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7. CHANGING METHODS OF INVENTORY VALUATION: THE IMPACT OF LIFO ON INVENTORY AND PROFITS STATISTICS

Changes over time in methods of inventory valuation for a given reporting unit and differences in method at a point in time among reporting units have become more widespread, and therefore more important, in recent years and have affected BEA calculations for the national accounts. The change in business inventories enters the national income and product accounts explicitly as part of the GNP and implicitly on the income side as a determinant of profits in those industries holding inventories.

Prior to the early 1960's, when the Census Bureau assumed responsibility for the monthly survey and divisional reporting was introduced, the reporting unit for the M3 was the company. A company's total inventories (as well as sales and orders) were classified in a single industry on the basis of products sold by the firm. The yearend inventory figures from this monthly series were benchmarked to company data appearing in balance sheets published by IRS in *Statistics of Income*. Although figures reported to the Office of Business Economics in the old monthly survey and to IRS for tax purposes were not identical, the reporting unit in both sets of figures was the company. In the early years as well as today, *Statistics of Income* was also used by BEA to benchmark profits estimates. Thus, yearend inventories and profits came from the same general benchmark source—IRS.

There were good reasons to give up *Statistics of Income* as a benchmarking source for inventories—such as lack of uniformity in timing of reports and treatment of subsidiaries and foreign operations. Two results have followed: (1) annual benchmarks for profits and inventories are now different, and (2) in a number of sectors, notably manufacturing different reporting units are used for benchmarking yearend inventories than for estimating monthly inventories. When the rate of inflation is low these disadvantages probably are unimportant. However, once the rate of inflation accelerates and companies begin to shift their valuation methods, especially to LIFO, differences in data sources become significant in effects on the quality and accuracy of inventory and profits statistics.

This chapter is a review of various statistical sources containing information on the use of LIFO and how LIFO information has entered BEA calculations. Special attention is given to the 1973-74 period when the rate of inflation was especially high and shifts in valuation methods became widespread. Newly collected data on the prevalence of various valuation methods in manufacturing, wholesale and retail trade and how they were used by BEA is included in the last section of the chapter.

Measuring LIFO by its relative importance in the total book value of inventories understates the proportion of physical inventories on LIFO. Consider the following example:

Firm	Book Value	LIFO Reserve	FIFO Basis
Firm 1 (LIFO)	40	-10	50
Firm 2 (FIFO)	50	0	50
Total	90		100

Under these assumptions 40/90 or 44 percent of the book value will be reported as LIFO inventories. However, this distribution is not entirely valid because portions of the LIFO stock are valued at prices of the past. If the LIFO reserve is added back to the LIFO inventories of the LIFO firm, both firms are then on a comparable FIFO basis. In these terms both have an equal physical volume of inventory. Other things equal, if prices rise, the LIFO proportion of an industry's book inventories will decline over time because goods under LIFO will be valued at progressively older prices.

INVENTORY VALUATION SURVEYS OF MANUFACTURING

AICPA Surveys

For many years the American Institute of Certified Public Accountants (AICPA) has been tabulating a variety of characteristics on accounting methods used by large corporations. These tabulations, which are based on an analysis of annual reports of 600 large corporations, cover a broad range of accounting methods. Included in the data is information on the "method of cost determination" for inventories.¹ Data for selected years are shown in table 7.1.

¹The data appear in American Institute of Certified Public Accountants, *Accounting Trends and Techniques, Annual Survey of Accounting Practices Followed in 600 Stockholders' Reports* (New York: AICPA, various years).

Table 7.1. METHODS OF DETERMINING INVENTORY COST, 600 LARGE CORPORATIONS

Valuation Method	1950	1955	1960	1965	1970	1971	1972	1973	1974	1975	1976
Number of corporations	600	600	600	600	600	600	600	600	600	600	600
Not stating cost method	239	218	174	155	89	55	23	12	(1)	(1)	(1)
Stating cost methods	361	382	426	445	511	545	577	588	(1)	(1)	(1)
Number of cost methods stated	518	577	640	676	765	822	920	927	1,054	1,044	1,059
Methods stated:											
LIFO, for all or part of inventory	161	202	196	191	146	144	150	150	303	315	331
FIFO	134	138	182	213	292	333	377	394	375	376	389
Average cost	136	146	157	176	203	220	242	235	236	235	232
Standard cost	32	31	35	28	30	36	54	52	49	48	31
Retail method	6	14	16	17	27	31	35	39	35	36	26
Others	49	46	54	51	67	58	62	57	56	34	50
Number of methods stated	518	577	640	676	765	822	920	927	1,054	1,044	1,059

Note: These figures represent company counts, not values. Some companies reported more than one method.

¹Not reported by AICPA.

Source: American Institute of Certified Public Accountants, *Accounting Trends and Techniques, Annual Survey of Accounting Practices Followed in 600 Stockholders' Reports* (New York:AICPA, various years).

The figures in table 7.1 represent the number of times a reference is made to some valuation method in stockholder reports. As measures, these statistics are very rough since they are counts of firms rather than values. The number of firms was held constant at 600, but only 470 of those same firms were in the study in each year from 1967 through 1971. In addition, statistics on changes in valuation methods over time may reflect the fact that firms have become more specific in reporting accounting methods to stockholders rather than that they have made substantive changes in methods. In 1950, for example, 239 of the 600 firms did not mention methods of valuing inventory in their annual reports, but by 1973 this number had dwindled to 12. For 1974 and 1975 AICPA did not even report the number. Most of the 600 firms in the tabulation are in manufacturing, but the group includes several retailers and others in scattered industries.

From 1950 to 1955, the LIFO method was adopted by 41 more firms in the survey, probably as a response to price increases during the Korean conflict. Over the next 10 years, use of the LIFO method was relatively stable, dropping slightly from 202 to 191 corporations. A gradual decline set in after 1965 and by 1971 only 144 of the 600 firms were using LIFO for all or part of their inventories. In 1974 the number of firms using LIFO doubled—from 150 to 303—and by 1975, more than half of the 600 corporations were using LIFO for all or part of their inventories.

Pre-1973 BEA Surveys

BEA's early approaches to examining methods of inventory valuation concerned only the proportion of inventory on the LIFO method. In recent years, surveys on methods of valuation were broadened to include other methods as well.

Early Surveys—From the earliest days of preparing the national income and product accounts BEA recognized that data from LIFO and nonLIFO firms had to be processed differently. As a consequence there is a long history of requests by the Office of Business Economics (predecessor to the present Bureau of Economic Analysis) for information on the extent of LIFO use by manufacturing firms. Price rises during World War II stimulated the use of LIFO, which received its first general authorization by IRS in the 1939 tax code. To meet needs of national income work, BEA conducted surveys on the value of LIFO inventories at the end of 1947 and again at the end of 1951.²

The survey conducted in 1952 requested about 2,300 manufacturing firms to report the book value of their LIFO inventory as of the end of 1951. About 1,800 questionnaires were returned in usable form. These replies were supplemented by published financial statements of large firms and results of a survey conducted for BEA by the Rubber Manufacturers Association covering rubber-producing firms. Some highlights are shown in table 7.2.

In the early postwar period, only producers of primary metals and petroleum made extensive use of the LIFO method, and in some industries (automobiles, apparel, and tobacco) the method was rarely used. However, use of LIFO increased in 1951 compared with 1947, partly as a consequence of the sharp 14.8 percent rise in wholesale prices from June 1950 to June 1951, the first year of the Korean conflict.

The 1969 Survey—Concern by BEA about the reliability of data on methods of inventory valuation was closely related to the rate of inflation. Since the inventory valua-

²See James P. Daly, "LIFO Inventories and National Income Accounting," *Survey of Current Business*, Vol. 33 (May 1953), pp. 16-22.

Table 7.2. ESTIMATES OF LIFO INVENTORIES IN MANUFACTURING INDUSTRIES, 1947 AND 1951

Industry	Total Book Value End of 1951 (Billions of dollars)	LIFO Inventories as Percent of Total Book Value of Inventories, End of	
		1951	1947
Total manufacturing	43.1	15	12
Durable goods industries	22.7	13	10
Primary metals	2.8	44	41
Fabricated metal products	2.3	16	11
Electrical machinery	2.9	11	3
Machinery, excluding electrical	5.2	12	4
Motor vehicles and equipment	2.7	2	—
Transportation equipment, excluding motor vehicles	1.9	—	—
Lumber products except furniture	1.1	12	12
Furniture and fixtures . . . . .	.6	15	11
Stone, clay and glass products . . . . .	.9	8	—
Professional and scientific instruments . . . . .	.7	7	5
Other including ordnance	1.5	3	2
Nondurable goods industries	20.4	17	14
Food and kindred products	3.8	17	12
Beverages	1.3	18	14
Tobacco	1.8	—	—
Textile mill products	3.0	19	17
Apparel and related products	1.7	3	—
Leather and products . . . . .	.6	16	16
Paper and allied products	1.0	18	14
Printing and publishing . . . . .	.8	—	—
Chemicals and allied products	3.1	11	10
Petroleum and coal products	2.6	46	46
Rubber products . . . . .	.8	12	—

Source: Adopted from James P. Daly, "LIFO Inventories and National Income Accounting," *Survey of Current Business*, Vol. 33 (May 1953), p. 17.

tion adjustment (IVA) was small when the rate was low, BEA believed that any imperfections in its methods of calculation or limited knowledge about methods of inventory valuation were not likely to cause more than a negligible error in the IVA. In the later 1950's and early 1960's, the IVA was extremely small, ranging between plus or minus \$1 billion. With the onset of the Vietnam conflict, the IVA became a slightly larger negative figure, but in 1969 it jumped to -\$6 billion, of which -\$5.5 billion was in the corporate sector.³ This was still a modest amount and only tech-

nicians in BEA appeared to be concerned about their inadequate knowledge of this subject.

For many years after the 1951 survey BEA conducted no new surveys of valuation methods. However, from time to time it made some adjustments to LIFO proportions on the basis of the IRS data cited later, public announcements by large firms, reports to SEC and the like.

A new LIFO survey covering end-of-1969 inventories was undertaken in early 1970. It was confined to manufacturing, since outside of manufacturing and department stores the LIFO method was uncommon. The objectives of the survey were modest and the questions simple because the complexities of the LIFO method were not well known then. In any case BEA lacked the resources to conduct a large survey and was also concerned about an unfavorable reaction from industry if a

³Most analysts are familiar only with the corporate IVA because it is published regularly with the statistics on national income; in this study, however, "IVA" means the aggregate IVA—corporate and non-corporate—unless the corporate portion is specified.

large survey were to be attempted. The respondent panel of about 1,200 mostly large manufacturing firms already reporting quarterly sales and inventory expectations to BEA, were asked: "Are any of your inventories valued by the LIFO method?" Those answering "yes" were asked to specify the percentage of their inventories so valued. About 900 firms responded.

Results of the survey broadly confirmed LIFO proportions BEA was using at the time, although this was not true for some detailed industries. Table 7.3 shows estimates of LIFO proportions compiled in the 1969 survey, those being used in the national income and product accounts at that time, and 1951 survey data.

For some industries the survey results were suspect. Since failure of a single large firm to respond would drastically alter an industry's LIFO proportion, further research was conducted on nonrespondents by reference to Moody's and similar sources. However, BEA introduced few changes in LIFO proportions in the national accounts as a consequence of this survey.

LIFO in IRS Statistics

For many years IRS has included a simple question on form 1120, U.S. Corporation Income Tax Returns, relating to inventory valuation methods. It was not designed to generate statistical data but to identify LIFO tax returns so IRS agents could review them more carefully. From time to time IRS has tabulated answers to this question; 1963 was the last year for which such data were published.⁴

The question in 1963 relating to inventories in the cost of goods sold schedule was:

Was inventory valued at — Cost ; LIFO : Other if "other" attach explanation.

⁴Internal Revenue Service, *Statistics of Income—1963, Corporation Income Tax Returns*, Publication No. 16 (3-68). Data on methods of inventory valuation were also published in 1950, 1954, and 1962.

Table 7.3. ESTIMATED LIFO INVENTORIES AS PERCENTAGE OF TOTAL BOOK VALUE OF INVENTORIES, BY MANUFACTURING INDUSTRY, 1951 AND 1969

Industry	1969 BEA Survey (1)	Used by BEA in 1969 GNP (2)	1951 BEA Survey (3)
All manufacturing	17½	19	15
Durable goods industries.	19	20	13
Primary metals	60	55	44
Fabricated metal products.	21	17	16
Machinery, except electric.	17	13	12
Electrical machinery	14	38	11
Motor vehicles	10	20	2
Other transportation	4	0	0
Lumber	10	14	12
Furniture.	13	10	15
Stone, clay and glass	13	9	8
Nondurable goods industries	15	18	17
Food and kindred products.	13	24	17
Tobacco	31	38	0
Textile mill products	15	15	19
Apparel	5	2	3
Paper and allied products	17	22	18
Printing and publishing.	8	5	0
Chemicals and allied products	11	11	11
Petroleum and coal products	45	55	46
Rubber and products	2	12	12
Leather and products	3	17	12

Source: First two columns: unpublished data from the Bureau of Economic Analysis. Third column: James P. Daly, "LIFO Inventories and National Income Accounting," *Survey of Current Business*, Vol. 33 (May 1953), p. 17.

The wording of the question was faulty because LIFO is a cost method. Also no attempt was made to determine the specific cost methods used other than LIFO. The question was presented as though firms use only one method, although multiple methods often are used. When two or more boxes were checked, accurate calculations of inventories valued by different methods could not be made because the value associated with each method was not requested. Some of the 1963 data pertaining to LIFO is presented in table 7.4.

Given the imperfections in the questionnaire it is difficult to interpret these LIFO data. The large, combined category for LIFO and other valuation methods is troublesome because of its size—\$8.8 billion. If most of it was truly LIFO, the combined LIFO total obtained from the two categories would be in the correct range based upon what is known from other sources.

Inventory Valuation Methods and Profits Data—Since profits data used in the national income accounts are taken from *Statistics of Income*, the lack of information on inventory valuation methods used in deriving national profits figures constitutes a serious defect. There is ample evidence that some firms using LIFO to calculate profits do not report LIFO inventory values to Census. Although a number of recommendations are made in this study to improve the reporting by

LIFO firms to Census, this will not lead to a better understanding of profits statistics. The problem has become more important in recent years since BEA adopted two inventory valuation adjustments—one for IRS profits data and another for Census inventory data. Further complications associated with quarterly data are taken up later in this chapter.

Recommendation—The IRS corporate tax form 1120 has always included an ambiguous question on method of inventory valuation that should be improved. Aside from statistical requirements, it could be argued that the tax collection process would benefit if a carefully phrased question were asked of corporations and partnerships. The desirability of extending the inquiry to proprietorships is questionable because small firms that do not hold inventories are so numerous.

The IRS question on inventory valuation methods should conform, in general, to the question asked by the Census Bureau in recent surveys of valuation methods. The question should relate to methods actually used by firms in determining inventory values entering in the cost of goods sold schedule. It is necessary to learn how much inventory was valued at cost and how much at market, as well as specific cost methods used. The question to be asked might be structured as shown below.

Table 7.4. ALL CORPORATE INVENTORIES, INVENTORIES OF CORPORATIONS SHOWING VALUATION METHOD, INVENTORIES OF CORPORATIONS USING LIFO, SELECTED INDUSTRIES: END OF 1963

(Dollar figures in billions)

Industry	All corporations ¹		Corporation showing method of inventory valuation ²					
			Total		LIFO		LIFO and another method	
	Number of returns	Ending inventory	Number of returns	Ending inventory	Number of returns	Ending inventory	Number of returns	Ending inventory
All industrial groups..	1,323,187	106.3	451,776	77.4	1,724	4.1	869	9.8
Manufacturing.....	181,800	64.7	117,291	46.2	757	3.3	538	8.8
Food and kindred products.....	18,310	6.6	12,161	4.9	55	.1	70	1.4
Textile mill products.....	6,448	3.0	4,201	2.5	95	.2	78	.5
Chemicals.....	10,804	4.9	7,727	3.2	39	.2	18	.5
Petroleum refining.	1,259	3.5	739	2.2	13	.5	12	1.3
Primary metals....	4,336	5.7	2,915	3.1	87	1.0	57	1.0
Machinery except electrical.....	19,306	6.7	12,473	5.6	50	.6	40	.8
Electrical machinery.....	9,140	5.3	6,264	4.6	41	.1	18	1.2
Wholesale trade.....	137,617	13.6	80,257	11.4	283	.3	102	.1
Retail trade.....	257,383	18.3	175,204	14.8	558	.5	172	.5
General merchandise stores.....	16,930	4.8	11,436	4.3	69	.4	61	.3

Note: Data refers to inventories as shown in cost of goods sold schedule.

¹Source: IRS, Statistics of Income-1963, Corporation Income Tax Returns, Publication No. 16(3-68) table 3, p. 62.

²Source: IRS, Statistics of Income-1963, Corporation Income Tax Returns, Publication No. 16(3-68) table 23, p. 220.

Proposed IRS Questionnaire on Inventory Valuation Methods

Method of Valuation Actually Used	Value of Inventory in Cost of Goods Sold Schedule	
	Opening	Closing
Cost methods		
FIFO		
Average		
LIFO		
Standard		
Other (specify)		
Market		
Because lower than cost		
Market always		
Retail method		
Approximating cost		
Approximating lower of cost or market		
LIFO		

Also, firms using LIFO could be requested to show the amount of LIFO reserves applicable to opening and closing inventories.

Statistical Problems From LIFO Adoption

Recent years have seen a considerable expansion in information pertaining to inventory valuation methods. Before these newer surveys are discussed it is useful to consider statistical problems that occur when firms shift to LIFO, particularly those related to quarterly reporting (treated more fully in chapter 8) and to plant company or divisional reporting.

Quarterly reporting—In the spring of 1974—a period of high inflation—a large number of firms announced they were shifting to LIFO. The announcements continued throughout the year. However, some firms did not make public their adoption of LIFO until 1975, when financial statements for the year and final quarter of 1974 were issued.

For tax purposes, a company may decide late in a tax year or even early in the succeeding year to adopt the LIFO method. Unlike other changes in methods of accounting, a change to LIFO does not require advance permission from IRS. (A change from LIFO, however, does.) All that is required to adopt LIFO is the submission of Form 970, Application to Use the LIFO Inventory Method (see Appendix E), which must be sent to IRS during the year of change or along with the tax return for the year. Firms must not have issued an annual statement for the year using any other method even though they may have made interim financial statements on a non-LIFO basis. Firms may decide early in the year to switch to LIFO and issue quarterly financial statements on that basis.

In the case of a firm adopting LIFO at the time of its third quarter financial report, assume the firm had issued

financial statements for the first two quarters containing the following net income and inventory:

Year and quarter	Net income	Ending inventory
1973.....		100
1974:		
First quarter.....	20	105
Second quarter.....	23	115

When the company issues its third quarter report it may continue on, say, a FIFO basis and decide to wait until the end of the year to present LIFO data. Its reports for the three quarters might be:

Year and quarter	Net income	Ending inventory
1973.....		100
1974:		
Total.....	70	
First quarter.....	20	105
Second quarter.....	23	115
Third quarter.....	27	125

Alternatively, the firm may issue a third quarter financial report with the prior quarters restated to a LIFO basis:

Year and quarter	Net income	Ending inventory	LIFO reserve
1973.....		100	
1974:			
Total.....	55		
First quarter.....	17	102	3
Second quarter.....	18	107	8
Third quarter.....	20	110	15

Although contrary to FASB standards it is possible that some firms treat the third quarter as a residual, leaving the earlier quarters unchanged:

Year and quarter	Net income	Ending inventory	LIFO reserve
1973.....		100	
1974:			
Total.....	55		
First quarter.....	20	105	
Second quarter.....	23	115	
Third quarter.....	12	110	15

Any second to third quarter changes in statistical data caused by such reporting would contain gross errors. FTC data for the fourth quarter of 1974 were seriously affected by a procedure like that just described. Suppose a firm in reporting the value of

its inventories to Census submitted successive figures of 100, 105, and 115 (end of June). What would it do at the end of September? While it might continue to report its FIFO value (125), it might also report the LIFO value (110). In the latter case the firm would have no incentive to call attention to the lack of comparability with earlier figures.

It is not uncommon for firms adopting LIFO to continue to report to Census on some other method for some months during a transition period. Telephone calls were made to firms that adopted LIFO in the past few years in an attempt to discover how such firms reported to Census during the transition period. However, such a variety of answers were received that data could not be organized for tabulation.

Plant reporting—Suppose a company uses dollar value LIFO and has one LIFO pool which consists of two manufacturing establishments. At the end of its first year on LIFO this company shows the following result:

Item	Total	Plant 1	Plant 2
End of prior year, FIFO inventory .	80	50	30
End of year of LIFO adoption:			
FIFO basis.	100	75	25
LIFO reserve	15		
LIFO value.	85		

Since the company has one LIFO pool it need make only one LIFO calculation, as shown above. In the annual survey of manufactures (ASM) the firm must report its inventory value by establishment. The company may not have a LIFO value by establishment and may continue to report on a FIFO basis in the ASM. Alternatively, it may actually make a true LIFO calculation for each plant for internal purposes. However, the two independent calculations need not add up to 85 if, for example, Plant 2 had an inventory depletion. In contrast to the addition for Plant 1, the depletion would be valued at prior year prices. Even if the two individual plants had additions to stock, the sum of the two plants calculated independently could differ slightly from the aggregate calculation of the single LIFO pool. This example demonstrates the tax advantages of combining plants into a single pool and helps to explain why LIFO is used to a lesser extent for establishment statistics than for company-reported data. That is what is found in statistics on methods of inventory valuation given later in this chapter.

An alternative to obtaining true LIFO values by plant is simply to allocate an overall LIFO value by FIFO proportions. In this example Plant 1 would be $85 \times 0.75 = 63.75$ and Plant 2 would be $85 \times 0.25 = 21.25$. We believe that this is a common procedure for firms providing LIFO values by plant in the annual survey of manufactures, but one which may yield arbitrary results.

The reporting of inventory data by stage of fabrication by manufacturing firms on LIFO also poses problems. Census

inventory statistics for manufacturing are reported by totals and by stage of fabrication—materials, work in process, and finished goods. Some firms using dollar value LIFO combine these three categories into one LIFO pool, which raises questions on the validity of inventory data by stage of fabrication as reported to the Census Bureau. Indeed, some manufacturing firms do not report to Census on a LIFO basis because they do not have LIFO data available for each stage of fabrication. Some respondents allocate LIFO values proportionately, essentially in the simple pro-rata way shown in the example above by plant. Others may use more sophisticated procedures of estimating, especially if they show a breakdown by stage of fabrication in reports to stockholders. It is clear that reporting inventory data by stage presents serious difficulties to LIFO firms. The subject merits careful investigation by the Census Bureau.

Recent BEA Surveys

The sharp increase in the rate of inflation in 1973 and 1974 and the resulting rapid shift to LIFO caused great concern in BEA and elsewhere about the quality of BEA's income and product calculations. The problem was highlighted by the quantum jump in the IVA that began early in 1973. The IVA had been 49 percent of the book value change in inventories in 1972; it rose to 56 percent in 1973 and to 77 percent in 1974. Components of the book value inventory change and quarterly changes in the IVA as reported in the national accounts prior to the January 1976 benchmark revision are shown in table 7.5.

With quarter-to-quarter changes in the IVA exceeding \$10 billion, the accuracy of the IVA calculation became extremely important not only for estimating business profits and the change in inventory but also for determining the rate of growth of GNP itself. The process by which the IVA was calculated was no longer a narrow, technical issue. During 1973 and early 1974 discussions were held with other agencies and research was conducted within BEA about data requirements and procedural changes needed to improve the reliability of the computations.

BEA 800 Survey—Over this same 1973-74 period inventory measurement problems were exacerbated by large revisions in the change in the book value of inventories compiled by the Census Bureau and by the beginning of a massive shift to LIFO. By the spring of 1974, BEA officials concluded that an improvement in the calculation of inventory change and profits would necessitate surveys of accounting methods by BEA rather than by other agencies. The result was the BEA 800 survey on valuation methods used at the end of 1973. The forms for manufacturing are shown as Appendix G. Form 800 covered large firms that might cross major industry divisions; other simplified forms were used for smaller firms in specific industry divisions.

The proposed survey forms were handled through normal channels within the Department of Commerce and the Office of Management and Budget. By midsummer of 1974, just as OMB approved the form, BEA staff decided it could not ignore shifts to LIFO during 1974. In a last minute negotia-

Table 7.5. BOOK VALUE CHANGE, CHANGE IN BUSINESS INVENTORIES, IVA AND CHANGE IN IVA: 1972-1974

(Billions of dollars, seasonally adjusted at annual rate)

Year and quarter	Book value change (1)	Change in business inventories (2)	IVA (3)	Quarterly change in IVA (4)
1972:				
1st quarter.	11.5	5.0	-6.5	
2nd quarter.	15.3	8.0	-7.3	-0.8
3rd quarter.	18.7	10.2	-8.5	-1.2
4th quarter.	21.1	11.0	-10.1	-1.6
1973:				
1st quarter.	29.2	10.0	-19.2	-9.1
2nd quarter.	33.6	10.7	-22.9	-3.7
3rd quarter.	31.2	11.8	-19.4	+3.5
4th quarter.	46.8	28.9	-17.9	+1.5
1974:				
1st quarter.	50.7	16.9	-33.8	-15.9
2nd quarter.	53.6	13.5	-40.3	-6.5
3rd quarter.	70.4	8.7	-61.7	-21.4
4th quarter.	55.8	17.8	-38.0	+23.7

Source: Columns 1, 3, and 4: unpublished data from the Bureau of Economic Analysis. Column 2: "Current Business Statistics, Survey of Current Business, Vol. 55 (July 1975), p. 5-1.

tion with OMB a new question (Item 8) was added to the 800 form. This was an attempt to collect crude information so the results obtained for the end of 1973 could be adjusted to yield LIFO proportions for the end of 1974.

The BEA 800 survey was unique in many ways. Firms were requested to state methods of inventory valuation they used in filing reports to: IRS for tax purposes, the Federal Trade Commission in the Quarterly Financial Report, and the Bureau of the Census in a variety of surveys. An attempt was also made to identify method differences between reports in Census monthly and annual surveys, between interim quarterly reports and the final quarterly report to FTC, and between interim monthly reports and the monthly report for the last month of the year in Census monthly surveys.

The panel for the survey was drawn from firms reporting in BEA's quarterly survey of actual and anticipated capital expenditures for plant and equipment (P&E). All large firms and a subsample of smaller firms were drawn in manufacturing, wholesale, retail, and utilities. The P&E survey is not based on a probability sample but is primarily a reporting panel of large firms. Consequently, the sample was not at all representative of wholesale and retail trade, where small firms are important in the aggregate. Altogether about 4,000 survey forms were mailed and about 2,800 responses were usable. The survey was well received by the business community in the sense that there were no letters of complaint to members of Congress or to the Secretary of Commerce.

The Census Bureau, which had been cautious about collecting data on inventory methods, then began to conduct its own surveys, which are discussed later. Census confines its surveys to valuation methods applicable to Census data and does not inquire about methods used by business in reporting to IRS or to stockholders.

The results of the BEA 800 survey are too extensive to present in detail; highlights on an aggregated basis are given. Again it should be noted that in the case of wholesale and retail trade the BEA sample was very small. It included responses from only 426 firms in retail and only 280 in wholesale. Of the retailers only 241 reported in the Census annual retail trade survey and 191 reported in the Census monthly retail inventory survey. Only the IRS column was completed by 185 retail firms, from which it may be surmised that they are not included in the Census Bureau retail surveys, which are probability samples. Because of the thin sample in retail, significantly different results were obtained depending upon whether the sample results were tabulated first by kind of business, percentages computed and then weighted up to total retail or whether no kind of business weights were used within the sample.

LIFO proportions being used in manufacturing and trade as of the end of 1973 prior to the new BEA 800 survey are compared in table 7.6 with the results obtained from the BEA 800 survey.

Table 7.6. ESTIMATED PROPORTIONS OF END-OF-1973 MANUFACTURING AND TRADE INVENTORIES VALUED BY LIFO: COMPARISON OF PROPORTIONS IN USE BY BEA WITH BEA SURVEY RESULTS

Inventories	LIFO percentages at end of 1973
Manufacturing:	
LIFO in actual use in GNP accounts....	17.4
LIFO in BEA 800 survey:	
IRS, tax reports.....	15.6
Census annual survey of manufactures	12.5
Census M3 survey at yearend.....	13.3
FTC, yearend.....	14.4
Retail:	
LIFO in use in GNP.....	2.8
LIFO in BEA 800 survey:	
IRS, tax reports.....	7.0
Census annual survey.....	5.8
Census monthly survey.....	6.1
Wholesale:	
LIFO in use in GNP.....	0
LIFO in BEA 800 survey:	
IRS, tax reports.....	8.9
Census monthly survey.....	3.4

Source: Unpublished data, Bureau of Economic Analysis.

For public utilities responding to the survey, 9.7 percent were reporting LIFO values to IRS at the end of 1973. At that time BEA was using 4 percent as the LIFO proportion for a more broadly based industry grouping that included communications as well as utilities. All the inventory of the more broadly defined group is held by electric and gas utilities.

BEA seems to have been using too high a LIFO proportion in manufacturing and too low a LIFO proportion in other industries. In manufacturing the LIFO proportion of 17.4 percent used in the national income accounts was a little high compared to the 15.6 percent on LIFO reporting to IRS and considerably higher than the figures reported in the annual survey of manufactures. BEA assumptions of no LIFO in wholesale trade and 3 percent in retail were clearly low. (These observations were later confirmed by more comprehensive surveys conducted by the Census Bureau.) The LIFO proportion being used in utilities at the end of 1973 was also low.

BEA 900 Survey—By mid-1974 it became quite clear that a large-scale shift to LIFO was under way. Although a last minute special question was added to the BEA 800 survey asking firms about switching to LIFO during 1974, BEA felt that more comprehensive information was needed. Consequently it started a new survey (BEA 900) to determine how firms who had already switched to LIFO during 1974, or were planning to do so, reported to the Federal Trade Commission and the Census Bureau during the transition period. In manufacturing, the Quarterly Financial Reports of the FTC are the temporary source of quarterly and annual profits estimates until IRS annual data become available, and the permanent source for quarterly interpolations of profits after IRS annual estimates become available. Preliminary IRS estimates of profits become available about a year and a half after the end of a given year, while final figures become available after yet another year has passed. In the case of FTC data, BEA asked in the survey (see Appendix H) for firms to restate quarterly profits as reported to FTC to what would have been reported if they had used LIFO since the beginning of the year. In the case of Census data, BEA attempted to ascertain how firms had been reporting and what their intentions were with respect to adoption of LIFO.

The BEA 900 form was sent to firms planning to shift to LIFO (or extending their use of LIFO) or who might be shifting to that method for 1974 financial statements. Firms receiving the forms were selected from respondents to the BEA 800 survey who indicated a change in method, from public announcements, and from a variety of trade sources. In the end, 955 firms were identified and 840 were surveyed. The mailing was staggered and continued into early 1975, but was not extended to include firms shifting to LIFO after the 1974 accounting year.

From the 840 forms mailed there were 545 usable responses. The coverage in terms of inventory values was better than implied by these company counts because some large firms who failed to return questionnaires were telephoned to obtain replies.

From the data received, BEA was able to project the sample results to universe estimates, although the process was not scientific. BEA estimated that shifting to LIFO by manufacturing corporations had an overall negative effect of \$6.7 billion on corporate profits; for wholesale and retail combined the estimate was \$1 billion. That is, if no corporations had shifted to LIFO in 1974, reported profits in manufacturing and trade would have been \$7.7 billion higher. Shifts to LIFO among non-corporate firms and corporations in other industries were negligible.

From the data collected for manufacturing corporations, BEA estimated also that respondents to the FTC Quarterly Financial Report had understated profits by \$2.2 billion because of the way firms adopting LIFO reported to FTC. (See table 7.7.) The quarterly pattern of reported profits was grossly distorted by the shift to LIFO. Profits data for the fourth quarter of 1974 as compiled by FTC, had to be raised and earlier quarters reduced because many firms shifting to LIFO made the change public only when reporting their fourth quarter and annual 1974 results. That is, some firms shifting to LIFO reported for three quarters on a FIFO or similar basis and then did an annual calculation by the LIFO method. In reporting to FTC these firms derived their fourth quarter profits as residuals. Hence, reported profits of such firms for the first three quarters had to be reduced while those for the fourth quarter had to be increased. BEA's adjustments to corporate manufacturing profits as published by FTC for 1974 were as follows:⁵

Year and quarter	Annual rate (billions of dollars)
1974:	
1st quarter.....	-4.8
2nd quarter.....	-5.6
3rd quarter.....	-4.0
4th quarter.....	+6.2
Annual.....	-2.05

Source: Computed from data in internal memorandum of December 4, 1975, Robert Parker to Allan H. Young, Bureau of Economic Analysis.

BEA Benchmark Revision

LIFO Proportions—During 1974, BEA continued to use LIFO proportions obtained from earlier survey results but only after they were adjusted upward on a judgmental basis to allow for the well-publicized shift to LIFO. In January 1975, before results of the BEA 800 survey were available, aggregate LIFO proportions in manufacturing, wholesale and retail were as

⁵This subject is also discussed in the November 1974 *Survey of Current Business* in an article on the results of the BEA 900 survey and their introduction in the national income figures for the first three quarters of 1974. It is interesting to note that this was the first time that one IVA was used to adjust profits and another to adjust inventory.

Table 7.7. ESTIMATED NEGATIVE IMPACT ON 1974 BEFORE TAX CORPORATE PROFITS IN MANUFACTURING DUE TO FIRMS' SWITCHING TO LIFO IN 1974

(Millions of dollars)

Industry	LIFO Impact on Profits	LIFO Impact Included in FTC ¹ Published Profits	Adjustments Needed to FTC ¹ Profits
Manufacturing, total	6,694	4,525	2,169
Nondurable goods	3,862	2,539	1,323
Food and kindred products	542	430	112
Tobacco products	36	30	6
Textile mill products	140	77	63
Paper and allied products	240	173	67
Printing and publishing	130	108	22
Chemicals and allied products	1,620	1,214	406
Petroleum and coal products	670	304	366
Rubber and plastic products	406	158	248
Other nondurable goods	78	45	33
Durable goods	2,832	1,986	846
Stone, clay, and glass products	260	222	38
Primary metals	612	437	175
Fabricated metals	460	383	77
Nonelectric machinery	520	325	195
Electric machinery	320	208	112
Transportation equipment, except motor vehicles	144	82	62
Motor vehicles and equipment	160	154	6
Instruments	158	77	81
Other durable goods	198	98	100

Note: This table represents estimates of how much higher 1974 profits before tax would have been if no firms had switched to LIFO in 1974.

¹ Federal Trade Commission.

Source: Unpublished BEA memorandum, Robert Parker to Allan H. Young, December 4, 1975, based on BEA 900 survey.

shown below. These reflect detailed industry LIFO proportions weighted by ending inventories of each industry group.

End of Year	Manu- facturing	Wholesale	Retail
1973	17	0	3
1974 (after judgmental adjustments)	20	0	3

BEA did not make its usual annual revisions in July 1975 in order to concentrate on the benchmark revision during 1974. In the benchmark revision, published in January 1976, BEA was able to integrate not only the results of its own surveys of inventory valuation methods but also data on valuation methods compiled by the Census Bureau in manufacturing industries.

In the fall of 1974 Census Bureau staff telephoned firms that had publicly announced a shift to LIFO to ascertain how

they were reporting for the M3 report. Rough tabulations were prepared to help BEA in its calculations. After this and the successful experience with BEA surveys, the Census Bureau in early 1975 began to collect data on methods of valuing inventory in both the annual survey of manufactures and the monthly M3 survey by mailing supplementary forms to the panels in each survey. In the early fall of 1975 Census prepared partial tabulations expressly for use in the BEA benchmark revisions. The ASM tabulation, based upon all reports keypunched at that time, covered about 58 percent of the value of inventories in that survey. The M3 survey omitted reports for approximately 300 firms as well as usual nonrespondents. The M3 tabulations were based on reports covering 55 percent of the value of inventories; a typical monthly M3 tabulation of inventories reflects about 65 percent coverage. Preliminary results for all of manufacturing as of October 1975 appear in table 7.8; the completed tabulations appear in tables 7.16 through 7.20.

The two surveys showed significant differences in LIFO proportions for the same dates. The difference of six percentage points was much more than the one-point spread reported by respondents in the BEA 800 survey for the end of 1973 (12.5

Table 7.8. PRELIMINARY ESTIMATES OF METHODS USED TO VALUE INVENTORIES REPORTED IN CENSUS ASM AND M3 SURVEYS, END OF 1973 AND 1974

(Percent distribution of book values)

Method	ASM		M3	
	1973	1974	1973	1974
LIFO	11	22	17	28
FIFO	38	31	40	35
Average cost	18	17	23	18
Standard cost	19	18	15	14
Other	14	12	5	5
Total	100	100	100	100

Source: Memorandum of October 24, 1975 Milton Eisen, Census Bureau, to Jerry Donahoe, Bureau of Economic Analysis.

percent for ASM vs. 13.3 percent for M3—see table 7.6). The same spread evident at the end of 1973 continued to be present at the end of 1974.

The differing results for this critical period posed difficulties for BEA in its the benchmark revision. The proportions actually used by BEA in the national accounts are shown in table 7.9 and compared with the prebenchmark data previously shown.

The aggregate LIFO proportions for manufacturing, wholesale and retail shown in table 7.9 as “benchmark” were the result of a careful review by BEA of all available data. For each industry the analysis included a review of response rates, a check of external sources in industries where survey response

Table 7.9. LIFO PROPORTIONS USED IN BEA ESTIMATES OF CHANGE IN BUSINESS INVENTORIES AND PROFITS

End of year	Manufacturing			Wholesale ¹	Retail ¹
	Inventories		Profits		
	Annual	Monthly			
1973					
Prebenchmark.	17	17	17	0	3
Benchmark....	14	16	16	9	5
1974					
Prebenchmark.	20	20	(NA)	0	3
Benchmark....	22	25	34	16	9

NA Not available.

¹In wholesale and retail the same LIFO proportions were used for inventories and profits.

Source: Unpublished Bureau of Economic Analysis data.

was low or otherwise suspect, and a general appraisal of other external information on the adoption of LIFO.

It is important to note that inadequate LIFO proportions previously used in wholesale and retail were abandoned. Further, BEA expanded its calculations of the IVA, recognizing that different LIFO proportions among statistical sources yield different estimates of the IVA. Introduction of multiple IVA's was begun in the fall of 1974 when BEA started to use one IVA for manufacturing profits and another for the change in manufacturing inventories. In the benchmark revision, three IVA's were used: one for yearend inventories based on the ASM; another for the monthly extrapolating series for inventories based on the M3; and a third for profits. The different proportions for all manufacturing, based on information from the new surveys on inventory valuation methods, appear in table 7.9. As can be seen from the table, fully one-third of manufacturing was estimated to be using the LIFO method by the end of 1974 for reporting profits for tax purposes; subsequent conversions to LIFO have made this proportion considerably higher.

Table 7.10 shows LIFO proportions by detailed manufacturing industries used by BEA for 1974 in the July 1977

Table 7.10. LIFO PROPORTIONS USED IN BEA ESTIMATES OF CHANGE IN BUSINESS INVENTORIES AND PROFITS FOR 1974

SIC code	Industry	Inventories		Profits
		ASM annual	M3 monthly	
20	Food and beverages.....	15	11	27
21	Tobacco.....	35	22	47
22	Textiles.....	20	16	47
23	Apparel.....	7	15	24
24	Lumber.....	16	22	33
25	Furniture.....	19	22	33
26	Paper.....	23	31	35
27	Printing.....	14	12	18
28	Chemicals.....	18	34	52
29	Petroleum.....	45	80	94
30	Rubber.....	25	29	37
31	Leather.....	10	31	39
32	Stone, clay, glass.....	29	26	44
33	Primary metals.....	28	47	64
34	Fabricated metals.....	25	26	27
35	Machinery, except electric.....	30	35	28
36	Electrical machinery...	25	41	34
37	Transportation equipment.....	7	3	13
38	Instruments.....	22	16	22
39	Other durables.....	15	18	21
208	Beverages.....	18	14	42
371	Motor vehicles.....	9	5	7
	Total.....	22	26	34

Source: Unpublished data, Bureau of Economic Analysis.

revision. The LIFO proportions for all manufacturing industries are only slightly different from those in table 7.9.

In wholesale and retail trade BEA continues to use the same LIFO proportion for profits as for inventories. However, it seems clear that LIFO firms in trade report inventories to Census on a preLIFO basis and to IRS on a LIFO basis. The procedure in manufacturing that uses differing LIFO proportions should be followed in trade as well but more comprehensive data may be required before BEA can introduce this further refinement.

IVA before and after benchmark revision—The benchmark revisions of early 1976 reflected updated statistics on the book values of inventory and on profits, new seasonal factors, new turnover period weights, and information from the new surveys of valuation methods. Although all of these contributed to the revisions the new valuation data were particularly important. Consequently the comparison in table 7.11 is of interest.

INVENTORY VALUATION SURVEYS IN WHOLESALE AND RETAIL TRADE

Retail Trade

Surveys of inventory valuation methods in the trade sector were first taken in connection with the 1970 and 1971 Annual

Table 7.11. IVA APPLICABLE TO INVENTORIES BEFORE AND AFTER 1976 BENCHMARK REVISION

(Billions of dollars at annual rates)

Year and quarter	Before benchmark	After Jan. 1976 benchmark	July 1977 ¹
1973:			
1st quarter.....	-19.2	-19.7	-19.7
2nd quarter.....	-22.9	-24.6	-24.6
3rd quarter.....	-19.4	-19.4	-19.4
4th quarter.....	-17.9	-21.3	-21.3
Annual.....	-19.9	-21.2	-21.2
1974:			
1st quarter.....	-33.8	-37.2	-39.9
2nd quarter.....	-40.3	-43.7	-48.1
3rd quarter.....	-61.7	-63.2	-68.0
4th quarter.....	-38.0	-46.4	-49.7
Annual.....	-43.5	-47.6	-51.4
1975:			
1st quarter.....	-7.5	-19.4	-20.9
2nd quarter.....	-20.0	-9.5	-11.1
3rd quarter ²	-13.1	-9.2	-10.3

¹In accordance with usual practice the July 1977 revision did not affect 1973 and earlier data.

²Fourth quarter 1975 was published only after January 1976 benchmark.

Source: Unpublished Bureau of Economic Analysis data.

Retail Trade Surveys (ARTS). Unfortunately the inquiry was improperly designed and the results were unusable.

The next effort to collect data on methods of inventory valuation was made as part of the Census Bureau's record-keeping survey of Group I retail firms, (those with less than 11 stores). This related to inventory values reported for September 1973 in the monthly survey of retail inventories (RIS). Some months later a similar form was sent to firms in Group II (those having 11 or more stores) but it related to valuation methods used for June 1974 inventories. It must be recognized, therefore, that even though results from the two parts have been summed they related to time periods nine months apart. The questions on valuation methods in the record-keeping surveys were viewed as more or less experimental by the Census Bureau, to see if respondents could report their methods of valuation.

A question on valuation methods was added to the ARTS for end-of-1974 inventories and it has been repeated each year since. For December 1975 a supplemental form on valuation methods also was sent to those reporting in the monthly retail inventory survey, now an annual feature of this work. Aggregate results for all retail trade combined are shown in table 7.12; detailed results appear in table 7.19.

Table 7.12. PERCENTAGE DISTRIBUTION OF RETAIL INVENTORIES BY VALUATION METHOD, THREE SURVEYS

Valuation method	All retail inventory			
	RKP	ARTS, end of		RIS, end of 1975
		1974	1975	
All methods.....	100	100	100	100
FIFO.....	14	21	20	19
LIFO.....	4	6	8	7
Average.....	9	10	10	13
Specific.....	27	31	29	30
Retail method.....	36	30	32	29
Approximating lower of cost or market..	20	20	18	16
Approximating cost..	12	7	7	6
LIFO retail method..	3	3	7	6
Other (including nonresponse).....	10	2	2	1
Sum of LIFO methods...	7	9	15	12

Note: Detail may not add to totals due to rounding.

RKP: Summary of reports relating to September 1973 and June 1974 inventory in recordkeeping surveys (see text).

ARTS: Annual Retail Trade Survey.

RIS: Special supplement, monthly retail inventory survey.

Source: Unpublished Bureau of the Census data.

For 1974 the Census survey confirmed the LIFO proportion of 9 percent used by BEA for that year. However, BEA used the same proportion for 1975 and missed the large shift to the LIFO method in 1975, subsequently corrected in July 1976. The rather large percentage for "other" in the recordkeeping surveys raises questions about the validity of data reported in that column. Also, one cannot know whether the same differences in the 1975 results between the ARTS and RIS are due to response differences, sampling variability, or differences in methods in annual versus monthly reporting.

A tabulation of the 1975 RIS data by size of inventory was also made (table 7.13). As might be expected, use of LIFO increases as size increase.

Table 7.13. PERCENTAGE OF RETAIL INVENTORIES VALUED BY LIFO BY INVENTORY SIZE CLASS, END OF 1975

Inventory Size Class (Dollars)	Percentage of Inventory on LIFO
Under 100 thousand	4
100 to 999 thousand	5
1 to 10 million	15
10 to 50 million	22
50 to 100 million	21
100 million or more	26
Average, all size classes	13

Source: Unpublished Bureau of the Census data.

Wholesale Trade

As with retail trade, the first attempt to collect data on inventory valuation methods in wholesale trade occurred as part of the Census Bureau's recordkeeping survey, which pertained to inventories as of June 1974. In January 1976, the Census Bureau mailed a supplementary form to the sample panel of merchant wholesalers to collect information on methods of inventory valuation as of December 1975. An innovation of this particular survey, which has since been extended to manufacturing, is the special breakdown asked of respondents using market methods for valuing inventories. Table 7.14 gives results for all merchant wholesalers. Detailed results by kind of business appear in table 7.20.

For merchant wholesalers it is possible that BEA used too high a LIFO proportion (16 percent) for the end of 1974 in the benchmark revisions but this is not certain because the LIFO proportion of 11 percent shown in table 7.14 relates to the middle rather than to the end of 1974.

A size tabulation for end-of-1975 inventories also was made (table 7.15); it shows that use of LIFO decreases for very large firms. Two points should be noted however. First, in wholesale trade there are few firms in the largest size class.

Table 7.14. PERCENTAGE DISTRIBUTION OF MERCHANT WHOLESALER INVENTORIES BY VALUATION METHODS: 1974-1975

Valuation methods	Mid-1974 ¹	End 1975 ²
All methods	100	100
FIFO	32	35
LIFO	11	16
Average cost	12	14
Specific cost	25	21
Market	13	11
Market because lower than cost	(3)	3
Market always used	(3)	8
Other (including nonresponse)	8	2

Note: Detail may not add to totals due to rounding.

¹Reports for June 1974 collected in recordkeeping survey.

²Special supplement, monthly wholesale trade survey.

³Not collected.

Source: Unpublished Bureau of the Census data.

Second, the largest size class includes some very large wholesalers of farm products, many of whom always use a market basis for determining the value of their inventories.

DETAILED TABLES BY METHOD OF INVENTORY VALUATION

Detailed data on methods of valuation by industry are presented in table 7.16 through 7.20. Some industry results appear to be affected by errors arising from response or nonresponse problems. These data are being presented as tabulated, despite possible errors, to emphasize problems Census and BEA have faced in collecting and using data pertaining to valuation methods. However, by 1975 most of the response, coverage, and processing problems were under reasonable control. More extensive analysis of these data is desirable.

Table 7.17 shows the changes in methods of valuation by method and industry from 1973 to 1975 as tabulated from the M3 survey. In this table, as in all tables covering more than one year, changing proportions by method of valuation reflect not only changes in accounting methods but also differential movements in underlying inventories within 2-digit industries with valuation methods unchanged. From 1973 to 1975, LIFO proportions rose in all industries except leather, where the proportions look somewhat peculiar and may reflect sampling variability. These increases took place at the expense of average cost, standard cost and especially FIFO valuations. The larger decline in FIFO than in average cost is not unexpected since using average cost valuation yields a cost of goods sold that is closer to the results obtained using LIFO. Fourteen of twenty industries showed declines in standard cost valuations.

Table 7.15. PERCENTAGE OF MERCHANT WHOLESALE INVENTORIES VALUED BY LIFO BY INVENTORY SIZE CLASS, END OF 1975

Inventory Size Class (Dollars)	Percentage of Inventory on LIFO
Under 100 thousand	5
100 to 999 thousand	12
1 to 10 million	21
10 to 50 million	25
50 to 100 million	4
100 million or more	0
Average, all size classes	16

Source: Unpublished Bureau of the Census data.

The 1975 valuation proportions from the M3 and ASM surveys are compared in table 7.18. Unlike tables 7.16 and 7.17, the 1972 Standard Industrial Classification is employed for table 7.18. LIFO proportions at the end of 1975 were uniformly higher in the M3 than in the ASM in all industries except transportation equipment and instruments. A second point of interest is that standard cost is much more common as a method of inventory valuation in the ASM than in the M3. This is not surprising since standard costs are typically used for management purposes.

Retail methods of valuation are presented in table 7.19, which also includes end-of-1976 inventories. LIFO is used much less in trade than in manufacturing but, as in manufacturing, the trend toward LIFO is continuing. LIFO is used extensively by department stores; almost half of the inventories of department stores as reported to the Census Bureau are valued by the LIFO method. As noted earlier, the acceptance by IRS of special price indexes compiled by BLS for depart-

Table 7.16. PROPORTION OF MANUFACTURING INVENTORIES VALUED BY LIFO IN BEA AND CENSUS BUREAU SURVEYS, BY INDUSTRY, SELECTED YEARS

(LIFO as percentage of total book value)

Industry	BEA Surveys							Census Surveys					
	1947	1951	1969	1973 BE 800 Survey				1973		1974		1975	
				IRS	FTC	ASM	M3	ASM	M3	ASM	M3	ASM	M3
Total manufacturing	12	15	18	16	14	13	13	11	16	22	26	24	32
Durable goods industries	10	13	19	16	15	13	14	14	16	22	23	24	32
Primary metals	41	44	60	49	39	25	34	28	42	28	47	30	60
Fabricated metal products	11	16	21	12	11	11	12	10	11	25	26	29	37
Electrical machinery	3	11	14	23	23	23	26	17	30	25	41	26	34
Machinery except electrical	4	12	17	18	18	19	18	18	25	30	35	32	34
Transportation equipment	—	0	6	3	3	3	0	4	2	7	3	8	7
Stone, clay, and glass products	—	8	13	2	2	2	3	9	6	29	26	31	33
Instruments and related products	5	7	11	6	6	3	1	13	6	22	16	27	23
Other durable goods	8	10	14	11	10	5	9	10	9	16	21	19	29
Nondurable goods industries	14	17	15	14	13	12	13	8	14	19	30	24	32
Foods and kindred products	12	17	13	10	10	8	11	8	8	15	11	16	18
Tobacco	0	0	31	47	47	48	48	1	33	35	22	35	44
Textile mill products	17	19	15	9	9	6	7	6	11	20	16	24	29
Paper and allied products	14	18	17	17	16	8	15	12	18	23	31	26	29
Chemicals and allied products	10	11	11	12	12	10	11	4	5	19	34	25	41
Petroleum and coal products	46	46	45	61	57	53	39	36	57	45	80	48	61
Rubber products	0	12	2	1	0	1	0	6	24	25	29	28	50
Other nondurable goods	2	3	6	5	4	6	6	6	12	10	16	12	17

Note: Industry classifications are based on the 1967 Standard Industrial Classification (SIC) for the M3 survey and on the 1972 SIC for the ASM. The Census Bureau did not consider the 1973 and 1974 results for the M3 survey adequate for publication because of a variety of reporting problems. ASM results are essentially based on data as originally reported and were reviewed by Census only for overall consistency rather than plant by plant.

Source: Unpublished Bureau of Economic Analysis and Bureau of the Census data.

Table 7.17. METHODS OF VALUING INVENTORIES OF MANUFACTURERS IN CENSUS BUREAU MONTHLY M3 SURVEY, BY INDUSTRY, 1973, 1974 AND 1975

(Percentages of total book value. Detail may not add to totals because of rounding)

Industry Group (1967 SIC) ¹	Year	Method of Inventory Valuation						Total
		FIFO	LIFO	Average Cost	Actual Cost	Standard Cost	Other ²	
All manufacturing	1973	43	16	22	7	12	0	100
	1974	37	26	19	6	12	0	100
	1975	30	32	17	6	12	3	100
Durable goods	1973	46	16	20	4	14	0	100
	1974	40	23	18	6	13	0	100
	1975	30	32	17	7	12	2	100
Lumber and wood products	1973	40	7	45	1	7	0	100
	1974	32	22	38	1	7	0	100
	1975	22	21	46	6	4	2	100
Furniture and fixtures	1973	62	12	5	5	16	0	100
	1974	50	24	5	5	16	0	100
	1975	51	26	10	1	12	0	100
Stone, clay and glass	1973	27	6	26	3	38	0	100
	1974	20	26	25	3	26	0	100
	1975	25	33	20	0	22	0	100
Primary metals	1973	29	42	16	2	11	0	100
	1974	26	47	15	2	10	0	100
	1975	10	60	13	1	6	10	100
Fabricated metal products	1973	58	11	7	6	18	0	100
	1974	44	26	6	7	17	0	100
	1975	36	37	4	8	14	1	100
Machinery, except electrical	1973	45	25	13	3	14	0	100
	1974	36	35	12	3	14	0	100
	1975	30	34	18	3	14	1	100
Electrical machinery	1973	42	30	12	6	10	0	100
	1974	31	41	10	6	12	0	100
	1975	39	34	4	8	14	1	100
Transportation equipment	1973	46	2	35	12	5	0	100
	1974	43	3	36	13	5	0	100
	1975	30	7	36	19	7	1	100
Instruments and related products .	1973	50	6	11	3	30	0	100
	1974	44	16	5	3	32	0	100
	1975	44	23	7	6	19	1	100
Other durable goods	1973	58	8	15	2	17	0	100
	1974	52	18	12	2	16	0	100
	1975	36	38	11	1	11	3	100

Table 7.17. METHODS OF VALUING INVENTORIES OF MANUFACTURERS IN CENSUS BUREAU MONTHLY M3 SURVEY, BY INDUSTRY, 1973, 1974 AND 1975—Continued

(Percentages of total book value. Detail may not add to totals because of rounding)

Industry Group (1967 SIC) ¹	Year	Method of Inventory Valuation						Total
		FIFO	LIFO	Average Cost	Actual Cost	Standard Cost	Other ²	
Nondurable goods	1973	41	14	21	7	15	2	100
	1974	34	29	16	5	13	3	100
	1975	31	32	17	4	13	3	100
Food and kindred products	1973	51	8	24	3	7	17	100
	1974	49	11	21	2	7	10	100
	1975	36	18	24	8	5	9	100
Tobacco manufactures	1973	4	0	25	8	63	0	100
	1974	5	22	22	6	45	0	100
	1975	5	44	44	6	1	0	100
Textile mill products	1973	48	11	12	4	25	0	100
	1974	45	16	11	5	24	0	100
	1975	30	29	13	3	23	2	100
Apparel and related products	1973	40	10	23	4	23	0	100
	1974	38	15	21	4	22	0	100
	1975	39	14	8	2	34	3	100
Paper and allied products	1973	32	18	32	3	15	0	100
	1974	23	31	29	2	15	0	100
	1975	34	29	22	3	12	0	100
Printing and publishing	1973	68	7	11	7	7	0	100
	1974	64	12	10	7	7	0	100
	1975	58	20	6	6	8	2	100
Chemicals	1973	41	5	29	1	24	0	100
	1974	33	34	15	1	17	0	100
	1975	28	41	8	1	22	0	100
Petroleum and coal products	1973	10	57	18	13	2	0	100
	1974	10	80	8	0	2	0	100
	1975	8	61	27	1	3	0	100
Rubber and plastic products	1973	47	24	11	2	16	0	100
	1974	47	29	8	2	14	0	100
	1975	28	50	10	5	7	0	100
Leather and leather products	1973	46	39	2	0	13	0	100
	1974	48	31	5	0	16	0	100
	1975	74	19	1	2	3	1	100

¹ Industry classifications based on the 1967 SIC. Classifications are not the same as those used in table 7.18.² Includes market valuations, which were requested explicitly starting in 1975. These are of consequence only in food.

Source: Unpublished Bureau of the Census data.

Table 7.18. METHODS OF VALUING INVENTORIES OF MANUFACTURERS REPORTING TO CENSUS BUREAU, BY SURVEY AND INDUSTRY, END OF 1975

(Percentages of total book value. Detail may not add to totals because of rounding)

Industry Group (1972 SIC) ¹	Method of Inventory Valuation						Total
	FIFO	LIFO	Average Cost	Actual Cost	Standard Cost	Other	
All manufacturing:							
M3	30	32	17	6	12	3	100
ASM ²	25	24	16	8	20	7	100
Durable goods							
M3	30	32	17	7	11	3	100
ASM	24	24	15	9	20	8	100
Lumber and wood products							
M3	26	20	43	6	3	2	100
ASM	21	18	29	13	12	7	100
Furniture and fixtures							
M3	51	27	9	1	11	1	100
ASM	41	21	6	10	16	6	100
Stone, clay and glass							
M3	25	34	19	0	22	0	100
ASM	19	31	18	6	24	2	100
Primary metals							
M3	11	59	13	1	6	10	100
ASM	9	30	15	4	28	14	100
Fabricated metal products							
M3	34	38	6	8	13	1	100
ASM	28	29	9	10	21	3	100
Machinery except electrical							
M3	30	34	19	3	14	0	100
ASM	24	32	8	7	25	5	100
Electrical machinery							
M3	41	34	5	8	11	1	100
ASM	30	26	7	10	22	5	100
Transportation equipment							
M3	30	6	36	20	7	1	100
ASM	24	8	34	14	8	12	100
Instruments and related products							
M3	39	24	6	5	25	1	100
ASM	34	27	5	5	23	6	100
Other durables							
M3	37	28	21	3	9	2	100
ASM	38	19	7	7	22	6	100

Table 7.18. METHODS OF VALUING INVENTORIES OF MANUFACTURERS REPORTING TO CENSUS BUREAU, BY SURVEY AND INDUSTRY, END OF 1975—Continued

(Percentages of total book value. Detail may not add to totals because of rounding)

Industry Group (1972 SIC) ¹	Method of Inventory Valuation						Total
	FIFO	LIFO	Average Cost	Actual Cost	Standard Cost	Other	
Nondurable goods							
M3	31	32	17	4	13	3	100
ASM	26	24	17	2	19	5	100
Food and kindred products							
M3	36	19	24	8	5	10	100
ASM	33	16	19	11	10	9	100
Tobacco manufactures							
M3	5	44	44	6	2	0	100
ASM	—	35	30	2	32	1	100
Textile mill products							
M3	30	29	13	3	24	2	100
ASM	31	24	6	9	23	6	100
Apparel and related products							
M3	39	14	8	2	34	3	100
ASM	45	7	7	11	23	7	100
Paper and allied products							
M3	34	26	22	3	15	0	100
ASM	18	26	22	7	24	2	100
Printing and publishing							
M3	58	20	6	6	8	2	100
ASM	45	16	8	22	7	2	100
Chemicals							
M3	28	40	8	0	23	1	100
ASM	26	25	16	5	26	2	100
Petroleum and coal							
M3	8	61	27	1	3	0	100
ASM	6	48	29	2	7	8	100
Rubber and plastic products							
M3	29	49	10	5	7	0	100
ASM	26	28	5	4	36	1	100
Leather and leather products							
M3	51	17	6	4	20	2	100
ASM	51	13	5	9	16	6	100

¹ Industry classifications are based on (new) 1972 Standard Industrial Classification and are not the same as classifications used in tables 7.16 and 7.17.

² ASM results are based on data as originally reported and were reviewed by Census only for overall consistency rather than plant by plant.

Source: Unpublished Bureau of the Census data.

Table 7.19. METHODS OF VALUING INVENTORIES OF RETAILERS REPORTING TO CENSUS BUREAU, BY KIND OF BUSINESS, SPECIFIED SURVEYS, AND SELECTED PERIODS

(Percentages of total book value. Detail may not add to totals because of rounding)

Method of Valuation	RKP ¹ 1973/4	1974 ARTS	1975 ARTS	1975 RIS	1976 ARTS ²	1976 RIS	RKP ¹ 1973/4	1974 ARTS	1975 ARTS	1975 RIS	1976 ARTS ²	1976 RIS
	Total Retail						Durable					
Total	100	100	100	100	100	100	100	(NA)	100	100	100	100
FIFO	14	21	20	19	16	19	11	(NA)	19	16	17	15
LIFO	4	6	8	7	9	12	4	(NA)	7	7	7	7
Average cost	9	10	10	13	9	12	8	(NA)	10	13	9	13
Specific cost	27	31	29	29	28	34	48	(NA)	49	48	47	52
Retail method approximating	36	30	32	28	32	20	15	(NA)	13	12	13	11
Lower of cost or market	20	20	18	16	9	8	8	(NA)	8	7	5	5
Cost	13	7	7	6	15	8	6	(NA)	4	4	7	5
LIFO	3	3	7	6	8	4	1	(NA)	1	1	1	0
Other	10	2	2	1	6	2	15	(NA)	2	1	7	1
Nonresponse	1	—	—	2	—	1	—	(NA)	0	3	—	1
Addendum: Sum of LIFO	7	9	15	12	17	16	5	(NA)	9	8	8	7
	Furniture and Appliances						Lumber and Farm Equipment					
Total	100	100	100	100	100	100	100	100	100	100	100	100
FIFO	16	27	25	26	21	25	20	27	26	19	28	21
LIFO	0	4	6	6	4	4	5	4	5	5	4	3
Average cost	9	12	12	17	13	14	13	12	14	19	10	22
Specific cost	49	41	40	32	40	37	42	33	34	32	25	36
Retail method approximating	19	13	15	16	15	16	17	22	19	20	25	13
Lower of cost or market	10	9	9	5	7	6	13	14	13	15	10	9
Cost	7	4	6	9	6	9	2	7	5	2	14	4
LIFO	2	0	0	2	2	1	2	1	1	3	1	1
Other	6	3	2	1	7	3	3	2	2	1	8	2
Nonresponse	—	—	—	2	—	3	1	—	—	5	—	1
Addendum: Sum of LIFO	3	5	6	8	6	5	6	5	6	8	5	4
	Automotive						Other Durables					
Total	100	100	100	100	100	100	100	(NA)	100	100	100	100
FIFO	7	16	13	10	12	9	6	(NA)	24	28	17	15
LIFO	6	6	10	9	9	11	1	(NA)	3	2	2	2
Average cost	7	7	6	8	6	8	6	(NA)	15	19	11	15
Specific cost	68	61	62	63	59	67	13	(NA)	33	27	35	38
Retail method approximating	9	7	7	6	6	4	22	(NA)	25	23	29	26
Lower of cost or market	4	5	4	4	2	2	11	(NA)	15	14	18	8
Cost	5	2	2	3	3	2	10	(NA)	9	8	10	17
LIFO	0	0	0	0	1	0	—	(NA)	1	1	1	0
Other	3	2	1	1	8	1	53	(NA)	1	0	5	2
Nonresponse	0	0	—	3	—	1	—	(NA)	—	1	—	3
Addendum: Sum of LIFO	6	6	10	9	10	11	1	(NA)	4	3	3	2

Table 7.19. METHODS OF VALUING INVENTORIES OF RETAILERS REPORTING TO CENSUS BUREAU, BY KIND OF BUSINESS, SPECIFIED SURVEYS, AND SELECTED PERIODS—Continued

(Percentages of total book value. Detail may not add to totals because of rounding)

Method of Valuation	RKP ¹ 1973/4	1974 ARTS	1975 ARTS	1975 RIS	1976 ARTS ²	1976 RIS	RKP ¹ 1973/4	1974 ARTS	1975 ARTS	1975 RIS	1976 ARTS ²	1976 RIS
	Nondurable						Food					
Total	100	(NA)	100	100	100	100	100	100	100	100	100	100
FIFO	16	(NA)	24	22	16	23	22	21	18	25	19	22
LIFO	4	(NA)	8	7	10	17	6	9	11	8	14	15
Average cost	10	(NA)	10	14	10	12	12	20	20	27	17	18
Specific cost	12	(NA)	13	13	13	17	12	11	10	13	9	16
Retail method approximating	52	(NA)	43	43	46	28	45	37	39	26	36	26
Lower of cost or market	29	(NA)	22	25	11	10	23	17	18	9	19	5
Cost	17	(NA)	9	8	22	10	20	16	14	11	13	14
LIFO	5	(NA)	12	10	13	8	1	4	7	7	4	7
Other	6	(NA)	2	1	5	2	2	1	2	1	5	2
Nonresponse	1	(NA)	—	1	—	1	1	—	—	—	—	1
Addendum: Sum of LIFO	9	(NA)	20	17	23	25	7	13	17	15	18	22
	Department Stores						Balance General Merchandise					
Total	100	100	100	100	100	100	100	100	100	100	100	100
FIFO	11	11	6	10	3	25	33	32	28	30	8	28
LIFO	3	10	12	10	13	30	4	2	4	7	5	19
Average cost	1	5	3	3	3	2	9	8	9	13	13	10
Specific cost	0	2	1	2	1	2	11	10	10	10	8	10
Retail method approximating	73	73	77	76	79	40	38	46	49	36	61	26
Lower of cost or market	52	51	45	49	6	15	27	34	27	18	21	8
Cost	9	10	6	5	39	8	8	8	9	13	18	13
LIFO	12	13	27	22	34	17	3	5	13	5	22	5
Other	11	0	0	0	1	1	4	1	0	0	4	4
Nonresponse	1	—	—	0	—	0	—	—	—	5	—	3
Addendum: Sum of LIFO	15	23	39	31	47	47	7	7	17	11	27	24
	Apparel						Other Nondurable					
Total	100	100	100	100	100	100	100	(NA)	100	100	100	100
FIFO	4	15	17	16	14	17	19	(NA)	33	32	22	22
LIFO	1	3	4	3	3	3	6	(NA)	7	5	3	10
Average cost	4	9	10	12	5	18	25	(NA)	12	18	19	15
Specific cost	15	25	22	17	26	19	24	(NA)	26	26	22	38
Retail method approximating	72	46	43	47	44	38	17	(NA)	20	18	27	13
Lower of cost or market	26	32	26	31	13	19	8	(NA)	11	9	9	5
Cost	43	11	12	10	27	15	6	(NA)	6	7	9	6
LIFO	3	4	5	6	4	4	2	(NA)	3	3	9	2
Other	4	2	3	2	8	4	7	(NA)	2	1	7	1
Nonresponse	1	—	—	3	—	2	3	(NA)	—	—	—	2
Addendum: Sum of LIFO	4	6	9	8	7	7	8	(NA)	9	7	12	12

NA Not available.

¹The recordkeeping survey (RKP) related to reporting in the retail inventory survey (RIS) and was conducted in two parts at different dates. Group 1 firms (those with 10 or fewer stores) reported their inventory valuation methods as of September 1973. Group 2 firms (11 or more stores) reported their valuation methods as of June 1974. Group 2 accounts for about one-third of retail inventories.

²1976 Annual Retail Trade Survey (ARTS) data reflect 1972 SIC definitions and therefore may not be comparable to other data, which reflect 1967 SIC definitions.

Source: Unpublished Bureau of the Census data.

Table 7.20. METHODS OF VALUING INVENTORIES OF MERCHANT WHOLESALERS REPORTING TO CENSUS BUREAU, BY KIND OF BUSINESS, END OF 1975 AND 1976

(Percentages of total book value. Detail may not add to totals because of rounding)

Method of Valuation	Total		Durables		Motor Vehicles		Electrical Goods		Furniture	
	1975	1976	1975	1976	1975	1976	1975	1976	1975	1976
Total	100	100	100	100	100	100	100	100	100	100
FIFO	35	35	32	34	27	27	47	44	48	46
LIFO	16	17	21	20	9	17	16	17	5	6
Average cost	14	13	13	12	18	11	11	16	8	14
Specific cost	21	21	23	24	36	38	16	15	34	28
Market	10	11	7	6	8	5	4	6	1	3
Lower than cost	3	3	3	3	3	1	2	4	1	2
Always used	8	8	4	4	5	4	2	2	1	1
Other	2	2	3	2	1	0	5	1	2	3
Nonresponse	2	1	2	1	2	2	1	1	1	1
	Hardware		Lumber		Machinery		Metals		Scrap	
	1975	1976	1975	1976	1975	1976	1975	1976	1975	1976
Total	100	100	100	100	100	100	100	100	100	100
FIFO	40	43	36	30	30	32	24	31	24	35
LIFO	29	22	14	15	28	24	26	26	25	26
Average cost	8	13	15	27	9	6	21	14	18	15
Specific cost	14	12	23	23	25	27	12	16	11	8
Market	5	9	7	3	8	7	7	5	11	10
Lower than cost	2	3	4	2	2	3	7	3	8	6
Always used	4	6	3	2	5	4	0	2	3	3
Other	2	0	—	1	—	2	9	8	6	0
Nonresponse	3	1	5	1	1	1	1	0	5	6
	Jewelry		Nondurables		Groceries		Beer & Wine		Drugs & Chemicals	
	1975	1976	1975	1976	1975	1976	1975	1976	1975	1976
Total	100	100	100	100	100	100	100	100	100	100
FIFO	24	38	39	37	44	43	51	53	45	39
LIFO	9	5	9	11	14	16	6	7	16	15
Average cost	21	16	15	14	13	12	7	6	13	8
Specific cost	25	28	17	17	16	16	25	30	13	12
Market	5	12	16	18	9	11	8	3	10	25
Lower than cost	5	9	2	5	3	3	1	0	1	2
Always used	1	3	14	14	6	8	7	3	9	22
Other	13	1	2	1	2	1	3	1	2	1
Nonresponse	3	0	1	1	1	2	1	0	1	1
	Tobacco		Apparel		Paper		Farm Products		Other Nondurables	
	1975	1976	1975	1976	1975	1976	1975	1976	1975	1976
Total	100	100	100	100	100	100	100	100	100	100
FIFO	36	33	51	53	49	44	1	3	43	35
LIFO	14	13	7	2	21	18	0	1	7	13
Average cost	7	12	15	9	9	13	25	24	18	19
Specific cost	33	30	14	22	9	15	14	11	21	16
Market	4	8	10	13	7	8	59	62	8	14
Lower than cost	1	3	6	10	3	2	0	2	2	9
Always used	3	5	5	2	4	5	59	60	5	5
Other	0	2	2	0	0	2	1	0	2	1
Nonresponse	5	2	1	1	4	1	0	0	1	1

Source: Bureau of the Census, supplements to the monthly survey of merchant wholesalers.

ment stores facilitates the use of LIFO and makes costly preparation of internal price indexes unnecessary. On an overall basis, specific cost is still the most common method in retail trade; it is especially important when units are relatively small in number and easily identified, like motor vehicles, major appliances, furniture and farm equipment.

Data for merchant wholesalers are presented in table 7.20. The interesting point in this table is the extensive use of the market always method, which accounts for 60 percent of inventories held by farm products wholesalers.

CONCLUSION

Over the past few years with the rising inflation and massive shifts to the LIFO method, the Census Bureau and

BEA have moved to fill a large gap in data needed to measure inventory change and profits. The collection of data on inventory valuation methods now has become institutionalized when just a few years ago there was serious concern over whether this could be done. Questions asked about valuation methods have been improved as experience has increased. Still, there is much more to learn about this subject. In particular, information is needed on valuation methods used in reporting profits to IRS. Improvements are necessary especially in interim (quarterly) reporting by LIFO firms and in tracking the monthly reporting of firms as they adopt the LIFO method; some of these are discussed in chapter 8. More refined data are needed for LIFO firms; appendix A is a recommended special survey of such firms.