8 per cent according to GPO, and 4.2 per cent based on the FRB index. Approximately the same differences in trends between the two series are indicated for the ten-year period, 1948–57, and for the eight-year period since 1957. Comparing the peak-to-peak years of successive business cycles, the growth rates as measured by OBE indexes are less than those indicated by the FRB for all periods, except for the incomplete cycle period 1960–64.

The indexes for the durable and nondurable goods industries also show similar patterns but with some recent exceptions. During 1948–64,

TABLE 5

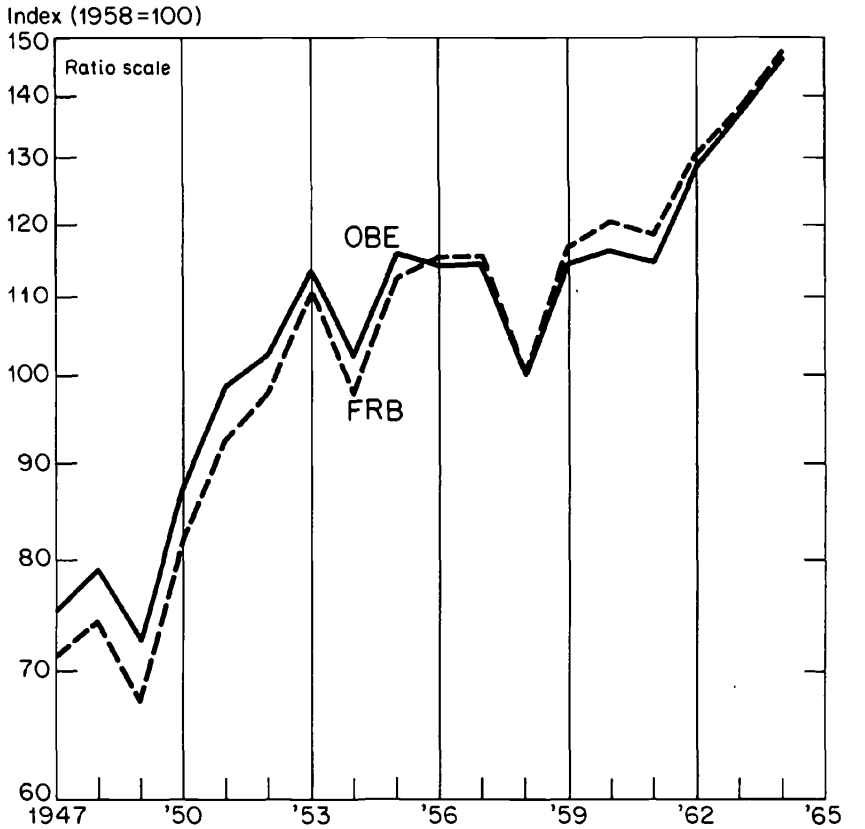
Average Annual Percentage Change for Manufacturing Output for Selected Periods, OBE and FRB Indexes

Year and Series	Total	Durable Goods Industries	Nondurable Goods Industries
1948–1964			
OBE	3.8	4.0	3.5
FRB	4.2	4.4	4.1
1948–1957			
OBE	3.8	4.2	3.2
FRB	4.3	5.0	3.7
1957–1964			
OBE	3.7	3.6	3.8
FRB	4.0	3.6	4.6
1948–1953			
OBE	6.0	7.7	3.7
FRB	6.1	8.3	3.8
1953–1957			
OBE	1.1	0.1	2.7
FRB	2.1	1.0	3.7
1957–1960			
OBE	1.5	0.6	2.9
FRB	2.6	1.4	4.2
1960–1964			
OBE	5.4	6.0	4.5
FRB	5.2	5.3	4.9

Note: Figures show the average annual compounded rate of change between the initial and terminal years of each period.

CHART 2

Durable Goods Industries: OBE and FRB Indexes of Real Output, 1947–64

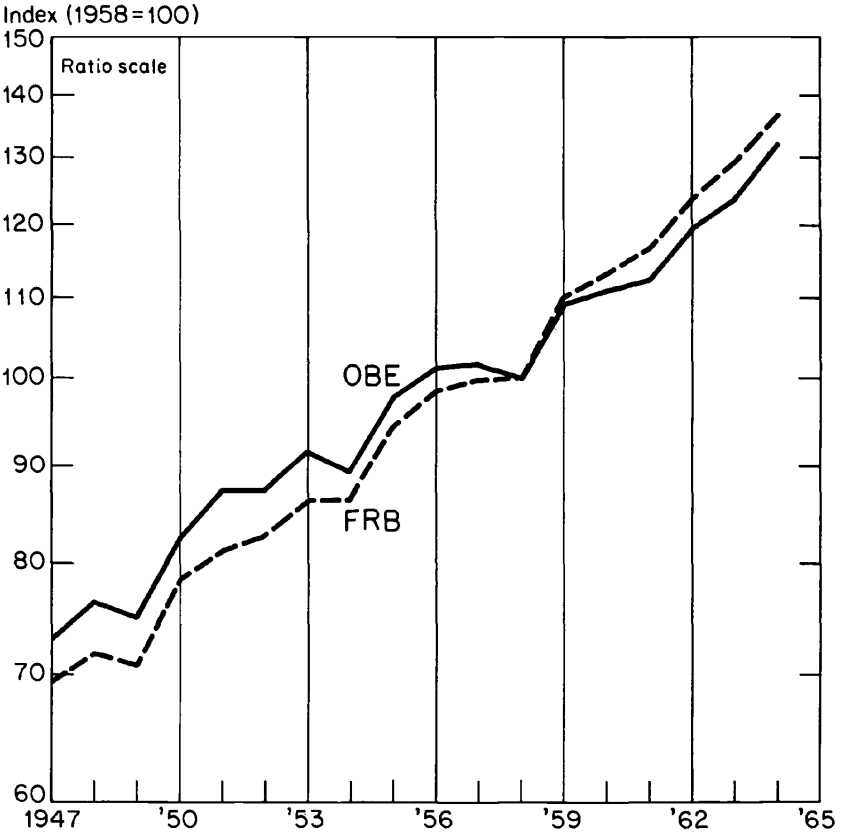


the average annual change for durable goods is 4.4 per cent according to the FRB indexes and 4.0 per cent for the OBE series. The rates for both durable goods series, however, are the same for the period since 1957 because of the sharper acceleration in the GPO series since 1960 (Chart 2). The 1960–64 rate for the OBE series is 6.0 per cent compared with 5.3 per cent for the FRB index.

For the nondurable goods industries, the OBE indexes always indicate a smaller growth than do the FRB series throughout 1948–64 and its subperiods (Chart 3). A partial explanation is the inclusion of excise

CHART 3

Nondurable Goods Industries: OBE and FRB Indexes of Real Output, 1947–64



taxes in the OBE series, which gives added weight to the slower moving components of the nondurable group. (See discussion below.)

The difference in growth rates between the FRB and OBE indexes for durables is smaller than for the nondurables goods industries because the trend differences for industries within the former group are largely offsetting, but are not for the nondurables. Significantly higher growth rates occur in the FRB measures for the primary metals, and transportation equipment and ordnance, except motor vehicles industries, which in both the FRB and OBE series account for about 29 per cent of the total for the durable goods industries (Table 6). However, these

TABLE 6

Average Annual Percentage Change by Manufacturing Industries for Selected Periods, OBE and FRB Indexes

	1948–64		1948–57		1957–64	
	OBE	FRB	OBE	FRB	OBE	FRB
Total manufacturing	3.8	4.2	3.8	4.3	3.7	4.0
Nondurable goods	3.5	4.1	3.2	3.7	3.8	4.6
Food and kindred products	2.5	2.6	2.7	2.2	2.1	3.2
Tobacco manufactures	2.7	2.3	2.0	1.4	3.4	3.6
Textile mill products	1.7	1.9	0.2	0.7	3.6	3.5
Apparel and other fabricated textile products	2.6	3.5	2.0	2.5	3.4	4.8
Paper and allied products	4.5	4.7	4.3	4.6	4.7	4.8
Printing, publishing, and allied industries	3.1	3.3	3.4	3.4	2.8	3.2
Chemicals and allied products	6.9	8.2	7.7	8.6	5.9	7.8
Petroleum refining and related industries	4.4	3.7	3.7	4.2	5.3	3.0
Rubber and miscellaneous plastic products	4.3	6.5	2.8	6.1	6.3	7.0
Leather and leather products	-0.3	0.9	-1.3	1.3	0.9	0.5
Durable goods	4.0	4.4	4.2	5.0	3.6	3.6
Lumber and wood products, except furniture	1.8	1.3	0.2	0.5	3.8	2.3
Furniture and fixtures	2.5	4.6	2.6	3.6	2.3	5.8
Stone, clay, and glass products	3.3	3.6	3.0	3.6	3.7	3.6
Primary metal industries	1.2	2.0	2.0	1.9	0.2	2.0
Fabricated metal products	3.6	3.4	3.8	3.1	3.3	3.9
Machinery, except electrical	3.2	3.7	2.6	3.4	3.9	4.2
Electrical machinery	6.9	6.3	6.8	7.4	6.9	4.8
Transportation equipment and ordnance, except motor vehicles	7.9	10.3	12.5	17.3	2.2	1.9
Motor vehicles and motor vehicle equipment	5.3	4.4	5.0	4.1	5.7	4.8
Instruments	5.8	5.8	6.8	6.6	4.6	4.8
Miscellaneous manufacturing industries	2.2	2.9	2.0	1.7	2.4	4.4

Note: Figures show average annual compounded rate of change between the initial and terminal years of each period.

TABLE 7

Frequency Distribution of Number of Manufacturing Industries by Size of Average Annual Rate of Change, 1948–64

Percentage Change	Number of Industries	
	OBE Series	FRB Series
Negative	1	0
0–0.9	0	1
1–1.9	3	2
2–2.9	5	4
3–3.9	4	6
4–4.9	3	3
5–5.9	2	1
6 or higher	3	4

are offset by higher growth rates in the OBE series for the electrical machinery, motor vehicles and equipment, and lumber industries which, in aggregate, account for about 27 per cent of the group total for both the FRB and OBE series. For the nondurable goods industries the 1948–64 growth rates as measured by the FRB indexes are higher for almost all of the industries within this group.

A frequency distribution of the number of manufacturing industries by size of the 1948–64 annual average rates of change is shown in Table 7. The OBE series contains one industry with a negative rate of change and the FRB has none. The industry is leather and leather products, which has a rate of −0.3 per cent in the OBE series and 0.9 per cent in the FRB series. The OBE real product indexes show that only three industries have a growth rate of 6 per cent or more. The same three industries and also the rubber and miscellaneous plastic products industry are included in the same class interval for the FRB series.

YEAR-TO-YEAR CHANGES

For ten of the seventeen years, the differences in the year-to-year change in indexes between the OBE and published FRB series for total manufacturing is less than 1 point, and differences of 1.5 or more

TABLE 8

Frequency Distribution of Number of Years: Point Differences in Year-to-Year Changes Between the FRB and OBE Indexes, 1947-64

Point Differences	All Manufacturing Industries	Durable Goods Industries	Nondurable Goods Industries
Under 0.5	5	5	4
0.5–0.9	5	1	5
1.0–1.4	3	1	2
1.5–1.9	1	5	4
2.0–2.4	2	3	2
Over 2.5	1	2	0
Total	17	17	17

between the indexes occur only for four periods—1950–51, 1951–52, 1955–56, 1961–62. Larger differences appear among the durables than the nondurables. The number of years for which the indexes differ by 1.5 points or more is ten for durable and six for the nondurables.

The 1951 OBE index for total manufacturing is 10.2 per cent higher and the FRB index 8.1 per cent higher than the respective 1950 figures. For the durable goods industries the percentage changes are 13.7 per cent for OBE and 12.7 per cent for the FRB series. However, for the nondurable goods industries the 1951 OBE index is 5.6 per cent higher and the FRB index 3.3 per cent higher than the respective 1950 figures. The larger FRB-OBE gap for the nondurable industries stems largely from diverse movements between total and net output and between the Census value-added and OBE series. Such differences in the annual changes are particularly significant in the tobacco, textiles, chemicals, rubber, and leather and leather products industries, which are also characterized by relatively large changes in the inventory valuation adjustment.

The FRB indexes show higher annual percentage changes in 1952 compared with 1951 for both durable and nondurable goods industries. In the durable goods industries, this difference largely disappears if GPO weights are substituted for the FRB weights in the FRB series. In the nondurable goods industries weighting is less important, and

the differences stem primarily from the diverse annual movements occurring in the apparel, paper, chemicals, and rubber industries.

The difference in the FRB-OBE percentage change from 1955 to 1956 for total manufacturing is largely due to the diverse movements for the durable goods industries. The FRB index for this group increased 2.1 per cent and the OBE index declined 1.6 per cent. This difference is caused primarily by the larger decline in the indexes for the motor vehicle and equipment industry (SIC 371) as measured by the OBE indexes than by the FRB indexes. The relatively large differences in the year-to-year movements in the indexes for total manufacturing from 1961 to 1962 again stem from the relative size of the changes in the OBE and FRB indexes for Industry 371.

Differences due to weighting for year-to-year changes are more significant in the earlier than the more recent years of the period reviewed. Generally, from 1947 through 1952 reweighting the FRB series by GPO weights brings the annual changes for this series closer to those reflected by the OBE series (Tables 9–11). With some exceptions, this is not true for the years since 1957.

While a portion of the dissimilarities in year-to-year movements between the FRB and OBE indexes arises from the diverse movements between gross and net output, these differences are relatively small for total durable and nondurable manufacturing industries. In addition, only a small amount of the differences for these groups is explained by the disparities in year-to-year changes between the current-dollar series for Census value added and gross product originating. Differences due to these factors for individual industries, however, are large; and are discussed below for selected industries.

DIFFERENCES DUE TO WEIGHTS

The effect of weighting differences on the growth rates for the 1948–64 period and for the two major subperiods is summarized below. The comparisons include a measure of the differences which result when the FRB indexes are weighted by 1958 GPO weights as well as when these indexes are recalculated with *total*-output rather than net-output weights.

Only a small portion of the FRB-OBE differences in the 1948–64 annual growth rates for total manufacturing is due to value-added

TABLE 9

Selected Measures of Manufacturing Activity, All Manufacturing Industries, 1947–64

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted												
		GPO	VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	71.2	73.1	73.7	75.7	75.6	75.8	76.2	74.2	-3.0	-2.5	-2.0	-.1	-.4	2.0
1948	73.9	75.5	76.1					77.8	-3.9	-2.2				
1949	69.8	71.0	72.2	73.4	76.7	69.3	70.2	73.5	-3.7	-2.4	-1.2	4.1	-.9	-3.3
1950	81.3	82.8	83.3	83.9	83.8	84.0	84.6	85.3	-4.0	-2.0	-.6	-.1	-.6	-.7
1951	87.9	89.8	89.5	90.7	89.4	92.2	92.4	93.9	-6.0	-1.6	-1.2	-1.5	-.2	-1.5
1952	91.4	92.2	91.7	94.1	94.0	94.2	94.1	96.0	-4.6	-.3	-2.4	-.1	.1	-1.9
1953	99.5	101.0	99.8	103.7	104.0	103.3	103.1	104.0	-4.5	-.3	-3.9	.4	.2	-.9
1954	92.6	93.3	93.1	94.9	95.5	94.2	94.1	96.6	-4.0	-.5	-1.8	.7	.1	-2.5
1955	104.4	105.9	105.6	107.0	107.6	106.2	106.1	108.0	-3.6	-1.2	-1.4	.8	.1	-1.9
1956	107.5	108.3	107.6	108.3	107.9	108.8	108.5	108.4	-.9	-.1	-.7	-.5	.3	.1
1957	108.2	108.7	107.9	107.8	107.6	108.2	107.9	108.8	-.6	.3	.1	-.4	.3	-.9
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	113.7	114.1	113.4	111.3	110.4	112.6	112.4	112.4	1.3	.3	2.1	-1.3	.2	.0
1960	116.8	117.3	116.6	113.3	113.0	113.7	113.7	113.9	2.9	.2	3.3	-.4	.0	-.2
1961	117.6	117.6	117.1	113.2	113.2	113.2	113.2	113.5	4.1	.5	3.9	.0	.0	-.3
1962	127.4	127.5	126.4	122.5	121.4	123.9	123.6	125.0	2.4	1.0	3.9	-1.4	.3	-1.4
1963	134.0	134.2	133.0	128.8	126.5	131.7	131.5	131.3	2.7	1.0	4.2	-2.9	.2	.2
1964	142.8	143.1	141.3	136.6	134.0	140.0	139.5	140.4	2.4	1.5	4.7	-3.4	.5	-.9

Note: VP = value of production; VA = value added. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE 10

Selected Measures of Manufacturing Activity, Nondurable Goods Industries, 1947–64

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	69.4	72.0	73.0	73.2	72.9	73.7	74.6	73.0	-3.6	-3.6	-.2	-.5	-.9	1.6
1948	71.8	73.7	74.3					76.4	-4.6	-2.5				
1949	70.6	72.3	73.2	74.1	75.8	71.6	72.6	74.8	-4.2	-2.6	-.9	2.5	-1.0	-2.2
1950	78.5	80.0	80.1	80.1	78.4	82.8	83.4	82.8	-4.3	-1.6	.0	-2.7	-.6	.6
1951	81.1	82.6	83.0	83.1	81.8	85.1	85.5	87.4	-6.3	-1.9	-.1	-2.0	-.4	-1.9
1952	82.6	83.7	84.9	85.0	85.8	83.8	84.6	87.4	-4.8	-2.3	-.1	1.2	-.8	-2.8
1953	86.4	87.0	87.8	89.0	88.2	90.2	90.5	91.5	-5.1	-1.4	-1.2	-1.2	-.3	-1.0
1954	86.4	86.7	87.8	88.3	88.5	88.1	88.3	89.3	-2.9	-1.4	-.5	.2	-.2	-1.0
1955	94.6	94.7	95.6	96.1	95.9	96.5	96.4	97.8	-3.2	-1.0	-.5	-.4	.1	-1.4
1956	98.6	98.6	99.4	100.3	99.7	101.0	100.8	101.1	-2.5	-.8	-.9	-.7	.2	-.3
1957	99.9	99.7	99.9	100.6	99.3	102.6	102.1	101.7	-1.8	.0	-.7	-2.0	.5	.4
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	110.0	109.9	109.4	108.3	107.5	109.7	109.1	109.2	.8	.6	1.1	-1.4	.6	-.1
1960	113.1	112.8	112.0	110.2	109.5	111.4	110.9	110.9	2.2	1.1	1.8	-1.2	.5	.0
1961	116.6	116.3	115.4	112.6	112.5	112.7	112.4	112.3	4.3	1.2	2.8	-.1	.3	.1
1962	123.8	123.0	121.5	118.5	117.6	120.0	119.2	119.6	4.2	2.3	3.0	-1.5	.8	-.4
1963	129.4	128.5	126.7	123.6	121.8	126.4	125.4	123.7	5.7	2.7	3.1	-2.8	1.0	1.7
1964	137.0	135.8	133.4	130.9	128.2	135.0	133.5	132.0	5.0	3.6	2.5	-4.1	1.5	1.5

Note: VP = value of production; VA = value added. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE 11

Selected Measures of Manufacturing Activity, Durable Goods Industries, 1947–64

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	71.2	73.9	74.5	78.2	78.9	77.5	77.5	75.2	-4.0	-3.3	-3.7	.7	.0	2.3
1948	74.2	76.9	77.8					78.9	-4.7	-3.6				
1949	67.4	70.0	71.3	72.7	77.7	67.5	68.0	72.5	-5.1	-3.9	-1.4	5.2	-.5	-4.5
1950	82.1	84.9	86.6	87.7	90.3	85.0	85.6	87.3	-5.2	-4.5	-1.1	2.7	-.6	-1.7
1951	92.5	95.4	96.1	98.3	98.5	98.0	98.4	99.0	-6.5	-3.6	-2.2	.3	-.4	-.6
1952	98.0	98.7	98.5	103.3	103.9	102.6	102.5	102.6	-4.6	-.5	-4.8	.7	.1	-.1
1953	110.6	111.8	112.1	118.5	123.0	113.9	114.1	113.7	-3.1	-1.5	-6.4	4.6	-.2	.4
1954	97.9	98.3	98.5	101.6	103.9	99.1	99.3	102.2	-4.3	-.6	-3.1	2.5	-.2	-2.9
1955	112.8	114.5	115.7	117.9	121.7	113.9	114.7	115.9	-3.1	-2.9	-2.2	4.0	-.8	-1.2
1956	115.2	115.7	115.9	116.3	117.6	115.1	115.2	114.1	1.1	-.7	-.4	1.2	-.1	1.1
1957	115.2	115.7	116.1	115.1	117.4	112.7	113.0	114.3	.9	-.9	1.0	2.4	-.3	-1.3
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	116.9	117.4	117.5	114.4	113.9	115.0	115.2	114.8	2.1	-.6	3.1	-.6	-.2	.4
1960	120.2	120.7	121.2	116.4	117.2	115.7	116.1	116.3	3.9	-1.0	4.8	.7	-.4	-.2
1961	118.5	118.7	118.8	113.8	113.9	113.7	113.9	114.5	4.0	-.3	5.0	.1	-.2	-.6
1962	130.6	130.9	131.4	126.5	126.0	127.1	127.6	129.2	1.4	-.8	4.9	-.6	-.5	-1.6
1963	137.9	138.7	139.3	134.0	132.1	136.1	136.8	137.3	.6	-1.4	5.3	-2.1	-.7	-.5
1964	147.8	148.8	149.4	142.4	140.8	144.1	144.9	146.9	.9	-1.6	7.0	-1.7	-.8	-2.0

Note: VP = value of production; VA = value added. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE 12

Point Differences in Trends Between Published and Reweighted FRB and OBE Indexes

Year and Series	Total	Durable Goods Industries	Nondurable Goods Industries
1948–64			
Pub. FRB minus OBE	0.4	0.4	0.6
FRB rewtd. GPO minus OBE	0.3	0.2	0.4
FRB rewtd. VP minus OBE	0.1	0.2	0.2
Pub. minus FRB rewtd. GPO	0.1	0.2	0.2
Pub. minus FRB rewtd. VP	0.3	0.2	0.4
1948–57			
Pub. FRB minus OBE	0.5	0.8	0.5
FRB rewtd. GPO minus OBE	0.3	0.4	0.2
FRB rewtd. VP minus OBE	0.2	0.3	0.1
Pub. minus FRB rewtd. GPO	0.2	0.4	0.3
Pub. minus FRB rewtd. VP	0.3	0.5	0.4
1957–64			
Pub. FRB minus OBE	0.3	0.0	0.8
FRB rewtd. GPO minus OBE	0.3	0.1	0.7
FRB rewtd. VP minus OBE	0.2	0.1	0.4
Pub. minus FRB rewtd. GPO	0.0	-0.1	0.1
Pub. minus FRB rewtd. VP	0.1	-0.1	0.4

Note: VP = value of production. For other abbreviations see note at the beginning of Appendix C.

weights.[11] However, when the FRB indexes are reweighted by the 1958 Census value of production the spread in the growth rates for 1948–64 and for the two subperiods is sizeably reduced. For 1948–64, the difference in growth rates between the OBE series and the FRB indexes

[11] However, if 1947 is used as the initial year, the trend differences between the OBE and the FRB series reweighted by 1958 GPO weights are halved for the period, as a whole, and the gap between the 1947–57 growth rates for the two series is substantially reduced.

reweighted by value of production is only 0.1 point rather than 0.4 points because of the closer relationship in trends for the nondurable goods industries.

In contrast with the impact on the total indexes, differences due to weighting in the 1948–64 trends are more important for the durables than for the nondurable goods industries. For this period when the FRB indexes are reweighted by the 1958 GPO, the differences for the durables are halved; for the nondurables, these are reduced by one-third. On the other hand, the influence of total-output weights is more pronounced on the spreads for the nondurables.

DIFFERENCES IN REAL TOTAL OUTPUT AS MEASURED BY QUANTITY OR BY DEFLATION

As previously indicated and described in detail in Appendix A, the measures that the FRB uses to estimate output are based on a count of quantities produced, or proxies of such counts. In recent years the principal proxy has been man-hours adjusted for changes in productivity. In the OBE series the derivation of total output is by deflation.

To measure differences between the two methods, the detailed FRB indexes used for manufacturing were weighted by appropriate 1958 Census production data and recalculated for 1947–64. Trends for 1947–64 (there are no 1948 Census data) based on these reweighted FRB series and corresponding Census measures appear in Table 13 below.

For 1947–64, the trends for the reweighted FRB series are higher than for the deflated Census value of production data for total manufacturing and for the subgroups. The point differences in the 1947–64 trends between the reweighted FRB and Census value of total production indexes for total manufacturing is 0.4 points. Differences in output for the durables are 0.6, and 0.2 points for the nondurables.

The 1947–64 trends for fourteen of the twenty-one manufacturing industries also show that the reweighted FRB series grows faster than the deflated Census VP series. Of the remaining seven industries, the deflated Census series grows faster for five, and the trends are identical for two industries.

For 1957–64, the growth of the FRB series is substantially larger (2.0 points or more) in apparel, furniture, and transportation equipment and ordnance, except motor vehicles; and substantially smaller for elec-

TABLE 13

Trends in Total Output for Manufacturing: FRB Indexes Weighted by 1958 Census Value of Production and Indexes of Deflated Census Value of Total Production, 1947–64, 1947–57, 1957–64

SIC Number	Industry	1947–64 FRB Wtd.	1947–64 Deflated Census	1947–57 FRB Wtd.	1947–57 Deflated Census	1957–64 FRB Wtd.	1957–64 Deflated Census
Manufacturing		3.9	3.5	3.9	3.6	3.9	3.4
	Nondurable goods	3.6	3.5	3.2	3.2	4.2	3.8
20	Food and kindred products	2.4	2.6	1.9	2.4	3.1	3.0
21	Tobacco manufactures	2.1	1.4	1.7	0.3	2.6	2.9
22	Textile mill products	2.1	3.2	1.2	2.2	3.5	4.5
23	Apparel and other fabricated textile products	3.6	2.9	2.7	3.1	4.9	2.7
26	Paper and allied products	4.5	4.0	4.3	3.8	4.9	4.2
27	Printing, publishing, and allied industries	3.6	3.1	3.8	3.0	3.2	3.3
28	Chemicals and allied products	7.9	6.7	8.1	7.0	7.6	6.3
29	Petroleum refining and related industries	3.8	4.1	4.5	4.8	2.8	3.1
30	Rubber and miscellaneous plastic products	5.6	4.4	4.4	2.9	7.3	6.6
31	Leather and leather products	0.5	-0.1	0.5	-0.2	0.4	0.1

(continued)

TABLE 13 (concluded)

SIC Number	Industry	1947–64 FRB Wtd.	1947–64 Deflated Census	1947–57 FRB Wtd.	1947–57 Deflated Census	1957–64 FRB Wtd.	1957–64 Deflated Census
	Durable goods	4.2	3.6	4.5	3.9	3.7	3.1
24	Lumber and wood products, except furniture	1.6	1.9	1.0	1.0	2.5	3.3
25	Furniture and fixtures	4.6	3.2	3.6	3.3	5.9	3.0
32	Stone, clay, and glass products	4.3	4.3	4.6	4.8	3.8	3.6
33	Primary metal industries	2.3	1.8	2.4	1.8	2.1	1.7
34	Fabricated metal products	3.4	2.8	3.1	3.1	3.8	2.3
35	Machinery, except electrical	3.6	2.7	3.2	2.3	4.3	3.4
36	Electrical machinery	5.9	5.9	6.9	4.9	4.6	6.5
37+19-371	Transport. equip. and ord., except motor veh.	9.2	7.1	14.7	12.9	1.9	-0.7
371	Motor vehicles and equipment	4.7	4.3	4.7	4.5	4.8	4.0
38	Instruments	5.6	5.5	6.1	4.8	4.8	6.5
39	Miscellaneous manufacturing industries	3.1	3.2	2.2	2.2	4.4	4.7

trical machinery. For all of these industries, except apparel, the FRB measures the quantity of output entirely or principally by the proxy, man-hours adjusted for productivity. For the eight industries where the 1957–64 trend differences are small (0.5 points or less) three are measured only by quantity measures and one only by man-hours. Of the remaining four industries, about 75 per cent of the output for the leather and rubber industries; 57 per cent for foods; and about 30 per cent of the output for the printing and publishing, and stone, clay, and glass products industries are measured by quantity measures.

OBE, FRB, and Census Measures of Net Output

In the discussion above, the FRB indexes reweighted by 1958 Census production data and corresponding deflated Census totals were compared to determine differences in total output when measured by quantity or by deflation. In this section the OBE and published FRB indexes are compared with Census measures of net output. When the OBE series are compared with Census value added, the latter have been adjusted to include federal excise taxes. Thus these two series are comparable.

The relationship between the OBE and Census data reflects differences or similarities in the underlying measures of net output in current dollars. The FRB-Census differences reflect the patterns of change in the underlying real-total-output measures as discussed above.

Differences in growth rates between Census value of production (VP) and value added (VA) for total manufacturing, durables, and nondurables are relatively small for 1947–64 and 1947–57. For the 1957–64 period the trend differences are relatively large for the durable goods industries, and this difference is also reflected in the figures for total manufacturing (Table 14).

From 1947 to 1957 both the OBE and FRB measures of output show larger increases than the Census value-added series. However, the gap between the FRB and Census is substantially larger for total manufacturing and for the durable goods industries than the OBE-Census growth rate differences. Since 1957, the OBE and Census value-added series have shown about the same rate of gain. On the other hand, the FRB growth rate for nondurables is considerably larger than the Census value-added rate.

TABLE 14

Comparison of Trends in Real Product as Measured by FRB, OBE, and Census Measures for Selected Periods
(point differences between compounded annual average rates of change)

Year and Series	Total	Durable Goods Industries	Nondurable Goods Industries
1947-64			
Pub. FRB minus OBE	0.4	0.4	0.6
Census VP minus VA	-0.2	-0.1	-0.1
OBE minus Census VA, plus tax	0.2	0.3	0.0
Pub. FRB minus Census VA	0.5	0.7	0.5
1947–57			
Pub. FRB minus OBE	0.4	0.6	0.3
Census VP minus VA	-0.0	0.1	-0.2
OBE minus Census VA, plus tax	0.4	0.5	0.2
Pub. FRB minus Census VA	0.7	1.1	0.3
1957–64			
Pub. FRB minus OBE	0.3	0.0	0.8
Census VP minus VA	-0.3	-0.5	-0.2
OBE minus Census VA, plus tax	0.0	0.0	-0.1
Pub. FRB minus Census VA	0.3	0.0	0.6

Note: VP = value of production; VA = value added. For other abbreviations see beginning of Appendix C.

COMPARISONS BY TWO-DIGIT INDUSTRIES, 1957–64

While the 1957–64 OBE and Census VA growth rates for total manufacturing and the durable goods industries are identical, this relationship does not hold for any two-digit industry. On the other hand, the 1957–64 trends based on the FRB and on the Census value-added indexes are identical for three industries.

As shown in Table 15, point differences in the 1957–64 trends for thirteen of the twenty-one industries are smaller when the OBE and

Census value-added series are compared than for the FRB and Census value-added series. The largest disparity occurs for the petroleum refining industry, which has a 3.0 per cent growth rate for 1957–64 according to the FRB indexes and a 7.7 per cent rate based on Census deflated value added. The largest gap between the OBE and Census value-added measures occurs for the instrument industry, which has a 2.5 point higher growth rate according to the Census measure. More rapid growth is shown for only eight industries (SIC 22, 24, 29, 31, 32, 36, 371, and (37 + 19 − 371)) by the OBE measures, when compared with the FRB series. For five of these industries, the 1957–64 average annual rate of change for the Census value-added series is higher than for the corresponding Census value-of-production series; for one industry, Census net and gross output trends are identical; and for two industries, Census total output is higher than value added.

Comparison by Industry

In this section, the principal reasons for differences in the OBE and FRB measures of output for two-digit (SIC) manufacturing industries are summarized. While data for all two-digit SIC industries are shown (see Appendix C), only selected industries are discussed below.[12] These industries illustrate more specifically the principal conditions causing variations between the FRB and OBE series in trends or year-to-year movements.

Disparities in the FRB and OBE trends for some industries and for some periods are related primarily to different movements in total and net output as reflected by the Census measures. Changes in the ratio of value added per unit of output have occurred because the composition of the products produced by an industry over time has changed and the FRB series selected to measure the industry output did not reflect this change. This is illustrated by the varying proportions of metal to wooden furniture produced by the household furniture industry (SIC 251), which is described below. Significant changes in product composition even within product groupings (radios, TV's, freezers, communications equipment, etc.) for the electrical machinery

[12] Discussions for all two-digit SIC manufacturing industries are available upon request to the Office of Business Economics, U.S. Department of Commerce, Washington, D.C. 20035.

TABLE 15

Comparison of Trends in Real Product as Measured by FRB, OBE, and Census Measures, by Industries, 1957–64
(point differences between compounded annual average rates of change)

SIC Number		Pub. FRB Minus OBE	Census VP Minus Census VA	OBE Minus Census VA Plus Tax	Pub. FRB Minus Census VA
Total manufacturing		0.3	-0.3	0.0	0.3
	Nondurable goods	0.8	-0.2	-0.1	0.6
20	Food and kindred products	1.1	1.5	0.4	1.7
21	Tobacco manufactures	0.2	-0.8	0.2	-0.1
22	Textile mill products	-0.1	0.6	-0.3	-0.4
23	Apparel and other fabricated textile products	1.4	-0.0	0.7	2.1
26	Paper and allied products	0.1	-0.6	-0.1	0.0
27	Printing, publishing, and allied industries	0.4	0.4	-0.1	0.3
28	Chemicals and allied products	1.9	-0.7	-1.1	0.8
29	Petroleum refining and related industries	-2.3	-4.6	-0.7	-4.7
30	Rubber and miscellaneous plastic products	0.7	0.0	-0.1	0.4
31	Leather and leather products	-0.4	-0.4	0.4	0.0

(continued)

TABLE 15 (concluded)

SIC Number		Pub. FRB Minus OBE	Census VP Minus Census VA	OBE Minus Census VA Plus Tax	Pub. FRB Minus Census VA
	Durable goods	0.0	-0.5	0.0	0.0
24	Lumber and wood prod., except furniture	-1.5	0.0	0.5	-1.0
25	Furniture and fixtures	3.5	0.8	0.1	3.6
32	Stone, clay, and glass products	-0.1	0.1	0.2	0.1
33	Primary metal industries	1.8	0.8	-0.7	1.1
34	Fabricated metal products	0.6	0.0	1.0	1.6
35	Machinery, except electrical	0.3	0.0	0.5	0.8
36	Electrical machinery	-2.1	-1.3	-0.8	-3.0
37-371+19	Transportation equipment and ordnance, except motor vehicles	-0.3	-1.6	1.3	1.0
371	Motor vehicles and motor vehicle equipment	-0.9	-1.5	0.3	-0.7
38	Instruments	0.2	-0.6	-2.5	-2.3
39	Miscellaneous manufacturing industries	2.0	0.3	-2.0	0.0

Note: VA = value added; VP = Value of production. For other abbreviations see note at the beginning of Appendix C.

industry (SIC 36) have also occurred, which apparently are not fully reflected by the FRB methodology. Changes in technology have also caused shifts in the unit cost of materials. For example, the value added per unit of output for the blast furnace and steel mills industry (SIC 331) has declined because the ores shipped from the mines in more recent years are of a higher grade than those previously shipped. Refinery gases, which are a source of petrochemicals, represent an increasing contribution to the output for the petroleum refinery industry (SIC 291), but have no explicit representation in the FRB indexes. Value added per unit of output in the dairy industry (SIC 202), which has been reduced by a shift from home to store and institutional deliveries, is not reflected by the total quantities of milk produced. Representation of tobacco stemming and drying, which accounts for a varying unit value added for the tobacco industry (SIC 21), by measures of the quantities of chewing and smoking tobacco produced contributed to differences between the OBE and FRB measures for this industry.

Differences in the measure of net output also reflect differences in total output which arise because FRB has measured output based on counts of quantities produced or proxies (principally man-hours) of such counts and the OBE has derived such output by deflation. For example, the 1947–64 average annual rates for the FRB indexes reweighted by 1958 value of production grow faster than the deflated Census value of production series for fourteen of the twenty-one manufacturing industries (See Table 13). Large differences (1.0 point or more) occur in the furniture, chemicals, rubber and plastics, fabricated metal products, and transportation equipment and ordnance, except motor vehicles, industries. Since 1957, almost 100 per cent of the total output for all of these industries, except chemicals, and rubber and plastics, was determined by a man-hour series adjusted for changes in productivity. Differences in output also arise for specified time periods in the apparel and shoe industries when output determined by number of garments cut or shoes produced is compared with deflated value of production.

The use of different data sources to determine output trends also contributes to varying movements. As shown below, the 1958–64 FRB movements for meat products (SIC 201) and dairy products (SIC 202) differ markedly from those of deflated value of production partially because the FRB measures are based on agricultural data whose coverage includes establishments not classified as manufacturing plants.

Differences in trends between the OBE and FRB series also are caused by the inclusion of taxes in the OBE series and their omission from the FRB measures. For example, the higher OBE growth rate compared with the FRB rate for tobacco manufactures (SIC 21) is partially due to this factor. Reweighting the FRB index by 1958 GPO weights also results in a greater similarity in the 1947–64 trends for rubber and plastics products (SIC 30) and transportation equipment and ordnance, except motor vehicles (SIC 37 + 19 − 371) industries.

Differences between the published FRB and OBE series in the year-to-year movements is also frequently related to varying movements for total and net output. This is particularly true for the years immediately after World War II and during the Korean conflict. In addition, for some industries, the discrepancies between the OBE and FRB series for years prior to 1952 arise because the weights used for the OBE series reflect 1958 price relationships for the 1947–64 period, while the currently published FRB indexes are combined with weights that embody 1957 price relationships for post-1952 data and 1947 price relationships for the years 1947–52. This relationship partially accounts for the pre-1957 variations in movements for the paper and allied products industry and transportation equipment and ordnance, except motor vehicles industries. Reweighting the FRB indexes reduces differences between year-to-year changes for the FRB and OBE series for some years for the same industries.

The direction or amplitude of change for the OBE series for some industries differs from the FRB or Census measures because the current-dollar totals for only the former series are adjusted for inventory valuation. These differences appear during years when large price movements occur, such as during 1949–51. For example, the year-to-year changes between the OBE and Census measures of value added would be similar for the apparel industry, particularly for 1949–53 and 1960–61, if the comparisons were based on GPO figures before adjustment for inventory valuation. The movements between Census value added and OBE indexes would also be more similar for the tobacco, furniture, rubber and leather industries, if the OBE series were adjusted to make them comparable in concept with the other measures.

Differences in classification of industries or activities also account for annual variations. For example, during the Korean conflict substantial amounts of war goods were produced as secondary products in the

machinery, fabricated metal, transportation equipment, and instruments industries. The Federal Reserve in its 1959 revision added "representation for these products to the private ordnance plant series rather than to the appropriate two-digit groups with the result that the former series is overstated and the latter industries understated in the year 1951, 1952, and possibly 1953." [13]

The sources from which the Census Bureau and the OBE derive their data also contribute to differences among the several measures. Such variations in coverage and classification of establishments are noticeable in the lumber and apparel industries particularly for the pre-1954 period when the Census data were subject to high sampling errors, and the OBE data include estimates of establishment profits based on the 1958 Census-IRS link project. Significant differences in OBE and Census payroll figures have also occurred since 1958 for instruments, fabricated metal products, leather, and lumber industries. Variations in the movements between the Census value added and OBE indexes have also caused differences between the FRB and OBE series.

Each of the industries which are discussed below have been selected because they contain examples of the major causes of differences between the OBE and FRB series. The discussion of the printing industry (SIC 27) is included for contrast since it illustrates how the OBE and FRB movements for some industries are similar despite differences in methodology and data sources.

FOOD AND KINDRED PRODUCTS (SIC 20)

The OBE and published FRB series show approximately the same 1948–64 annual rates of growth for the food, beverage, and kindred products industries.[14] The figures are 2.5 per cent and 2.6 per cent respectively. The annual average rates of change for both series, however, differ substantially for the periods prior to and subsequent to 1957 and are principally explained by varying movements between net and total output. For 1948–57, the average annual rate for the

[13] Letter of May 18, 1966, from Clayton Gehman.

[14] The relative importance of this industry expressed as a percentage of the respective manufacturing total is as follows:

	1947	*1958*	*1964*
OBE	12.4	12.1	10.1
FRB (as pub.)	13.4	11.9	10.1

OBE series is 2.7 per cent, and for the FRB series, 2.2 per cent.[15] Since 1957, the rates are 2.1 and 3.2 per cent respectively for the OBE and the FRB series (Appendix C). Reweighting the FRB series by either 1958 GPO or by 1958 Census value of production affects the 1948–57 growth rates. The trend for the FRB indexes is 0.2 points lower when weighted by GPO weights, and 0.2 points higher, when weighted by gross weights, than the rates for the published series. The 1957–64 trends for the reweighted and published FRB series are approximately the same.

The deflated 1947–57 Census data for the food and kindred products [16] industry show a slightly declining ratio of quantity of materials and energy consumed to the amount of goods produced, but a more rapidly rising ratio since 1957. Thus, the Census measures of net output increased less rapidly since 1957 compared with 1947–57, and the converse applies to the annual rates of change for total output.[17] The OBE indexes of real product reflect the Census net-output pattern, and the trend of the FRB indexes follows that of the Census value-of-production series, which shows 1957–64 as a period of more rapid increase compared with 1947–57.

The FRB-OBE differences in year-to-year changes for some years are also due to diverse movements between total and net output. For example, larger changes in quantity of value added than in total output occurred between 1949–50, 1952–53, 1956–57, and even in the direction of the change as for 1957–58 or 1960–61 (see Appendix Table C-2). Differences in weighting also result in disparities in the year-to-year movements, particularly for 1947–52, between the OBE and FRB indexes.

Another cause for trend and year-to-year disparities between the OBE and FRB series is the derivation of output by deflation versus quantity measures. Many of the twenty-three series used by FRB to

[15] If the terminal year of 1957 is not used, then the percentage changes from 1948 to 1956 or to 1958 for both indexes are approximately the same.

[16] Adjusted for SIC changes. The adjustments in the Census and OBE data and in the *Annual Survey of Manufacturers* data for the fluid milk industry, the fats and oils industries, and other SIC changes are relatively large in the early years of this subperiod.

[17] The 1957–64 higher growth rates for value of production compared with value added are largely due to higher than average increases in output by industries characterized by low unit value added such as SIC 201—meat products or SIC 2092—soybean oil mills.

measure output for this industry are quantity series based on information compiled by the U.S. Department of Agriculture. These product data are not necessarily representative of the Census shipment data because the food producing establishments may not be classified as a manufacturing unit.[18] Variations resulting from the sources as well as from the measures employed may be illustrated by the 1958–63 percentage changes for selected food industries as indicated by the FRB series, the Census bench mark, and deflated value of shipments as shown below.

	FRB Indexes	*Census Bench-mark Indexes*	*Deflated Census Shipments*
201 Meat products [a]	22.3	15.5	24.1
202 Dairy products [a]	9.8	14.4	1.7
203 Canned and frozen foods [b]	36.8	[d]	28.8
205 Bakery products [b]	16.0	6.4	3.5
206 Sugar [a]	13.0	18.6	16.4
207 Candy and related products [c]	18.4	20.7	9.1

[a] FRB indexes based on quantity data compiled by U.S. Dept. of Agriculture.
[b] FRB indexes based on man-hours adjusted for productivity changes.
[c] FRB indexes based on quantity data compiled by Census Bureau.
[d] Not shown because comparable quantity data were not obtained for a significant portion of these products. (*1963 Census of Manufactures,* Vol. 2, 20C [preliminary version].)

The percentage changes from 1958 shown in the FRB series for bakery products (SIC 205) and for canned and frozen foods (SIC 203), which are based on man-hours, are higher than for the Census bench-mark series or deflated shipments. When the FRB indexes are based on U.S. Department of Agriculture data they are higher than the Census bench-mark figures for meat products (SIC 201) and lower for dairy products (SIC 202) and sugar (SIC 206). When the FRB is based on Census data, such as for SIC 207, the percentage changes for this series and the Census bench-mark series are approximately the same.

In addition to differences in coverage, represented by varying series, outputs derived from a quantity series and by deflation may differ because of differences in product mix. This is illustrated by the figures for the dairy products industry (SIC 202). More than 60 per cent of

[18] For meat products see *1958 Census of Manufactures,* p. 20A-2; for dairy products, p. 20B-3; for grain mill products, p. 20C-1.

the shipment values for industry 202 arise from the fluid milk industry (2026), and its principal product class, packaged milk and related products (20262). The 1963 product class figure in current dollars is 4.8 per cent higher than the 1958 total, but 7.6 per cent less when expressed in 1958 dollars. The Census production indexes, principally based on quantity of products shipped, show that 1963 output is 8.1 per cent higher than for 1958, and that unit values declined by 2.8 per cent. In contrast, the BLS price composite for this product class shows an increase of 13.4 per cent since 1958. The price decline in average unit prices resulting from measuring changes in output by quantities for relatively broad categories does not reflect shifts in quantities between home and retail store deliveries, nor in shifts from quarts to half-gallon packages, or for all other "quality" changes. Some of these changes are measured by specification prices.

Variations in the amplitude of change between the Census value added plus excise taxes and the OBE series are caused by differences in the current-dollar totals for the respective series. In part, these disparities are generally explained by the IVA adjustments to the GPO totals. For example, the 1955 figure for IVA raised the GPO total for that year, while the 1956 and 1957 figures were lowered by IVA (Appendix B). The change from 1955 to 1956 in the real product index is 4.2 per cent, but would be 6.7 per cent if there were no IVA adjustment. These figures compare with the 8.0 per cent increase for deflated Census value added plus excise tax. For the other periods indicated, the differences between the OBE and Census value added plus excise taxes series would also have been reduced.

FURNITURE AND FIXTURES (SIC 25)

The 1948–64 average annual rate of increase of this major group [19] when measured by the FRB index is almost twice (4.6 per cent) the figure based on the OBE series (2.5 per cent). The rates also differ markedly for the subperiods 1948–57 and 1957–64. For the former period, the trends are 2.6 and 3.6 per cent respectively for the OBE

[19] The relative importance of this industry, expressed as a percentage of the respective manufacturing total, is as follows:

	1947	*1958*	*1964*
OBE	1.6	1.5	1.4
FRB (As pub.)	1.8	1.8	1.9

and the FRB series. In the post-1957 period, the compound annual rate of change for the OBE series is 2.3 per cent and 5.8 per cent for the FRB series. The reweighted FRB indexes (1958 GPO or Census value of production weights) do not differ significantly in trends or in year-to-year changes from the published FRB series. The spread between the 1964 published or reweighted FRB indexes and the OBE index is 26 or more points (Appendix Table C-7).

The movements of the OBE series generally parallel those of Census value added (VA). The annual rates of change in the Census VA series since 1947 are smaller (2.6 per cent) than in the Census production series (3.2 per cent). The 1947–64 trend toward less value added per unit of output stems from the relative changes in the product mix. These shifts occur between the household furniture industry (SIC 251) and the rest of the industries included in this major group as well as from changes within the household furniture industry. The varying average annual rates of change in the Census and FRB measures by industry sectors [20] are indicated below:

	Household Furniture (SIC 251)		*Other Furniture and Fixtures (SIC 252-9)*	
Census Measures	1947–57	1957–64	1947–57	1957–64
VP	3.7	2.8	2.4	3.6
CM	4.0	3.6	3.0	4.8
VA	3.3	1.9	2.0	2.7
FRB Indexes	3.4	7.0	4.1	3.3

In addition, within the household furniture group (SIC 251) there has also been a significant shift of product mix. For example, metal household furniture shipments (2514), which have a relatively lower value added per unit of output than "other furniture," increased relatively more than other household furniture from 1947 to 1957 but have been decreasing since then.[21] Conceptually, the trend for FRB indexes for

[20] The FRB measures output for this industry by two series; one for SIC 251, and the other for SIC 252-9.

[21] The ratios of constant-dollar shipment values of metal household furniture (SIC 2514) to the total for household furniture (SIC 251) for selected years are as follows:

1947	10.2	1957	15.7
1950	13.4	1958	15.0
1954	14.6	1963	13.5
		1964	13.6

SIC 251 and SIC 252-9 should show the same growth rates as Census value of production (VP) for each of these sectors.

Differences between the FRB and OBE series are due not only to the lower growth rate for net compared with total output but also to disparities in measures of total output. Prior to 1958, the FRB determined output by deflated value data, and since then by man-hours. While the 1947–57 rates of increase for the published and reweighted FRB and deflated Census value of production series are thus approximately the same (3.6 per cent and 3.3 per cent, respectively), the 1957–64 growth rate of 5.8 per cent for the published FRB index is almost twice the figure of 3.0 per cent for the deflated Census value-of-production series.

Differences in movement between Census value added and GPO are primarily explained by the IVA. When the IVA is excluded from the calculations of the indexes for GPO, the year-to-year movements of the two series are similar.

PRINTING, PUBLISHING, AND ALLIED INDUSTRIES (SIC 27)

The trends and annual movements when measured by either the FRB or OBE series are almost identical for this industry.[22] For 1948–64, the OBE series shows a compounded annual rate of increase of 3.1 per cent while the rate for the FRB series is 3.3 per cent. The difference between the two series is accounted for by the post-1957 trends of 3.2 per cent for the FRB indexes and 2.8 per cent for the OBE series, since identical 1948–57 growth rates of 3.4 per cent are reflected by both series. The FRB indexes when reweighted by either the 1958 GPO or value of production do not differ significantly in level or movement from the published FRB figures.

The implicit deflator for GPO is derived by double deflation from the Census data on production and cost of materials, supplies, fuels, and electricity. Since the Wholesale Price Index includes no representation for printing, publishing, and allied industries, special price series were constructed. These were used to deflate Census product groupings of subscriptions and sales of newspapers and periodicals, advertising

[22] The relative importance of this industry, expressed as a percentage of the respective manufacturing total, is as follows:

	1947	*1958*	*1964*
OBE	5.0	5.0	4.3
FRB (As pub.)	5.5	5.5	4.9

receipts by medium, sales for books published by subject as well as for job printing and allied activities. On the other hand, the FRB uses four series to measure activity in this major group. Based on 1957–59 industry proportions, 68 per cent was based on deflated value of shipments prior to 1958, and 68 per cent based on man-hours adjusted for productivity since 1958. Nevertheless, the trends and year-to-year changes between the FRB series reweighted by 1958 Census value-of-production and the deflated Census value-of-production series are very similar, except for the years prior to 1952 (Appendix Table C-9).

The similarities in trends and year-to-year movements between the OBE and FRB series also stem from the fact that the differences between total and net output are not large. Furthermore, the differences in movements between Census value added and OBE are not large.

PRIMARY METAL INDUSTRIES (SIC 33)

For 1948–57, the OBE and FRB indexes show an almost identical growth rate of 2 per cent. If the terminal year is extended to 1964, the compounded annual rate of increase for this industry [23] is 0.2 per cent for the OBE series compared with 2.0 per cent for the FRB. Reweighting the FRB indexes by 1958 GPO or Census value of production results in a higher growth rate (2.2 per cent) for 1948–57, but no change for 1957–64. Disparities between the FRB and OBE series largely arise from differences when output is derived from quantity measures or by deflation and by the differing movements between total and net output.

In measuring output for the primary metal industries the FRB employs twenty-three quantity series (see Appendix A). These represent production and may include, as in the case of ferrous castings, the quantities shipped to other plants of the same company as well as the amounts produced by departments (e.g., foundries) of plants classified in industries other than SIC 33. Because the ferrous and nonferrous industries are composed of nonintegrated, partially integrated, and fully integrated plants, Census shipment data include varying amounts of duplication. The large differences in Appendix Table C-15, column 11, for 1950–53 may partially reflect comparisons of measures relating

[23] The relative importance of this industry expressed as a percentage of the respective manufacturing total is as follows:

	1947	*1958*	*1964*
OBE	12.8	8.8	8.2
FRB (As pub.)	11.6	8.0	8.3

to production and to shipments. These differences are also magnified during these years by the independent adjustments to the Census data by FRB and OBE to reflect Census reporting procedures and the 1953 FRB link.

The Census measures for Major Group 33 show a higher growth rate for total compared with net output for 1947–64 as well as for the eleven years ending in 1957 and for the eight-year period since 1957. The 1957–64 trends for the subgroups iron and steel and the nonferrous industries, compared with those for the major industry group, are as follows:

	Value of Production	*Cost of Materials*	*Value Added*
Industry 33 total	1.7	2.4	0.9
Iron and steel [a]	0.9	1.4	0.4
Nonferrous metals	3.7	4.4	2.4

[a] According to the output measures for the steel industry (SIC 331) computed by BLS, the compounded rate of change from 1957 to 1964 is 0.7 per cent. *Indexes of Output per Man-hour,* Steel Industry, 1947–65, U.S. Department of Labor, BLS report 306, p. 9, June 1966.

The trends in the industry averages principally stem from the movements in the iron and steel subgroup, which accounts for about two-thirds of the industry total. Illustrative of the declining value added per unit of output for the blast furnaces and steel mills industry has been the shipment of higher grade ores from the mines.[24] Thus more work is done at the latter establishment and less processing is required by the iron- and steel-making industry.

The effect of diverse trends for total and net output is further magnified by the FRB procedure in assigning the value-added weights for Industries 3312 and 3399. Value added for each series used in determining output for this industry is estimated by subtracting the estimated value of its major inputs from the estimated value of output.[25] Any errors in such procedures such as in computing the selling prices for pig iron (about 99 per cent of which is captive production) and in costs of its raw materials may overstate its importance relative to the more highly fabricated products of the industry.

Differences in levels between the OBE real product and deflated

[24] *Minerals Year Book,* Washington, D.C., 1962, pp. 668–669.

[25] This procedure was used by the Census Bureau in preparing the 1954 benchmark indexes. For details, see *1954 Census of Manufactures,* Vol. 4, Indexes of Production, p. 32.

Census value-added series for some years are relatively large. These differences are the result of disparities between the movements of the current-dollar series. For example, the 1963 gap between the two indexes is 6 points (Appendix Table C-15, column 14). The IVA adjustment and the difference between the OBE and Census payroll totals accounted for 3 of these 6 points. Other differences may be accounted for by the relatively large percentage of intracompany shipments and their evaluations. When these are between establishments in the same industry group, the Census value-added figure is unaffected, but when the industry classification of the establishment receiving these goods differs or the reporting of the values is inconsistent, then differences may arise. Also contributing to differences in movement between the Census value-added and the OBE figure is the fact that OBE figures are partially dependent upon the establishment allocation of company total for profit and capital consumption allowances.

FABRICATED METAL PRODUCTS (SIC 34)

The 1948–64 compounded average annual rates of change for this industry [26] as measured by the OBE and FRB indexes are 3.4 and 3.6 per cent respectively. However, the subperiod trends differ. For 1948–57, the growth rate for the OBE series is 3.8 per cent and 3.1 per cent for the FRB series, while the converse occurs for 1957–64 when the trend for the FRB series is 3.9 per cent and for the OBE series, 3.3 per cent. The reweighted FRB series compared with the published FRB data show no significant differences in trends or in year-to-year movements. The Census measures of value of production and value added show lower annual average rates of change and the year-to-year movements differ when compared with the FRB and OBE series.

Disparities between the FRB and OBE indexes stem principally from differences in the measurement of total output. The average annual rates of change for the FRB indexes, reweighted by value of production and the deflated Census measure of total output are identical for 1947–57, when the former series is also dependent upon "deflated values." However, for 1957–64 the gap between these two series is 1.5 per cent. In this period, almost 90 percent of output of this

[26] The relative importance of this industry, expressed as a percentage of the respective manufacturing total, is as follows:

	1947	*1958*	*1964*
OBE	6.4	6.3	6.1
FRB (As pub.)	7.1	6.2	6.2

industry is measured by the FRB by a man-hour series. (See Appendix Table C-16.)

Industry classification differences may also contribute to the difference between the two output series. The FRB includes representation for the lighting fixture industry (SIC 3642) in this major group but excludes information for the valves and pipe fittings industry (SIC 3494) and the fabricated pipe and fittings industry (SIC 3498) which are assigned to Major Group 35. In addition during the Korean conflict the FRB assigned war material made by the establishments classified in this industry to private ordnance plants.

While the trends for the Census measures of total and net output are approximately the same, this situation is a result of the relationship prevailing for the terminal years only. The variations in movements between total and net output generally explain the variations during 1948–64 in the amplitudes and direction of year-to-year changes. In 1951–54, the FRB-OBE gap is partially explained by the different movements for the Census measures of gross and net output. During these years there were also large disparities in the current-dollar totals for Census value added and GPO.

Since 1957, the growth rates for the Census value-added series is considerably less than that for the OBE indexes. The difference in current-dollar totals for these series appears to be primarily due to industry classification as indicated below (percentage changes in current dollars, 1958–64).

	Census Value Added	*Gross Product Originating*
Total	32.2	41.1
Payroll	26.7	35.1
Other	5.5	6.0

MOTOR VEHICLES AND EQUIPMENT (SIC 371)

Throughout the 1948–64 period, the OBE indexes for this industry [27] show higher levels of activity when compared with the FRB measures.

[27] The relative importance of this industry, expressed as a percentage of the respective manufacturing total, is as follows:

	1947	*1958*	*1964*
OBE	6.6	5.7	8.7
FRB (As pub.)	6.3	5.4	6.8

The 1948–64 average annual rate of change for the OBE series is 5.3 per cent; and 4.4 per cent for the FRB index. The growth rates for 1948–57 are 5.0 and 4.1 per cent respectively for the OBE and FRB series; and the corresponding figures for 1957–64 are 5.7 and 4.8 per cent. The magnitude of these differences remains whether the FRB indexes are reweighted by 1958 GPO or Census value of production.

In measuring the output of the motor vehicle industry, the FRB uses nine series. Since 1958 about 47 per cent, based on 1957–59 proportions, of the industry output are based on man-hours adjusted for estimated changes in productivity. The quantity indexes for passenger cars include adjustments to reflect quality changes but, "there is no allowance in the index for the marked gains in performance of late model trucks compared with those produced in the period immediately after the Second World War." [28] The adjustments for quality changes are based on production by (a) make and model, (b) certain items of equipment, and (3) body styles.[29] Since the late 1950's, the quality adjustment has been based on less detailed methods than employed for the preceding years.

Adjustments for quality changes in the OBE series are largely dependent upon the BLS wholesale prices and their specifications. The difficulties encountered in this area are well known. In addition, prices for original equipment may move differently from that for the replacement market. This error, if any, is cancelable to the extent that the original equipment represents an intraindustry shipment. The double deflation procedure also measures changes in value added when "trading up or down" [30] by consumers occurs.

Between 1952 and 1955, there are large differences between the FRB indexes, reweighted by 1958 value of shipments, and the Census deflated value-of-production series (Appendix Table C-20, column 11). A part of this difference stems from the reclassification by FRB of war goods produced as secondary products in this industry to the private ordnance

[28] "The Revised Index of Industrial Production," reply by Clayton Gehman, *American Economic Review*, June 1963, p. 520.

[29] For more detailed description, see *1954 Census of Manufactures*, Vol. IV, pp. 33–34.

[30] The term "trading up" refers to the shift in consumer demand from low price cars or standard models to more expensive makes, body styles, or with additional equipment. An example of "trading down" is the shift from standard-sized cars to economy compacts.

series.[31] The Census data represent total activities for all establishments classified in this industry.

Despite differences between outputs calculated from quantity measures and those derived by deflation, average annual rates of change in the FRB series are more closely approximated by those for Census value of production than by Census value added. The OBE trend, however, is more closely approximated by the Census value-added series. Differences between the growth rates for the FRB and Census value of production series are larger for the post-1957 period than for the earlier subperiod, while the converse is true when the OBE and Census value-added trends are compared.

The point differences between total and net output vary greatly (Appendix Table C-20, column 12). A varying value-added ratio rather than a constant ratio is realistic for this industry, since value added per unit of output increases as output rises. As indicated below, when total motor vehicle sales increase sizeably over the previous year's sales, larger increases occur in value added (Census and OBE) than in the Census value-of-production series. On the other hand, a sizeable decline in output is not necessarily accompanied by a larger decrease in value added than in value of production. This is partly due to replacement parts sales, which apparently decline less than sales of other products of the industry,[32] and partly to the curtailment of direct expenses.

Levels and amplitudes of the annual movements for the OBE and

	Increases						*Decreases*				
	Number of Vehicles	Census		FRB	OBE		Number of Vehicles	Census		FRB	OBE
		VP	VA					VP	VA		
1949–50	28.0	29.9	42.7	28.6	41.5	1950–51	18.1	11.3	4.3	8.3	4.7
1952–53	32.2	31.2	23.5	26.9	25.6	1953–54	9.9	13.6	15.3	9.8	12.9
1954–55	38.9	41.0	51.4	43.0	43.9	1955–56	24.5	22.0	21.7	19.8	25.1
1958–59	31.0	27.5	33.8	31.1	40.7	1957–58	28.9	26.8	24.8	23.4	30.8
1961–62	22.4	26.3	26.7	19.9	36.7	1960–61	15.1	13.5	11.1	9.9	10.6

[31] See pp. 262–263.

[32] In 1958 the Census Bureau established a product class (37176): parts and accessories for passenger cars, trucks, and busses, shipped to other than motor vehicles manufacturers. For 1960–61, the constant-dollar percentage decline was 3.5 per cent for this product class and 14.0 per cent for the remainder of Industry 3717.

Census value-added series differ from 1949 through 1955 because of disparities in the two current-dollar series (Appendix Table C-20, column 14). The current-dollar figures of gross product originating during this period exceed Census value added, while for other years the usual relationship between these figures prevails. Significant differences in OBE and Census payroll figures also occur since 1958, as indicated by percentage changes in current dollars shown below.

Census Value Added and GPO

	Census Value Added	Gross Product Originating
Total	97.4	118.3
Payroll	70.0	59.6
Other	117.0	185.3

In summary, the OBE indexes display higher growth rates than the FRB series for 1948–64. The gap between the trends for these two series is identical for 1948–57 and for 1957–64. The largest disparities occur in 1950–55 and since 1962. The 1950–55 disparities are principally explained by differences in measuring output and by the current-dollar movements of GPO, which in contrast to the FRB series reflect total activity for the establishments classified in the industry. The disparities since 1962 are largely due to the variation in movement between total and net output. The OBE measures of value added are more volatile than the FRB measures because the former reflect the volatility of profits due to scale of operation as well as shifts in margins as consumers "trade up," or "trade down" in make, model, or added equipment. In addition, when the data for new cars appearing in the final product accounts are compared with the GPO indexes, there is some evidence that increases since 1961 in GPO for Industry 371 have been offset by declines in the value added for industries whose principal activity relates to transporting or marketing new vehicles.

Appendix A: Description of FRB and OBE Indexes of Manufacturing Output

1. FEDERAL RESERVE BOARD'S INDEXES

Based on the value-added weights in the 1957–59 base period, slightly less than 90 per cent of the FRB index of industrial production is

accounted for by manufacturing activity; the remainder represents the output for mining and electric and gas utilities. While the measures include production at Government owned and operated installations,[1] the indexes for manufacturing predominantly relate to activities of the privately operated sectors.

The FRB published indexes show changes in physical output by industry as well as for market categories, including a division between final products and materials and a subdivision of final products between output of consumer goods and output of equipment (including ordnance) for business and government use.

The current indexes of the FRB reflect major revisions described in detail in *Industrial Production, 1959 Revisions,* and those made in October 1962 when the comparison and weight bases were shifted from 1957 to 1957–59.[2] These revisions established new market groupings, expanded coverage and representation, refined procedures for estimating changes in industries represented by man-hour series, and revised the seasonal-adjustment factors. In addition, the 1959 revisions incorporated the 1947–54 production indexes derived from the comprehensive Census of Manufactures data for 1947 and 1954,[3] and also adjusted the 1955–57 production indexes using information compiled in the *Annual Surveys of Manufactures*. Moreover, the industry grouping was made to conform to the 1957 edition of *Standard Industrial Classification (SIC) Manual.* In the 1962 revision, the annual levels for eight series in the apparel, food, and chemical groups were adjusted to take account of the information appearing in the preliminary *1958 Census of Manufactures* and the 1959 and 1960 *Annual Survey of Manufactures.*

The total and other aggregate indexes are derived from weighted averages of relatives. Various measures are used to represent changes

[1] These include arsenals (0.12 per cent) and Navy shipyards (0.35 per cent).

[2] For further details, see Board of Governors of the Federal Reserve System, *Industrial Production: 1959 Revision,* Washington, D.C., 1960; *Industrial Production: 1957–59 Base,* Washington, D.C., 1962; and *Industrial Production Measurements in the United States* (reply to an inquiry from the Economic Commission for Europe), Washington, D.C., February 1964.

[3] *1954 Census of Manufactures,* Vol. IV, Indexes of Production, G.P.O., Washington, D.C., 1958. "In the 1954 bench-mark 82 percent of the total value added for manufacturing was represented by indexes derived from product data. Of these indexes, products represented by both quantity and value data made up about 75 percent and products represented only by deflated value data about 25 percent. Another 3½ percent was represented by indexes based on materials consumption and the remaining 14½ percent consisted of industry values indexes deflated by selected price or unit value indexes." (Industrial Production Measurement in the U.S., p. 36.)

in the quantity of output. These changes are expressed as relatives with 1957–59 = 100; each series of relatives is multiplied by a base-year-weight factor; and the product summed. The weight used for manufacturing components is the average of the 1957–59 Census of Manufactures value added expressed in 1957 prices. For each series the 1957–59 value-added figure in 1957 prices was obtained by dividing 1957 value added by the ratio of production in 1957 to production in 1957–59. Census value-added data are available either at an industry (four-, three-, or two-digit SIC) level, and for many product groupings (plants specializing in shipments of specified product classes) for some series. Value-added weights are based on the assumption that value added is proportional to the value of the product within the group.[4]

Since the indexes prior to 1953 were not recalculated, but linked in the 1959 revision, the weighting pattern for these indexes is based on weights derived from the 1947 Census value-added data. Because of the subsequent revision from the 1957 base to the 1957–59 base, the linked indexes on the 1957 base were converted to the 1957–59 base period by a multiplying factor for each aggregate index.

The indexes of output for the annual series discussed in this paper are based on a variety of measures—number of physical units produced, deflated values, man-hours, or materials consumed. The 200 series used for manufacturing measures and the proportions of 1957–59 value added for manufacturing accounted for by these series are shown in Table A-1.

2. INDEXES OF REAL PRODUCT FOR MANUFACTURING INDUSTRIES

Indexes of GPO for major manufacturing industries (two-digit SIC industries) are derived by deflation. The current-dollar figures for a two-digit industry, compiled from the national income accounts of the gross national product, represent the unique contribution (value added), in market prices by the specified industry to the nation's economy. To secure a measure in "real terms," the current-dollar total is deflated by a gross product price index calculated by the double deflation method.[5]

[4] For blast furnaces and rolling mills (SIC 331) and a few other industries, other estimating procedures are used.

[5] The limitations of the value added implicit deflator are discussed in the OBE unpublished document, "GNP by Major Industry; Concepts and Methods," and also by Paul A. David, "The Deflation of Value Added," *The Review of Economics and Statistics*, May 1962, pp. 148 ff.

TABLE A-1

Percentage of the 1957–59 Industry Proportion

SIC No.	Prior to 1958					1958–64				
	Annual Quantity Produced	Deflated Value	Man-Hours Adjusted for Productivity[a]	Imputed or Extrapolated	Quantity of Materials Consumed	Monthly Quantity Produced	Deflated Value	Man-Hours Adjusted for Productivity[a]	Imputed or Extrapolated	Quantity of Materials Consumed
All mfg.	43.0	43.2	8.6	2.2	3.0	33.7	--	55.0	6.1	5.2
20	76.7	20.5	--	2.8	--	39.3	--	43.0	17.7	--
21	100.0	--	--	--	--	100.0	--	--	--	--
22	38.3	36.6	--	18.6	6.5	35.9	--	16.9	19.3	27.9
23	67.1	9.8	20.3	2.8	--	59.1	--	38.7	2.2	--
26	93.9	--	--	6.1	--	61.5	--	--	38.5	--
27	--	67.7	--	--	32.3	--	--	67.7	--	32.3
28	30.5	52.9	15.4	1.2	--	33.7	--	57.4	0.3	8.6
29	94.9	--	--	5.1	--	90.9	--	--	9.1	--
30	38.7	61.3	--	--	--	33.7	--	26.1	--	40.2
31	75.7	24.3	--	--	--	75.7	--	24.3	--	--
24	68.2	--	14.5	17.3	--	51.9	--	20.8	17.3	--
25	--	100.0	--	--	--	--	--	100.0	--	--
32	50.5	36.4	0.7	6.7	5.7	29.1	--	70.2	0.7	--
33	93.8	--	--	1.4	4.8	91.4	--	--	3.9	4.7
34	5.8	77.7	9.1	--	7.4	3.0	--	89.6	--	7.4
35	5.8	94.2	--	--	--	7.0	--	93.0	--	--
36	25.9	74.1	--	--	--	28.1	--	71.9	--	--
371	85.3	14.7	--	--	--	47.0	--	38.3	14.7	--
37+19-371	4.0	40.0	56.0	--	--	2.0	--	98.0	--	--
38	--	92.4	7.6	--	--	--	--	100.0	--	--
39	--	42.4	57.6	--	--	--	--	100.0	--	--

Source: *Industrial Production Measurement in the U.S.*, p. 36 ff.

[a]Representation in the monthly and annual series also include employment adjusted for changes in productivity. These series, however, account for about one-half of 1 per cent.

Indexes for durable and nondurable goods industries and for total manufacturing are calculated by summing the constant-dollar totals for selected industries.

As described in detail in "GNP by Major Industries; Concepts and Methods," [6] current-dollar figures are compiled by summing the appropriate factor payments and nonfactor costs for an industry (two-digit SIC).[7] Since the corporate profits and capital consumption allowance (CCA) components of gross product are compiled on a company rather than on an establishment basis, adjustments are made in these totals to reflect the establishment composition of the manufacturing industries, as defined by the *Standard Industrial Classification Manual.* For all industries, except the petroleum refining industry (SIC 29), these adjustments are based on the company-establishment pattern weighted to reflect industry variations in profits or CCA per employee. The employment data appear in the U.S. Bureau of the Census publication, *Enterprise Statistics: 1958 Part 3, Link of Census Establishment and IRS Corporation Data.* For the petroleum refining industry, profits represent a residual after determining the amount due to mining activities (based on depletion allowances) and for wholesale and retail trade (based on industry averages). Depreciation charges for the petroleum refining industry are allocated on the basis of information for "assets by departments" as compiled in the Chase Manhattan Bank's studies for integrated oil companies.

The current-dollar measures of an industry's gross product, derived as the sum of its factor payments and nonfactor costs, are not directly convertible to constant dollars because the components (employee compensation, profits, interest, etc.) cannot be expressed in quantity and unit prices suitable for this purpose. To calculate constant-dollar figures, the gross product originating is deflated by implicit deflators derived by deflating output and purchases separately (double deflation). This method involves the derivation of measures of output and input by specified manufacturing industry groups separately expressed in current dollars and also in base-year dollars and the value added obtained by

[6] A methodology is available upon request to the Office of Business Economics.

[7] The only exception is for Major Group 37, transportation equipment, which is combined with Major Group 19, ordnance. The subtotals: (a) motor vehicles (SIC 371) and transportation equipment, except motor vehicles (SIC 37-371 and 19), are considered as industry groups, rather than the combination of the major SIC industries.

subtraction. The implicit price deflator is calculated by dividing the current-dollar figure by the constant-dollar figure for value added.

The data sources showing current dollars for total output (shipments figures adjusted for changes in inventories of finished goods and goods in process) and inputs for specified industries are the *Census of Manufactures* and *The Annual Survey of Manufactures*. To reflect the industry classifications appearing in the 1957 edition of the SIC manual, shipments and cost of materials, supplies, etc. for years prior to 1958 were adjusted when necessary on basis of the "bridge" data appearing in the *1958 Census of Manufactures, Vol. I, Summary,* Appendix C, Part 2. The price information is obtained primarily from *The Wholesale Price Indexes,* U.S. Bureau of Labor Statistics.

In order that the constant-dollar aggregate for value added may consist of the current year's quantity valued at prices prevailing in the base year, an industry's current value of shipments, inventory, and cost of materials and other items consumed in the manufacturing process should be deflated by a price index representing the given year's composite of products. For nearly all industries, the output composite for each year may be reliably approximated by the Census annual shipment values of each product class wherever made. However, the output for a small number of industries consists of a significant amount of products classified in other industries. In these cases, the annual data on total product class shipments are inadequate. For such industries, output price indexes with current-year weights are estimated from information contained in the *1947, 1954, and 1958 Censuses of Manufactures,* which provide information on the product composition of each industry's total value of shipments. Weights were calculated for the three Census years using these detailed product-mix data. Linear interpolations yielded the weighting pattern for the intercensal years.

Current-year weighted price indexes, as described above, are thus used to derive a constant-dollar series at a four-digit SIC industry level. These are then summed to the 1958 input–output sectors (industry) and again aggregated to the SIC two-digit manufacturing levels.[8]

Inventory data for the input–output industries are adjusted to provide one set of inventory figures which reflect average prices during the given

[8] Because of differences stemming from definitional changes affecting the compiled industry statistics prior to, and subsequent to, 1958, two sets of data were compiled: (a) 1947 through 1958 and (b) 1958 to date. Whenever a continuous series from 1947 was needed, 1958 served as a link for the two series.

year and a second set which reflect 1958 prices. The deflators used for this adjustment are adapted from the price indexes used in the calculation of the "inventory valuation adjustment" [9] included in the national accounts.

A basic problem in deflating Census data on cost of materials, supplies, components, fuel, and electricity for manufacturing industries is that information on the annual composition of their intermediate purchases is incomplete. The 1947 input–output study conducted by BLS, and the 1958 study, conducted by OBE, provide estimates of the relative dollar values of the items purchased by an industry. Composite price indexes were constructed using the data appearing in these studies as weights; these two sets of deflators (1947-weighted and 1958-weighted) were then interpolated to provide an approximation of a current-year-weighted-input-price index. The weights for 1958 and subsequent years are based on the 1958 study.

Value added at the two-digit industry level was computed in given year prices and in 1958 prices by subtracting cost of materials from value of production (shipments plus inventory changes) valued at the respective price levels. These two-digit industry totals were adjusted to include excise taxes. From the current- and constant-dollar totals of value added, as adjusted, implicit price deflators (1958 = 100) were computed. These deflators then are used to calculate the constant-dollar (1958) gross product originating in the specified industry.

The preceding discussion relates to the calculation of real gross product for all years except 1948 and for all manufacturing industries, except petroleum refining (SIC 29). With respect to 1948, no full-scale Census surveys of manufacturing industries were conducted for that year. Consequently, implicit price deflators for that year are obtained by using 1948 price indexes weighted by the 1947 shipments and purchases.

The data for Industry 29, are dominated by the figures for Industry 2911, petroleum refining. The ratio of cost of materials to value of shipments for the latter industry is among the highest, and for many years the highest, of all manufacturing industries. (The ratio varies from 80 to 84 per cent from 1950 to the present). Since value added is a residual, small differences in the price levels of output and input and small inconsistencies in the measures of output and input may yield larger differences in the price movements for value added. This was the experience

[9] See above.

when the double deflation method was used for SIC 29. In addition, the number of series and/or items priced and the weights used to derive geographic and national price composites do not coincide with the regional activities represented by the annual values of shipments and costs of crude petroleum and intra-industry purchases, as compiled by the Bureau of the Census. Furthermore, the BLS annual prices are arithmetic averages of monthly prices while shipments of the major products of this industry are generally seasonal.

Unusually complete physical measures of output and input for petroleum refineries for the required number of years are compiled by the U.S. Bureau of Mines. The data also reflect the technical changes which result in varied proportions of product outputs derived principally from a single material input. Therefore, these statistics are used to calculate indexes of physical volume comparable to the Census product classes. By extrapolating the 1958 product class shipment values by the appropriate indexes, a constant-dollar series is calculated. For the input crude petroleum oil a realized price based on the U.S. Bureau of Mines data is substituted for the BLS price series. For all other industries [10] in Major Group 29, the standard procedures as described above are followed.

For each two-digit industry, the implicit deflator based on Census value added is used to derive a constant-dollar series for the corresponding total of gross product originating. For Industry 29, petroleum and related products and Industry 21, tobacco manufactures, the deflator derived from the Census data is used only for the sum of all components, except excise taxes. The total for these taxes is deflated separately, based on changes in the latter tax rates. For other industries, excise taxes are not separately deflated since they represent a relatively small proportion of the gross product originating in that industry.

Data for Census cost of materials are only a partial measure of intermediate purchases, since purchased business services such as advertising fees, legal services, rents, telephone and postal bills, and royalties are not included in these totals. When the relative proportion of these business expenses to total costs is large and the price behavior of purchased services differs markedly from value added, the calculated implicit deflator may be affected.

To secure an estimate of what the implicit deflator might be if data on purchases of services were available annually, information was

[10] Data for Industry 2992, lubricating oils and greases, are included with the figures for Industry 2911.

utilized from the 1958 and preliminary 1961 input–output tables. Based on the calculations for three industries, for which purchased services are known to be relatively high, the following results for 1961 were derived:

SIC	Industry	*Implicit Deflator for GPO, 1958 = 100*	
		As Used	Adjusted for Services
20	Food and kindred products	110.2	110.7
21	Tobacco manufactures [11]	98.7	96.8
371	Motor vehicles and equipment	99.5	98.3

While these results are inconclusive, it is believed that for most of the manufacturing industries, for which purchased services are relatively small, the implicit deflator based on Census value added represents the price movement of GPO.

3. THE WEIGHT BASE

As indicated above, the weight base for the Federal Reserve Board's index for manufacturing is the 1957–59 Census value-added figures in 1957 prices. The base for gross product originating is 1958, a year of relatively low output, and is based on gross national product, which differs in concept from Census value added. In production indexes, different weight periods will result in changes only if relative proportions are widely different. If this occurs, then the use of different weights may result in changes in the general levels and also affect the timing and amplitude of the fluctuations in the indexes.[12] A comparison of the 1958 weight proportions for the two indexes appears below (Table A-2). The differences in proportions shown partly stem from the conceptual differences between Census value added and gross national product. The larger relative weights for the food and kindred products, tobacco, and petroleum refining industries are principally accounted for by the inclusion of excise taxes in the GPO totals and their exclusion from the Census value-added figures. These payments are not offset by purchased services which are relatively high in these industries. Other differences in proportions are partly accounted for by classification differences.

[11] For this industry, the implicit deflator for GPO is based on a composite for Census value added and for excise taxes. The implicit deflator for Census value added, excluding taxes, is 96.4 (1958=100).

[12] *1954 Census of Manufactures*, Vol. IV, Indexes of Production, pp. 20–26.

TABLE A-2

Assigned 1958 Weights for Indexes of Manufacturing: Office of Business Economics and Federal Reserve Board

Industry	OBE	FRB	OBE	FRB
Manufacturing	100.00	100.00	--	--
Nondurable goods	43.70	46.13	100.00	100.00
Food and kindred products	12.13	12.64	27.76	27.41
Tobacco manufactures	2.21	1.02	5.06	2.21
Textile mill products	3.33	3.39	7.62	7.35
Apparel and other fabricated textile products	3.69	4.24	8.44	9.19
Paper and allied products	3.90	4.13	8.92	8.95
Printing, publishing, and allied industries	4.95	5.71	11.33	12.38
Chemicals and allied products	7.45	9.02	17.05	19.55
Petroleum refining and related industries	2.53	2.38	5.79	5.16
Rubber and misc. plastic products	2.33	2.27	5.33	4.92
Leather and leather products	1.18	1.33	2.70	2.88
Durable goods	56.30	53.87	100.00	100.00
Lumber and wood products, except furniture	2.67	2.06	4.74	3.82
Furniture and fixtures	1.55	1.77	2.75	3.29
Stone, clay, and glass products	3.77	3.46	6.70	6.42
Primary metal industries	8.82	7.54	15.67	14.00
Fabricated metal products	6.31	6.20	11.21	11.51
Machinery, except electrical	8.83	9.19	15.68	17.05
Electrical machinery	7.56	7.11	13.43	13.20
Transportation equipment and ordnance, except motor vehicles	7.11	8.01[a]	12.63	14.87[a]
Motor vehicles and motor vehicle equipment	5.73	4.82	10.18	8.95
Instruments	2.11	1.95	3.75	3.62
Miscellaneous manufacturing industries	1.85	1.76	3.29	3.27

[a]Includes government owned and government operated establishments.

For example, the FRB includes representation for the lighting fixture industry (SIC 3642) in Major Group 34 but excludes information for the valves and pipe fitting industry (SIC 3494) and the fabricated pipe and fittings industry (SIC 3498), which are assigned to Major Group 35. In addition, the company profits and capital consumption allowances are adjusted by OBE to an establishment industry basis.[13]

The amount of the adjustment for profits and capital consumption allowances, other than for the petroleum refining industry, when related to the company industry totals, is less than 5 per cent for eight of the twenty listed manufacturing industries. For only five industries is the adjustment more than 15 per cent. These adjustments when expressed as a percentage of total GPO are considerably less. For example, the percentage adjustment in 1958 company profit totals to represent activity for establishments classified in the industry only are as follows in Table A-3:

TABLE A-3

	Industries	
Percentage Adjustment	Number	SIC Number
Less than 0.5 per cent	7	21, 23, 27, 24, 25, 32, 34
0.5–0.9	5	20, 28, 30, 31, 35
1.0–1.4	3	33, 36 (37 + 19 - 371)
1.5–1.9	0	
2.0–2.4	1	26
2.5–2.9	3	22,38,39
Over 3 per cent	2	29, 371

Appendix B: Gross Product Originating, by Industry, 1947–64

EXPLANATION OF ABBREVIATIONS USED IN TABLES

These tables show Gross Product Originating in 1958 dollars, in current dollars, and the current dollar totals for components.

[13] See above for adjustment procedures.

CO(1958) $ = Gross product originating in 1958 dollars. For derivation, see Appendix A; for deflators, see Appendix D.

CU $, Total = Gross product originating in current dollars. The sum of factor and nonfactor charges, which appears in the columns on the right.

Employee Compensation = Employee compensation, which consists of wages, salaries, and supplements.

Interest = Net interest component of national income.

CCA = Capital consumption allowances, which consist of depreciation and accidental damage to fixed business property. These figures represent establishment totals (see Appendix A).

IBT = Indirect business tax and nontax liability and business transfer payments. Includes federal excise taxes for which the industry has legal responsibility.

Profit Type Income:

Total = Sum of profits and IVA.

Profits = Sum of corporate profits on an establishment basis and income of unincorporated enterprises.

IVA = Inventory valuation adjustment. See *National Income*, 1954 edition, supplement to the *Survey of Current Business*, pp. 44–45 and 135–138.

Appendix C: Selected Measures of Manufacturing Activity by Industry Groups and by Industry, 1947–64

The statistical framework for analyzing the relationship between the OBE and FRB indexes involves comparisons with reweighted FRB series and Census measures of total and net output. The text discussions and tables below include data for selected measures of total and net output. Point differences between these selected measures of manufacturing activity are also shown. In addition, the trends of the various measures for 1948–64 and for the subperiods ending and beginning with 1957 were computed and are shown below. A brief description and derivation of the series appearing in these tables appears below:

FRB As Pub. (column 1) = The published indexes of the Federal Reserve Board for the given industry or groups rebased to 1958 = 100. The weights for these indexes are discussed in Appendix A. The series shown is derived by dividing the given year FRB index by the 1958 FRB index.

FRB Reweighted (columns 2 and 3) = The FRB (output) relatives rebased to 1958 = 100 from 1957–59 = 100 and reweighted by (1) 1958 gross product originating (column 2) and (2) 1958 Census Value of Production (column 3).

Value of Production—VP (column 4) = Deflated Census value of shipments plus deflated change in inventories of finished goods and work in

TABLE B-1

Gross Product Originating, by Industry, 1947–64

(million dollars)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			All Manufacturing Industries						
1947	91,788	66,869	45,271	-27	2,418	6,079	13,128	16,971	-3,843
1948	96,264	74,696	49,367	-14	2,855	6,245	16,243	17,631	-1,388
1949	90,907	72,012	46,983	-14	3,242	6,449	15,352	14,245	1,107
1950	105,517	83,752	53,528	-135	3,492	7,082	19,785	23,001	-3,216
1951	116,172	98,602	63,572	-92	4,044	7,510	23,568	24,173	-605
1952	118,710	102,868	68,726	9	4,698	8,591	20,844	20,198	646
1953	128,599	112,048	76,229	11	5,567	9,235	21,006	21,652	-646
1954	119,450	106,248	72,743	51	6,372	8,687	18,395	18,723	-328
1955	133,561	120,846	79,884	-47	7,171	9,694	24,144	25,460	-1,316
1956	134,050	126,761	86,321	9	7,741	10,148	22,542	24,188	-1,646
1957	134,556	131,386	90,089	129	8,551	10,714	21,903	22,774	-871
1958	123,673	123,673	86,242	296	9,103	10,580	17,452	17,658	-206
1959	138,950	141,128	95,776	120	9,426	11,494	24,312	24,678	-366
1960	140,904	144,368	99,424	99	9,831	12,428	22,586	22,254	332
1961	140,423	144,172	99,718	199	10,405	12,531	21,319	21,451	-132
1962	154,605	158,759	108,158	320	12,189	13,477	24,615	24,467	148
1963	162,439	167,035	112,888	328	12,765	14,294	26,760	27,264	-504
1964	173,613	179,808	120,460	338	13,742	15,135	30,133	30,466	-333

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Nondurable Goods Industries						
1947	39,446	33,283	20,036	-2	1,154	4,756	7,339	9,011	-1,672
1948	41,292	36,614	21,826	23	1,373	4,712	8,680	8,395	285
1949	40,415	34,926	21,514	42	1,595	4,811	6,964	6,256	708
1950	44,732	38,033	23,514	13	1,699	5,157	7,650	9,524	-1,874
1951	47,217	43,279	25,970	30	1,899	5,378	10,002	9,870	132
1952	47,250	44,057	27,258	33	2,102	6,147	8,517	7,749	768
1953	49,455	46,241	29,159	23	2,338	6,250	8,471	8,313	158
1954	48,281	45,541	29,265	66	2,721	6,064	7,425	7,445	-20
1955	52,872	50,310	31,266	45	3,073	6,381	9,545	9,504	41
1956	54,620	53,182	33,367	43	3,341	7,019	9,412	9,647	-235
1957	54,944	53,761	34,649	92	3,677	7,265	8,078	8,387	-309
1958	54,039	54,039	34,665	148	4,074	7,526	7,626	7,511	115
1959	59,010	59,933	37,553	73	4,280	7,925	10,102	10,120	-18
1960	59,939	61,908	38,945	21	4,334	8,592	10,016	9,866	150
1961	60,697	63,004	39,897	119	4,652	8,847	9,489	9,602	-113
1962	64,650	66,863	42,136	189	5,453	9,197	9,888	9,805	83
1963	66,823	69,604	43,507	224	5,800	9,611	10,462	10,692	-230
1964	71,323	74,408	46,003	260	6,237	10,141	11,767	11,680	87

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958)$	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Durable Goods Industries						
1947	52,342	33,586	25,235	-25	1,264	1,323	5,789	7,960	-2,171
1948	54,972	38,082	27,541	-37	1,482	1,533	7,563	9,236	-1,673
1949	50,492	37,086	25,469	-56	1,647	1,638	8,388	7,989	399
1950	60,785	45,719	30,014	-148	1,793	1,925	12,135	13,477	-1,342
1951	68,955	55,323	37,602	-122	2,145	2,132	13,566	14,303	-737
1952	71,460	58,811	41,468	-24	2,596	2,444	12,327	12,449	-122
1953	79,144	65,807	47,070	-12	3,229	2,985	12,535	13,339	-804
1954	71,169	60,707	43,478	-15	3,651	2,623	10,970	11,278	-308
1955	80,689	70,536	48,618	-92	4,098	3,313	14,599	15,956	-1,357
1956	79,430	73,579	52,954	-34	4,400	3,129	13,130	14,541	-1,411
1957	79,612	77,625	55,440	37	4,874	3,449	13,825	14,387	-562
1958	69,634	69,634	51,577	148	5,029	3,054	9,826	10,147	-321
1959	79,940	81,195	58,223	47	5,146	3,569	14,210	14,558	-348
1960	80,965	82,460	60,479	78	5,497	3,836	12,570	12,388	182
1961	79,726	81,168	59,821	80	5,753	3,684	11,830	11,849	-19
1962	89,955	91,896	66,022	131	6,736	4,280	14,727	14,662	65
1963	95,616	97,431	69,381	104	6,965	4,683	16,298	16,572	-274
1964	102,290	105,400	74,457	78	7,505	4,994	18,366	18,786	-420

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Food and Kindred Products, SIC 20						
1947	11,391	9,432	5,014	16	352	2,454	1,596	2,193	-597
1948	11,880	10,205	5,342	26	433	2,285	2,119	1,857	262
1949	11,380	10,208	5,445	32	497	2,346	1,888	1,825	63
1950	12,360	10,605	5,779	33	522	2,542	1,729	2,030	-301
1951	12,552	11,134	6,386	50	579	2,567	1,552	1,771	-219
1952	13,017	12,171	6,728	45	604	2,835	1,959	1,795	164
1953	13,977	12,719	7,141	28	616	2,908	2,026	1,978	48
1954	13,478	12,777	7,396	34	664	2,797	1,886	1,944	-58
1955	14,174	13,777	7,747	34	741	2,892	2,363	2,160	203
1956	14,771	14,032	8,246	35	761	3,087	1,903	2,046	-143
1957	15,158	14,279	8,521	46	808	2,953	1,951	1,991	-40
1958	14,996	14,996	8,701	46	989	3,030	2,230	2,239	-9
1959	15,098	15,944	9,215	37	1,045	3,129	2,518	2,434	84
1960	15,464	16,345	9,662	34	1,081	3,178	2,390	2,451	-61
1961	15,256	16,812	9,901	47	1,134	3,287	2,443	2,445	-2
1962	15,794	17,358	10,248	66	1,298	3,389	2,357	2,397	-40
1963	16,615	18,077	10,484	66	1,323	3,502	2,702	2,876	-174
1964	17,553	19,361	11,000	67	1,401	3,911	2,982	2,806	176

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Tobacco Manufactures, SIC 21						
1947	2,011	1,633	207	15	9	1,268	134	189	-55
1948	2,144	1,746	215	19	11	1,317	184	241	-57
1949	2,273	1,834	229	20	13	1,326	246	262	-16
1950	2,184	1,836	241	20	14	1,354	207	291	-84
1951	2,418	2,013	278	21	15	1,452	247	299	-52
1952	2,522	2,272	295	22	14	1,672	269	289	-20
1953	2,341	2,343	314	25	17	1,624	363	346	17
1954	2,200	2,262	326	24	19	1,552	341	332	9
1955	2,336	2,331	339	23	21	1,604	344	395	-51
1956	2,467	2,419	362	24	24	1,645	364	415	-51
1957	2,570	2,554	374	28	27	1,713	412	448	-36
1958	2,738	2,738	385	22	31	1,829	471	526	-55
1959	2,906	2,889	405	19	36	1,872	557	574	-17
1960	3,027	3,025	439	22	40	1,968	556	597	-41
1961	3,174	3,132	438	18	42	2,035	599	650	-51
1962	3,293	3,236	463	22	52	2,048	651	641	10
1963	3,346	3,410	476	17	59	2,135	723	675	48
1964	3,259	3,348	504	18	59	2,087	680	650	30

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Textile Mill Products, SIC 22						
1947	3,730	4,703	3,114	-6	131	59	1,405	1,559	-154
1948	4,098	5,253	3,556	-5	157	67	1,478	1,540	-62
1949	3,776	4,203	3,172	-5	173	62	801	639	162
1950	3,965	4,595	3,630	-1	192	70	704	1,196	-492
1951	4,079	5,241	3,771	14	208	76	1,172	922	250
1952	4,078	4,661	3,655	10	216	69	711	460	251
1953	3,987	4,501	3,690	7	229	71	504	470	34
1954	3,793	3,914	3,322	11	240	68	273	258	15
1955	4,226	4,408	3,531	11	267	73	526	501	25
1956	4,284	4,502	3,602	22	281	74	523	511	12
1957	4,190	4,303	3,497	28	299	73	406	406	0
1958	4,122	4,122	3,318	23	289	69	423	346	77
1959	4,542	4,701	3,722	15	282	74	608	645	-37
1960	4,396	4,734	3,708	19	290	77	640	563	77
1961	4,396	4,506	3,663	23	320	74	426	480	-54
1962	4,808	4,957	3,906	37	339	83	592	593	-1
1963	4,967	5,012	3,950	39	349	90	584	604	-20
1964	5,361	5,511	4,210	38	367	95	801	752	49

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Apparel and Related Products, SIC 23						
1947	3,676	3,569	2,806	-7	46	38	686	797	-111
1948	3,888	3,678	3,051	-4	55	41	535	530	5
1949	3,839	3,524	2,944	-5	64	42	479	377	102
1950	4,184	3,619	3,172	1	66	44	336	559	-223
1951	4,480	4,010	3,313	8	71	44	574	474	100
1952	4,483	4,129	3,453	-3	73	45	561	481	80
1953	4,603	4,272	3,666	-1	77	48	482	441	41
1954	4,300	4,076	3,530	-2	79	49	420	410	10
1955	4,613	4,327	3,740	3	87	53	444	453	-9
1956	4,701	4,616	3,970	1	89	56	500	489	11
1957	4,629	4,550	4,026	1	82	55	386	381	5
1958	4,559	4,559	3,918	-2	95	59	489	447	42
1959	4,894	4,879	4,300	5	95	63	416	479	-63
1960	5,101	5,101	4,414	4	92	64	527	497	30
1961	5,068	5,230	4,451	8	107	70	594	587	7
1962	5,432	5,682	4,864	16	121	76	605	613	-8
1963	5,526	5,874	5,030	24	123	81	616	629	-13
1964	5,840	6,295	5,337	29	134	87	708	731	-23

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
Lumber and Wood Products, Except Furniture, SIC 24									
1947	3,285	2,651	1,778	4	103	35	731	910	-179
1948	3,224	2,982	1,957	7	144	45	829	857	-28
1949	2,979	2,562	1,732	8	174	48	600	550	50
1950	3,239	3,213	2,066	6	188	52	901	1,071	-170
1951	3,301	3,621	2,377	7	229	58	950	925	25
1952	3,206	3,411	2,378	9	242	61	721	719	2
1953	3,106	3,339	2,369	9	247	60	654	633	21
1954	3,018	3,199	2,247	8	250	65	629	651	-22
1955	3,487	3,755	2,515	9	292	69	870	912	-42
1956	3,475	3,798	2,588	14	304	77	815	776	39
1957	3,272	3,367	2,350	23	330	77	587	544	43
1958	3,306	3,306	2,297	20	295	82	612	646	-34
1959	3,619	3,861	2,616	20	322	81	822	862	-40
1960	3,550	3,674	2,555	32	339	88	660	574	86
1961	3,479	3,458	2,438	38	331	89	562	548	14
1962	3,784	3,727	2,591	50	347	95	644	657	-13
1963	3,965	4,009	2,723	53	353	102	778	816	-38
1964	4,263	4,425	2,970	64	397	109	885	896	-11

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Furniture and Fixtures, SIC 25						
1947	1,425	1,013	901	1	45	27	39	236	-197
1948	1,657	1,238	991	1	37	20	189	221	-32
1949	1,569	1,219	949	-1	43	22	206	179	27
1950	1,901	1,458	1,163	0	46	25	224	303	-79
1951	1,807	1,603	1,229	1	54	28	291	282	9
1952	1,950	1,675	1,312	0	57	29	277	268	9
1953	1,946	1,687	1,394	0	58	29	206	229	-23
1954	1,872	1,636	1,329	0	63	30	214	209	5
1955	2,171	1,893	1,503	2	71	34	283	325	-42
1956	2,186	2,022	1,597	2	71	36	316	340	-24
1957	2,091	2,032	1,643	0	70	38	281	277	4
1958	1,911	1,911	1,597	1	78	37	198	214	-16
1959	2,180	2,182	1,787	0	87	41	267	278	-11
1960	2,147	2,211	1,817	3	91	41	259	254	5
1961	2,066	2,190	1,782	5	92	44	267	257	10
1962	2,218	2,393	1,943	7	99	50	294	296	-2
1963	2,282	2,487	2,030	5	91	52	309	331	-22
1964	2,460	2,716	2,204	6	83	55	368	380	-12

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Paper and Allied Products, SIC 26						
1947	3,631	2,502	1,408	-5	114	40	945	1,086	-141
1948	3,342	2,630	1,573	-4	140	46	875	905	-30
1949	3,329	2,457	1,544	-4	162	49	706	637	69
1950	4,328	3,051	1,785	-9	177	54	1,044	1,145	-101
1951	4,626	3,844	2,053	-14	206	69	1,530	1,571	-41
1952	4,114	3,583	2,138	-12	233	75	1,149	1,118	31
1953	4,528	3,808	2,369	-14	266	81	1,106	1,114	-8
1954	4,567	3,923	2,451	-7	314	80	1,085	1,081	4
1955	5,109	4,424	2,679	-3	386	88	1,274	1,327	-53
1956	5,280	5,005	2,913	1	423	99	1,569	1,575	-6
1957	4,882	4,853	3,032	12	480	110	1,219	1,244	-25
1958	4,820	4,820	3,094	26	531	112	1,057	1,060	-3
1959	5,480	5,403	3,415	17	546	114	1,311	1,319	-8
1960	5,397	5,532	3,573	20	568	121	1,250	1,199	51
1961	5,737	5,737	3,769	37	622	128	1,181	1,167	14
1962	6,121	6,127	4,020	35	750	140	1,182	1,155	27
1963	6,584	6,171	4,197	40	755	148	1,031	1,071	-40
1964	6,746	6,598	4,414	38	832	157	1,157	1,175	-18

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Printing and Publishing, SIC 27						
1947	4,613	3,234	2,344	-7	82	54	761	825	-64
1948	4,724	3,510	2,605	-6	103	62	746	795	-49
1949	4,803	3,689	2,750	-3	123	69	750	744	6
1950	4,992	3,884	2,925	-5	135	72	757	792	-35
1951	5,078	4,144	3,164	-5	151	76	758	821	-63
1952	5,092	4,420	3,386	-8	161	79	802	837	-35
1953	5,402	4,792	3,679	-9	175	89	858	862	-4
1954	5,688	4,977	3,865	-8	184	85	851	851	0
1955	6,042	5,444	4,131	-12	217	92	1,016	1,037	-21
1956	6,280	5,809	4,447	-14	235	99	1,042	1,070	-28
1957	6,364	6,167	4,700	-20	265	105	1,117	1,147	-30
1958	6,128	6,128	4,819	-20	295	110	924	925	-1
1959	6,594	6,700	5,159	-17	311	115	1,132	1,148	-16
1960	6,764	7,122	5,487	-27	340	125	1,197	1,201	-4
1961	6,765	7,239	5,668	-25	355	130	1,111	1,109	2
1962	7,041	7,689	5,900	-10	430	141	1,228	1,233	-5
1963	7,018	7,923	6,138	2	460	153	1,170	1,170	0
1964	7,701	8,671	6,550	3	505	161	1,452	1,449	3

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Chemicals and Allied Products, SIC 28						
1947	4,072	3,685	2,174	-17	216	62	1,250	1,617	-367
1948	4,817	4,403	2,364	-13	279	70	1,703	1,523	180
1949	4,985	4,586	2,377	-16	331	80	1,814	1,574	240
1950	6,023	5,433	2,632	-27	374	86	2,368	2,657	-289
1951	6,503	6,542	3,200	-32	435	103	2,836	2,843	-7
1952	6,570	6,465	3,476	-5	548	126	2,320	2,205	115
1953	7,018	6,899	3,880	-3	672	133	2,217	2,233	-16
1954	7,252	7,208	4,017	8	801	131	2,251	2,272	-21
1955	8,530	8,462	4,300	5	931	145	3,081	2,983	98
1956	8,981	8,774	4,773	-4	987	166	2,852	2,903	-51
1957	9,395	9,273	5,161	8	1,058	178	2,868	2,953	-85
1958	9,218	9,218	5,238	34	1,144	191	2,611	2,547	64
1959	10,928	10,775	5,660	13	1,252	201	3,649	3,564	85
1960	10,975	10,766	5,992	-16	1,244	220	3,326	3,297	29
1961	11,534	11,165	6,233	17	1,366	229	3,320	3,324	-4
1962	12,446	11,961	6,600	22	1,660	251	3,428	3,365	63
1963	13,088	12,604	6,939	30	1,768	293	3,574	3,674	-100
1964	14,009	13,491	7,367	34	1,854	311	3,925	4,042	-117

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Petroleum and Related Industries, SIC 29						
1947	2,070	1,881	965	9	124	575	208	314	-106
1948	2,261	2,458	1,095	6	107	630	620	652	-32
1949	2,269	1,934	1,134	19	148	650	-17	-44	27
1950	2,595	2,264	1,163	1	135	707	258	265	-7
1951	2,624	2,798	1,395	-11	128	770	516	532	-16
1952	2,658	2,713	1,529	-16	135	1,023	42	30	12
1953	2,824	3,144	1,626	-18	156	1,065	315	349	-34
1954	2,746	2,948	1,700	-2	276	1,091	-117	-145	28
1955	3,100	3,184	1,759	-25	252	1,192	6	15	-9
1956	3,179	3,678	1,858	-34	351	1,508	-5	21	-26
1957	3,144	3,291	1,991	-24	443	1,742	-861	-733	-128
1958	3,124	3,124	1,968	-1	451	1,787	-1,081	-1,137	56
1959	3,310	3,740	2,020	-30	462	1,977	-689	-726	37
1960	3,498	4,268	2,003	-57	413	2,458	-549	-499	-50
1961	3,530	4,187	2,059	-29	419	2,473	-735	-747	12
1962	3,826	4,217	2,033	-26	469	2,572	-831	-831	0
1963	4,068	4,700	2,068	-37	603	2,699	-633	-649	16
1964	4,508	4,925	2,081	-17	717	2,790	-646	-656	10

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Rubber and Misc. Plastic Products, SIC 30						
1947	2,584	1,483	1,018	2	60	191	212	174	38
1948	2,403	1,442	1,008	5	65	178	186	190	-4
1949	2,185	1,333	941	5	58	170	159	126	33
1950	2,556	1,590	1,133	-1	60	212	186	410	-224
1951	3,210	2,173	1,339	-3	80	203	554	514	40
1952	3,181	2,246	1,441	0	90	205	510	379	131
1953	3,193	2,363	1,599	5	103	213	443	385	58
1954	2,766	2,066	1,500	6	118	193	249	295	-46
1955	3,187	2,521	1,785	7	142	223	364	459	-95
1956	3,105	2,813	1,887	9	157	265	495	454	41
1957	3,067	2,941	2,015	10	180	316	420	392	28
1958	2,878	2,878	1,930	15	213	319	401	418	-17
1959	3,609	3,299	2,233	9	213	360	484	509	-25
1960	3,764	3,350	2,268	14	224	358	486	408	78
1961	3,751	3,421	2,296	17	249	398	461	450	11
1962	4,275	3,899	2,623	20	297	473	486	476	10
1963	4,322	4,028	2,736	28	309	484	471	463	8
1964	4,703	4,360	2,969	32	321	511	527	522	5

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Leather and Leather Products, SIC 31						
1947	1,668	1,161	986	-2	20	15	142	257	-115
1948	1,735	1,289	1,017	-1	23	16	234	162	72
1949	1,576	1,158	978	-1	26	17	138	116	22
1950	1,545	1,156	1,054	1	24	16	61	179	-118
1951	1,647	1,380	1,071	2	26	18	263	123	140
1952	1,535	1,397	1,157	0	28	18	194	155	39
1953	1,582	1,400	1,195	3	27	18	157	135	22
1954	1,491	1,390	1,158	2	26	18	186	147	39
1955	1,555	1,432	1,255	2	29	19	127	174	-47
1956	1,572	1,534	1,309	3	33	20	169	163	6
1957	1,545	1,550	1,332	3	35	20	160	158	2
1958	1,456	1,456	1,294	5	36	20	101	140	-39
1959	1,649	1,603	1,424	5	38	20	116	174	-58
1960	1,553	1,665	1,399	8	42	23	193	152	41
1961	1,486	1,575	1,419	6	38	23	89	137	-48
1962	1,614	1,737	1,479	7	37	24	190	163	27
1963	1,589	1,805	1,489	15	51	26	224	179	45
1964	1,643	1,848	1,571	18	47	31	181	209	-28

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
Stone, Clay, and Glass Products, SIC 32									
1947	3,405	2,067	1,495	-2	84	32	458	519	-61
1948	3,636	2,389	1,699	-2	105	36	551	609	-58
1949	3,388	2,382	1,629	-3	121	40	595	597	-2
1950	4,058	2,946	1,880	-6	136	42	894	927	-33
1951	4,356	3,350	2,237	-7	159	50	911	936	-25
1952	4,114	3,213	2,225	-6	186	55	753	763	-10
1953	4,423	3,605	2,439	-9	230	70	875	920	-45
1954	4,323	3,679	2,419	-9	250	65	954	973	-19
1955	4,973	4,411	2,727	-14	288	77	1,333	1,368	-35
1956	4,897	4,569	2,953	-13	305	80	1,244	1,288	-44
1957	4,755	4,617	3,030	-5	383	86	1,123	1,161	-38
1958	4,661	4,661	3,010	-1	478	99	1,075	1,105	-30
1959	5,242	5,363	3,416	-8	484	102	1,369	1,382	-13
1960	5,128	5,277	3,531	7	538	106	1,095	1,095	0
1961	5,043	5,189	3,485	8	549	111	1,036	1,036	0
1962	5,358	5,481	3,707	8	633	123	1,010	1,012	-2
1963	5,739	5,825	3,904	11	653	132	1,125	1,123	2
1964	6,114	6,236	4,191	14	690	144	1,197	1,207	-10

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Primary Metal Industries, SIC 33						
1947	11,796	5,674	4,173	-1	325	111	1,066	1,453	-387
1948	11,711	6,277	4,548	1	352	111	1,265	1,539	-274
1949	10,168	5,989	4,080	6	384	122	1,397	1,284	113
1950	12,430	7,682	5,041	-14	422	131	2,102	2,315	-213
1951	14,866	9,841	6,225	-16	514	152	2,966	3,025	-59
1952	13,171	8,943	6,265	24	711	176	1,767	1,776	-9
1953	15,233	10,846	7,106	63	1,057	221	2,399	2,457	-58
1954	11,899	9,210	6,243	41	1,229	193	1,504	1,565	-61
1955	14,572	11,789	7,558	1	1,313	216	2,701	2,939	-238
1956	14,308	12,591	8,262	11	1,347	227	2,744	2,826	-82
1957	13,984	13,299	8,675	20	1,400	247	2,957	2,818	139
1958	10,912	10,912	7,542	90	1,290	244	1,746	1,782	-36
1959	12,181	12,364	8,469	59	1,212	246	2,378	2,420	-42
1960	12,001	12,589	8,905	58	1,328	269	2,029	1,970	59
1961	11,286	11,647	8,562	34	1,384	278	1,389	1,407	-18
1962	12,055	12,742	9,216	59	1,723	307	1,437	1,357	80
1963	12,722	13,371	9,492	51	1,778	323	1,727	1,782	-55
1964	14,208	15,132	10,476	47	1,942	344	2,323	2,480	-157

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Fabricated Metal Products, SIC 34						
1947	5,913	4,127	3,135	-9	150	68	783	1,097	-314
1948	6,026	4,634	3,418	-6	164	82	976	1,196	-220
1949	5,403	4,225	3,176	-8	179	86	792	785	7
1950	6,566	5,338	3,804	-11	192	94	1,259	1,387	-128
1951	6,908	6,355	4,524	-11	234	108	1,500	1,590	-90
1952	7,088	6,301	4,798	-5	264	116	1,128	1,202	-74
1953	7,875	6,954	5,472	-3	296	132	1,057	1,203	-146
1954	7,601	6,674	5,214	-4	318	132	1,014	1,054	-40
1955	8,089	7,377	5,768	-4	361	139	1,113	1,279	-166
1956	8,208	7,830	6,174	7	362	151	1,136	1,325	-189
1957	8,409	8,291	6,526	7	397	168	1,193	1,312	-119
1958	7,804	7,804	6,146	13	437	171	1,037	1,084	-47
1959	8,726	8,630	6,830	12	453	174	1,161	1,176	-15
1960	8,750	8,706	7,063	22	501	189	931	921	10
1961	8,751	8,795	6,891	18	523	197	1,166	1,157	9
1962	9,464	9,596	7,455	28	648	215	1,250	1,234	16
1963	9,745	10,008	7,814	31	667	230	1,266	1,301	-35
1964	10,550	11,004	8,503	48	706	245	1,502	1,519	-17

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Machinery, Except Electrical, SIC 35						
1947	9,509	5,829	4,476	-1	214	124	1,016	1,440	-424
1948	10,126	6,683	4,973	-14	258	147	1,319	1,740	-421
1949	8,782	6,165	4,345	-11	291	151	1,389	1,361	28
1950	9,572	6,959	4,847	-26	319	162	1,657	1,910	-253
1951	12,256	9,707	6,658	-23	376	201	2,495	2,731	-236
1952	13,323	10,698	7,428	-6	441	230	2,605	2,630	-25
1953	13,212	10,794	7,939	-7	493	260	2,109	2,320	-211
1954	11,926	9,946	7,250	-10	566	253	1,887	1,930	-43
1955	12,194	10,414	7,768	-13	649	275	1,735	2,026	-291
1956	13,470	12,379	9,005	-5	711	313	2,355	2,708	-353
1957	12,802	12,584	9,322	-6	780	335	2,153	2,386	-233
1958	10,921	10,921	8,246	10	796	324	1,545	1,590	-45
1959	12,687	12,941	9,475	0	910	337	2,219	2,334	-115
1960	12,722	13,104	9,832	11	945	371	1,945	1,965	-20
1961	12,624	13,116	9,728	7	1,008	376	1,997	2,021	-24
1962	14,121	14,813	10,763	5	1,159	394	2,492	2,515	-23
1963	14,696	15,475	11,383	13	1,122	415	2,542	2,598	-56
1964	16,739	17,927	12,684	26	1,313	443	3,461	3,544	-83

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Electrical Machinery, SIC 36						
1947	5,235	4,167	3,189	-5	83	303	597	842	-245
1948	5,389	4,424	3,342	-3	114	332	639	826	-187
1949	4,895	4,146	2,998	-5	120	280	753	656	97
1950	6,157	5,264	3,580	-20	136	375	1,193	1,361	-168
1951	7,062	6,313	4,450	-12	157	454	1,264	1,365	-101
1952	8,299	7,262	5,072	0	187	480	1,523	1,523	0
1953	9,096	8,086	5,931	-7	226	552	1,384	1,479	-95
1954	8,123	7,311	5,444	1	258	399	1,209	1,240	-31
1955	8,779	7,769	5,996	0	304	440	1,029	1,192	-163
1956	9,501	8,674	6,725	11	342	448	1,148	1,240	-92
1957	9,767	9,552	7,153	22	380	464	1,533	1,518	15
1958	9,348	9,348	7,063	15	431	456	1,383	1,391	-8
1959	11,085	11,185	8,415	-3	425	517	1,831	1,877	-46
1960	11,660	11,532	9,097	-2	460	518	1,459	1,418	41
1961	12,274	12,041	9,498	11	522	539	1,471	1,461	10
1962	14,034	13,290	10,521	21	591	590	1,567	1,538	29
1963	14,770	13,633	10,717	20	664	634	1,598	1,614	-16
1964	15,622	14,091	11,083	-10	718	667	1,633	1,702	-69

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Motor Vehicles and Equipment, SIC 371						
1947	6,024	3,964	2,413	6	132	465	948	1,080	-132
1948	6,595	4,603	2,660	-21	154	579	1,231	1,491	-260
1949	6,988	5,639	2,763	-35	167	718	2,026	1,997	29
1950	9,889	7,506	3,507	-64	190	849	3,024	3,178	-154
1951	9,427	7,127	3,933	-61	200	874	2,181	2,282	-101
1952	8,296	7,500	4,027	-55	234	1,074	2,220	2,252	-32
1953	10,419	9,117	5,007	-71	309	1,406	2,466	2,517	-51
1954	9,071	7,910	4,411	-50	374	1,259	1,916	1,948	-32
1955	13,058	11,752	5,549	-70	433	1,823	4,017	4,186	-169
1956	9,781	9,165	5,203	-73	519	1,523	1,993	2,173	-180
1957	10,254	9,936	5,296	-67	633	1,736	2,338	2,431	-93
1958	7,092	7,092	4,535	-46	640	1,338	625	659	-34
1959	9,980	10,239	5,210	-87	623	1,748	2,745	2,726	19
1960	11,011	10,978	5,657	-125	621	1,921	2,904	2,907	-3
1961	9,807	9,758	5,137	-93	615	1,690	2,409	2,401	8
1962	12,923	13,117	6,369	-108	740	2,119	3,997	3,995	2
1963	14,912	14,972	7,095	-148	768	2,368	4,889	4,919	-30
1964	15,103	15,481	7,706	-150	798	2,533	4,594	4,609	-15

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
Transportation Equipment and Ordnance, Except Motor Vehicles, SIC 37+19-371									
1947	2,655	1,670	1,797	-19	55	49	-212	-74	-138
1948	3,215	2,157	1,906	-4	62	61	132	260	-128
1949	3,151	2,193	1,860	-8	71	61	209	207	2
1950	3,324	2,360	1,913	-14	68	71	322	393	-71
1951	4,890	3,927	3,391	-2	98	81	359	444	-85
1952	7,598	6,063	5,145	8	137	98	675	684	-9
1953	9,139	7,311	6,240	5	168	118	780	948	-168
1954	8,763	7,107	5,813	0	187	113	994	1,031	-37
1955	8,428	7,012	5,935	-7	204	119	761	960	-199
1956	8,495	7,790	6,827	0	220	133	610	1,043	-433
1957	9,322	9,098	7,671	25	261	153	988	1,190	-202
1958	8,791	8,791	7,440	24	317	158	852	902	-50
1959	8,756	8,905	7,926	37	351	164	427	504	-77
1960	8,534	8,781	7,768	52	392	170	399	375	24
1961	8,877	9,179	7,994	40	404	191	550	554	-4
1962	10,145	10,541	8,866	47	445	209	974	973	1
1963	10,666	11,167	9,445	40	483	230	969	1,005	-36
1964	10,885	11,636	9,614	2	544	242	1,234	1,279	-45

(continued)

TABLE B-1 (continued)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
			Instruments and Related Products, SIC 38						
1947	1,366	904	766	-2	19	50	71	104	-33
1948	1,466	1,013	835	-1	21	60	98	121	-23
1949	1,429	1,019	806	-2	23	53	139	115	24
1950	1,675	1,218	950	-2	27	60	183	189	-6
1951	2,015	1,602	1,217	-3	47	63	278	299	-21
1952	2,300	1,831	1,413	0	56	53	309	306	3
1953	2,500	2,035	1,595	1	60	61	318	336	-18
1954	2,468	2,058	1,576	0	66	42	374	383	-9
1955	2,610	2,208	1,682	-1	79	49	399	408	-9
1956	2,759	2,489	1,892	2	107	59	429	443	-14
1957	2,646	2,564	2,035	6	116	61	346	389	-43
1958	2,604	2,604	1,990	10	134	63	407	423	-16
1959	2,980	3,054	2,226	9	143	72	604	611	-7
1960	3,017	3,153	2,336	8	160	73	576	589	-13
1961	3,019	3,218	2,382	6	209	77	544	563	-19
1962	3,251	3,524	2,550	8	232	81	653	662	-9
1963	3,531	3,813	2,677	13	256	91	776	760	16
1964	3,622	3,941	2,785	18	192	100	846	839	7

(continued)

TABLE B-1 (concluded)

Year	Gross Product Originating		Current-Dollar Components						
							Profit-Type Income		
	CO(1958) $	CU $ Total	Employee Compensation	Interest	C C A	I B T	Total	Profits	I V A
Miscellaneous Manufacturing Industries, SIC 39									
1947	1,729	1,520	1,112	3	54	59	292	353	-61
1948	1,927	1,682	1,212	5	71	60	334	376	-42
1949	1,740	1,547	1,131	3	74	57	282	258	24
1950	1,974	1,775	1,263	3	69	64	376	443	-67
1951	2,067	1,877	1,361	5	77	63	371	424	-53
1952	2,115	1,914	1,405	7	81	72	349	326	23
1953	2,195	2,033	1,578	7	85	76	287	297	-10
1954	2,105	1,977	1,532	8	90	72	275	294	-19
1955	2,328	2,156	1,617	5	104	72	358	361	-3
1956	2,350	2,272	1,728	10	112	82	340	379	-39
1957	2,310	2,285	1,739	12	124	84	326	361	-35
1958	2,284	2,284	1,711	12	133	82	346	351	-5
1959	2,504	2,471	1,853	8	136	87	387	388	-1
1960	2,445	2,455	1,918	12	122	90	313	320	-7
1961	2,500	2,577	1,924	6	116	92	439	444	-5
1962	2,602	2,672	2,041	6	119	97	409	423	-14
1963	2,588	2,671	2,101	15	130	106	319	323	-4
1964	2,724	2,811	2,241	13	122	112	323	331	-8

Note: See the beginning of this appendix for the explanation of the abbreviations used in these tables.

process. Value is generally fob plant and excludes excise taxes. For more detailed explanation, see *1958 Census of Manufactures.*

Cost of Materials (column 5) = Deflated cost of materials, supplies, components, semifinished goods, fuels and electricity actually consumed or put into production during the year and cost of products purchased for resale. Cost includes direct charges actually paid or payable for items consumed after discounts and including freight and other direct charges. For more detailed explanation, see *1958 Census of Manufactures.*

Value Added—VA (column 6) = Deflated value of production (above) less deflated cost of materials, etc. (above). Equivalent to adjusted Census value added by manufactures.

VA plus Excise (column 7) = Deflated value added (above) plus deflated federal excise taxes for which the given industry is legally liable.

OBE Gross Product (column 8) = Deflated current-dollar total of gross product originating in the specified industry. For derivation, see Appendix A.

Total (FRB – OBE) (column 9) = Published FRB index (column 1) minus published OBE index (column 8). Differences between the two series may arise from weights and measures of output.

FRB (Net Minus Gross Wtd.) (column 10) = Published FRB index weighted by 1957–59 Census value added (column 1) minus FRB series weighted by 1958 Census value of production (column 3). Since the identical FRB output relatives are used in the calculations of both indexes, discrepancies between the two series arise because of weighting differences. Such disparities are the result of relative differences in the individual industry's contribution to the major group when computed on a net- or gross-output basis.

Total Output (Quantity Minus Deflated) (column 11) = FRB series weighted by 1958 Census value of production (column 3) minus Census series of deflated value of production (column 4). This series generally reflects the difference in total output derived by a quantity extrapolation technique vis-à-vis a deflation procedure. However, differences between the series may arise from data limitations. For example, the two series may differ because of coverage (see discussion for Major Group 34), adjustments due to SIC changes particularly in years when the FRB indexes are linked (Major Group 26) and in changes since 1958 in FRB procedures to derive annual measures (Major Group 25).

Total Minus Net Output (column 12) = Deflated Census value of production (column 4) minus deflated Census value added (column 6). This series measures differences between the movement of gross and net output as derived from deflated Census data. Movement differences between total and net output reflect the industry changes in unit costs relative to unit output because of shifts in product mix, substitutions of materials, technological changes, and other circumstances influencing the amount of work done in an industry.

Excise Tax (column 13) = Deflated Census value added (column 6) minus deflated Census value added plus excise tax (column 7). This difference illustrates the effect of the addition of manufacturer's excise taxes to the value of net output. Since Census value added excluding excise taxes is used to weight the published FRB series and the OBE series includes this nonfactor payment, the difference between the two series quite often is related to these taxes, cf. SIC 20, 21, 29, 30, 36 and 371.

Net Output (Census – OBE) (column 14) = Census value added plus excise taxes (column 7) minus published OBE (column 8). Disparities between these two measures are based on differences in the movements of the current-dollar series and partially reflect changes occasiond by the conceptual differences between the two measures including inventory valuation adjustment (IVA) in the GPO series. The use of independent data sources may also be a cause of differences and reflect differencs in classification by the several government agencies.

In addition to measures of trend, shown below, averages of the absolute value of the percentage changes over the entire period for each of the series shown in columns 1 through 8 were computed. The standard deviation of these percentage changes was also calculated. The results indicated that generally the averages and the distribution about these averages for each of the series were approximately of the same magnitude by industry. The variation in any one series was not significantly greater than the variation in the others.

GROWTH RATES

The average annual growth rates of the various series by industry for selected periods are shown below. These measures show the average annual compounded rate of change between the initial and terminal years of each period. The computations are based on the "Growth Rate Conversion Tables" appearing in Bureau of the Census, *Long Term Economic Growth 1860–1965*, ES-4-No. 1, October 1966, p. 115.

Appendix D: Implicit Price Deflators by Industry Groups and by Industry, 1947–64

EXPLANATION OF ABBREVIATIONS USED IN TABLES

These tables contain implicit price deflators (current-dollar series divided by constant-dollar series) for the series indicated below. A description of how these price deflators are derived appears in Appendix A.

Value of Production (VP) = Census value of shipments plus change in inventory of finished goods and work in process.

TABLE C-1

Average Annual Rates of Growth by Industry for Selected Periods

Periods	FRB			Deflated Census Data				OBE
	As Pub.	Reweighted		VP	Cost of Materials	VA	VA Plus Excise	Gross Product
		GPO	VP					
				All Manufacturing Industries				
1947–64	4.2	4.0	3.9	3.5	3.4	3.7	3.6	3.8
1948–64	4.2	4.1	3.9					3.8
1947–57	4.3	4.0	3.9	3.6	3.6	3.6	3.5	3.9
1948–57	4.3	4.1	4.0					3.8
1957–64	4.0	4.0	3.9	3.4	3.2	3.7	3.7	3.7
				Nondurable Goods Industries				
1947–64	4.1	3.8	3.6	3.5	3.4	3.6	3.5	3.5
1948–64	4.1	3.9	3.7					3.5
1947–57	3.7	3.3	3.2	3.2	3.1	3.4	3.2	3.4
1948–57	3.7	3.4	3.3					3.2
1957–64	4.6	4.5	4.2	3.8	3.7	4.0	3.9	3.8
				Durable Goods Industries				
1947–64	4.4	4.2	4.2	3.6	3.5	3.7	3.7	4.0
1948–64	4.4	4.2	4.2					4.0
1947–57	4.9	4.6	4.5	3.9	4.1	3.8	3.8	4.3
1948–57	5.0	4.6	4.5					4.2
1957–64	3.6	3.7	3.7	3.1	2.6	3.6	3.6	3.6
				Food and Kindred Products, SIC 20				
1947–64	2.4	2.3	2.4	2.6	2.7	2.4	2.2	2.6
1948–64	2.6	2.6	2.7					2.5
1947–57	1.9	1.6	1.9	2.4	2.1	3.0	2.5	2.9
1948–57	2.2	2.0	2.4					2.7
1957–64	3.2	3.2	3.1	3.0	3.7	1.5	1.7	2.1
				Tobacco Manufactures, SIC 21				
1947–64	2.3	2.6	2.1	1.4	0.6	3.1	2.5	2.9
1948–64	2.3	2.5	1.9					2.7
1947–57	1.5	2.1	1.7	0.3	–0.7	2.6	2.0	2.5
1948–57	1.4	1.8	1.4					2.0
1957–64	3.6	3.4	2.6	2.9	2.5	3.7	3.2	3.4

(continued)

TABLE C-1 (continued)

Periods	FRB As Pub.	FRB Reweighted GPO	FRB Reweighted VP	Deflated Census Data VP	Deflated Census Data Cost of Materials	Deflated Census Data VA	Deflated Census Data VA Plus Excise	OBE Gross Product
				Textile Mill Products, SIC 22				
1947–64	2.2	2.2	2.1	3.2	3.5	2.7	2.7	2.2
1948–64	1.9	1.9	1.8					1.7
1947–57	1.3	1.2	1.2	2.2	2.5	1.9	1.9	1.2
1948–57	0.7	0.6	0.6					0.2
1957–64	3.5	3.5	3.5	4.5	4.9	3.9	3.9	3.6
				Apparel and Related Products, SIC 23				
1947–64	3.5	3.5	3.6	2.9	3.1	2.7	2.7	2.8
1948–64	3.5	3.4	3.5					2.6
1947–57	2.7	2.6	2.7	3.1	3.3	2.8	2.8	2.3
1948–57	2.5	2.4	2.5					2.0
1957–64	4.8	4.7	4.9	2.7	2.7	2.7	2.7	3.4
				Lumber and Wood Products Except Furniture, SIC 24				
1947–64	1.4	1.6	1.6	1.9	2.9	0.9	0.9	1.5
1948–64	1.3	1.5	1.5					1.8
1947–57	0.8	1.0	1.0	1.0	2.7	-0.7	-0.7	0.0
1948–57	0.5	0.7	0.7					0.2
1957–64	2.3	2.6	2.5	3.3	3.2	3.3	3.3	3.8
				Furniture and Fixtures, SIC 25				
1947–64	4.5	4.5	4.6	3.2	3.8	2.6	2.6	3.3
1948–64	4.6	4.6	4.6					2.5
1947–57	3.6	3.6	3.6	3.3	3.7	2.9	2.9	3.9
1948–57	3.6	3.6	3.6					2.6
1957–64	5.8	5.9	5.9	3.0	3.9	2.2	2.2	2.3
				Paper and Allied Products, SIC 26				
1947–64	4.6	4.4	4.5	4.0	4.3	3.7	3.7	3.7
1948–64	4.7	4.5	4.6					4.5
1947–57	4.4	4.2	4.3	3.8	4.6	2.9	2.9	3.0
1948–57	4.6	4.4	4.5					4.3
1957–64	4.8	4.8	4.9	4.2	3.7	4.8	4.8	4.7

(continued)

TABLE C-1 (continued)

Periods	FRB			Deflated Census Data				OBE Gross Product
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost of Materials	VA	VA Plus Excise	
				Printing and Publishing, SIC 27				
1947–64	3.4	3.5	3.6	3.1	3.8	2.8	2.8	3.1
1948–64	3.3	3.4	3.4					3.1
1947–57	3.6	3.8	3.8	3.0	3.4	2.7	2.7	3.3
1948–57	3.4	3.5	3.5					3.4
1957–64	3.2	3.2	3.2	3.3	4.2	2.9	2.9	2.8
				Chemicals and Allied Products, SIC 28				
1947–64	8.2	8.1	7.9	6.7	5.7	7.7	7.7	7.5
1948–64	8.2	8.1	8.0					6.9
1947–57	8.6	8.4	8.1	7.0	5.9	8.1	8.1	8.7
1948–57	8.6	8.5	8.2					7.7
1957–64	7.8	7.7	7.6	6.3	5.4	7.0	7.0	5.9
				Petroleum and Related Industries, SIC 29				
1947–64	3.9	3.8	3.8	4.1	3.8	5.1	4.8	4.7
1948–64	3.7	3.7	3.5					4.4
1947–57	4.6	4.3	4.5	4.8	5.1	3.4	4.0	4.3
1948–57	4.2	4.1	4.1					3.7
1957–64	3.0	3.1	2.8	3.1	2.0	7.7	6.0	5.3
				Rubber and Miscellaneous Plastic Products, SIC 30				
1947–64	6.2	5.4	5.6	4.4	5.0	3.9	3.7	3.6
1948–64	6.5	6.0	6.1					4.3
1947–57	5.6	4.2	4.4	2.9	4.0	2.0	1.8	1.7
1948–57	6.1	5.1	5.3					2.8
1957–64	7.0	7.1	7.3	6.6	6.6	6.6	6.4	6.3
				Leather and Leather Products, SIC 31				
1947–64	0.6	0.6	0.5	-0.1	0.7	-0.7	-0.7	-0.1
1948–64	0.9	0.9	0.8					-0.3
1947–57	0.7	0.7	0.5	-0.2	1.4	-1.6	-1.6	-0.8
1948–57	1.3	1.3	1.1					-1.3
1957–64	0.5	0.5	0.4	0.1	-0.4	0.5	0.5	0.9

(continued)

TABLE C-1 (continued)

Periods	F R B As Pub.	F R B Reweighted GPO	F R B Reweighted VP	Deflated Census Data VP	Deflated Census Data Cost of Materials	Deflated Census Data VA	Deflated Census Data VA Plus Excise	OBE Gross Product
Stone, Clay, and Glass Products, SIC 32								
1947–64	3.8	4.0	4.3	4.3	5.3	3.7	3.7	3.5
1948–64	3.6	3.8	4.0					3.3
1947–57	3.9	4.3	4.6	4.8	6.4	3.8	3.8	3.4
1948–57	3.6	3.9	4.1					3.0
1957–64	3.6	3.7	3.8	3.6	3.8	3.5	3.5	3.7
Primary Metal Industries, SIC 33								
1947–64	2.1	2.2	2.3	1.8	2.3	1.1	1.1	1.1
1948–64	2.0	2.1	2.2					1.2
1947–57	2.1	2.4	2.4	1.8	2.2	1.2	1.2	1.7
1948–57	1.9	2.2	2.2					2.0
1957–64	2.0	2.0	2.1	1.7	2.4	0.9	0.9	0.2
Fabricated Metal Products, SIC 34								
1947–64	3.3	3.4	3.4	2.8	2.7	2.8	2.8	3.5
1948–64	3.4	3.5	3.5					3.6
1947–57	3.0	3.0	3.1	3.1	3.0	3.2	3.2	3.6
1948–57	3.1	3.2	3.2					3.8
1957–64	3.9	3.9	3.8	2.3	2.3	2.3	2.3	3.3
Machinery, Except Electrical, SIC 35								
1947–64	3.5	3.7	3.6	2.7	2.8	2.7	2.7	3.4
1948–64	3.7	3.9	3.8					3.2
1947–57	3.1	3.3	3.2	2.3	2.3	2.2	2.2	3.0
1948–57	3.4	3.6	3.4					2.6
1957–64	4.2	4.3	4.3	3.4	3.4	3.4	3.4	3.9
Electrical Machinery, SIC 36								
1947–64	6.1	6.0	5.9	5.6	4.2	6.7	6.7	6.6
1948–64	6.3	6.1	6.0					6.9
1947–57	7.1	7.0	6.9	4.9	3.7	6.0	6.0	6.4
1948–57	7.4	7.3	7.1					6.8
1957–64	4.8	4.7	4.6	6.5	4.8	7.8	7.7	6.9

(continued)

TABLE C-1 (concluded)

Periods	F R B			Deflated Census Data				OBE Gross Product
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost of Materials	VA	VA Plus Excise	
Trans. Equip. and Ord. Except Mot. Vehicles, SIC 37 + 19 - 371								
1947–64	10.3	9.8	9.2	7.1	6.7	7.4	7.4	8.7
1948–64	10.3	10.1	9.3					7.9
1947–57	16.6	15.7	14.7	12.9	13.6	12.3	12.3	13.4
1948–57	17.3	16.9	15.5					12.5
1957–64	1.9	1.6	1.9	-0.7	-2.4	0.9	0.9	2.2
Motor Vehicles and Equipment, SIC 371								
1947–64	4.6	4.7	4.7	4.3	3.9	5.1	5.1	5.6
1948–64	4.4	4.5	4.5					5.3
1947–57	4.5	4.7	4.7	4.5	4.4	4.9	4.9	5.5
1948–57	4.1	4.3	4.2					5.0
1957–64	4.8	4.7	4.8	4.0	3.2	5.5	5.4	5.7
Instruments and Related Products, SIC 38								
1947–64	5.6	5.6	5.6	5.5	4.9	5.8	5.8	5.9
1948–64	5.8	5.8	5.7					5.8
1947–57	6.2	6.2	6.1	4.8	4.5	4.9	4.9	6.8
1948–57	6.6	6.6	6.5					6.8
1957–64	4.8	4.8	4.8	6.5	5.4	7.1	7.1	4.6
Miscellaneous Manufacturing Industrial, SIC 39								
1947–64	3.1	3.1	3.1	3.2	3.0	3.4	3.4	2.7
1948–64	2.9	2.9	2.9					2.2
1947–57	2.2	2.2	2.2	2.2	1.6	2.6	2.6	2.9
1948–57	1.7	1.7	1.7					2.0
1957–64	4.4	4.4	4.4	4.7	5.2	4.4	4.4	2.4

Note: VA = Value added; VP = Value of production. For other abbreviations see note at the beginning of Appendix C.

TABLE C-2

Selected Measures of Manufacturing Activity 1947–1964: Food and Kindred Products, SIC 20

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	81.0	83.2	81.5	78.0	77.8	78.6	81.2	76.0	5.0	-.5	3.5	-.6	-2.6	5.2
1948	80.2	81.4	79.2					79.2	1.0	1.0				
1949	81.1	81.8	80.6	78.5	80.4	73.9	76.2	75.9	5.2	.5	2.1	4.6	-2.3	.3
1950	84.0	85.7	83.2	80.3	79.4	82.4	84.7	82.4	1.6	.8	2.9	-2.1	-2.3	2.3
1951	85.6	87.2	85.5	82.4	80.9	85.9	87.5	83.7	1.9	.1	3.1	-3.5	-1.6	3.8
1952	87.4	87.4	88.1	85.3	84.8	86.6	87.9	86.8	.6	-.7	2.8	-1.3	-1.3	1.1
1953	88.7	89.2	89.1	87.6	85.6	92.3	93.1	93.2	-4.5	-.4	1.5	-4.7	-.8	-.1
1954	90.7	90.6	91.2	87.3	86.9	88.2	89.0	89.9	.8	-.5	3.9	-.9	-.8	-.9
1955	94.2	94.3	95.4	92.9	93.0	92.6	93.3	94.5	-.3	-1.2	2.5	.3	-.7	-1.2
1956	97.8	98.2	98.9	97.7	96.6	100.3	100.8	98.5	-.7	-1.1	1.2	-2.6	-.5	2.3
1957	97.7	97.6	98.1	98.5	95.6	105.4	104.4	101.1	-3.4	-.4	-.4	-6.9	1.0	3.3
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	104.5	104.7	105.1	104.2	106.4	99.2	99.7	100.7	3.8	-.6	.9	5.0	-.5	-1.0
1960	107.4	107.5	107.8	107.4	108.5	104.7	104.7	103.1	4.3	-.4	.4	2.7	.0	1.6
1961	111.0	111.1	111.4	109.4	112.4	102.2	103.0	101.7	9.3	-.4	2.0	7.2	-.8	1.3
1962	114.3	114.1	114.1	112.7	115.3	106.6	107.2	105.3	9.0	.2	1.4	6.1	-.6	1.9
1963	117.7	117.4	117.5	115.8	117.4	111.9	112.1	110.8	6.9	.2	1.7	3.9	-.2	1.3
1964	121.7	121.8	121.4	121.3	123.1	116.9	117.3	117.1	4.6	.3	.1	4.4	-.4	.2

Note: VP = value of production; VA = value added. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-3

Selected Measures of Manufacturing Activity, 1947–64: Tobacco Manufactures, SIC 21

	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	81.4	76.3	81.0	92.0	105.5	69.7	75.3	73.4	8.0	.4	-11.0	22.3	-5.6	1.9
1948	83.4	80.0	84.2					78.3	5.1	-.8				
1949	82.8	79.7	83.6	98.9	109.1	82.2	82.7	83.0	-.2	-.8	-15.3	16.7	-.5	.3
1950	83.8	81.2	84.9	99.0	113.3	75.4	80.8	79.8	4.0	-1.1	-14.1	23.6	-5.4	1.0
1951	88.8	86.9	90.5	99.5	106.2	88.4	88.6	88.3	.5	-1.7	-9.0	11.1	-.2	.3
1952	91.8	90.8	94.2	101.0	109.7	86.7	89.5	92.1	-.3	-2.4	-6.8	14.3	-2.8	-2.6
1953	89.8	88.9	92.3	95.7	111.8	69.2	80.4	85.5	4.3	-2.5	-3.4	26.5	-11.2	-5.1
1954	86.0	85.0	88.2	88.9	104.0	64.1	75.9	80.4	5.6	-2.2	-.7	24.8	-11.8	-4.5
1955	88.0	87.3	90.1	92.5	101.8	77.2	83.2	85.3	2.7	-2.1	-2.4	15.3	-6.0	-2.1
1956	90.3	90.0	92.3	93.6	96.6	88.5	89.4	90.1	.2	-2.0	-1.3	5.1	-.9	-.7
1957	94.1	93.9	95.6	95.1	98.1	90.0	92.1	93.9	.2	-1.5	.5	5.1	-2.1	-1.8
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	105.0	104.9	103.0	103.0	101.0	106.4	104.1	106.1	-1.1	2.0	.0	-3.4	2.3	-2.0
1960	107.1	107.9	104.3	110.8	111.5	109.6	108.5	110.6	-3.5	2.8	-6.5	1.2	1.1	-2.1
1961	110.5	112.2	106.9	112.7	110.6	116.3	113.5	115.9	-5.4	3.6	-5.8	-3.6	2.8	-2.4
1962	111.7	113.5	107.0	113.3	108.5	121.2	116.0	120.3	-8.6	4.7	-6.3	-7.9	5.2	-4.3
1963	114.9	117.1	109.1	113.4	113.6	113.1	115.1	122.2	-7.3	5.8	-4.3	.3	-2.0	-7.1
1964	120.4	118.8	114.5	116.3	116.3	116.3	115.0	119.0	1.4	5.9	-1.8	.0	1.3	-4.0

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-4

Selected Measures of Manufacturing Activity, 1947–64: Textile Mill Products, SIC 22

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	90.1	90.5	91.0	81.7	80.0	84.1	84.1	90.5	-.4	-.9	9.3	-2.4	.0	-6.4
1948	96.3	96.9	97.2					99.4	-3.1	-.9				
1949	89.1	89.4	89.5	82.1	80.5	84.6	84.6	91.6	-2.5	-.4	7.4	-2.5	.0	-7.0
1950	101.4	101.7	101.8	94.9	91.6	99.6	99.6	96.2	5.2	-.4	6.9	-4.7	.0	3.4
1951	100.3	100.1	100.2	93.6	95.8	90.2	90.2	99.0	1.3	.1	6.6	3.4	.0	-8.8
1952	99.5	99.4	99.3	94.0	97.7	88.5	88.5	98.9	.6	.2	5.3	5.5	.0	-10.4
1953	101.5	101.5	101.4	99.5	102.2	95.5	95.5	96.7	4.8	.1	1.9	4.0	.0	-1.2
1954	94.9	95.0	94.9	91.6	92.1	90.9	90.9	92.0	2.9	.0	3.3	.7	.0	-1.1
1955	104.9	104.9	105.0	103.6	105.7	100.6	100.6	102.5	2.4	-.1	1.4	3.0	.0	-1.9
1956	106.5	106.7	106.9	104.7	105.6	103.4	103.4	103.9	2.6	-.4	2.2	1.3	.0	-.5
1957	102.3	102.4	102.5	101.9	102.2	101.5	101.5	101.6	.7	-.2	.6	.4	.0	-.1
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	115.8	115.9	116.1	111.8	112.2	111.2	111.2	110.2	5.6	-.3	4.3	.6	.0	1.0
1960	111.3	111.4	111.5	109.8	110.9	108.2	108.2	106.6	4.7	-.2	1.7	1.6	.0	1.6
1961	113.6	113.5	113.4	114.2	115.8	111.8	111.8	106.6	7.0	.2	-.8	2.4	.0	5.2
1962	122.3	122.2	122.3	123.5	125.5	120.4	120.4	116.6	5.7	.0	-1.2	3.1	.0	3.8
1963	124.0	123.9	124.0	127.9	131.0	123.1	123.1	120.5	3.5	.0	-3.9	4.8	.0	2.6
1964	130.3	130.2	130.1	138.7	142.7	132.6	132.6	130.1	.2	.2	-8.6	6.1	.0	2.5

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-5

Selected Measures of Manufacturing Activity, 1947–64: Apparel and Related Products, SIC 23

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted												
		GPO	VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	77.8	78.7	77.9	77.7	76.8	78.7	78.7	80.6	-2.8	-.1	.2	-1.0	.0	-1.9
1948	81.1	82.3	81.6					85.3	-4.2	-.5				
1949	80.4	80.9	80.2	83.4	86.8	79.1	79.1	84.2	-3.8	.2	-3.2	4.3	.0	-5.1
1950	86.5	87.7	87.2	83.3	81.8	85.2	85.2	91.8	-5.3	-.7	3.9	-1.9	.0	-6.6
1951	84.9	83.9	83.6	82.6	75.4	91.5	91.5	98.3	-13.4	1.3	1.0	-8.9	.0	-6.8
1952	89.3	89.3	89.1	88.2	86.7	90.0	90.0	98.3	-9.0	.2	.9	-1.8	.0	-8.3
1953	90.9	91.1	91.0	93.4	87.6	100.6	100.6	101.0	-10.1	-.1	-2.4	-7.2	.0	-.4
1954	87.8	88.1	87.8	91.6	90.7	92.8	92.8	94.3	-6.5	.0	-3.8	-1.2	.0	-1.5
1955	96.4	97.0	96.9	99.6	99.2	100.2	100.2	101.2	-4.8	-.5	-2.7	-.6	.0	-1.0
1956	100.3	100.9	100.7	103.2	105.0	101.0	101.0	103.1	-2.8	-.4	-2.5	2.2	.0	-2.1
1957	101.4	101.7	101.6	105.0	106.3	103.6	103.6	101.5	-.1	-.2	-3.4	1.4	.0	2.1
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	113.5	113.9	113.9	106.8	106.1	107.8	107.8	107.3	6.2	-.4	7.1	-1.0	.0	.5
1960	117.4	117.6	117.8	108.6	107.3	110.3	110.3	111.9	5.5	-.4	9.2	-1.7	.0	-1.6
1961	117.6	117.6	117.9	109.3	110.6	107.6	107.6	111.2	6.4	-.3	8.6	1.7	.0	-3.6
1962	124.8	124.9	125.4	115.6	118.4	112.0	112.0	119.1	5.7	-.6	9.8	3.6	.0	-7.1
1963	131.8	131.9	132.6	121.8	122.6	120.9	120.9	121.2	10.6	-.8	10.8	.9	.0	-.3
1964	140.7	140.6	141.6	126.7	128.3	124.7	124.7	128.1	12.6	-.9	14.9	2.0	.0	-3.4

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-6

Selected Measures of Manufacturing Activity, 1947–64: Lumber and Wood Products, Except Furniture, SIC 24

	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	92.3	90.3	90.3	91.1	75.7	111.3	111.3	99.4	-7.1	2.0	-.8	-20.2	.0	11.9
1948	96.0	94.1	94.1					97.5	-1.5	1.9				
1949	84.7	83.0	83.1	80.9	73.4	90.7	90.7	90.1	-5.4	1.6	2.2	-9.8	.0	.6
1950	102.9	101.5	101.7	97.7	87.8	110.6	110.6	98.0	4.9	1.2	4.0	-12.9	.0	12.6
1951	102.7	101.3	101.4	97.6	88.9	108.9	108.9	99.8	2.9	1.3	3.8	-11.3	.0	9.1
1952	101.4	100.3	100.4	97.7	90.8	106.7	106.7	97.0	4.4	1.0	2.7	-9.0	.0	9.7
1953	107.1	105.0	105.1	98.9	93.5	105.9	105.9	94.0	13.1	2.0	6.2	-7.0	.0	11.9
1954	104.2	102.9	103.1	94.2	92.0	97.0	97.0	91.3	12.9	1.1	8.9	-2.8	.0	5.7
1955	114.5	114.2	114.3	107.4	104.8	110.8	110.8	105.5	9.0	.2	6.9	-3.4	.0	5.3
1956	110.3	109.2	109.1	108.4	104.7	113.2	113.2	105.1	5.2	1.2	.7	-4.8	.0	8.1
1957	100.3	99.9	99.9	100.7	98.6	103.4	103.4	99.0	1.3	.4	-.8	-2.7	.0	4.4
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	113.5	114.3	114.2	109.3	108.6	110.3	110.3	109.5	4.0	-.7	4.9	-1.0	.0	.8
1960	106.8	106.4	106.1	107.0	107.8	105.8	105.8	107.4	-.6	.7	-.9	1.2	.0	-1.6
1961	106.0	106.9	106.6	106.5	106.9	106.0	106.0	105.2	.8	-.6	.1	.5	.0	.8
1962	111.0	111.9	111.6	112.4	111.4	113.7	113.7	114.5	-3.5	-.6	-.8	-1.3	.0	-.8
1963	113.9	115.1	114.8	118.8	116.3	122.2	122.2	119.9	-6.0	-.9	-4.0	-3.4	.0	2.3
1964	117.8	119.2	119.0	126.1	123.1	130.1	130.1	128.9	-11.1	-1.2	-7.1	-4.0	.0	1.2

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-7

Selected Measures of Manufacturing Activity, 1947–64: Furniture and Fixtures, SIC 25

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	72.9	73.0	72.9	75.7	71.2	79.9	79.9	74.6	-1.7	.0	-2.8	-4.2	.0	5.3
1948	75.6	75.8	75.7					86.7	-11.1	-.1				
1949	69.9	70.0	69.9	71.4	68.2	74.4	74.4	82.1	-12.2	.0	-1.5	-3.0	.0	-7.7
1950	85.3	85.2	85.4	87.2	82.0	92.0	92.0	99.5	-14.2	-.1	-1.8	-4.8	.0	-7.5
1951	80.6	80.7	80.4	84.1	80.7	87.3	87.3	94.6	-14.0	.2	-3.7	-3.2	.0	-7.3
1952	82.8	82.8	82.8	87.3	82.6	91.7	91.7	102.0	-19.2	.0	-4.5	-4.4	.0	-10.3
1953	86.6	86.7	86.4	94.6	91.1	97.8	97.8	101.8	-15.2	.2	-8.2	-3.2	.0	-4.0
1954	90.3	90.3	90.2	91.7	88.4	94.7	94.7	98.0	-7.7	.1	-1.5	-3.0	.0	-3.3
1955	102.6	102.6	102.5	104.6	100.8	108.2	108.2	113.6	-11.0	.1	-2.1	-3.6	.0	-5.4
1956	105.9	105.9	105.5	107.5	103.7	111.1	111.1	114.4	-8.5	.4	-2.0	-3.6	.0	-3.3
1957	104.1	104.1	103.9	104.3	102.5	106.0	106.0	109.4	-5.3	.2	-.4	-1.7	.0	-3.4
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	119.5	119.6	119.8	110.8	110.5	111.0	111.0	114.1	5.4	-.3	9.0	-.2	.0	-3.1
1960	124.6	124.6	124.5	108.0	108.5	107.6	107.6	112.3	12.3	.1	16.5	.4	.0	-4.7
1961	124.4	124.5	124.5	105.3	108.5	102.2	102.2	108.1	16.3	-.1	19.2	3.1	.0	-5.9
1962	136.7	136.9	137.1	114.3	117.5	111.3	111.3	116.1	20.6	-.4	22.8	3.0	.0	-4.8
1963	143.6	143.8	144.1	119.8	121.1	118.5	118.5	119.4	24.2	-.5	24.3	1.3	.0	-.9
1964	154.7	155.0	155.7	128.6	134.1	123.1	123.1	128.7	26.0	-1.0	27.1	5.5	.0	-5.6

Note: VP = value of production; VA = value added. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = vol. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-8

Selected Measures of Manufacturing Activity, 1947–64: Paper and Allied Products, SIC 26

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	64.2	65.7	64.9	69.8	64.9	75.8	75.8	75.3	-11.1	-.7	-4.9	-6.0	.0	.5
1948	65.9	67.4	66.7					69.3	-3.4	-.8				
1949	63.1	64.3	64.0	65.7	65.9	65.5	65.5	69.1	-6.0	-.9	-1.7	.2	.0	-3.6
1950	75.9	77.1	76.7	80.1	75.9	85.4	85.4	89.8	-13.9	-.8	-3.4	-5.3	.0	-4.4
1951	80.5	81.3	80.7	83.8	78.8	89.8	89.8	96.0	-15.5	-.2	-3.1	-6.0	.0	-6.2
1952	76.6	76.9	76.5	80.0	81.5	78.2	78.2	85.4	-8.8	.1	-3.5	1.8	.0	-7.2
1953	83.4	83.5	83.1	90.6	88.1	93.8	93.8	93.9	-10.5	.3	-7.5	-3.2	.0	-.1
1954	84.4	84.4	84.0	91.6	89.7	94.0	94.0	94.8	-10.4	.4	-7.6	-2.4	.0	-.8
1955	95.2	95.3	95.0	100.1	97.6	103.2	103.2	106.0	-10.8	.2	-5.1	-3.1	.0	-2.8
1956	99.7	99.8	99.5	102.2	101.3	103.4	103.4	109.5	-9.8	.2	-2.7	-1.2	.0	-6.1
1957	99.0	99.0	98.9	101.6	102.2	100.8	100.8	101.3	-2.3	.1	-2.7	.8	.0	-.5
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	109.8	109.9	110.0	110.8	107.5	115.0	115.0	113.7	-3.9	-.2	-.8	-4.2	.0	1.3
1960	110.8	110.8	110.9	110.9	109.7	112.4	112.4	112.0	-1.2	-.1	.0	-1.5	.0	.4
1961	117.0	117.0	117.2	115.9	115.3	116.6	116.6	119.0	-2.0	-.2	1.3	-.7	.0	-2.4
1962	123.1	123.1	123.5	122.6	121.5	124.0	124.0	127.0	-3.9	-.4	.9	-1.4	.0	-3.0
1963	128.7	128.8	129.2	129.5	126.5	133.2	133.2	130.4	-1.7	-.5	-.3	-3.7	.0	2.8
1964	137.2	137.2	137.8	135.4	131.9	139.9	139.9	140.0	-2.8	-.6	2.4	-4.5	.0	-.1

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-9

Selected Measures of Manufacturing Activity, 1947–64: Printing and Publishing, SIC 27

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	71.9	70.4	70.4	74.8	68.3	78.6	78.6	75.3	-3.4	1.5	-4.4	-3.8	.0	3.3
1948	75.6	74.9	74.7					77.1	-1.5	.9				
1949	77.6	75.4	75.0	75.9	72.4	77.9	77.9	78.4	-.8	2.6	-.9	-2.0	.0	-.5
1950	81.2	79.8	79.4	78.6	73.9	81.2	81.2	81.5	-.3	1.8	.8	-2.6	.0	-.3
1951	82.8	81.8	81.5	82.5	78.1	85.0	85.0	82.9	-.1	1.3	-1.0	-2.5	.0	2.1
1952	82.6	82.1	81.8	81.2	76.5	83.8	83.8	83.1	-.5	.8	.6	-2.6	.0	.7
1953	86.4	86.3	86.1	84.4	81.1	86.3	86.3	88.2	-1.8	.3	1.7	-1.9	.0	-1.9
1954	89.9	89.9	89.7	90.9	87.4	92.8	92.8	92.8	-2.9	.2	-1.2	-1.9	.0	.0
1955	95.5	95.4	95.1	95.1	92.0	96.8	96.8	98.6	-3.1	.4	.0	-1.7	.0	-1.8
1956	100.4	100.4	100.2	100.5	95.4	103.4	103.4	102.5	-2.1	.2	-.3	-2.9	.0	.9
1957	102.2	102.0	102.0	100.4	95.8	103.0	103.0	103.9	-1.7	.2	1.6	-2.6	.0	-.9
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	107.5	107.5	107.6	108.1	108.2	108.1	108.1	107.6	-.1	-.1	-.5	.0	.0	.5
1960	113.5	113.5	113.7	111.9	112.8	111.4	111.4	110.4	3.1	-.2	1.8	.5	.0	1.0
1961	115.1	115.1	115.4	113.6	116.4	112.0	112.0	110.4	4.7	-.3	1.8	1.6	.0	1.6
1962	118.3	118.3	118.6	117.0	120.0	115.3	115.3	114.9	3.4	-.3	1.6	1.7	.0	.4
1963	120.1	120.0	120.4	118.2	120.4	116.9	116.9	114.5	5.6	-.3	2.2	1.3	.0	2.4
1964	127.2	127.2	127.5	126.3	128.0	125.4	125.4	125.7	1.5	-.3	1.2	.9	.0	-.3

Note: VP = value of production; VA = value added. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-10

Selected Measures of Manufacturing Activity, 1947–64: Chemicals and Allied Products, SIC 28

	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	43.3	44.0	45.2	51.5	58.2	45.9	45.9	44.2	-.9	-1.9	-6.3	5.6	.0	1.7
1948	46.9	47.5	48.6					52.3	-5.4	-1.7				
1949	46.2	46.7	47.6	55.1	61.8	49.5	49.5	54.1	-7.9	-1.4	-7.5	5.6	.0	-4.6
1950	57.8	58.3	59.2	67.2	70.8	64.3	64.3	65.3	-7.5	-1.4	-8.0	2.9	.0	-1.0
1951	65.6	65.7	66.5	72.3	79.4	66.4	66.4	70.5	-4.9	-.9	-5.8	5.9	.0	-4.1
1952	68.5	69.0	69.8	75.1	80.9	70.2	70.2	71.3	-2.8	-1.3	-5.3	4.9	.0	-1.1
1953	74.1	74.5	75.5	79.5	84.8	75.0	75.0	76.1	-2.0	-1.4	-4.0	4.5	.0	-1.1
1954	73.9	74.3	75.1	79.9	84.3	76.2	76.2	78.7	-4.8	-1.2	-4.8	3.7	.0	-2.5
1955	86.3	86.6	87.7	92.4	96.0	89.5	89.5	92.5	-6.2	-1.4	-4.7	2.9	.0	-3.0
1956	93.0	93.1	93.8	99.3	102.1	97.0	97.0	97.4	-4.4	-.8	-5.5	2.3	.0	-.4
1957	98.5	98.6	98.9	101.4	103.3	99.9	99.9	101.9	-3.4	-.4	-2.5	1.5	.0	-2.0
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	114.6	114.5	114.9	116.3	113.8	118.4	118.4	118.6	-4.0	-.3	-1.4	-2.1	.0	-.2
1960	121.7	121.4	121.7	116.9	114.6	119.0	119.0	119.1	2.6	.0	4.8	-2.1	.0	-.1
1961	128.8	128.3	128.5	120.5	116.6	123.9	123.9	125.1	3.7	.3	8.0	-3.4	.0	-1.2
1962	142.1	141.5	141.3	132.9	128.3	136.9	136.9	135.0	7.1	.8	8.4	-4.0	.0	1.9
1963	155.1	154.5	154.2	143.6	138.2	148.4	148.4	142.0	13.1	.9	10.6	-4.8	.0	6.4
1964	166.6	165.9	165.5	155.3	149.0	160.8	160.8	152.0	14.6	1.1	10.2	-5.5	.0	8.8

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 − col. 8; col. 10 = col. 1 − col. 3; col. 11 = col. 3 − col. 4; col. 12 = col. 4 − col. 6; col. 13 = col. 6 − col. 7; col. 14 = col. 7 − col. 8.

TABLE C-11

Selected Measures of Manufacturing Activity, 1947–64: Petroleum and Related Industries, SIC 29

	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted			Cost		VA Plus							
Year	(1)	GPO (2)	VP (3)	VP (4)	Mat. (5)	VA (6)	Excise (7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	64.6	66.4	65.6	64.0	61.8	74.8	68.5	66.3	-1.7	-1.0	1.6	-10.8	6.3	2.2
1948	69.9	70.6	71.0					72.4	-2.5	-1.1				
1949	67.8	69.7	68.5	67.4	64.9	79.5	74.4	72.6	-4.8	-.7	1.1	-12.1	5.1	1.8
1950	74.6	76.7	75.8	74.2	69.9	95.3	86.3	83.1	-8.5	-1.2	1.6	-21.1	9.0	3.2
1951	83.5	84.6	85.2	84.3	82.5	93.1	86.4	84.0	-.5	-1.7	.9	-8.8	6.7	2.4
1952	85.5	86.2	86.8	86.4	86.1	87.7	85.7	85.1	.4	-1.3	.4	-1.3	2.0	.6
1953	90.6	90.7	90.9	89.9	88.6	96.0	91.8	90.4	.2	-.3	1.0	-6.1	4.2	1.4
1954	89.8	89.7	89.9	90.3	91.0	87.1	87.7	87.9	1.9	-.1	-.4	3.2	-.6	-.2
1955	96.5	96.4	96.5	97.5	96.4	102.8	100.1	99.2	-2.7	.0	-1.0	-5.3	2.7	.9
1956	101.3	100.8	101.5	102.9	102.7	104.1	102.4	101.8	-.5	-.2	-1.4	-1.2	1.7	.6
1957	101.2	101.2	101.6	101.8	101.3	104.1	101.5	100.6	.6	-.4	-.2	-2.3	2.6	.9
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	106.7	106.8	106.2	105.9	105.9	105.8	104.8	106.0	.7	.5	.3	.1	1.0	-1.2
1960	109.3	110.1	109.0	108.0	107.0	112.9	110.0	112.0	-2.7	.3	1.0	-4.9	2.9	-2.0
1961	111.6	111.9	111.1	108.7	107.0	117.2	112.9	113.0	-1.4	.5	2.4	-8.5	4.3	-.1
1962	115.9	116.5	115.3	112.3	108.9	129.0	121.5	122.5	-6.6	.6	3.0	-16.7	7.5	-1.0
1963	120.2	120.9	119.6	119.3	113.8	146.8	134.7	130.2	-10.0	.6	.3	-27.5	12.1	4.5
1964	124.2	125.5	123.1	126.4	116.6	174.7	152.5	144.3	-20.1	1.1	-3.3	-48.3	22.2	8.2

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-12

Selected Measures of Manufacturing Activity, 1947–64: Rubber and Misc. Plastic Products, SIC 30

	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted					VA Plus Excise							
Year	(1)	GPO (2)	VP (3)	VP (4)	Cost Mat. (5)	VA (6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	61.0	69.8	68.6	76.9	66.8	86.7	87.9	89.8	-28.8	-7.6	-8.3	-9.8	-1.2	-1.9
1948	61.8	67.4	66.4					83.5	-21.7	-4.6				
1949	58.4	62.1	61.3	69.2	61.8	76.3	77.3	75.9	-17.5	-2.9	-7.9	-7.1	-1.0	1.4
1950	75.6	76.2	75.3	85.1	66.0	103.6	104.4	88.8	-13.2	.3	-9.8	-18.5	-.8	15.6
1951	77.2	79.3	78.3	89.7	71.3	107.5	107.3	111.5	-34.3	-1.1	-11.4	-17.8	.2	-4.2
1952	79.3	80.7	79.8	90.6	79.2	101.5	101.6	110.5	-31.2	-.5	-10.8	-10.9	-.1	-8.9
1953	85.0	86.1	85.2	97.6	86.6	108.2	108.1	110.9	-25.9	-.2	-12.4	-10.6	.1	-2.8
1954	83.4	84.0	83.4	92.2	80.4	103.6	103.1	96.1	-12.7	.0	-8.8	-11.4	.5	7.0
1955	103.4	104.1	103.4	104.4	92.3	116.2	116.0	110.7	-7.3	.0	-1.0	-11.8	.2	5.3
1956	100.9	101.2	100.9	101.9	96.4	107.1	107.1	107.9	-7.0	.0	-1.0	-5.2	.0	-.8
1957	105.3	105.6	105.4	102.1	98.7	105.4	105.2	106.6	-1.3	-.1	3.3	-3.3	.2	-1.4
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	120.1	120.6	120.8	121.6	114.8	128.4	127.4	125.4	-5.3	-.7	-.8	-6.8	1.0	2.0
1960	120.4	121.4	121.8	122.6	115.9	129.3	128.1	130.8	-10.4	-1.4	-.8	-6.7	1.2	-2.7
1961	121.4	122.3	123.0	126.3	119.1	133.7	132.1	130.3	-8.9	-1.6	-3.3	-7.4	1.6	1.8
1962	141.6	142.5	143.4	140.7	134.2	147.4	145.4	148.5	-6.9	-1.8	2.7	-6.7	2.0	-3.1
1963	151.8	152.6	153.7	148.7	142.4	155.1	152.8	150.2	1.6	-1.9	5.0	-6.4	2.3	2.6
1964	169.5	170.9	172.3	159.8	154.3	165.4	162.8	163.4	6.1	-2.8	12.5	-5.6	2.6	-.6

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-13

Selected Measures of Manufacturing Activity, 1947–64: Leather and Leather Products, SIC 31

	Indexes (1958 = 100)								Point Differences In Indexes[a]				
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	96.7	96.6	98.5	105.3	91.3	120.0	120.0	114.6	-17.9	-1.8	-6.8	-14.7	.0	5.4
1948	92.1	92.0	93.6					119.2	-27.1	-1.5				
1949	87.6	87.5	88.7	96.6	91.9	101.6	101.6	108.2	-20.6	-1.1	-7.9	-5.0	.0	-6.6
1950	94.8	94.6	95.7	96.4	86.9	106.3	106.3	106.1	-11.3	-.9	-.7	-9.9	.0	.2
1951	88.9	88.8	89.5	91.4	84.5	98.7	98.7	113.1	-24.2	-.6	-1.9	-7.3	.0	-14.4
1952	94.6	94.5	95.0	97.9	100.5	95.3	95.3	105.4	-10.8	-.4	-2.9	2.6	.0	-10.1
1953	94.9	94.7	95.5	102.1	97.4	107.0	107.0	108.7	-13.8	-.6	-6.6	-4.9	.0	-1.7
1954	94.0	93.8	94.3	97.3	98.0	96.7	96.7	102.4	-8.4	-.3	-3.0	.6	.0	-5.7
1955	102.1	102.1	102.4	104.3	104.1	104.6	104.6	106.8	-4.7	-.3	-1.9	-.3	.0	-2.2
1956	104.0	103.9	104.1	104.8	105.0	104.6	104.6	108.0	-4.0	-.1	-.7	.2	.0	-3.4
1957	103.3	103.4	103.5	103.7	105.3	102.0	102.0	106.1	-2.8	-.2	-.2	1.7	.0	-4.1
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	109.1	109.2	108.9	103.5	89.3	118.5	118.5	113.3	-4.2	.2	5.4	-15.0	.0	5.2
1960	103.8	103.8	103.6	100.2	99.0	101.5	101.5	106.7	-2.9	.2	3.4	-1.3	.0	-5.2
1961	104.3	104.3	104.3	98.6	94.8	102.5	102.5	102.1	2.2	.0	5.7	-3.9	.0	.4
1962	106.6	106.7	106.4	99.9	96.2	103.8	103.8	110.9	-4.3	.2	6.5	-3.9	.0	-7.1
1963	104.0	104.0	103.9	99.0	100.9	97.0	97.0	109.1	-5.1	.1	4.9	2.0	.0	-12.1
1964	106.9	107.0	106.7	104.3	102.7	105.9	105.9	112.8	-5.9	.2	2.4	-1.6	.0	-6.9

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-14

Selected Measures of Manufacturing Activity, 1947–64: Stone, Clay, and Glass Products, SIC 32

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted		VP	Cost Mat.	VA	VA Plus Excise							
		GPO	VP											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	71.9	69.2	67.0	64.6	54.9	71.4	71.4	73.1	-1.2	4.9	2.4	-6.8	.0	-1.7
1948	76.5	74.4	72.7					78.0	-1.5	3.8				
1949	71.4	69.5	68.0	65.5	63.0	67.2	67.2	72.7	-1.3	3.4	2.5	-1.7	.0	-5.5
1950	86.4	84.2	83.1	80.3	73.0	85.5	85.5	87.1	-.7	3.3	2.8	-5.2	.0	-1.6
1951	95.4	93.6	92.5	88.6	83.4	92.4	92.4	93.5	1.9	2.9	3.9	-3.8	.0	-1.1
1952	91.2	90.2	89.7	87.3	83.4	90.0	90.0	88.3	2.9	1.5	2.4	-2.7	.0	1.7
1953	93.5	92.6	91.6	90.0	85.9	92.9	92.9	94.9	-1.4	1.9	1.6	-2.9	.0	-2.0
1954	89.9	89.2	88.3	88.8	86.3	90.6	90.6	92.7	-2.8	1.6	-.5	-1.8	.0	-2.1
1955	102.6	102.0	101.3	101.9	99.2	103.8	103.8	106.7	-4.1	1.3	-.6	-1.9	.0	-2.9
1956	107.4	107.0	106.6	105.4	102.3	107.6	107.6	105.1	2.3	.8	1.2	-2.2	.0	2.5
1957	105.6	105.1	104.7	103.1	102.0	104.0	104.0	102.0	3.6	.9	1.6	-.9	.0	2.0
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	116.3	116.7	117.2	115.2	116.1	114.5	114.5	112.5	3.8	-.9	2.0	.7	.0	2.0
1960	115.7	115.9	116.3	113.0	114.1	112.1	112.1	110.0	5.7	-.6	3.3	.9	.0	2.1
1961	114.2	114.5	115.0	112.1	113.7	110.8	110.8	108.2	6.0	-.8	2.9	1.3	.0	2.6
1962	119.2	119.4	119.8	117.0	118.0	116.3	116.3	115.0	4.2	-.6	2.8	.7	.0	1.3
1963	126.1	126.5	127.1	125.9	125.8	126.0	126.0	123.1	3.0	-1.0	1.2	-.1	.0	2.9
1964	135.2	135.6	136.2	132.1	132.2	132.1	132.1	131.2	4.0	-1.0	4.1	.0	.0	.9

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-15

Selected Measures of Manufacturing Activity, 1947–64: Primary Metal Industries, SIC 33

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	103.7	101.6	100.7	104.0	98.7	111.2	111.2	108.1	-4.4	3.0	-3.3	-7.2	.0	3.1
1948	107.8	105.9	104.7					107.3	.5	3.1				
1949	90.7	89.9	89.0	91.4	91.2	91.6	91.6	93.2	-2.5	1.7	-2.4	-.2	.0	-1.6
1950	114.2	112.5	111.5	103.9	94.1	117.2	117.2	113.9	.3	2.7	7.6	-13.3	.0	3.3
1951	124.2	123.8	121.6	128.0	120.0	138.9	138.9	136.2	-12.0	2.6	-6.4	-10.9	.0	2.7
1952	113.5	113.1	111.6	119.2	114.5	125.4	125.4	120.7	-7.2	1.9	-7.6	-6.2	.0	4.7
1953	128.6	129.7	127.8	140.6	135.8	147.1	147.1	139.6	-11.0	.8	-12.8	-6.5	.0	7.5
1954	104.3	104.6	103.8	103.9	99.3	110.0	110.0	109.0	-4.7	.5	-.1	-6.1	.0	1.0
1955	135.3	135.7	133.9	131.3	126.6	137.7	137.7	133.5	1.8	1.4	2.6	-6.4	.0	4.2
1956	133.0	133.3	132.1	133.3	129.9	137.8	137.8	131.1	1.9	.9	-1.2	-4.5	.0	6.7
1957	128.2	128.9	127.8	124.2	123.1	125.7	125.7	128.2	.0	.4	3.6	-1.5	.0	-2.5
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	114.7	114.6	113.7	114.8	112.9	117.5	117.5	111.6	3.1	1.0	-1.1	-2.7	.0	5.9
1960	115.8	115.8	115.3	115.2	117.7	111.8	111.8	110.0	5.8	.5	.1	3.4	.0	1.8
1961	113.0	113.2	113.6	113.0	116.2	108.6	108.6	103.4	9.6	-.6	.6	4.4	.0	5.2
1962	119.5	119.7	119.9	120.7	125.0	114.9	114.9	110.5	9.0	-.4	-.8	5.8	.0	4.4
1963	129.5	130.0	129.9	126.3	129.3	122.1	122.1	116.6	12.9	-.4	3.6	4.2	.0	5.5
1964	147.5	148.2	147.8	140.2	144.9	133.7	133.7	130.2	17.3	-.3	7.6	6.5	.0	3.5

Note: VP = value of production; VA = value added. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-16

Selected Measures of Manufacturing Activity, 1947–64: Fabricated Metal Products, SIC 34

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	81.7	81.1	79.9	79.3	79.9	78.7	78.7	75.8	5.9	1.8	.6	.6	.0	2.9
1948	83.1	82.5	81.5					77.2	5.9	1.6				
1949	75.1	74.5	74.0	69.9	71.9	67.9	67.9	69.2	5.9	1.1	4.1	2.0	.0	-1.3
1950	91.9	91.4	90.5	87.9	90.4	85.5	85.5	84.1	7.8	1.4	2.6	2.4	.0	1.4
1951	98.2	97.8	96.4	95.0	98.5	91.6	91.6	88.5	9.7	1.8	1.4	3.4	.0	3.1
1952	95.8	95.6	94.5	92.0	92.8	91.1	91.1	90.8	5.0	1.3	2.5	.9	.0	.3
1953	108.0	108.1	106.5	104.3	105.5	103.2	103.2	100.9	7.1	1.5	2.2	1.1	.0	2.3
1954	97.1	97.4	96.6	94.4	93.3	95.5	95.5	97.4	-.3	.5	2.2	-1.1	.0	-1.9
1955	105.8	106.3	105.3	104.7	105.5	103.9	103.9	103.7	2.1	.5	.6	.8	.0	.2
1956	106.4	106.6	106.0	107.6	107.9	107.2	107.2	105.2	1.2	.4	-1.6	.4	.0	2.0
1957	109.3	109.1	108.5	107.9	107.7	108.1	108.1	107.8	1.5	.8	.6	-.2	.0	.3
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	113.6	113.4	112.5	110.0	108.1	111.9	111.9	111.8	1.8	1.1	2.5	-1.9	.0	.1
1960	115.8	115.5	114.6	108.7	107.1	110.4	110.4	112.1	3.7	1.2	5.9	-1.7	.0	-1.7
1961	114.6	114.3	113.4	108.0	107.3	108.8	108.8	112.1	2.5	1.2	5.4	-.8	.0	-3.3
1962	126.0	125.6	124.1	115.5	114.5	116.5	116.5	121.3	4.7	1.9	8.6	-1.0	.0	-4.8
1963	132.8	132.5	130.7	118.5	116.6	120.5	120.5	124.9	7.9	2.1	12.2	-2.0	.0	-4.4
1964	142.8	142.5	140.5	126.5	126.2	126.8	126.8	135.2	7.6	2.3	14.0	-.3	.0	-8.4

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-17

Selected Measures of Manufacturing Activity, 1947–64: Machinery, Except Electrical, SIC 35

	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted			Cost		VA Plus							
Year	(1)	GPO (2)	VP (3)	VP (4)	Mat. (5)	VA (6)	Excise (7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	89.4	87.3	87.7	91.9	91.2	92.4	92.4	87.1	2.3	1.7	-4.2	-.5	.0	5.3
1948	89.9	87.9	89.0					92.7	-2.8	.9				
1949	76.7	75.2	76.5	76.5	78.9	74.7	74.7	80.4	-3.7	.2	.0	1.8	.0	-5.7
1950	86.0	84.3	85.1	86.7	87.3	86.2	86.2	87.6	-1.6	.9	-1.6	.5	.0	-1.4
1951	109.3	107.4	107.7	109.9	108.9	110.7	110.7	112.2	-2.9	1.6	-2.2	-.8	.0	-1.5
1952	118.7	116.5	116.1	116.7	116.7	116.8	116.8	122.0	-3.3	2.6	-.6	-.1	.0	-5.2
1953	122.4	120.8	120.0	117.8	119.2	116.7	116.7	121.0	1.4	2.4	2.2	1.1	.0	-4.3
1954	104.4	103.5	103.1	101.3	98.9	103.1	103.1	109.2	-4.8	1.3	1.8	-1.8	.0	-6.1
1955	112.2	110.7	110.5	111.1	110.5	111.5	111.5	111.7	.5	1.7	-.6	-.4	.0	-.2
1956	125.1	123.6	123.0	120.9	120.2	121.4	121.4	123.3	1.8	2.1	2.1	-.5	.0	-1.9
1957	121.0	120.9	120.3	114.9	114.9	114.9	114.9	117.2	3.8	.7	5.4	.0	.0	-2.3
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	120.3	119.7	119.4	114.8	114.4	115.1	115.1	116.2	4.1	.9	4.6	-.3	.0	-1.1
1960	123.8	123.5	122.9	113.1	112.8	113.2	113.2	116.5	7.3	.9	9.8	-.1	.0	-3.3
1961	121.2	121.2	120.5	111.5	111.2	111.7	111.7	115.6	5.6	.7	9.0	-.2	.0	-3.9
1962	136.2	136.5	135.6	123.8	122.5	124.8	124.8	129.3	6.9	.6	11.8	-1.0	.0	-4.5
1963	144.4	144.7	143.9	131.6	129.7	133.1	133.1	134.6	9.8	.5	12.3	-1.5	.0	-1.5
1964	161.7	162.0	161.3	145.4	145.6	145.2	145.2	153.3	8.4	.4	15.9	.2	.0	-8.1

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-18

Selected Measures of Manufacturing Activity, 1947–64: Electrical Machinery, SIC 36

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	56.8	57.1	57.6	66.3	75.3	59.3	59.3	56.0	.8	-.8	-8.7	7.0	.0	3.3
1948	58.9	59.6	60.5					57.6	1.3	-1.6				
1949	55.2	55.3	56.2	60.0	68.2	53.5	53.3	52.4	2.8	-1.0	-3.8	6.5	.2	.9
1950	75.7	71.4	73.5	78.8	89.0	70.8	70.6	65.9	9.8	2.2	-5.3	8.0	.2	4.7
1951	76.1	75.9	77.1	86.4	92.2	81.9	82.1	75.5	.6	-1.0	-9.3	4.5	-.2	6.6
1952	87.0	89.2	89.8	96.7	101.1	93.3	93.1	88.8	-1.8	-2.8	-6.9	3.4	.2	4.3
1953	101.0	101.3	102.1	109.4	119.5	101.6	101.6	97.3	3.7	-1.1	-7.3	7.8	.0	4.3
1954	91.7	91.3	91.8	94.8	102.9	88.4	88.2	86.9	4.8	-.1	-3.0	6.4	.2	1.3
1955	104.1	104.5	105.3	105.6	111.4	101.1	101.3	93.9	10.2	-1.2	-.3	4.5	-.2	7.4
1956	114.8	115.2	115.4	111.0	114.3	108.4	108.3	101.6	13.2	-.6	4.4	2.6	.1	6.7
1957	112.3	112.3	112.3	107.4	108.5	106.5	106.4	104.5	7.8	.0	4.9	.9	.1	1.9
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	120.9	120.9	120.8	118.8	118.4	119.2	119.1	118.6	2.3	.1	2.0	-.4	.1	.5
1960	126.2	125.2	124.5	125.7	122.8	128.0	127.5	124.7	1.5	1.7	-1.2	-2.3	.5	2.8
1961	128.6	126.8	126.0	131.9	128.0	135.2	134.6	131.3	-2.7	2.6	-5.9	-3.3	.6	3.3
1962	142.8	141.2	140.2	151.9	143.7	158.7	157.8	150.1	-7.3	2.6	-11.7	-6.8	.9	7.7
1963	147.0	145.4	144.5	157.9	146.3	167.5	166.8	158.0	-11.0	2.5	-13.4	-9.6	.7	8.8
1964	156.2	154.6	153.8	166.7	150.6	179.9	179.1	167.1	-10.9	2.4	-12.9	-13.2	.8	12.0

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-19

Selected Measures of Manufacturing Activity, 1947–64: Transportation Equipment and Ordnance, Except Motor Vehicles, SIC 37+19-371

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted					VA Plus Excise							
		GPO	VP	VP	Cost Mat.	VA								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	23.5	25.3	28.1	33.8	33.7	34.0	34.0	30.2	-6.7	-4.6	-5.7	-.2	.0	3.8
1948	26.0	26.7	30.1					36.6	-10.6	-4.1				
1949	25.2	27.0	30.1	34.5	37.3	32.0	32.0	35.8	-10.6	-4.9	-4.4	2.5	.0	-3.8
1950	26.7	27.9	30.2	37.5	38.4	36.7	36.7	37.8	-11.1	-3.5	-7.3	.8	.0	1.1
1951	53.9	60.8	63.6	60.1	58.8	61.3	61.3	55.6	-1.7	-9.7	3.5	-1.2	.0	5.7
1952	81.2	87.2	88.8	101.8	107.8	96.3	96.3	86.4	-5.2	-7.6	-13.0	5.5	.0	9.9
1953	101.9	110.0	111.4	126.0	139.4	113.9	113.9	104.0	-2.1	-9.5	-14.6	12.1	.0	9.9
1954	88.3	91.8	91.9	109.9	116.5	104.0	104.0	99.7	-11.4	-3.6	-18.0	5.9	.0	4.3
1955	90.0	93.2	93.9	101.4	105.5	97.6	97.6	95.9	-5.9	-3.9	-7.5	3.8	.0	1.7
1956	98.7	99.7	100.9	102.9	105.5	100.6	100.6	96.6	2.1	-2.2	-2.0	2.3	.0	4.0
1957	109.2	109.1	110.3	114.1	120.4	108.4	108.4	106.0	3.2	-1.1	-3.8	5.7	.0	2.4
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	106.5	107.7	108.1	102.8	104.9	100.7	100.7	99.6	6.9	-1.6	5.3	2.1	.0	1.1
1960	102.2	104.2	104.8	97.6	98.4	96.9	96.9	97.1	5.1	-2.6	7.2	.7	.0	-.2
1961	105.2	108.2	108.0	96.4	99.0	94.0	94.0	101.0	4.2	-2.8	11.6	2.4	.0	-7.0
1962	114.7	118.0	118.3	103.0	101.0	104.8	104.8	115.4	-.7	-3.6	15.3	-1.8	.0	-10.6
1963	120.5	123.8	124.2	108.1	100.7	115.0	115.0	121.3	-.8	-3.7	16.1	-6.9	.0	-6.3
1964	124.4	124.6	125.7	108.6	101.7	115.2	115.2	123.8	.6	-1.3	17.1	-6.6	.0	-8.6

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-20

Selected Measures of Manufacturing Activity, 1947–64: Motor Vehicles and Equipment, SIC 371

Year	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted GPO	Reweighted VP	VP	Cost Mat.	VA	VA Plus Excise							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	83.8	83.0	83.2	87.7	90.3	82.2	82.4	84.9	-1.1	.6	-4.5	5.5	-.2	-2.5
1948	91.0	90.2	90.5					93.0	-2.0	.5				
1949	93.2	95.0	94.6	97.4	106.2	78.5	83.0	98.5	-5.3	-1.4	-2.8	18.9	-4.5	-15.5
1950	119.9	122.8	122.1	126.5	131.2	116.5	118.4	139.4	-19.5	-2.2	-4.4	10.0	-1.9	-21.0
1951	109.9	111.8	111.3	112.2	112.4	111.7	113.3	132.9	-23.0	-1.4	-.9	.5	-1.6	-19.6
1952	94.2	95.4	95.1	105.0	106.3	102.1	101.9	117.0	-22.8	-.9	-9.9	2.9	.2	-15.1
1953	119.5	122.5	121.8	137.8	143.7	124.9	125.8	146.9	-27.4	-2.3	-16.0	12.9	-.9	-21.1
1954	107.8	109.0	108.6	119.1	125.7	104.9	106.5	127.9	-20.1	-.8	-10.5	14.2	-1.6	-21.4
1955	154.2	156.7	155.7	167.9	171.3	160.5	161.2	184.1	-29.9	-1.5	-12.2	7.4	-.7	-22.9
1956	123.6	125.0	124.6	131.0	133.2	126.2	126.3	137.9	-14.3	-1.0	-6.4	4.8	-.1	-11.6
1957	130.6	131.8	131.3	136.6	138.6	132.3	133.0	144.6	-14.0	-.7	-5.3	4.3	-.7	-11.6
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	131.1	132.1	131.8	127.5	124.3	134.4	133.8	140.7	-9.6	-.7	4.3	-6.9	.6	-6.9
1960	149.9	152.1	151.3	144.5	141.2	151.7	150.8	155.3	-5.4	-1.4	6.8	-7.2	.9	-4.5
1961	135.0	134.2	134.4	125.0	120.2	135.3	134.1	138.3	-3.3	.6	9.4	-10.3	1.2	-4.2
1962	161.8	162.3	162.0	157.9	151.7	171.2	169.9	182.2	-20.4	-.2	4.1	-13.3	1.3	-12.3
1963	176.2	177.7	177.2	174.3	168.2	187.2	186.5	210.3	-34.1	-1.0	2.9	-12.9	.7	-23.8
1964	181.1	182.1	181.7	179.4	173.3	192.6	192.6	213.0	-31.9	-.6	2.3	-13.2	.0	-20.4

Note: VP = value of production; VA = value added. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-21

Selected Measures of Manufacturing Activity, 1947–64: Instruments and Related Products, SIC 38

	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE Gross Product	Total (FRB Minus OBE)	FRB (Net Minus Gross Wtd.)	Total Output (Quantity Minus Defltd.)	Total Minus Net Output	Excise Tax	Net Output (Census Minus OBE)
	As Pub.	Reweighted			Cost		VA Plus							
Year	(1)	GPO (2)	VP (3)	VP (4)	Mat. (5)	VA (6)	Excise (7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1947	58.3	58.2	58.7	64.3	66.4	63.2	63.2	52.5	5.8	-.4	-5.6	1.1	.0	10.7
1948	59.9	59.8	60.3					56.3	3.6	-.4				
1949	53.4	53.3	53.7	57.5	57.8	57.3	57.3	54.9	-1.5	-.3	-3.8	.2	.0	2.4
1950	62.2	62.2	62.6	70.9	69.0	72.0	72.0	64.3	-2.1	-.4	-8.3	-1.1	.0	7.7
1951	71.3	71.2	71.7	81.1	80.5	81.4	81.4	77.4	-6.1	-.4	-9.4	-.3	.0	4.0
1952	84.8	84.7	85.4	92.0	95.7	89.9	89.9	88.3	-3.5	-.6	-6.6	2.1	.0	1.6
1953	92.6	92.4	93.2	97.0	96.7	97.2	97.2	96.0	-3.4	-.6	-3.8	-.2	.0	1.2
1954	90.0	90.1	90.4	88.6	88.8	88.4	88.4	94.8	-4.8	-.4	1.8	.2	.0	-6.4
1955	96.3	96.5	96.4	96.8	92.0	99.6	99.6	100.2	-3.9	-.1	-.4	-2.8	.0	-.6
1956	103.6	103.5	103.4	102.0	97.7	104.5	104.5	106.0	-2.4	.2	1.4	-2.5	.0	-1.5
1957	106.4	106.4	106.3	102.5	103.3	102.1	102.1	101.6	4.8	.1	3.8	.4	.0	.5
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	119.3	119.1	119.0	117.7	112.9	120.6	120.6	114.4	4.9	.3	1.3	-2.9	.0	6.2
1960	126.5	126.4	126.0	124.3	120.3	126.6	126.6	115.9	10.6	.5	1.7	-2.3	.0	10.7
1961	125.7	125.8	125.4	126.6	126.6	126.6	126.6	115.9	9.8	.3	-1.2	.0	.0	10.7
1962	133.6	133.4	133.1	135.5	133.3	136.9	136.9	124.8	8.8	.5	-2.4	-1.4	.0	12.1
1963	141.4	141.5	141.3	152.1	144.7	156.6	156.6	135.6	5.8	.1	-10.8	-4.5	.0	21.0
1964	148.1	147.8	147.5	159.5	149.5	165.5	165.5	139.1	9.0	.6	-12.0	-6.0	.0	26.4

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE C-22

Selected Measures of Manufacturing Activity, 1947–64: Miscellaneous Manufacturing Industries, SIC 39

	Indexes (1958 = 100)								Point Differences In Indexes[a]					
	FRB			Deflated Census Data				OBE						
		Reweighted												
Year	As Pub. (1)	GPO (2)	VP (3)	VP (4)	Cost Mat. (5)	VA (6)	VA Plus Excise (7)	Gross Product (8)	Total (FRB Minus OBE) (9)	FRB (Net Minus Gross Wtd.) (10)	Total Output (Quantity Minus Defltd.) (11)	Total Minus Net Output (12)	Excise Tax (13)	Net Output (Census Minus OBE) (14)
1947	84.5	84.5	84.5	78.4	80.2	77.0	77.0	75.7	8.8	.0	6.1	1.4	.0	1.3
1948	90.2	90.2	90.2					84.4	5.8	.0				
1949	83.6	83.6	83.6	77.9	82.6	74.0	74.0	76.2	7.4	.0	5.7	3.9	.0	-2.2
1950	94.1	94.1	94.1	88.2	93.6	83.8	83.8	86.4	7.7	.0	5.9	4.4	.0	-2.6
1951	91.2	91.2	91.2	83.1	81.7	84.3	84.3	90.5	.7	.0	8.1	-1.2	.0	-6.2
1952	93.8	93.8	93.8	83.9	83.4	84.4	84.4	92.6	1.2	.0	9.9	-.5	.0	-8.2
1953	105.7	105.7	105.7	95.2	93.0	97.0	97.0	96.1	9.6	.0	10.5	-1.8	.0	.9
1954	95.7	95.7	95.7	87.2	86.9	87.4	87.4	92.2	3.5	.0	8.5	-.2	.0	-4.8
1955	107.1	107.1	107.1	96.1	93.4	98.3	98.3	101.9	5.2	.0	11.0	-2.2	.0	-3.6
1956	110.4	110.4	110.4	100.0	98.0	101.7	101.7	102.9	7.5	.0	10.4	-1.7	.0	-1.2
1957	105.0	105.0	105.0	97.2	93.8	100.0	100.0	101.1	3.9	.0	7.8	-2.8	.0	-1.1
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	.0	.0	.0	.0	.0	.0
1959	114.0	114.0	114.0	109.1	108.8	109.5	109.5	109.6	4.4	.0	4.9	-.4	.0	-.1
1960	118.3	118.3	118.3	112.4	112.8	112.1	112.1	107.0	11.3	.0	5.9	.3	.0	5.1
1961	120.0	120.0	120.0	116.0	120.3	112.3	112.3	109.5	10.5	.0	4.0	3.7	.0	2.8
1962	130.0	130.0	130.0	122.8	123.6	122.1	122.1	113.9	16.1	.0	7.2	.7	.0	8.2
1963	133.0	133.0	133.0	127.6	126.4	128.7	128.7	113.3	19.7	.0	5.4	-1.1	.0	15.4
1964	141.9	141.9	141.9	134.3	133.4	135.1	135.1	119.3	22.6	.0	7.6	-.8	.0	15.8

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix C.

[a]Col. 9 = col. 1 – col. 8; col. 10 = col. 1 – col. 3; col. 11 = col. 3 – col. 4; col. 12 = col. 4 – col. 6; col. 13 = col. 6 – col. 7; col. 14 = col. 7 – col. 8.

TABLE D-1

Implicit Price Deflators, 1947–64

(1958 = 100)

Year	VP	Cost of Materials	VA	VA Plus Excise	GPO	VP	Cost of Materials	VA	VA Plus Excise	GPO	VP	Cost of Materials	VA	VA Plus Excise	GPO
	All Manufacturing Industries					*Nondurable Goods Industries*					*Durable Goods Industries*				
1947	76.3	79.2	72.7	72.9	72.9	88.8	92.3	83.4	83.0	84.4	64.7	64.8	64.5	64.4	64.2
1948	81.8	86.8	75.9	75.8	77.6	92.5	99.3	83.0	82.6	88.7	71.2	72.5	69.8	69.5	69.3
1949	81.1	82.4	79.3	79.0	79.2	88.7	90.6	85.7	85.0	86.4	73.4	72.9	73.9	73.5	73.4
1950	82.9	85.8	79.3	79.0	79.4	90.3	94.8	83.8	83.3	85.0	76.2	76.6	75.7	75.3	75.2
1951	90.5	95.0	85.0	84.5	84.9	100.3	106.7	90.9	89.9	91.7	82.1	83.4	80.8	80.5	80.2
1952	89.5	92.1	86.2	86.4	86.7	97.4	100.6	92.5	92.3	93.2	82.9	83.8	82.0	82.1	82.3
1953	89.2	91.4	86.5	86.7	87.1	95.5	97.7	92.2	92.0	93.5	84.5	86.0	82.9	83.0	83.1
1954	90.7	92.3	88.6	88.7	88.9	96.0	97.6	93.5	93.1	94.3	86.1	86.9	85.2	85.2	85.3
1955	91.9	93.2	90.3	90.3	90.5	95.2	95.5	94.8	94.3	95.2	89.2	91.0	87.3	87.3	87.4
1956	95.8	96.9	94.4	94.4	94.6	96.7	96.4	97.0	96.8	97.4	95.0	97.3	92.5	92.5	92.6
1957	98.7	99.5	97.8	97.8	97.6	98.9	99.5	98.1	98.2	97.8	98.6	99.6	97.5	97.5	97.5
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1959	100.6	100.1	101.4	101.4	101.6	99.4	98.2	101.3	101.4	101.6	101.9	102.2	101.5	101.5	101.6
1960	100.9	99.9	102.2	102.4	102.5	99.8	97.9	102.6	103.1	103.3	102.0	102.2	101.8	101.8	101.8
1961	100.6	99.1	102.6	102.9	102.7	99.7	97.3	103.6	104.1	103.8	101.5	101.2	101.9	101.8	101.8
1962	100.6	99.1	102.6	102.8	102.7	99.8	97.6	103.2	103.7	103.4	101.4	100.7	102.2	102.1	102.2
1963	100.3	98.6	102.5	102.7	102.8	99.4	96.9	103.3	103.8	104.2	101.2	100.5	102.0	101.9	101.9
1964	100.7	98.9	103.0	103.2	103.6	99.1	96.4	103.1	103.6	104.3	102.3	101.6	103.0	102.9	103.0

(continued)

TABLE D-1 (continued)

Year	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise	GPO	VP	Cost of Materials	VA	VA Plus Excise (GPO)
	Food and Kindred Products, SIC 20				*Tobacco Manufactures, SIC 21*					*Textile Mill Products, SIC 22*			
1947	93.2	98.0	82.0	82.8	74.2	77.8	65.3	78.5	81.2	110.5	99.4	126.1	126.1
1948	99.3	105.2	85.7	85.9	76.0	79.4	67.3	79.6	81.4	116.5	107.3	128.2	128.2
1949	91.5	92.0	90.2	89.7	77.8	82.7	67.3	78.7	80.7	105.4	101.1	111.3	111.3
1950	92.8	96.0	85.6	85.8	81.2	83.4	75.9	82.8	84.1	112.9	110.6	115.9	115.9
1951	103.0	109.4	88.7	88.7	83.5	90.9	68.8	80.6	83.3	127.6	127.1	128.5	128.5
1952	101.6	105.6	92.3	93.5	83.8	89.9	71.0	87.7	90.1	112.1	110.8	114.3	114.3
1953	96.2	99.3	89.6	91.0	92.3	89.2	100.3	100.1	100.1	108.4	105.5	112.9	112.9
1954	98.3	100.2	93.9	94.8	96.2	91.3	109.3	103.4	102.8	103.7	104.1	103.2	103.2
1955	94.2	93.1	96.7	97.2	93.6	91.0	99.3	99.7	99.8	103.9	103.6	104.3	104.3
1956	93.4	93.0	94.3	95.0	94.2	94.1	94.3	97.5	98.1	103.6	102.6	105.1	105.1
1957	95.8	97.0	93.4	94.2	97.3	96.8	98.2	99.2	99.4	103.1	103.4	102.7	102.7
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1959	97.7	94.3	106.5	105.6	101.6	103.6	98.3	99.3	99.4	101.8	100.7	103.5	103.5
1960	97.7	94.1	106.5	105.7	101.2	102.1	99.7	99.9	99.9	102.6	99.3	107.7	107.7
1961	99.2	94.4	111.8	110.2	103.0	106.9	96.5	98.4	98.7	99.5	97.5	102.5	102.5
1962	99.7	95.2	111.4	109.9	103.4	108.5	95.5	97.9	98.3	100.4	98.6	103.1	103.1
1963	99.2	94.9	110.1	108.8	103.0	101.8	105.2	102.2	101.9	99.6	98.9	100.9	100.9
1964	99.2	94.1	111.8	110.3	103.4	101.1	107.4	103.3	102.7	99.9	98.1	102.8	102.8

(continued)

TABLE D-1 (continued)

Year	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise (GPO)
	Apparel and Related Products, SIC 23				*Lumber and Wood Products, Except Furniture, SIC 24*				*Furniture and Fixtures, SIC 25*			
1947	103.4	108.6	97.1	97.1	79.6	78.5	80.7	80.7	74.0	77.5	71.1	71.1
1948	105.1	114.6	94.6	94.6	91.2	89.7	92.5	92.5	79.0	84.4	74.7	74.7
1949	98.8	103.9	91.8	91.8	85.0	84.0	86.0	86.0	79.2	81.1	77.7	77.7
1950	99.2	110.0	86.5	86.5	97.0	94.9	99.2	99.2	81.7	87.8	76.7	76.7
1951	106.0	122.4	89.5	89.5	106.2	103.0	109.7	109.7	92.0	95.8	88.7	88.7
1952	101.0	108.4	92.1	92.1	103.5	100.9	106.4	106.4	88.9	92.5	85.9	85.9
1953	99.5	105.9	92.8	92.8	103.7	100.4	107.5	107.5	89.9	93.5	86.7	86.7
1954	99.2	102.8	94.8	94.8	102.1	99.0	106.0	106.0	90.1	93.1	87.4	87.4
1955	99.1	103.4	93.8	93.8	105.5	103.8	107.7	107.7	91.3	96.0	87.2	87.2
1956	100.7	102.7	98.2	98.2	107.4	105.8	109.3	109.3	95.6	99.1	92.5	92.5
1957	100.5	102.2	98.3	98.3	102.1	101.5	102.9	102.9	98.5	99.9	97.2	97.2
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1959	100.9	101.8	99.7	99.7	106.5	106.4	106.7	106.7	101.0	101.9	100.1	100.1
1960	102.0	103.6	100.0	100.0	102.8	102.3	103.5	103.5	102.1	101.1	103.0	103.0
1961	101.7	100.5	103.2	103.2	98.6	98.0	99.4	99.4	102.6	99.4	106.0	106.0
1962	102.4	100.7	104.6	104.6	99.0	99.4	98.5	98.5	103.7	99.7	107.9	107.9
1963	102.9	100.2	106.3	106.3	101.2	101.3	101.0	101.1	104.6	100.2	109.0	109.0
1964	103.9	100.9	107.8	107.8	103.0	102.4	103.8	103.8	105.1	100.3	110.4	110.4

(continued)

TABLE D-1 (continued)

Year	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise (GPO)
	Paper and Allied Products, SIC 26				*Printing and Publishing, SIC 27*				*Chemicals and Allied Products, SIC 28*			
1947	73.2	77.2	68.9	68.9	69.8	69.2	70.1	70.1	90.4	90.3	90.5	90.5
1948	77.2	75.9	78.7	78.7	74.9	76.3	74.3	74.3	93.2	95.0	91.4	91.4
1949	74.5	75.1	73.8	73.8	77.2	78.0	76.8	76.8	89.0	86.1	92.0	92.0
1950	76.3	81.5	70.5	70.5	78.3	79.1	77.8	77.8	89.0	87.6	90.2	90.2
1951	90.4	97.1	83.1	83.1	83.4	86.8	81.6	81.6	100.1	99.7	100.6	100.6
1952	88.8	90.1	87.1	87.1	88.0	90.4	86.8	86.8	96.7	95.0	98.4	98.4
1953	87.8	91.0	84.1	84.1	89.6	91.2	88.7	88.7	96.9	95.5	98.3	98.3
1954	88.5	90.7	85.9	85.9	88.7	90.9	87.5	87.5	97.7	95.9	99.4	99.4
1955	90.6	94.0	86.6	86.6	91.1	93.1	90.1	90.1	97.8	96.2	99.2	99.2
1956	97.0	98.9	94.8	94.8	94.2	97.5	92.5	92.5	98.1	98.5	97.7	97.7
1957	99.4	99.3	99.4	99.4	98.2	100.8	96.9	96.9	99.5	100.5	98.7	98.7
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1959	100.2	101.5	98.6	98.6	101.2	100.6	101.6	101.6	98.8	98.9	98.6	98.6
1960	101.5	100.7	102.5	102.5	104.1	102.0	105.3	105.3	99.0	100.0	98.1	98.1
1961	98.6	97.4	100.0	100.0	105.1	101.9	107.0	107.0	97.8	99.1	96.8	96.8
1962	99.1	98.3	100.1	100.1	106.8	102.7	109.2	109.2	96.2	96.4	96.1	96.1
1963	98.3	98.3	98.2	98.2	109.4	103.5	112.9	112.9	95.6	94.8	96.3	96.3
1964	98.5	99.1	97.8	97.8	109.6	104.7	112.6	112.6	95.4	94.2	96.3	96.3

(continued)

TABLE D-1 (continued)

Year	VP	Cost of Materials	VA	VA Plus Excise	GPO	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise (GPO)
	Petroleum and Related Industries, SIC 29					*Rubber and Misc. Plastic Products, SIC 30*				*Leather and Leather Products, SIC 31*			
1947	74.6	71.6	86.5	75.5	90.9	69.6	86.9	56.8	57.4	92.8	122.2	69.6	69.6
1948	71.2	89.3	45.3	47.1	108.7	72.3	89.0	59.7	60.0	95.2	120.2	74.3	74.3
1949	82.3	84.3	74.2	66.9	85.2	71.2	84.4	60.9	61.0	91.3	110.3	73.5	73.5
1950	79.9	83.8	65.9	62.0	87.2	78.0	104.0	62.1	62.2	96.8	122.6	74.8	74.8
1951	89.3	87.4	97.5	83.1	106.6	91.4	128.0	68.1	67.7	111.4	142.5	83.8	83.8
1952	89.6	87.2	101.2	88.9	102.1	88.0	110.4	71.2	70.6	96.2	101.0	91.0	91.0
1953	91.5	90.5	96.2	86.2	111.3	86.2	100.8	74.9	74.0	96.3	104.6	88.5	88.5
1954	92.9	91.4	100.7	87.6	107.4	86.5	101.0	75.6	74.7	94.1	94.9	93.2	93.2
1955	93.8	92.0	101.9	89.1	102.7	92.9	109.3	80.4	79.1	93.8	95.3	92.1	92.1
1956	98.3	93.8	120.1	106.3	115.7	97.3	104.2	91.4	90.6	98.8	100.0	97.6	97.6
1957	105.0	102.0	119.1	111.9	104.7	98.6	102.1	95.5	95.9	99.3	98.3	100.3	100.3
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1959	99.3	97.5	108.5	108.3	113.0	96.8	103.4	90.8	91.4	109.8	125.6	97.2	97.2
1960	99.5	97.4	109.6	117.9	122.0	95.2	103.0	88.2	89.0	108.9	110.5	107.2	107.2
1961	100.1	97.5	112.0	119.3	118.6	93.2	96.9	89.8	91.2	109.3	112.7	106.0	106.0
1962	98.8	97.9	102.7	113.0	110.2	92.1	95.6	88.9	91.2	110.9	114.3	107.6	107.6
1963	97.4	97.5	96.9	108.6	115.5	92.5	94.1	91.1	93.2	109.2	105.3	113.6	113.6
1964	93.4	96.6	82.8	97.7	109.3	91.9	93.3	90.7	92.7	109.3	106.2	112.5	112.5

(continued)

TABLE D-1 (continued)

Year	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise (GPO)
	Stone, Clay, and Glass Products, SIC 32				*Primary Metal Industries, SIC 33*				*Fabricated Metal Products, SIC 34*			
1947	63.7	69.3	60.7	60.7	56.6	63.8	48.1	48.1	64.1	58.3	69.8	69.8
1948	69.4	76.2	65.7	65.7	64.6	74.3	53.6	53.6	71.3	65.5	76.9	76.9
1949	73.1	77.5	70.3	70.3	66.3	71.7	58.9	58.9	73.2	68.3	78.2	78.2
1950	75.3	79.7	72.6	72.6	70.1	77.7	61.8	61.8	75.8	70.4	81.3	81.3
1951	80.1	85.1	76.9	76.9	76.1	84.6	66.2	66.2	84.5	77.3	92.0	92.0
1952	81.3	86.1	78.1	78.1	77.7	85.6	67.9	67.9	83.4	77.9	88.9	88.9
1953	84.3	88.5	81.5	81.5	81.2	89.2	71.2	71.2	84.8	81.3	88.3	88.3
1954	86.9	89.6	85.1	85.1	84.3	90.0	77.4	77.4	85.3	82.8	87.8	87.8
1955	89.7	91.0	88.7	88.7	90.0	97.4	80.9	80.9	89.0	86.7	91.2	91.2
1956	94.1	95.2	93.3	93.3	98.0	105.9	88.0	88.0	94.5	93.7	95.4	95.4
1957	97.8	98.7	97.1	97.1	99.9	103.5	95.1	95.1	98.5	98.5	98.6	98.6
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1959	101.4	100.2	102.3	102.3	102.6	103.5	101.5	101.5	100.5	102.0	98.9	98.9
1960	102.0	100.9	102.9	102.9	103.9	103.2	104.9	104.9	101.1	102.6	99.5	99.5
1961	101.8	100.3	102.9	102.9	102.5	102.1	103.2	103.2	101.2	101.8	100.5	100.5
1962	101.6	100.7	102.3	102.3	102.0	99.6	105.7	105.7	101.5	101.6	101.4	101.4
1963	101.0	100.4	101.5	101.5	101.5	99.0	105.1	105.1	102.1	101.4	102.7	102.7
1964	101.2	100.2	102.0	102.0	103.5	101.5	106.5	106.5	103.3	102.4	104.3	104.3

(continued)

TABLE D-1 (continued)

Year	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise (GPO)
	Machinery, Except Electrical, SIC 35				*Electrical Machinery, SIC 36*				*Motor Vehicles and Equipment, SIC 371*			
1947	61.0	60.5	61.3	61.3	73.5	68.9	78.0	79.6	65.4	63.3	70.3	65.8
1948	66.3	66.8	66.0	66.0	77.2	74.2	80.1	82.1	71.7	70.1	75.5	69.8
1949	69.6	68.9	70.2	70.2	77.6	72.3	83.0	84.7	77.5	73.8	88.4	80.7
1950	72.1	71.3	72.7	72.7	80.2	76.6	83.7	85.5	76.9	75.2	81.2	75.9
1951	78.9	78.5	79.2	79.2	86.7	85.3	87.9	89.4	80.6	81.0	79.9	75.6
1952	79.5	78.4	80.3	80.3	85.6	84.9	86.2	87.5	86.0	83.3	92.1	90.4
1953	81.4	81.0	81.7	81.7	87.0	86.4	87.5	88.9	85.6	84.4	88.6	87.5
1954	83.0	82.5	83.4	83.4	88.2	86.8	89.4	90.0	85.9	85.1	88.0	87.2
1955	85.5	85.7	85.4	85.4	88.5	88.9	88.2	88.5	88.9	88.1	90.8	90.0
1956	92.1	92.5	91.9	91.9	93.3	96.0	91.1	91.3	93.5	93.3	94.1	93.7
1957	98.1	98.0	98.3	98.3	98.4	99.2	97.8	97.8	97.4	97.6	96.9	96.9
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1959	101.9	101.8	102.0	102.0	101.3	101.7	100.9	100.9	102.1	101.8	102.7	102.6
1960	102.8	102.7	103.0	103.0	100.2	102.0	98.9	98.9	100.7	101.2	99.6	99.7
1961	103.1	102.1	103.9	103.9	99.1	100.2	98.2	98.1	100.4	100.9	99.3	99.5
1962	103.7	102.2	104.9	104.9	96.9	99.8	94.7	94.7	101.0	100.6	101.8	101.5
1963	104.1	102.6	105.3	105.3	95.4	99.7	92.3	92.3	100.2	100.0	100.7	100.4
1964	105.6	103.7	107.1	107.1	94.2	100.0	90.2	90.2	101.4	100.5	103.1	102.5

(continued)

TABLE D-1 (concluded)

Year	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise (GPO)	VP	Cost of Materials	VA	VA Plus Excise (GPO)
	Trans. Eq. and Ord., Except Mot. Vehicles, SIC 37+19-371				*Instruments and Related Products, SIC 38*				*Miscellaneous Manufacturing Ind., SIC 39*			
1947	61.6	60.1	62.9	62.9	69.3	74.4	66.2	66.2	84.6	80.8	87.9	87.9
1948	66.7	66.2	67.1	67.1	73.2	80.0	69.1	69.1	86.9	86.4	87.3	87.3
1949	69.3	69.1	69.6	69.6	74.2	79.4	71.3	71.3	86.2	83.2	88.9	88.9
1950	71.3	71.7	71.0	71.0	75.5	80.6	72.7	72.7	88.1	86.2	89.9	89.9
1951	79.9	79.5	80.3	80.3	82.5	87.8	79.5	79.5	94.1	98.3	90.8	90.8
1952	80.2	80.5	79.8	79.8	82.3	86.7	79.6	79.6	92.3	94.5	90.5	90.5
1953	81.6	83.2	80.0	80.0	84.4	89.6	81.4	81.4	93.5	94.7	92.6	92.6
1954	83.0	84.9	81.1	81.1	85.4	88.7	83.4	83.4	94.3	94.8	93.9	93.9
1955	86.0	88.8	83.2	83.2	87.0	91.5	84.6	84.6	94.7	97.4	92.6	92.6
1956	93.0	94.4	91.7	91.7	92.3	96.1	90.2	90.2	98.0	99.5	96.7	96.7
1957	98.1	98.6	97.6	97.6	97.6	98.8	96.9	96.9	99.4	100.0	98.9	98.9
1958	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1959	101.4	101.1	101.7	101.7	102.4	102.3	102.5	102.5	100.1	101.8	98.7	98.7
1960	102.5	102.1	102.9	102.9	104.0	103.2	104.5	104.5	101.0	101.8	100.4	100.4
1961	102.7	102.0	103.4	103.4	105.2	102.8	106.6	106.6	101.5	99.7	103.1	103.1
1962	103.0	101.9	103.9	103.9	106.6	103.5	108.4	108.4	101.7	100.6	102.7	102.7
1963	103.1	101.3	104.7	104.7	106.2	103.1	108.0	108.0	102.0	100.6	103.2	103.2
1964	104.9	102.5	106.9	106.9	106.9	103.5	108.8	108.8	102.5	101.8	103.2	103.2

Note: VA = value added; VP = value of production. For other abbreviations see note at the beginning of Appendix D.

Cost of Materials = Census cost of materials, supplies, components, semi-finished goods, fuel and electricity, actually consumed or put into production during the year and cost of goods purchased for resale.

Value Added (VA) = Value of production (above) less cost of materials (above).

VA + Excise = Value added (above) plus federal excise taxes for which the given industry is legally liable.

Gross Product Originating (GPO) = Gross product originating in a given industry. The deflators for the two-digit industries are the same as those for VA plus Excise except for SIC industries 21 and 29 where different procedures are used. For all manufacturing, durable, and nondurable goods industries, the GPO and VA plus Excise deflators are not the same because of differences in the two-digit industry deflators and weights.

COMMENT

CLAYTON GEHMAN AND CORNELIA MOTHERAL, Federal Reserve Board

The Gottsegen-Ziemer paper and its appendixes provide new data on deflated gross product series in manufacturing which can be used to compare two-digit industry groups with annual averages of the presently published Federal Reserve monthly production indexes. Until these new data can be examined in detail and analyzed in relation to the results of the Census-Federal Reserve bench mark indexes for 1947–54, 1954–58, and 1958–63, it is not possible to judge whether the gross product data provide more accurate indicators of growth in this sector of the economy. However, it is possible—before completing the general revision of the Federal Reserve monthly index now underway—to agree that the manufacturing total index may be slightly overstated in 1959 and 1960 and that changes in series and weights are likely to result in various revisions in the total and the parts for more recent years. Detailed analysis would involve study of differences in deflators for the 425 four-digit industries and the several thousand product classes directly represented in the Census-Federal Reserve bench-mark indexes.

Comparisons of the corrected two-digit results of the two systems of measurement can be made only for the 1947–54 period since the published Federal Reserve indexes are not yet adjusted to subsequent bench-mark levels. Here the record shows practically identical results for total manufacturing—increases of 30.1 and 30.2 per cent. But if the same weight periods are used, the presently revised gross product series rises

more than the Federal Reserve manufacturing production index, as noted below. The previously published gross product series available for the comparison made in the February 1964 U.S. reply to the ECE rose 25.0 per cent from 1947 to 1954. That increase was just about the same as the increase in the Federal Reserve manufacturing production index adjusted to the Census-Federal Reserve bench mark, when allowances were made for differences in scope and when weights in the gross product series were used.

The Federal Reserve indexes have not yet been adjusted to the 1954–58 bench mark, but the bench-mark results for manufacturing and mining have been distributed to the contributors to this discussion. They show an output increase of 8.5 per cent for manufacturing based on the 1958 weight year used for the gross product series for manufacturing (which rises only 3.5 per cent), while the published Federal Reserve manufacturing index rises 8.0 per cent. Much of the difference between the bench-mark and the gross product series in this period is between the gross product current-dollar data and current-dollar Census value added, which implies (aside from statistical differences, which may actually be at issue here) a substantial increase in business services per unit of product; it would be of interest to try to develop a direct measure of business services for this period as a check.

The 1958–63 bench-mark compilations, still in a preliminary stage, suggest that while there are many differences at the two-digit and more detailed levels from the presently published Federal Reserve indexes, the totals for manufacturing are about as close in 1963 as in 1958.

In 1964, the year after the last bench-mark period, the Federal Reserve manufacturing index rises 6.6 per cent which is quite close to the increase of 6.8 per cent shown by the gross product series. Preliminary Census Annual Survey shipments for 1965, after adjustment for inventory and price changes at the total level only, show an increase of 8.2 per cent from 1964 to 1965. Allowing for the tendency of both the Federal Reserve and OBE net measures to rise more than such a gross value series in recent years, this suggests that the 8.9 per cent rise shown by the Federal Reserve series for 1965 will be borne out by more detailed calculations. The finding that annual averages of the monthly production index are still close to comprehensive annual Census data twelve years after the last bench-mark adjustment should not be overlooked in

appraising the adequacy of the Federal Reserve monthly production index results.

We see little basis for the indication in the Gottsegen-Ziemer paper and the Moss commentary of any persistent divergence in the two sets of numbers and the emphasis that "an essential difference" is the larger growth rate of the presently published Federal Reserve series than of the revised gross product series. Over the seventeen-year interval of changes shown, a major portion of the divergence for the total comes within several annual periods which might be largely isolated by a more detailed comparison of gross product data with the bench-mark results. The Federal Reserve index is higher at the end of the seventeen-year interval and the differences are even greater at the extremes reached in 1951 and 1961, but the evidence of persistent differences is not clear from the presently available data. We do hold the view that a net industry measure would probably rise more in certain periods than the presently published Federal Reserve index (see the comparisons for total industrial production presented in a paper on "Estimating Aggregate Output" in the 1964 *Proceedings* of the American Statistical Association).

The accompanying table shows that for the bench-mark interval from 1947 to 1954, the gross product series rises 2 per cent more than the Federal Reserve series, as reweighted by the OBE. Although the widest margin was 3 per cent in 1951, it was still plus 0.5 in 1955. After downward shifts in the 1954–58 bench-mark period and from 1958 to 1960, the gross product series again rises more than the Federal Reserve series to 1964.

Gross Product Series Relative to the Manufacturing Production Index, 1947 = 100

1947	100.0	1956	98.6
1948	101.3	1957	98.7
1949	102.1	1958	98.5
1950	101.3	1959	96.9
1951	103.0	1960	95.6
1952	102.6	1961	95.1
1953	101.4	1962	96.9
1954	102.0	1963	96.5
1955	100.5	1964	96.6

NOTE: Calculated from reweighted Federal Reserve indexes shown in the paper in this volume, "Comparison of Federal Reserve and OBE Measures of Real Manufacturing Output, 1947–64."

As the Gottsegen-Ziemer paper and Moss's comments indicate, differences in results shown stem not only from changes in input–output relationships but also from differences in the measurement of gross output. We expect that a more detailed examination of the gross product and bench-mark industry gross output deflators could lead to more similarity of results between the two approaches.

The Gottsegen-Ziemer paper apparently finds little evidence of an over-all bias in the man-hour portion of the index in the unbenchmarked interval since 1954. Moss uses the two-digit furniture group, which accounts for 1.8 per cent of total manufacturing, as an illustration of the hazards of projecting adjusted man-hour data. His comparison was only for the change from 1958 to 1964 and it was not noted that the increase for the presently published furniture index from 1954 to 1958 was about the same as the Census-Federal Reserve bench mark (that was 11 per cent, while the gross product series increased only 2 per cent) and that the published annual changes since 1959–60 are close to deflated Census value results. The Federal Reserve published furniture group is doubtless too high for the 1959–60 period. The gross product series for furniture shows an irregular downtrend over this period. By 1962 it is only 2 per cent higher than seven years earlier and thus implies little change in labor productivity for most of the period, which seems unlikely. Moss correctly notes the problems of measuring price changes for these products but another basic question is whether an adequate monthly sample of the value of factory sales or shipments of furniture can be maintained—various attempts to do so in the past have not been successful.

As was stated in our paper, it is planned to exclude estimated purchases of business services from the value-added weights in the forthcoming revision of the Federal Reserve monthly index and to use 1958 price relationships for recent periods. We do not think it would be appropriate to take the other three steps which would be necessary to make the weights of the two series completely comparable: (1) using 1958 price relationships for earlier periods; (2) adding excise taxes to weights which are intended to approximate factor costs; and (3) shifting from the Census weighting universe to the gross product weighting universe.

We have reservations about series whose year-to-year movements are affected by various company-establishment and inventory valuation ad-

justments. Admittedly the annual movements of Census value of output data may also be affected by inventory valuation and sampling and coverage problems; in these cases we prefer to rely as much as possible on appropriate quantity indicators for annual indexes which are used to adjust the levels of the monthly indexes.

Assuming that there were no differences in weights or in deflation of gross output, the question has been raised whether it would be desirable to adjust the Federal Reserve monthly series to reflect changes in input–output relationships that have apparently occurred in some industries such as primary metals, autos, petroleum refining, and (to go outside manufacturing) electric utilities. Some adjustments might be accomplished by increased use of value added weights below the industry level. If an increase in output per unit of input in the auto industry is due to more fabrication of components within the industry, such an increase could be imputed to the original equipment auto parts series. Changes due to more efficient use of materials (as in electric utilities) or to use of more highly processed materials (as in primary metals) could be allowed for by adjusting an industry group total index rather than the component product series, so that the components could still be aggregated with gross weights for analyzing commodity flows in the over-all economy, as outlined in our paper.

We would like to underscore, however, the comments made in the Gottsegen-Ziemer paper on the sensitivity to error of double deflation measures and to note that they did not accept the resulting calculations for the petroleum refining industry, although in that industry input and price data can be more exactly determined than in other larger and more heterogeneous industry groups. For a further example, in the course of our bench-mark work two experimental double deflations were made of the auto industry for 1954–58, one using wholesale price index components and another using unit values derived from quantity indexes. The difference between the input deflators was negligible; the difference between the output deflators was 4 per cent, or 1 per cent per year, and the resulting difference between the residual net output indexes was 14 per cent, nearly 3.5 per cent per year.

We chose in our paper to develop the analytical value of using the monthly production measures as links to final demand and prices and to raise some questions concerning the data currently available for analyzing output and inventory changes in the goods sector of the economy. The

OBE elected to contribute additional statistical comparisons and points of possible reconciliation of the two sets of series for the manufacturing sector. Without the new, more detailed gross product data which became available at this Conference, it was not possible for us to go much beyond the analysis for manufacturing which we presented two years ago in the reply to the ECE. That analysis compared the Federal Reserve indexes with the then published gross product series of the BLS as well as the OBE; also, the net versus gross comparisons were presented in an ASA paper cited above.

More direct comparisons are now possible within the Census framework; we plan to be working further on such comparisons, particularly with regard to gross output deflators. We hope that the efforts of others at OBE and Census will include consideration of such matters as comparison of Census current-dollar values with gross product data and direct measurement of at least the current-dollar value of business services.

CORNELIA MOTHERAL

The following comments represent scattered further observations on the Gottsegen-Ziemer paper.

Mr. Gottsegen has indicated that some differences between the OBE measures, on the one hand, and OBE's deflated Census value-added measures and the Federal Reserve measures, on the other, stem from the inventory valuation adjustment to the former, particularly in year-to-year movements for 1950–51. With Census data it is only necessary to adjust for changes in valuation of finished and in-process inventories and sometimes not even those, since in many industries where changes in such inventories are important, value of production or value of work done rather than value of shipments is reported to the Census. The industries in which the differences stemming from IVA occur, according to Gottsegen, are tobacco, textiles, furniture, chemicals, rubber, and leather. Many of the Federal Reserve monthly series in these groups, and more of the annual series, are based on quantity of production data, so that no adjustment for inventory change is necessary, with or without IVA. Some of the monthly and somewhat more of the annual data use shipments as a proxy for production; these will be in error by the

amount of real inventory change, not by the amount of IVA. I have inspected two of the series where man-hours—a production proxy not needing inventory adjustment of any kind—are used monthly, and the annual indexes are based on deflated value of shipments. It does not seem likely that adjustment for inventory change, with or without IVA, would change the direction of the plastics products component of the rubber and plastics products index for the 1950–51 period. The other rubber series are based on quantities of production or rubber consumption. I conclude that the IVA is more likely to be at fault than the production indexes in this area. Another area where deflated value of shipments is used annually is furniture. Here I inspected the 1953–54 difference, where the Federal Reserve series goes up while the OBE series goes down. Adjustment for inventory change, with or without IVA, would have little effect on the movement of the Federal Reserve series; however, the Federal Reserve household furniture series is based on wherever-made product shipments—industry shipments decline from 1953 to 1954, and should have been used.

Doing the IVA in three- and four-digit detail is often more work than it's worth. We have done it in the 1947–54 and 1954–58 bench marks, and of course it is necessary and makes a difference in certain years such as 1947 and 1950. For 1954 and 1958 it was hardly worth the effort. We are now setting up a system in which our annual indexes will be based on deflated Census data to a greater extent, and the possibility that we will have to apply an IVA for some years and some industries will have to be borne in mind.

In our attempt to monitor current index levels, it would be a help if BLS published monthly wholesale price indexes classified to correspond to the industry groupings used in the Census Bureau's monthly manufacturers' shipments survey. Such indexes would be useful for deflating shipments and finished and in-process inventories.

Gottsegen ascribes the differences between the OBE and Federal Reserve series for Group 30, rubber and plastics products, to the Federal Reserve use of unrepresentative quantity or man-hour indicators. But the greatest trend divergence for this industry occurs in the 1947–57 period when the Federal Reserve series are adjusted to bench-mark and annual levels; in the period for 1957 to date when we are dependent on tire quantity series and man-hours with estimated productivity adjust-

ments, the trends are not dissimilar. I think that the difference in the earlier period is caused partly by our use of 1947 weights through 1952, not only in combining the series but also internally in the detailed bench-mark indexes to which the series are adjusted; and partly by our bench-mark and annual measures for plastics products, which represent a Census value deflated with a deflator derived from Tariff Commission quantity and value data for plastics materials. We realize that it is often not appropriate to deflate a product value with a materials deflator, but we believe that the Tariff data provided better coverage of this field than available wholesale price index components, and think that in this area we were probably more nearly correct than the OBE measure.

The differences that arise from weighting are associated more with choice of weight year than with choice of weight concept. The basic question involved is whether it is really appropriate to measure the output of the late 1940's and early 1950's with the price relationships of 1958.

We are surprised at many of the differences shown because as Spencer indicated, the Federal Reserve manufacturing index is very close to the 1954–58 bench mark and a preliminary 1958–63 bench mark; it is also very close in 1962 and 1964, relative to 1963, to Annual Survey data deflated in some detail with BLS wholesale price indexes, and in 1965 to deflated totals from the very recently available 1965 Annual Survey.

We recognize that legitimate and plausible differences can arise because of changes in materials input per unit of output, as in primary metals. In primary metals these changes arise from use of more highly processed ores, yet this increase is not reflected in the OBE mining measures since they use the Federal Reserve mining series based on usable ore, which are considerably understated as measures of mining gross product.

We are also surprised, however, to see that the two "gross" measures for primary metals—Federal Reserve indexes gross weighted versus deflated Census gross output—show such differences for the 1958–64 period. Primary metals has usually been our best index, requiring little bench-mark revision. If both of the two gross measures are correct—that is, if we are measuring the quantities correctly and the deflators applied to the Census data measure the prices correctly—they seem to me to imply a decline in quality of primary metals. Or, if we assume

that such difficult aspects of quality as strength and durability are equally badly measured by the production and price indexes, then the difference between the two measures suggest that in this period there was a movement toward the cheaper grades within the types of metal and metal product measured by the Federal Reserve indexes for primary metals. The only other possibility I can think of is some peculiarity in the detailed product weights, which in the steel industry are open to question.

On the other hand, as Spencer has suggested from study of Census unit value and BLS price indications at the five-digit product class level, there may be an upward bias in the BLS price indexes for these products. Of course, to the extent that these products become inputs to other manufacturing industries, the errors will cancel at the total manufacturing level, although the gross product series for primary metals would be understated, and those for metal fabricating would be overstated.

VIVIAN E. SPENCER, Bureau of the Census

The first comment on this extremely valuable paper, which maintains the high quality of work to be expected from these authors, must be on its excellence.

The second comment must be on the really striking similarity, considering the differences in methods and concepts used in their construction, of the FRB and OBE series as presented in the paper. In the deflated Census value-added series plotted on the charts attached to this paper, the latter series usually fall between the OBE and FRB series—but closer to the OBE figures. In one sense, the differences between these series furnish a measure of their reliability. Where the differences are significant, one would like to analyze them as indicators of the effect of differences in the basic concepts and methods. Some such discussion is included in the paper. However, time has not permitted me to expand upon them.

One desirable study would be comparing the behavior of the 1954–58 and 1958–63 relationships with that of the new Census bench-mark indexes based on data for the approximately 7,000 commodities on which information is collected in the Census of Manufactures. These indexes use value-added weights at the five-digit commodity level and are also available with employment, man-hour, current-capital-input, and value of shipment weights, and at the four-digit level with energy-

input weights. Such a study could not as yet be made: Although the wherever-made commodity indexes for most areas were published in the final 1963 publications of the censuses of Manufactures and Mineral Industries, and the 1954–58 industry indexes have had limited distribution, nevertheless, work on the 1958–63 industry indexes is not yet entirely complete.

In the course of the index work, one bit of analysis which we did may have some bearing on the relations between series in this paper. In the total series and many of the two-digit group comparisons, it is notable that the FRB series rises throughout most of the period more rapidly than the OBE series. The 1947–54 Census bench-mark index was found to be five points higher than the FRB. It appears that the final Census bench marks for 1954–58 and 1958–63 will also be slightly higher than the FRB, but in each case only by one or two points.

The OBE series depends entirely for deflation on the especially constructed BLS price indexes. The FRB depends to a much lesser extent on BLS price series. Although the final Census indexes incorporate many BLS price series for areas where inadequate or no quantity data are available, they do so to a still lesser extent. In our working analysis of the relation between BLS indexes and the raw Census four-digit implied unit value indexes constructed with maximium use of Census quantity and value data, scatter diagrams were constructed comparing the two-price measures. A tendency was noted for the BLS indexes to show higher increases in price than the Census series. This seemed particularly clear in both periods for areas like Major Groups 28—chemicals and 33—primary metals where this pattern of more rapid increase of FRB than OBE is notable. If the BLS price indexes do tend to overstate price increases, this might be a significant factor in the lower rate of increase in the OBE series than in the FRB series, and again would contribute to the FRB index falling somewhat below the Census bench marks.

The divergence of the FRB and OBE series for Group 29 in 1964 and certain other years, and the even greater divergence when they are compared with the deflated value-added series, point to the need for a further restudy of the special methods used for construction of these series and of alternative methods possible. There are, of course, significant problems in arriving at good petroleum refining measures.

MILTON MOSS, Bureau of the Budget

It is probably fair to say that the figures in the national accounts which are used most intensively here and abroad are those in *constant* prices. The past decade has witnessed a considerable advance in the measurement and publication of estimates in constant prices in the United States, partly reflecting the strong interest in the analysis of economic growth.

Such advances include the following: (1) United States gross national product by major type of purchaser which, formerly available only annually, was put on a quarterly basis early in the decade; (2) GNP by major type of product for durable and nondurable goods, services, and structures, with a breakdown for goods as between final sales and change in business inventories on a quarterly basis; (3) industrial production indexes, published more promptly and in greater detail than before and developed along market categories to provide comparisons with final sales and between materials and finished products; (4) real gross product originating by industry on an annual basis, building on earlier estimates by Alterman and Jacobs, and which opens the door to analysis of productivity change in industry detail within a consistent accounting framework; (5) coincident with the preceding, the regrouping and reweighting of prices along industry lines to provide the framework for developing industry or so-called sector price indexes; (6) integration of the input–output table with the income and product accounts, making possible a consistent accounting of changes in the industrial distribution of final demand.

Partly in consequence of this work, we are faced with an embarassment of riches exposing various differences in the existing bodies of information.

The period ahead, with its continued pressure to increase the timeliness and detail of data in constant prices, will necessarily involve decisions about the extent to which differences between measures such as the Index of Industrial Production and GNP by industry can be adequately resolved.

NOTE: I should like to take this occasion to acknowledge my association with Gary G. Schlarbaum, who worked with me as a summer intern at the Budget Bureau in 1966 and who made intensive study of problems involved in reconciling the Index of Industrial Production with real gross product by industry.

What have the papers in this section contributed to our understanding of differences and what have they contributed to resolving them?

It is clear from both Gottsegen-Ziemer and Gehman-Motheral papers that there are significant differences between the movements of the Index of Industrial Production and of the gross product figures—over the long term, from year to year, and for quarterly changes—whether industry or commodity comparisons are made. In a broad sense, of course, the two measures show similar results and the error margins implied by the differences in movement would not trouble many other countries where the data base is far poorer than ours.

But, for the uses to which the data are put, the fact that the FRB measure for manufactures rises 4.2 per cent per year and OBE's corresponding measure rises 3.8 per cent over the whole postwar period, and the fact that for durable manufactures one rose (FRB) and the other fell (OBE) from 1955–56 pose serious questions for analysis of growth and fluctuations.

The Gottsegen-Ziemer paper, which I have been asked to discuss, should be highly commended for making available a wealth of material for indicating some of the possible factors making for differences between the two measures. Much work will need to be done, however, to resolve the difficulties, and I hope this conference will provide the push necessary to get this work done.

I would like to illustrate (Table 1) what the difficulties are and what we might conclude about the directions ahead. My remarks will be similar in many respects to those of Jack Gottsegen, but my emphasis will be different and I would like to suggest some remedies. The figures in the table are adapted from appendix material mostly supplied with the Gottsegen-Ziemer paper and which shows indexes for manufacturing for the year 1964 with the year 1958 = 100.

Analyzing the difference between the Federal Reserve and OBE measures based only on the span of two years, which I have done in the table, has severe limitations, particularly since the size and nature of the differences between the indexes will depend on the particular pair of years chosen. Moreover, the fact that 1958 was a recession year and 1964 a prosperous one tends to exaggerate differences for a number of groups—although at the total level the difference between the two series is very small. Also, at this level of aggregation, the operation of the various influences cannot be separated. For example,

TABLE 1

Indexes of Manufacturing Activity: 1964

(in constant prices, 1958 = 100)

Manufacturing Industry	Federal Reserve		Census – OBE			OBE	
	Value-Added Weights (1)	Gross Weights (2)	Gross Output (3)	Input (4)	Value Added (5)	Value-Added Plus Excise (6)	Product Originating (7)
Total	142.8	141.8	136.6	134.0	140.1	139.6	140.4
Nondurables	137.0	134.2	130.9	128.2	135.1	133.6	132.0
Durables	147.8	149.9	142.4	140.8	144.1	144.9	146.9
Food	121.7	121.6	121.3	123.1	116.9	117.3	117.1
Tobacco	120.4	115.2	116.3	116.3	116.3	115.0	119.0
Textiles	130.3	130.1	138.7	142.7	132.6	132.6	130.1
Apparel	140.7	143.1	129.4	128.3	130.8	130.8	128.1
Lumber	117.8	120.5	126.1	123.1	130.1	130.1	128.9
Furniture	154.7	155.6	128.6	134.1	123.1	123.1	128.7
Paper	137.2	138.9	135.4	131.9	139.9	139.9	140.0
Printing	127.2	127.7	124.2	128.0	121.9	121.9	125.7
Chemicals	166.6	167.3	155.3	149.0	160.8	160.8	152.0
Petroleum	124.2	122.9	126.4	116.6	174.7	152.5	144.3
Rubber	169.5	174.0	159.8	154.3	165.4	162.8	163.4
Leather	106.9	106.9	104.3	102.7	105.9	105.9	108.9
Stone, clay, and glass	135.2	136.3	132.1	132.2	132.1	132.1	131.2
Primary metals	147.5	148.7	140.2	144.9	133.7	133.7	130.2
Fabricated metals	142.8	140.7	126.5	126.2	126.8	126.8	135.2
Nonelectrical machinery	161.7	159.3	145.4	145.6	145.2	145.2	153.3
Electrical machinery	156.2	155.9	166.7	150.6	179.9	179.1	167.3
Motor vehicles	181.1	186.1	179.4	173.3	192.6	192.6	213.0
Transportation equipment, ordnance, except motor vehicles	122.2	125.5	108.6	101.7	115.2	115.2	123.8
Instruments	148.1	153.4	159.5	149.5	165.5	165.5	139.6
Miscellaneous manufacturing	141.9	142.8	134.3	133.4	135.1	135.1	119.3

Source: Data are based on figures from paper by J. J. Gottsegen and R. C. Ziemer, except for column 2 which is based on unpublished Federal Reserve Board data.

differences between aggregate input and output indexes could result from differences in output movements of individual industries with different ratios of input to output, even though input–output relations in individual industries might not have changed—the familiar product mix problem. Still another problem—a perennial one—is that 1964 is not a bench-mark year and we are dealing with preliminary figures in both systems. Whatever the difficulties, however, the table does provide a convenient framework for illustrating the main factors accounting for differences between the measures

At the risk of being too obvious, let me quickly describe the figures in each column. The first column of figures represents the Federal Reserve indexes as published, but on a 1958 rather than 1957–59 base. These indexes are based on series that are gross of material inputs but combined with value-added weights. The second column represents the same series combined with gross value weights. Aside from some generally minor problems of aggregation, columns 1 and 2 differ merely because of differences between value-added and gross value weights. The underlying series are identical.

Column 3 represents deflated gross value of output of individual industries combined with gross value weights using Census data. At the individual industry level these indexes should be identical in theory with indexes in columns 1 and 2, except in those few cases where FRB has developed value-added weights for individual products. They differ from column 1 at aggregate levels because of the use of gross value weights, but they should be identical with those in column 2 at the levels of aggregation shown. That they do in fact differ and that they ought to conform will be emphasized at later points in my discussion.

Columns 4 and 5 are also based on Census data giving indexes of constant-dollar input and value added. These figures, including column 3, are based on values from the Census of Manufactures and the Annual Survey of Manufactures deflated by OBE with BLS wholesale price series. While the data do not necessarily represent bench marks, they provide, by and large, a consistent set of information for analyzing changes in the movement of material inputs and outputs in constant prices as measured by OBE and hence provide one basis for inferring whether differences between the FRB and OBE measures reflect differences between gross output and *value added.*

The last two columns, shown here as OBE data, represent in column 6 indexes of value added in constant prices but inclusive of excise taxes, and the last column, gross product originating in constant prices. These two columns show different results only because they use different current-dollar figures for measuring value added. The deflators are the same. The first and last columns provide us with the comparison between the two measures under consideration in this session. The columns in between help interpret those differences.

For total manufacturing, we note that in the change from 1958 to 1964 the FRB index rises 42.8 per cent (col. 1) and OBE 40.4 per cent (col. 7)—a rather similar increase. It is instructive to try to interpret even this small difference, using the indexes in the other columns to seek clues. Is the difference shown a result of the fact that the FRB index is gross, i.e., does not allow for differences between gross output of products and input of materials while the OBE measure is net in this respect? The table suggests otherwise. Comparison of columns 3 and 4 shows that gross output rose relative to input, and therefore value added has risen relative to gross output.

If the Federal Reserve index were regarded as simply a gross output index, on that account it should have risen less than OBE but in fact it has risen more. So whatever differences exist between the two measures at the total level it has apparently not arisen as a result of differences between input and output. However, when we look at some of the underlying two-digit groups shown in the table, a fuller appreciation of the role played by the various factors is more clearly revealed.

In the food group, for example, the lower OBE index (117.1) compared with the Federal Reserve (121.7) appears to result from a difference between value added and gross output as indicated in columns 4 and 5. The deflated Census data indicate that input has increased faster than output and consequently value added has increased less than gross output. This would seem to explain, at least statistically, why product originating showed an increase of only 17 per cent while the Federal Reserve showed an increase of 22 per cent, or closer to the gross output figure in column 3. To determine whether this is the underlying reason *in fact,* however, would require more detail. That is, additional detail would be needed to determine, for example, whether the difference arose because the FRB index included in its food index the increase in packaging materials; or in other words, was or was not duplicating some of the output of the paper industry.

It is instructive to compare columns 2 and 3. Since the figures in the two columns are broadly similar as to weights, and assuming they deal with the same value data, the differences result from the fact that quantity-type data are used in one case (FRB) and BLS price data for deflation are used in the other. *Conceptually* the figures in these two columns should be identical, as I indicated earlier; that is, with ideal quantity and price data the use of quantity indexes with base-period price weights should provide the same results as indexes based on deflation of value data with detailed price indexes with current-year quantity weights. In fact, the results are quite different. Differences are sizeable in some groups and go in different directions. At bench-mark intervals when both measures rely heavily on identical Census value data such differences ought to be fully explained. Is it because detailed quantity data are inferior or superior to price data or is it because FRB and Census are in fact "deflating" different value aggregates because of classification or other reasons?

The indexes in columns 6 and 7 use identical deflators but different current-dollar data. Here, too, differences in a number of groups are quite sizeable and in my conclusion later I wish to emphasize the need to reconcile these figures.

I should like now to illustrate two problems which are thorns of criticism in the series under review. I refer to the problem of reliance on man-hours in the FRB measure and the difficulty with double deflation in the OBE measure.

First, the man-hour problem. I can illustrate this with the index shown in the table for the furniture industry. Note that this index at 154.7 (col. 1) compares with an OBE measure of 128.7.

Monthly changes in the FRB index for the furniture industry are equal to percentage changes in man-hours for this industry multiplied by assumed changes in output per man-hour. These monthly changes are interpolated between and extrapolated beyond bench marks, at which time levels of output and of output per man-hour are calculated using Census production and BLS employment. Generally value data deflated by wholesale price indexes rather than quantity-type data are used to estimate output for this industry because a sample of price data for major items is more readily available than is a detailed listing for the great heterogeneity of physical quantities of furniture.

Assuming that selected price data are broadly representative of price

changes for all furniture items and that they allow for quality change (heroic assumptions of course), the deflated value data constitute a basic approach to measurement of physical volume for this type of industry. But the published index has not been adjusted regularly to Census bench marks or Annual Survey of Manufactures data for some time. It may well be that a detailed study of this industry will expose weaknesses in the price data for deflating the Census value data, in which case price data should be improved. But I see no better alternative for such an industry.

The problem then for resolving difficulties of the type exemplified by the furniture industry is for the FRB to have more frequent bench marks using the Census Annual Survey of Manufactures. A sizeable fraction of the total Index of Industrial Production (approximately half) requires the bench-mark study of adjusted man-hour series. While these series are monitored by FRB in the aggregate by comparisons with product-type indexes and other data such as electric power and freight transport, their detailed adjustment at approximately annual intervals is highly desirable.

I know how difficult it is to carry out bench-mark studies frequently —it is one of the most thankless and exacting jobs. But it must be done and whatever can be done to make this task less slavish, more expeditious, and even more interesting, if possible, should be done.

To illustrate the problem with double deflation in the OBE measure, attention is now directed to the indexes in the table for petroleum refining. The table shows, for example, that gross output of petroleum rose 26.4 per cent (col. 3) and input rose 16.6 per cent (col. 4). Value added, as a consequence, rose 75 per cent (col. 5). This enormous difference between value added and gross output raises serious questions. The level of input is large relative to output in this industry and small errors in both can be magnified in the value-added residual, as is well known. But as a matter of fact, have refined products, for example, increased relative to inputs or is this a result of the oddities of double deflation? I ask this question because this happens to be an industry with especially good physical volume information on outputs, as Gottsegen and Ziemer recognize. But we also know a great deal about inputs of crude oil, electric power, additives, fuel, etc., which they do not recognize as well.

Gottsegen and Ziemer have apparently done a good deal of work

on this industry, which at first I had not fully appreciated. But the irony of this example consists in this simple fact—despite an unusually rich amount of information of both inputs and outputs, double deflation procedures have been found seriously wanting. I suspect that refined products have not risen relative to crude oil, fuels, electric power, additives, etc., by the differences suggested in columns 3, 4, and 5. The index finally accepted by OBE (144.3 in column 7) is still considerably higher than the gross output measure, 126.4 in column 3 and than the FRB measure, 124.2 in column 1.

What Do We Do?

The following recommendations spell out in slightly more detail what has been already said on eliminating unnecessary differences between the FRB and OBE figures.

1. The figures in column 2 and column 3 should be made as identical as possible at bench-mark intervals. The figures in these two columns theoretically are deflating the same value base in the individual industries. As mentioned earlier, they differ only because quantity-type information with base-year price weights are used in the Federal Reserve, and BLS price data with quantity weights are used by OBE.

2. The basic data from which columns 6 and 7 are derived should be made as identical as possible. Differences arise because the current-dollar data on value added come from different sources, one from Census, and the other from IRS and other sources. The Census data include business services, while the OBE data require difficult problems of allocation of company-based data to an establishment order. In order that the figures in columns 6 and 7 be made as identical as possible, two things need to be done; one involves a strengthening of the Enterprise Statistics Program at Census to improve our links between company and establishment data and classifications, the other is that Census value-added data should be made less duplicative to exclude purchased business services.

3. The detail in GPO by industry should be made available for analysis. Not only should two-digit and lower orders of aggregation be made available on net output but the data for analyzing the significance of the net output measures, namely, relations between gross output and input, should also be made available. In other words, at

least at bench-mark intervals, the figures on gross output, input, and net output, in current dollars, constant dollars, and implied deflators should be made available—if not for publication, for special analysis. These data were made available to this conference and I hope this practice will continue.

4. The price indexes need to be strengthened, both in those areas where these indexes are apparently less accurate than quantity-type information, but more importantly in those areas where they are presently woefully incomplete. The latter include particularly the area of producers durable equipment. Where the price data are clearly more accurate than quantity-type information they should be used in the FRB index. At bench-mark intervals these judgments can be made.

5. A problem remains if we put all emphasis on net output measures. For one thing, information for commodities tends to disappear in the framework of GNP originating so long as indexes are shown only for net output. It is true that on a bench-mark basis we can show indexes of dollar values for outputs, inputs, and net outputs. Such detail would be extremely useful as indicated above. But quarterly or monthly data on this detailed basis is not likely to be developed for a long, long time.

The detailed commodity flows that can be shown monthly for materials and finished products in the Index of Industrial Production, from producing through distributing channels, should be encouraged.

As pointed out in the Gehman-Motheral paper, these detailed commodity flows can help in understanding the bases for inventory and price change and can provide the basis for a more detailed understanding of short-run fluctuations.

One possibility is to have value-added type measures at bench-mark intervals supplemented by gross output series for monthly movements and for special groupings. The value-added type measures of FRB and OBE should be reconciled and the gross output type measures in FRB should be reconciled with those which OBE calculates as an early step in its procedures. If this is done at bench-mark intervals (annual as much as possible), differences could be resolved, say at two-digit levels, and a major element of confusion would thereby be eliminated.

6. At more frequent intervals (monthly and quarterly), I recommend that we look to the wider use of the Monthly Industry Survey of Shipments, Inventories, and Orders for use in those series in which the Board relies heavily on man-hours for current changes. While

man-hour data provide very useful indicators in many industries where the production process is long, the need for current measures of productivity change requires that these man-hour measures be supplemented as much as possible by production-type data on a monthly basis. This will require further strengthening of the Monthly Industry Survey, including a strengthening of its sample, the more frequent bench-mark extrapolation of these monthly data to annual survey levels (last bench mark was for 1962), and a closer tie with employment information so that analysis of output in relation to employment on a current basis may be strengthened.

7. More detailed input–output studies (which will require continual improvement in data on material and service inputs) will help in reconciling many problems of data and analysis of intermediate and final output.

Conclusion

All, or nearly all, the people needed to bring a little more peaceful coexistence between IP and GPO are in attendance at this conference. It seems to me that there is an opportunity ahead for these people to develop an imaginative solution to the problems posed by the differences between the Index of Industrial Production and GNP. The different approaches in the two measures challenge us to reap the benefits of both without necessarily attempting an ironclad solution that would end up with only one type of measure. The advantages of a detailed industry analysis of productivity changes within a consistent accounting framework are clear, and we should direct the statistics program to strengthen this work to make it more detailed and more timely. The advantages of a commodity-flow type of analysis for both short-run and long-term analysis, but particularly for the short-run, should be made more widely understood. The flexibility that the Index of Industrial Production provides for this type of commodity-flow analysis suggests that this work should be encouraged.

While we of course look for a lessening of unnecessary tensions in this area of disparate statistics—I would like to end my discussion with a request for a constructive variety in our approach to the study of output and demand developments.

"In My Father's house are many mansions."

FRANK R. GARFIELD

In my view the Gottsegen-Ziemer paper marks the beginning of a new phase in the discussion of measuring manufacturing production in the United States. This developing discussion may well have a significant bearing on production measurement problems in other areas and on policy problems relating to productivity, unit labor costs, growth, and the like. These policy problems are of great practical importance and measurement issues affecting them call for the most careful study.

The two-digit data made available with this paper and the analysis by two-digit groups, which is begun here and to be extended in later papers, will provide students in this area with important basic material essential for appraising certain alternative methods of measurement and considering what methods may be appropriate in different types of situations. For example, this new material will offer an opportunity for study at the two-digit level of differences between indexes of deflated value of product, deflated value of input and deflated value-added, as derived here from Census data in current-value terms through deflation by regrouped Bureau of Labor Statistics price data.

The new material will also make possible, for years of comprehensive censuses, comparisons between the results of this double deflation work and of the work embodied in the Census-Federal Reserve bench-mark indexes. Such comparisons could be made now for 1947–54 and 1954–58, and comparison for 1958–63 will be possible in the near future when the Census-Federal Reserve indexes become available.

In the Gottsegen-Ziemer analysis emphasis is on other comparisons and especially on those relating to recent years. For recent years, as the authors point out, the comparisons between the GPO measures of the Office of Business Economics and the Federal Reserve Board measures must be regarded as preliminary because some of the two-digit indexes in the Federal Reserve index will probably be revised appreciably when the new bench marks become available, even though, as reported in the Gehman-Motheral paper, the total for manufacturing is not expected to be altered much. The present showing is one of significant similarities but also of significant differences.

In commenting on measurement problems, Gottsegen and Ziemer note a number of issues associated with representation of real value added (or gross product originating) by physical output series and by

such proxies as adjusted man-hours. They also note various different problems associated with measurement of gross product originating by the double deflation approach in which price deflators obtained by deflating Census value of output and of input are used to transform current-dollar gross product originating into real terms. The authors take the view that this approach can be accepted for all two-digit groups in manufacturing, with the single exception of petroleum refining. There, a constant-dollar output series derived from physical volume measures is substituted for deflated dollar figures. This substitution is probably desirable and I think it likely that for some other groups also constant-dollar series might better be derived by means other than deflating dollar figures; and beyond questions concerning particular series lie broader questions concerning the best general (or selective) approach.

As the authors suggest, production measurement problems are many. Comment on a single issue must, therefore, leave much unsaid. But I think the nature of the double deflation approach particularly needs to be explored further, especially with respect to one aspect noted by the authors. They say: "The GPO implicit deflator has the quality that small differences in the level of output or input prices yield larger differences in the GPO deflator since the latter is derived as a residual—that is, the output price index has a positive weight but the input price index has a negative weight." And again, in discussing the petroleum refining problem they say: "Since value added is a residual, small differences in price levels of output and input and small inconsistencies in the measures of output and input may yield large differences in the price movements for value added. This was the experience when the double deflation method was used for SIC 29."

In citing this reason as one of several for making a substitution here, but not elsewhere, the authors point out that the ratio of cost of materials to value of shipments in that industry is unusually high, ranging from 80 to 84 per cent in the 1950–58 period. Another way of stating the situation for 1958 in petroleum refining is to say that value added (the residual to be approximated) was 16 per cent of value of output and a little less than 9 per cent of value of output plus value of input, the values deflated to arrive at a price deflator for value added. Considering the proportions shown for petroleum refining and the problems involved in matching prices in price series and prices in

value series, it hardly seems surprising that the results shown for this industry were found to be unsatisfactory. When errors occur in deflating inputs or outputs they may, of course, be offsetting—or they may not. In this connection, it may be noted that equal percentage errors in input and output measures will not exactly offset each other.

In 1958, the 16 per cent for petroleum refining was the extreme low for the two-digit industry ratios of value added to value of output. But in the food industry, value added was only 29 per cent of value of product—and 17 per cent of the sum of value of product and value of input. The behavior of the food processing series shown in their chart and the behavior of corresponding real output and input series shown in the tables raise questions: Did real GPO (or value added) actually show little net change from 1957 to 1960 or 1961? Little change for real value added implies a decline in real value added in relation to real value of output in that period of 9 per cent or more. This sharp decline was preceded and followed by increases in the ratio of real value added to real value of output. Independent evidence seems to me essential to corroborate this finding before it can be accepted. The 9 per cent decline in the ratio, from 31.4 to 28.6 per cent, reflected the difference between a 9 per cent rise in real output and a 13 per cent rise in real input (comparing 1957 and 1960). Is this perhaps a case where rather small errors in price measurement and matching could have accounted for much or all of the temporary levelling off in real value added? Would either input or output perhaps have provided a better representation of real value added?

At the other extreme from petroleum refining and food processing in 1958 were printing and publishing and instruments and allied products, with value added to value of product ratios of 63 and 62 per cent. But even for printing and publishing the deflation process is applied to a total of 100 (for output) plus 37 (for input) or 137 altogether in obtaining a residual for 63 (i.e., 100 minus 37). Thus, at best, with respect to this aspect of the problem, the risks of important effects from small errors seem to me considerable over the whole range of industries.

The analysis in the Gottsegen-Ziemer paper is largely in terms of changes over long periods; while year-to-year percentage changes shown in the tables provide a ready reference for those interested, the discussion of year-to-year changes by industry, for the most part, will come later.

I expect this to be a very significant part of the whole analytical project.

The problems of current monthly or even quarterly figures are rather different from those of annual figures—in many respects they are more difficult—and the answers as to the most appropriate approaches may not be the same as those arrived at for annual figures. But it is of great importance that the issues relating to annual figures be discussed further in quite some detail to improve our understanding both of what has been happening from year to year and of what can be learned by various approaches to annual production measurement.