Labor productivity in the retail trade industry, 1987–99

Faced with fierce competition, consolidation, and increased demand, the industry experienced strong growth in labor productivity over the period, partially due to increased investments in information technologies

Mark Sieling, Brian Friedman, and Mark Dumas

Retail trade employed 22.8 million persons in 1999 and generated sales of nearly $3 trillion. The large size of the retail sector results in a high degree of interest in monthly and especially holiday retail sales and makes the performance of this sector important to the overall health of the U.S. economy. In addition, it has been suggested that "the retail sector . . . is particularly important in creating jobs for groups with high unemployment levels, employing relatively large numbers of women, young people and the people with little education. It is also a major provider of part-time work."[1]

The retail sector is a competitive and dynamic part of the U.S. economy. Retail stores offer goods bundled with services such as store location, product assortment, timely delivery, product education, and store ambience.[2] Differing retail store formats have evolved offering varying degrees of these services.[3]

Output and labor productivity in retail trade experienced strong growth over the 1987–99 period. Strong demand for retail products corresponded with gains in labor productivity. (See chart 1.) In addition, growth in retail square footage far exceeded population growth over the period.[4] As a result, the industry has been faced with overcapacity of retail space, which in turn has led to continued fierce competition, consolidation under large corporations, and increasing bankruptcies and liquidations.[5]

A long-term trend in retailing that began well before 1987 and continued into the 1990s was increased concentration. The proportion of sales accounted for by the largest 50 firms and the largest 4 firms increased in nearly all retail industries between 1977 and 1997.[6] Stores belonging to chains became more dominant in the industry, and the growth in chain stores was accompanied by growth in investment in information technologies, largely due to the widespread use of Universal Product Codes (UPC's).

UPC's are machine readable labels placed on product packaging containing a series of bars (bar codes) and numbers that provide information on the manufacturer, a description of the item, and its price. This technology allows retailers to gather data at the point of sale (POS) with laser-based bar code scanners. The information is then used to pinpoint markets and better manage inventories. UPC's were first used in the food store industry and quickly spread to general merchandising and eventually all segments of retail trade.[7]

The Bureau of Labor Statistics has maintained measures of labor productivity for all three- and four-digit Standard Industrial Classification (SIC) code industries in retail trade for several years.[8] In June, 2001 BLS published measures of labor productivity for the total retail trade sector, as well as for each of the eight major groups within retail, defined at the two-digit level of the SIC system.

Over the 1987–99 period, labor productivity for the total retail trade industry grew by an average annual rate of 2.0 percent per year, reflecting annual output growth of 3.4 percent and average annual hours growth of 1.4 percent.[9] During the second half of the 1990s, labor productivity growth for retail trade accelerated sharply. (See chart 2.) During

Mark Sieling and Mark Dumas are economists and Brian Friedman is a supervisory economist in the Office of Productivity and Technology, Bureau of Labor Statistics.

Chart 1. **Labor productivity, output, and hours in retail trade, 1987–99**

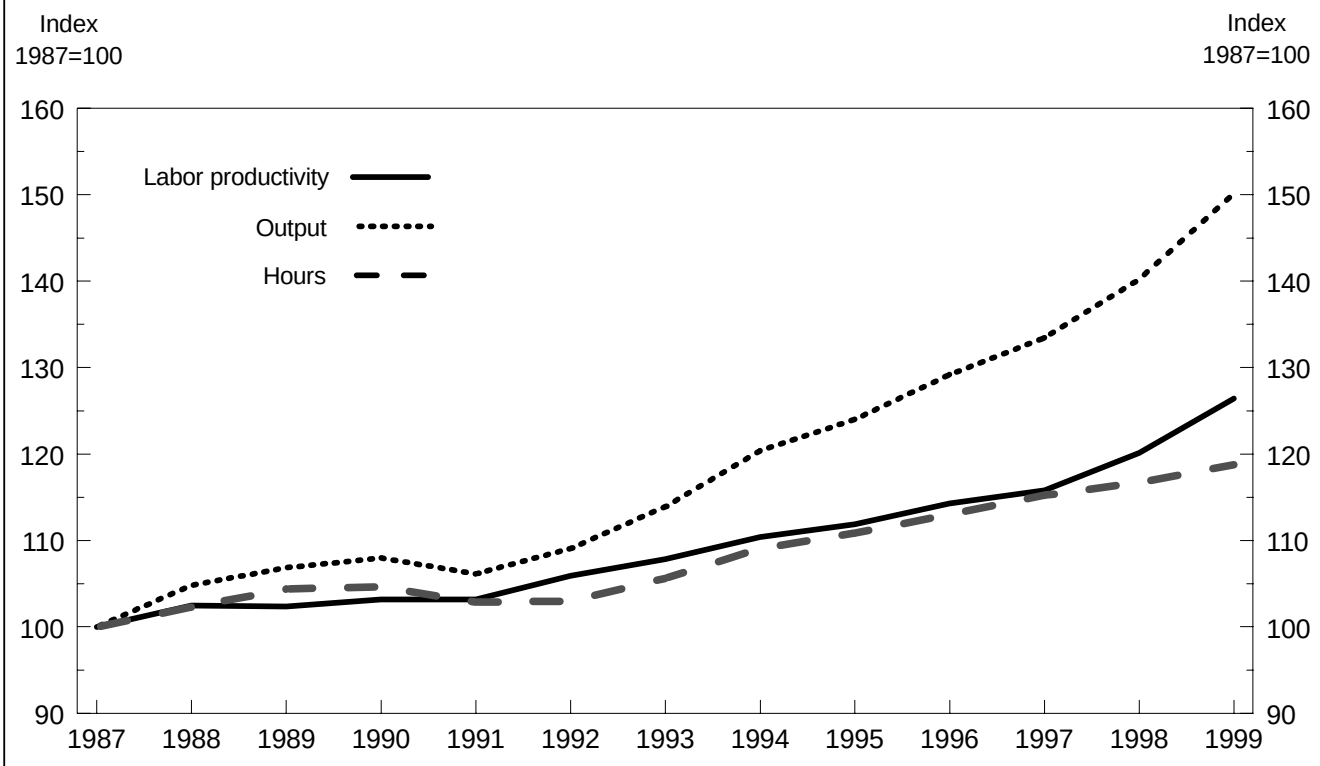
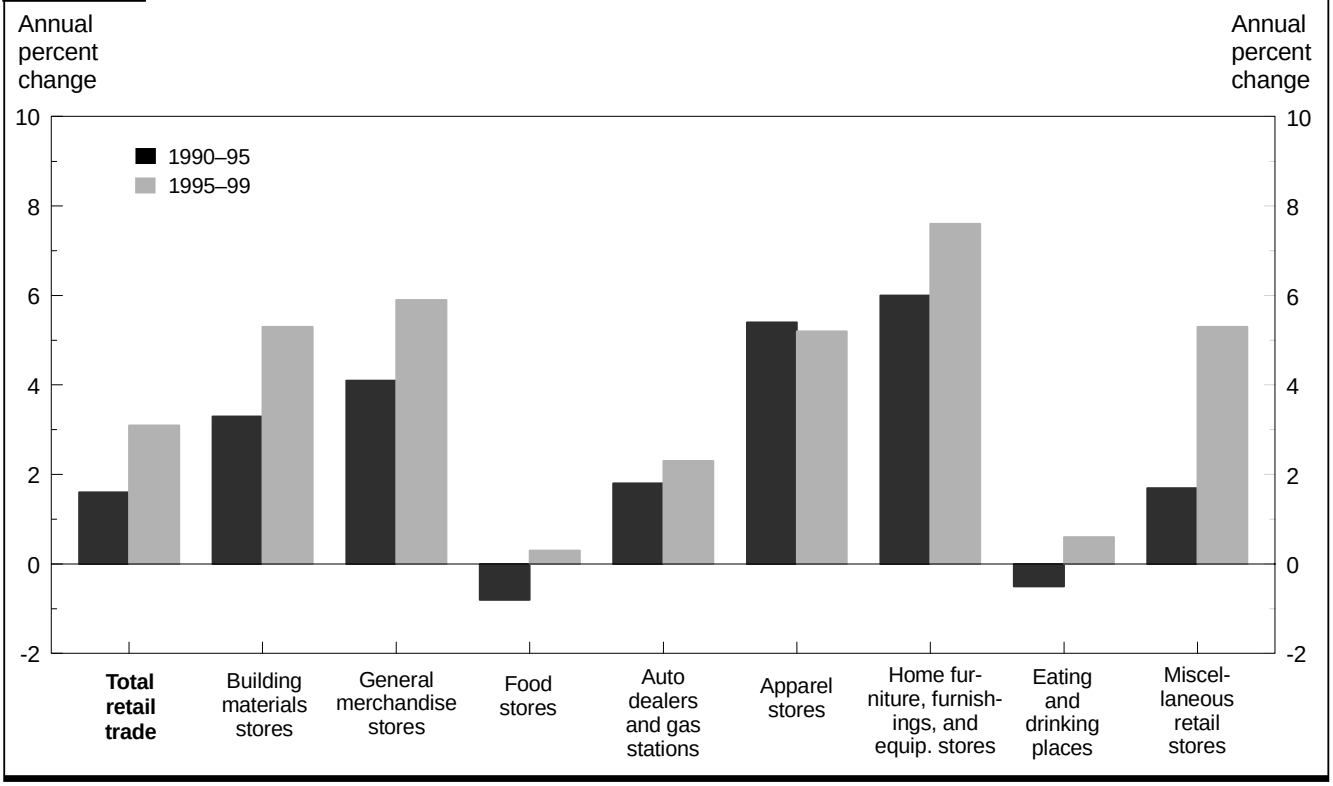


Chart 2. **Comparing labor productivity in retail trade, 1990–95 and 1995–99**



the 1995–99 period, labor productivity increased at an average annual rate of 3.1 percent or about twice the increase seen during the 1990–95 period (1.6 percent). This pattern, to various degrees, also was evident in each of the two-digit SIC industries in retail, with the exception of apparel stores.

Productivity in the total nonfarm business sector also experienced a speedup during this later period. One factor unique to retail trade during the 1995–99 period was an increased use of POS systems, which electronically link cash registers, laser scanning devices, and credit card processing machines with sophisticated software packages. POS systems allow retailers to expand service and sales without the need for increased sales personnel.[10]

Year-to-year changes in labor productivity for the retail trade industry varied widely over the period, declining by 0.1 percent in 1989 and gaining 5.2 percent in 1999. The only year in which both output and employee hours declined was 1991, a year of overall economic contraction. In all other years, growth in both output and employee hours was positive.

Between 1987 and 1997, gross retail sales in constant (1987) dollars increased by 35.4 percent—from $1,541 billion to $2,087 billion. Over the same period, the number of retail establishments grew by only 6.7 percent (from 1.5 million to 1.6 million) and retail employment grew by 16.4 percent (from 20.1 to 23.4 million).[11] In addition, the industry became increasingly concentrated during the period, characterized by larger firms. In 1987, for example, the 50 largest retail firms accounted for 20.3 percent of all sales, but by 1997 that proportion had grown to 25.7 percent.[12]

It should be noted, however, that growth in concentration, constant-dollar sales per establishment, and labor productivity for the total retail sector masks important differences among various types of retail stores. For example, among the individual two-digit industries in retail trade, average annual labor productivity changes over the 1987–99 period ranged from a decline of 0.4 percent per year for food stores to a gain of 5.8 percent for furniture, home furnishings and equipment stores, which includes computer equipment stores. (See table 1.) These varying rates of productivity growth in retail trade appear to reflect different rates in the use of technological innovations, as well as disparate changes in industry structures, and shifts in consumer purchasing patterns and preferences.[13] The sections that follow examine labor productivity growth in each of the two-digit industries within retail trade in terms of these and other factors.

Building materials and garden supplies (SIC 52). Labor productivity in this retail industry rose at an annual average rate of 3.5 percent over the 1987–99 period. As with other retail groups, the rate of growth in labor productivity was higher in the second half of the 1990s. Over the 1990–95 period, labor productivity rose at an average rate of 3.3 percent, reflecting average annual output growth of 5.0 percent and employee hours growth of 1.6 percent. During the 1995–99 period, by contrast, productivity advanced by an average of 5.3 percent per year, with output increasing by 8.3 percent annually and hours increasing by 2.8 percent per annum.

Lumber and other building materials stores (SIC 521), which accounted for about two-thirds of total sales in building materials, experienced a similar pattern to that of the larger group. During the 1990–95 period, labor productivity growth averaged 2.5 percent per year, with output growth averaging 5.4 percent and employee hours averaging 2.9 percent. During the 1995–99 period, labor productivity increased by 4.8 percent per annum, with output growing by an average of 9.5 percent and employee hours increasing by 4.5 percent.

In contrast to overall retail trade, in which output changes typically closely follow overall economic conditions, year-to-year changes in output and labor productivity for lumber and building materials stores are more influenced by trends in home building and home remodeling.[14] Unlike all other retail trade stores, which sell predominately to the general public, a large proportion of lumber and building materials sales are accounted for by home builders and building contractors. In 1992, for example, more than two-fifths of total sales in lumber and building materials stores were accounted for by sales to builders and contractors—the highest ratio of sales not made to final consumers among all types of retail outlets.[15]

Lumber and building materials stores underwent structural changes during the 1990s that affected growth in labor productivity. The industry became increasingly characterized by large-sized chain stores.[16] Large national and regional chain stores tend to invest more in computer-based technologies like POS terminals and their associated software programs, which are designed to manage inventories and facilitate ordering from manufacturers.

General merchandise stores (SIC 53). Between 1987 and 1999, labor productivity in general merchandise stores rose by an average annual rate of 4.0 percent—double the rate for overall retail trade. While the number of general merchandise establishments remained fairly constant over the period, at about 35,000, employee hours increased by 19.9 percent (or 1.5 percent, on average, per year) and constant dollar sales increased by 92 percent (5.6 percent per annum).[17] Productivity gains during the 1990–95 period, which averaged 4.1 percent per year, were lower than those of the 1995–99 period (5.9 percent). While annual output gains were similar in both periods (6.2 percent versus 6.6 percent), hours growth slowed during the latter period to 0.7 percent per year, after growing by 2.0 percent per year in the first half of the decade.

A key factor underlying labor productivity growth has been the increasingly sophisticated use of computer technologies by general merchandise retail stores. Starting with simple POS terminals in the 1980s, most general retailers have expanded their use of POS-based systems to better manage

Table 1. Output per hour, output, and hours for retail trade industries: 1987–99, 1990–95, and 1995–99

SIC	Industry	Output per hour			Output			Hours		
		1987–99	1990–95	1995–99	1987–99	1990–95	1995–99	1987–99	1990–95	1995–99
	Retail trade	2.0	1.6	3.1	3.4	2.8	4.9	1.4	1.2	1.7
52	Building materials	3.5	3.3	5.3	5.3	5.0	8.3	1.8	1.6	2.8
521	Lumber and other building materials dealers	3.0	2.5	4.8	6.0	5.4	9.5	3.0	2.9	4.5
523	Paint, glass, and wallpaper stores	4.2	4.2	5.7	3.4	2.3	5.7	–.8	–1.8	.0
525	Hardware stores	3.4	.0	6.6	2.7	1.0	3.9	–.7	1.0	–2.6
526	Retail nurseries, lawn, and garden supply stores	3.5	6.7	6.5	4.1	5.3	8.7	.6	–1.3	2.1
53	General merchandise stores	4.0	4.1	5.9	5.6	6.2	6.6	1.5	2.0	.7
531	Department stores	3.3	3.7	6.2	5.7	6.5	7.1	2.3	2.8	.9
533	Variety stores	10.2	6.5	10.9	4.8	2.5	9.9	–4.9	–3.7	–.9
539	Miscellaneous general merchandise stores	5.7	7.1	3.9	5.5	5.4	4.0	–.3	–1.6	.1
54	Food stores	–.4	–.8	.3	.5	–.2	.9	.9	.6	.7
541	Grocery stores	–.4	–.6	.4	.6	–.2	.9	1.0	.4	.5
542	Meat and fish (seafood) markets	–.1	–.9	1.3	–1.7	–2.5	2.4	–1.6	–1.6	1.1
546	Retail bakeries	–1.5	–1.9	.2	–.6	.1	2.1	.9	2.0	1.9
55	Automotive dealers and gasoline service stations	1.8	1.8	2.3	2.6	2.0	3.7	.8	.1	1.4
551	New and used car dealers	9	.3	.9	2.1	1.6	2.8	1.1	1.3	1.9
553	Auto and home supply stores	1.2	1.0	1.6	3.0	1.8	4.2	1.7	.7	2.6
554	Gasoline service stations	2.9	4.3	2.5	2.3	2.3	2.4	–.6	–1.9	–.1
56	Apparel stores	4.4	5.4	5.2	4.5	3.5	6.2	.1	–1.8	.9
561	Men's and boys' wear stores	3.7	1.0	6.2	.9	–2.3	4.5	–2.7	–3.2	–1.7
562	Women's clothing stores	5.5	5.6	8.0	2.1	.7	3.7	–3.3	-4.6	–4.0
565	Family clothing stores	3.8	5.6	2.5	7.8	7.5	8.6	3.8	1.8	6.0
566	Shoe stores	3.5	5.2	2.1	2.7	1.3	3.5	–.7	–3.7	1.4
57	Home furniture, furnishings, and equipment stores	5.8	6.0	7.6	8.0	7.7	10.7	2.1	1.6	2.9
571	Furniture and home-furnishings stores	2.5	2.3	3.4	3.9	2.8	5.9	1.3	.4	2.4
572	Household appliance stores	5.2	5.8	7.4	3.3	3.0	5.4	–1.8	–2.6	–1.9
573	Radio, television, computer, and music stores	10.0	10.5	12.1	14.6	15.6	17.1	4.2	4.6	4.5
58	Eating and drinking places	.4	–.5	.6	2.3	1.5	2.9	2.0	2.0	2.4
59	Miscellaneous retail stores	2.6	1.7	5.3	4.3	2.8	7.5	1.6	1.0	2.1
591	Drug and proprietary stores	2.2	.9	4.0	3.3	.8	6.4	1.1	–.1	2.3
592	Liquor stores	1.1	–.2	2.3	.1	–2.6	3.7	–1.1	–2.3	1.4
593	Used merchandise stores	5.1	3.2	10.8	9.9	7.7	16.0	4.6	4.4	4.7
594	Miscellaneous shopping goods stores	3.2	2.8	4.2	4.9	3.8	6.4	1.6	1.0	2.1
596	Nonstore retailers	6.9	6.5	9.9	9.3	9.2	12.7	2.2	2.5	2.5
598	Fuel dealers	1.2	5.7	.8	.0	3.7	–.3	–1.1	–1.9	–1.1
599	Retail stores, n.e.c.	4.0	2.1	6.1	6.0	3.8	7.9	1.9	1.6	1.7

inventories, maintain and adjust prices more efficiently, and develop individual customer databases used to micromarket products.[18]

Although department stores (SIC 531) account for slightly less than one-third of all general merchandise establishments, they account for nearly 80 percent of total sales and 90 percent of total employment in the industry. During the first half of the 1990s, labor productivity growth for department stores averaged 3.7 percent per year, with output growth of 6.5 percent per year and employee hours growth of 2.8 percent per year. From 1995 to 1999, by contrast, labor productivity grew by 6.2 percent per year, as output growth remained strong at

7.1 percent per year, and employee hours increased by 0.9 percent per year.

In addition to the technology trends mentioned previously, growth in department store labor productivity partly reflects shifts in consumer spending patterns away from conventional stores to discount or mass merchandising department stores, which typically employ fewer workers per dollar of sales. In 1987, discount-type department stores accounted for 43 percent of total department store sales; by 1997, the proportion had increased to 63 percent. In response to this shift in spending patterns, conventional stores have initiated a number of changes, including creating freestanding specialty stores within the confines of their retail space.[19]

Reflecting different merchandising approaches, productivity gains in variety stores (SIC 533) outstripped those of department stores over various periods. Between 1987 and 1999, labor productivity growth in variety stores increased by an average of 10.2 percent per year, while output grew only 4.8 percent per year, and all-person hours declined by 4.9 percent per year. Labor productivity growth averaged 6.5 percent per annum during the 1990–95 period and accelerated to 10.9 percent per annum during the 1995–99 period.

Productivity gains in variety stores resulted in part from the growth in larger mass merchandising stores. As discussed previously, these newer stores are geared toward increased use of self-service operations and employed fewer employees per square foot of retail space and fewer employees per dollar of sales. The number of variety stores increased by 34.9 percent between 1987 and 1997 (from 10,424 to 14,065), while the total number of employees fell by 45 percent over the same period (from 247,200 to 135,900).

Food stores (SIC 54). Among the two-digit industries within retail trade, only food stores had negative labor productivity growth over the entire period of this study (1987–99). Average annual labor productivity declined by 0.4 percent, reflecting output growth of 0.5 percent per year and employee hours growth of 0.9 percent per year. Reversing a decline of 0.8 percent per year that occurred for the 1990–1995 period, labor productivity increased 0.3 percent per year during the 1995–99 period. Output during the first half of the 1990s declined by an average of 0.2 percent per year, while hours grew by an average of 0.6 percent per year. During the second half of the decade, output grew by an average of 0.9 percent per year, and hours increased by 0.7 percent annually.

Among the seven three-digit SIC industries making up the food stores group (SIC 54), the grocery stores group (SIC 541) was by far the largest in terms of both number of employees and annual sales. In 1997, grocery stores employed 3.2 million workers (87 percent of food store employment) and registered sales of more than $402 billion (95 percent of total food store sales). Average annual changes in output, employee hours, and productivity in grocery stores over the 1987–99 period were influenced by shifting consumer spending patterns and changes in industry structure. Consumers increasingly turned away from conventional grocery stores for their food purchases, choosing instead superstores and hypermarkets. These stores typically offer a wide variety of general merchandise in addition to food products, and many are classified as part of the general merchandise retail group. In addition, there was strong growth in convenience food stores in combination with service stations and classified as part of the service station industry. In 1988, conventional grocery stores accounted for 42.8 percent of all consumer expenditures for food at home; by 1998, that proportion had fallen to 13.4 percent.[20]

In response to these changes in consumer spending patterns, the overall number of grocery stores shrank over the 1987–97 period—from 137,584 to 126,546, an 8.0-percent drop. At the same time, however, overall floor space increased, as newly opened establishments tended to be larger sized establishments.[21] A wide range of technologies and processes designed to improve customer service and profits also was introduced in many establishments.[22] These include the growing use of POS data and continuous replenishment programs to better control inventories, electronic data interchange and computer assisted ordering to increase the speed and reduce errors in ordering, and new standard bar codes for case lots and variable weight products like produce.[23] The positive effect on labor productivity that these new technologies and processes offer, however, was dampened to some degree by an increase in the percentage of establishments offering specialized services. These services—such as delicatessens, full-service bakeries, and specialized meat and fish departments—are more labor intensive than self-service operations.[24]

Automotive dealers and gasoline service stations (SIC 55). Labor productivity in this industry grew at an average annual rate of 1.8 percent over the 1987–99 period, while output increased by 2.6 percent per year, and hours grew by 0.8 percent per year. Labor productivity growth in the second half of the 1990s grew at a slightly faster pace than in first half—2.3 percent per annum versus 1.8 percent per annum. Productivity changes for this retail group reflect the changes in its dominant industries—new and used car dealers (SIC 551), auto and home supply stores (SIC 553), and gasoline service stations (SIC 554)—which together account for about 85 percent of sales and employment.[25]

The overall growth of labor productivity for new and used car dealers over the period (0.9 percent annually) reflected annual output growth of 2.1 percent and hours gains of 1.1 percent. During the 1990–95 period, labor productivity grew at a relatively slow pace (0.3 percent per year), reflecting output growth of 1.6 percent per year and employee hours growth of 1.3 percent. During the next 4 years, labor productivity

growth increased at an average annual pace of 0.9 percent, as output grew by 2.8 percent and hours by 1.9 percent.

Although the number of car dealerships shrank slightly, from 28,300 in 1987 to 25,900 thousand in 1997, total employment grew by 13 percent over the period, from 925,000 to 1,046,100. The employment gains were primarily focused in the area of car repair and maintenance services.[26] Gains in efficiency in the service departments of car dealerships—mainly due to the increased use of computer diagnostic equipment and modular systems in automobiles—may have led to some of these productivity increases.

Auto and home supply stores generally followed the same pattern. With average output growth of 3.0 percent and hours increasing at an average annual rate of 1.7 percent, overall labor productivity increased by 1.2 per year for the 1987–99 period. Labor productivity gains were greater during the 1995–99 period than in the early part of the decade—1.6 versus 1.0 percent. In addition, as with car dealerships, the number of auto and home supply stores declined—from 46,000 in 1987 to 40,500 in 1997—while the number of employees increased—from 345,000 to 415,000. Again, employment gains were greater in the vehicle repair and maintenance segment of the industry rather than in sales personnel.[27]

Gasoline stations experienced higher average annual rates of labor productivity growth than either new and used car dealerships or auto and home supply stores. Over the 1987–99 period, annual output growth of 2.3 percent and a decline in all-person hours of 0.6 percent led to productivity increases in service stations averaging 2.9 percent annually. Unlike most retail industries, average annual labor productivity gains were greater for gasoline stations in the 1990–95 period (4.3 percent) than in the 1995–99 period (2.5 percent).

The number of gas stations fell by 13.9 percent—from 115,000 in 1987 to 99,000 in 1997. Labor productivity in the industry was aided by the long-term trend toward more self-service gasoline pumps and by a reduction in auto repair and maintenance services, which is a more labor-intensive activity.[28]

Apparel stores (SIC 56). Labor productivity in apparel stores increased at the second highest rate among all major retail groups—averaging 4.4 percent a year over the 1987–99 period. Output grew at an average annual rate of 4.5 percent, while hours grew only 0.1 percent per year. Most of the three- and four-digit SIC apparel store industries experienced a decline in the number of establishments and basically flat employment levels over this 12-year period.

Alone among all of the two-digit SIC major retail groups, apparel stores registered lower labor productivity growth over the 1995–99 period compared with the 1990–95 period (5.2 percent versus 5.4 percent). Output growth in total apparel stores was higher in the second half of the 1990s (6.2 percent versus 3.5 percent). Hours declined by an average annual rate of 1.8 percent during the 1990–95 period and increased at a rate of 0.9 percent for the 1995–99 period. Most of the employment decline in the latter period came from family clothing stores (SIC 565). These declines were not repeated in all three-digit industries within apparel stores, however, as different kinds of stores responded differently to changes in consumer spending patterns. Like many industries in retail trade, the general trend was towards fewer but larger sized establishments offering a greater variety of merchandise while at the same time offering more customer service in terms of increased sales personnel.[29]

The top three apparel groups in terms of sales are family clothing stores (SIC 565), with 38 percent of sales in 1997; women's clothing stores (SIC 562), with 25 percent; and shoe stores (SIC 566), with 17 percent. Family clothing stores, which include jeans and casual wear stores, experienced an average annual growth rate in labor productivity of 3.8 percent over the 1987–99 period. Output grew by an average of 7.8 percent per year and employee hours by 3.8 percent. The family clothing stores group also was the only large apparel industry that had an increase in the number of establishments over the 1987–97 period—from about 18,000 to 20,000. In addition, employment increased from 272,000 to 362,000 over the period.[30]

During the 1990–95 period, labor productivity grew by 5.6 percent per year in family clothing stores, reflecting output growth of 7.5 percent and annual gains in hours of 1.8 percent. During the second half of the decade, output growth accelerated to 8.6 per cent per annum (partially reflecting the shift to more casual attire in many offices around the country).[31] Hours growth averaged 6.0 percent, which resulted in labor productivity growth of 2.5 percent. For family clothing stores, factors tending to increase labor productivity, such as larger store sizes and increasing consolidation (which allows for larger investments in computer technology), were offset to some degree by increased levels of personal service.[32]

Average annual labor productivity growth in women's clothing stores was higher in the 1995–99 period (8.0 percent) than in the first half of the decade (5.6 percent). While output climbed at an average annual rate of 3.7 percent during the 1995–99 period (compared with only 0.7 percent during the 1990–95 period), employee hours shrank by 4.0 percent per year—similar to the average annual decline in the early 1990s of 4.6 percent. Between 1987 and 1997, the number of women's clothing stores fell by 23.1 percent—from 52,000 to 40,000—while the number of employees declined by 29.4 percent—from 419,000 to 296,000. Productivity gains in women's clothing stores were only moderately influenced by industry consolidation. Between 1987 and 1997, the proportion of sales accounted for by the top four firms remained fairly stable and was the lowest ratio of any of the major apparel industries.[33]

Average annual labor productivity growth in shoe stores was lower in the 1995–99 period (2.1 percent) than in the first half of the decade (5.2 percent). Although average output increased by 3.5 percent (compared with 1.3 percent in the

1990–95 period), employee hours grew by 1.4 percent annually in contrast to an average annual decline in hours over the 1990–95 period of 3.7 percent.[34]

Home furniture, furnishings, and equipment stores (SIC 57). This two-digit industry within retail trade had the highest annual average growth in labor productivity over the 1987–99 period, 5.8 percent, reflecting output growth of 8.0 percent per year and hours growth of 2.1 percent. As with most other retail trade groups, labor productivity gains were higher during the 1995–99 period than during the first half of the 1990s—7.6 percent versus 6.0 percent per year.

A similar pattern was found in the two largest components of this two-digit retail trade industry—furniture and homefurnishing stores (SIC 571) and radio, television, computer, and music stores (SIC 573). The former increased by 2.3 percent per year during the 1990–95 period, and by 3.4 percent during the 1995–99 period. These increases reflected gains in annual output over the two periods of 2.8 percent and 3.4 percent, respectively, and gains in hours of 0.4 percent and 2.4 percent.[35]

Even greater gains were registered in radio, television, computer, and music stores for both periods.[36] For the 1990–95 period, labor productivity gains averaged 10.5 percent per annum, reflecting output gains of 15.6 percent and employee hours increases of 4.6 percent. During the 1995–99 period, labor productivity increased 12.1 percent per year, output increased 17.1 percent per year, and employee hours increased by 4.5 percent per year. In contrast to furniture stores, which remained a relatively dispersed industry with the top four firms accounting for less than one-tenth of sales over the 1987–97 period, radio, television, computer, and music stores became much more concentrated. In 1987, the top four firms accounted for about one-third of all sales, but by 1997, that percentage was a little more than three-fifths.

Eating and drinking places (SIC 58). Output in eating and drinking places expanded at an average annual rate of 2.3 percent over the 1987–99 period. Labor productivity, however, increased by only 0.4 percent as average hours growth (2.0 percent) almost kept pace with output gains.

Labor productivity in eating places (SIC 5812), which account for 95 percent of industry sales and employment, increased 0.5 percent per year over the 1987–99 period, with output increasing by 2.6 percent and hours increasing 2.1 percent per year. During the 1990–95 period, labor productivity increased 0.7 percent per annum, compared with average annual declines of 0.4 percent during the 1990–95 period. During the first half of the 1990s, average annual output gains of 1.7 percent per year were exceeded by gains in hours of 2.2 percent. In the second half of the decade, by contrast, average output gains exceeded growth in hours (3.1 percent versus 2.4 percent). Part of the increase in labor productivity over the latter part of the decade can be attributed to the growing use of POS terminals and small computer systems—especially in table service restaurants—which speed up service and reduce labor requirements.[37]

Between 1987 and 1997, the number of eating places increased by more than one-fifth—the largest percent increase of any retail group—while employment increased by about one-quarter, which also is among the highest increases recorded.[38] Productivity trends, however, do not seem to have been influenced by changes in the industry's structure: Table service establishments, for example, have consistently accounted for about one-half of total industry sales and number of establishments.[39]

Miscellaneous retail stores (SIC 59). Labor productivity in miscellaneous retail stores—a group comprising a diverse blend of specialized retailers—grew by 2.6 percent per year over the 1987–99 period, which reflected per annum output growth of 4.5 percent and hours growth of 1.6 percent. Growth in average annual labor productivity varied considerably among the several types of specialized retailers—ranging from 1.1 percent for liquor stores (SIC 592) to 6.9 percent for nonstore retailers (SIC 596).

As with other major industries within retail trade, productivity growth for miscellaneous retail stores was greater during the second half of the 1990s than during the first half of the decade (5.3 percent versus 1.7 percent per year). During the 1990–95 period, output grew by 2.8 percent per annum, and employee hours grew by 1.0 percent per year. From 1995 to 1999, however, average annual output and hours growth more than doubled, rising to 7.5 percent and 2.1 percent, respectively.

Productivity growth for drug stores also was higher during the 1995–99 period.[40] Reflecting average output growth of 6.4 percent and hours growth of 2.3 percent, labor productivity during the latter half of the 1990s averaged 4.0 percent per year—nearly 4 times the rate recorded in the first half of the decade (0.9 percent per annum)[41]. Contributing to the strong growth was the introduction of a variety of computer-based systems that reduce labor requirements in such areas as billing and dispensing medications.[42] Increasingly during the 1990s, drug stores employed management information systems linking individual stores to health insurer's databases, which allowed more accurate and timely filling of prescriptions and billing. In addition, automated dispensing systems, which usually make prescription filling more efficient, increasingly are being used throughout the industry.

Reflecting different rates of productivity growth among a variety of specialty retail stores, labor productivity growth in miscellaneous shopping goods stores (SIC 594) also was higher during the 1995–99 period than during the first half of

the decade (4.2 percent versus 2.8 percent)[43]. While industry hours advanced by an average of 2.1 percent per year over the 1995–99 period (versus 1.0 percent during the 1990–95 period), output advanced by an average of 6.4 percent (versus earlier gains of 3.8 percent).

Productivity growth for nonstore retailers (SIC 596) increased from an average annual rate of 6.5 percent during the 1990–95 period to 9.9 percent during the latter half of the decade. Catalog and mail order houses (SIC 5961), the dominant industry in this group, accounted for 79 percent of sales in 1999. Although this industry lost some market share to miscellaneous general merchandise stores (SIC 539), the desire for consumers to save time spent engaged in shopping favored the retail formats of catalog and mail order houses.[44] Productivity in this industry grew at an average annual rate of 7.0 percent during the 1990–95 period and increased to 12.4 percent per year during the 1995–99 period. Industry output growth was bolstered by increases in online sales—the vast majority of catalog companies sell on the Internet.[45] E-commerce sales accounted for 0.5 percent of total retail sales in 1999, 77 percent of these sales occurring in the nonstore retailer industry group.[46]

DURING THE 1987–99 PERIOD, labor productivity growth has varied widely among retail industries. Large stores offering a wide array of goods accompanied by low prices and relatively high use of self-service systems spurred labor productivity growth in a number of retail industries. For example, variety stores (SIC 533) and radio, television, computer, and music stores (SIC 573) posted average annual gains in labor productivity of 10.0 percent and 10.2 percent, respectively, with productivity growth in the latter industry aided by strong demand for computers and related products. On the other hand, retail industries having relatively labor intensive production functions experienced lower productivity growth. Eating and drinking places (SIC 581), for example, recorded productivity growth of less than 1.0 percent during the 1987–99 period.

Retail trade also experienced a widespread pickup in labor productivity growth in the latter half of the 1990s, compared with the first half of the decade. Of the 28 published three-digit SIC industries in retail, 22 experienced stronger growth in productivity in the 1995–99 period than in the 1990–95 period. In addition, 5 three-digit retail industries experienced increases in average annual productivity growth over the period of at least 4 additional percentage points.

Retail trade remains an important and dynamic part of the U.S. economy. Productivity growth will continue to depend on maintaining tightly controlled inventories and offering products finely tuned to consumer demand based on data collected at the point of sale and stored in large marketing databases. □

NOTES

[1] Martin Neil Baily and Eric Zitzewitz, "Service Sector Productivity Comparisons: Lessons for Measurement," in Charles R. Hulten, Edwin R. Dean, and Michael J. Harper, eds., *New Developments in Productivity Analysis* (Chicago, University of Chicago Press, 2001), pp. 419–64; quote, p. 434.

[2] Roger R. Betancourt and David A. Gautschi, "The Output of Retail Activities: Concepts, Measurement and Evidence from U.S. Census Data, *The Review of Economics and Statistics*, May 1993.

[3] Walter Oi, "Retailing in a Dynamic Economy," paper presented at the Output and Productivity Measurement in the Service Sector Workshop, The Brookings Institution, Sept 18, 1998.

[4] Retail square footage figures, International Council of Shopping Centers; population figures, Bureau of the Census.

[5] *Standard and Poor's*, "Retailing: General," May 1999, pp. 6–7.

[6] Bureau of the Census, Census of Retail Trade.

[7] Stephen A. Brown, *Revolution at the Checkout Counter* (Harvard University Press, Cambridge, MA, and London, UK, 1977), pp. 1–22.

[8] The BLS Division of Industry Productivity Studies publishes labor productivity and related measures for 28 three-digit SIC and 40 four-digit SIC industries in retail trade, available on the Internet at **http://www.bls.gov/lpc**. BLS also maintains measures for an additional 13 three-digit SIC and 24 four-digit SIC retail measures that currently are unpublished. Requests for data, published and unpublished, or for information relating to the data should be sent to dipsweb@bls.gov (e-mail); for telephone inquiries, call (202) 691–5618. For information on the SIC system itself, see *Standard Industrial Classification Manual: 1987* (Office of Management and Budget, 1987); also, "Industrial Classification," *BLS Handbook of Methods*, Bulletin 2490 (Bureau of Labor Statistics, April 1997), app. B, pp. 234–36.

[9] Hours for retail trade, with two exceptions, are all-person hours, including hours for the self-employed, unpaid family workers, and paid employees. The two exceptions are department stores, SIC 531, and new and used franchised car dealers, SIC 551, for which hours are based on paid employees only.

[10] Point-of-sale (POS) terminals in retail trade increased over the 1990–95 period from 53,000 to 529,000, but growth accelerated from 1995 forward with about 1.7 million POS terminals in use by 1998. See *Statistical Abstract of the United States* (Bureau of the Census, 1999), table 829.

[11] The latest year for which data from the census of retail trade are available for the total number of establishments is 1997. The number of establishments declined in the areas of building materials stores (SIC 52), general merchandise stores (SIC 53), food stores (SIC 54), automobile dealers and gas stations (SIC 55), and apparel stores (SIC 56). These declines, however, were more than offset by increases in the number of establishments in all other areas of retail trade. In contrast, only apparel stores (SIC 56) experienced a decline in employment over the 1987–97 period.

[12] Bureau of the Census, 1992 Economic Census.

[13] See *Standard & Poor's Industry Surveys*, various years, for detailed analysis of various components of the retail industry and changes in consumer preferences.

[14] Annual changes in housing starts were consistently negative over 1987–91 and 1994–95 periods, which had a dampening effect on out-

put and productivity growth. New home sales had picked up by 1995. Industry sales were boosted by the fact that the typical buyer of an existing home spends about $1,000 per year on home improvement activities during the first two years of occupancy. See *Standard & Poor's Industry Surveys*, "Retailing: Specialty," May 27, 1999, page 2.

[15] Bureau of the Census, 1992 Economic Census.

[16] *Standard & Poor's Industry Surveys*, "Retailing: Specialty," May 27, 1999, pp. 2–3.

[17] The actual number of employees increased by about 16.7 percent over the 1987–1999 period, from 2.4 million to 2.8 million (1.1 percent per year).

[18] *Standard & Poor's Industry Surveys*, "Retailing: General," May 20, 1999, pp. 14–15.

[19] Daniel Raff and Peter Temin, "Sears Roebuck in the Twentieth Century: Competition, Complementaries, and the Problem of Wasting Assets," NBER Working Paper Series on Historical Factors in Long Run Growth, Historical Paper 102, June 1997.

[20] USDA, *Food Marketing Review*. Hypermarkets and superstores were generally classified within the grocery store industry, SIC 541. These different types of grocery stores, however, offered varying degrees of services to the consumers and affected measured industry productivity. Convenience stores connected to service stations typically were classified in the service station industry, SIC 554.

[21] Between 1987 and 1992 (the last year for which data are available), under-roof selling floor space for grocery stores increased by 12.9 percent—from 747.6 million square feet to 844 million square feet; Bureau of the Census, Economic Censuses.

[22] The introduction of capital-intensive technologies was abetted by the growing consolidation of the grocery store industry—especially since the early 1990s—because large firms can more readily afford such expenditures. In 1992, for example, the top five firms in the industry in terms of sales accounted for 19 percent of total sales. By 1998, that proportion was projected to reach 33 to 40 percent. See *Standard & Poor's Industry Surveys*, "Supermarkets & Drugstores," 1998, p. 9.

[23] For a detailed discussion of these and other technologies and processes, see Ronald B. Larson, "Key Developments in the Food Distribution System," Working Paper 97–08, Applied Economics Department, University of Minnesota, 1997.

[24] Between 1990 (the first year for which data are available) and 1998, the percent of supermarkets offering a full service delicatessen increased from 73 percent to 81 percent; full service bakeries from 60 percent to 69 percent; full service meat departments from 42 percent to 59 percent; and full service fish departments from 33 percent to 43 percent. *Progressive Grocer*, Annual Report of the Grocery Industry, various years.

[25] During this period, the percent of sales accounted for by each group remained fairly constant, with new and used car dealerships accounting for about 60 percent of total sales, gasoline service stations accounting for about 20 percent, and auto supply stores accounting for 5 to 6 percent.

[26] According to BLS employment estimates, the total number of employees working in new and used car dealerships increased by about 9 percent from 1988 to 1997, and the number of auto mechanics and auto body repairers increased by 12 percent over the same period—from 211,000 to 237,000.

[27] Between 1988 and 1997, total employment in auto and home supply stores increased by 14 percent, while the number of auto mechanics and auto body repairers increased by 21 percent over the period.

[28] In 1987, about two-thirds of all gas pumps were self-service; by 1992, that proportion had grown to slightly more than four-fifths; Bureau of the Census, Economic Census. Between 1988 and 1997, total employment in gas stations increased by about 3.4 percent, but the number of auto mechanics and auto body repairers fell by a little more than 20 percent—from 53,500 to 42,400.

[29] *Standard & Poor's Industry Surveys*, "Retailing: Apparel and Footwear," 1997, p. 10. In general, apparel and accessory stores have experienced the highest rate of turnover of any retail sector, which has weeded out the weaker players, leaving the more efficient ones standing. Also, see *Standard & Poor's Industry Surveys*, "Retailing: Specialty," May 27, 1999, p. 12.

[30] The only other apparel industry experiencing growth in the number of stores was women's accessory stores (SIC 563), which account for a small percentage of total apparel store sales. The number of accessory establishments increased from 7,500 in 1987 to 8,900 in 1997.

[31] *Standard & Poor's Industry Surveys*, "Retailing: Specialty," May 27, 1999, p. 15.

[32] In 1987, the four top firms in the industry accounted for 29.9 percent of total sales. By 1997, the proportion was 43.3 percent; Bureau of the Census, Census of Retail Trade. Between 1987 and 1997, the average number of employees per establishment increased by one-fifth, from 15 to 18 employees per store.

[33] Bureau of the Census, Economic Census; in 1987, the four top firms accounted for 22.1 percent of total sales; by 1997, the proportion was 27.1 percent.

[34] From 1987 to 1997, the number of shoe stores declined by more than 20 percent—from 39,000 to 31,000. Employment, however, declined by only 10 percent over that period—from 231,000 to 208,000—and posted positive gains in 1997 and 1998.

[35] In 1997, furniture and homefurnishing stores accounted for about 58 percent of the 115,000 establishments within this sector; 52 percent of the 1.1 million employees, and 49 percent of the 140 billion dollars of annual sales—percentages that were similar to those of 1987.

[36] Radio, television, computer, and music stores experienced significant gains in the number of establishments, employees, and sales over the 1987–97 period: The number of establishments increased from 33,700 to 38,400, the number of employees increased from 296,700 to 453,800, and total sales increased from $24.9 billion (32 percent of sales) to $61.8 billion (44 percent of sales).

[37] David Belam, "Tools of the Trade: Technology in the Restaurant," *Restaurants USA*, September 1997. According to this case study, the introduction of POS terminals and technology produced substantial reductions in labor requirements and improvements in both speed and service.

[38] In 1997, eating and drinking places was the largest retail group in terms of number of establishments (476,000) and employment (7.9 million workers). Four other retail trade groups, however, registered greater total sales than those recorded for eating and drinking places ($254 billion).

[39] *Standard & Poor's Industry Surveys*, "Restaurants," February 24, 2000.

[40] Drug stores were the largest industry group within miscellaneous retail stores, in terms of establishments, employment, and sales. In 1997, for example, drug stores accounted for about 12 percent of all miscellaneous retail establishments, 18 percent of employment, and 25 percent of total miscellaneous retail sales.

[41] Between 1987 and 1997, the number of drug stores fell from 52,000 to about 44,000—a decline of more than 15 percent. The number of employees, on the other hand, actually rose by about 5 percent over the same period—from 603,000 to 634,000.

[42] *Standard & Poor's Industry Surveys*, "Supermarkets and Drug-

stores," 1998, p. 17. It should also be noted that the introduction of such technologies was abetted by the growing consolidation of the industry—larger firms can more readily afford such systems. In 1987, for example, the top four firms accounted for about 23 percent of total drug store sales. By 1997, the proportion was 47 percent; Bureau of the Census, Economic Census.

[43] Miscellaneous shopping goods stores consists of sporting goods stores (SIC 5941), book stores (SIC 5942), stationary stores (SIC 5943), jewelry stores (SIC 5944), hobby, toy, and game shops (SIC 5945), camera and photographic supply stores (SIC 5946), gift, novelty, and souvenir shops (SIC 5947), luggage and leather goods stores (SIC 5948), and sewing, needlework, and piece goods stores (SIC 5949). In 1997, these stores combined accounted for about one-third of total establishments and employment and about one-quarter of total sales for SIC 59.

[44] Mark W. Dumas, "Productivity trends in two retail trade industries, 1987–95," *Monthly Labor Review*, July 1997, p. 38.

[45] A study by the Direct Marketing Association reported that 95 percent of all catalog companies also sold on the Internet, with these sales accounting for 13 percent of their total sales. See "Retailing by the Book," *The Washington Post*, September 6, 2001.

[46] Based on Annual Retail Trade data published by the Bureau of the Census. Data are for nonstore retailers classified under the North American Industry Classification System as industry NAICS 454.

Appendix: Using the CPI-U-RS versus the CPI-U for output deflators

The indexes of output per hour of all persons for retail trade have been developed according to procedures followed by the Bureau of Labor Statistics for measuring changes in the relationship between output and the hours expended in producing that output.[1] Output indexes—referred to as benchmark indexes—are first derived from data from two consecutive quinquennial (5-year) censuses. Annual indexes of intercensal year output are adjusted to the benchmark levels for census years. To compute an index of output per hour, the output index is then divided by an index of hours.

For four-digit SIC industries in retail trade, the computation of the benchmark output indexes begins with sales data from the Census of Retail Trade. Current-dollar sales for each category of merchandise in the industry (merchandise lines) are deflated with price indexes. The deflated sales, by merchandise line, are aggregated according to the Tornqvist index formula. This aggregation is further adjusted for industry coverage to yield the final benchmark output index.

Annual industry output indexes are computed by deflating annual total industry sales with annual industry deflators. Annual industry deflators are constructed as a weighted average of the price indexes for the current year. The weights are the value of the merchandise lines in the previous benchmark year.

Previously, benchmark and annual industry deflators were derived from the detailed price index series of the Consumer Price Index for All Urban Consumers (CPI-U).[2] Now, the benchmark and annual deflators are derived using the recently constructed *CPI research series using current methods* (CPI-U-RS).[3] When methodological changes are made to the official CPI-U, they are carried forward in time, but the CPI-U is not revised historically. The CPI-U-RS, on the other hand, incorporates all methodological changes made to the CPI-U and extends these changes back to 1978. The CPI-U-RS was developed by BLS to provide government statistical agencies and researchers a consistent time series of price change—exactly what is needed for developing the deflated output measures for productivity series.

The detailed CPI-U-RS series are available at the product group level for the 1978–87 period, and at the more detailed product level for 1987 to the present. For the 24 industry labor productivity series of retail trade that extend back prior to 1987, revisions using the CPI-U-RS series were made beginning with 1978. The analysis that follows measures the effects of using the CPI-U-RS on labor productivity growth rates, and it breaks the 1978–97 period into 5-year subperiods corresponding to the quinquennial censuses: 1977–82, 1982–87, 1987–92, and 1992–97.

In some cases, the price index used to deflate a value of merchandise-line sales is a directly matched CPI-U-RS. In other cases, the deflator is a weighted average of CPI-U-RS price indexes that have been combined using the relative-importance weights assigned to each CPI. In still other cases (those prior to 1987), deflators or combined deflators based on the CPI-U are adjusted to CPI-U-RS levels using the ratio of the CPI-U-RS to the CPI-U at the product group level and applying these ratios to the appropriate CPI-U detailed price indexes. In cases in which there is not an exact match of price indexes with merchandise line sales, a price index or combination of price indexes closely associated with the merchandise line sales is used.

For the 1977–82 period, 88 separate deflators based on the CPI-U-RS are used for the various merchandise lines for all retail industries. Of these deflators, 23 are direct matches between the merchandise line and a specific price index, 22 are combinations of CPI-U-RS indexes, and 43 are price indexes or combinations that are adjusted to CPI-U-RS levels using the ratio of product group CPI-U-RS to CPI-U. For the 1982–87 period, 113 deflators are used—24 directly priced, 24 weighted averages of CPI-U-RS indexes, and 65 deflators adjusted using product group index ratios. After 1987, much more product detail is available for the CPI-U-RS. For the 1987–92 period, 122 deflators are used, with 75 directly matched to merchandise lines and 47 weighted averages of individual CPI-U-RS indexes. For 1992 forward, 128 deflators are used with 79 directly matched to merchandise lines and 49 weighted averages of CPI-U-RS indexes.

In developing output and productivity measures for three-digit SIC retail trade industry groups, four-digit SIC industry annual output indexes are Tornqvist weighted to derive indexes of output. Four-digit SIC industry sales are used as weights. In the same manner, two-digit SIC major group series are aggregates of the three-digit series. The series for total retail trade is an aggregate of the two-digit SIC major group measures.

Results

Table A-1 shows the percentage-point changes in labor productivity trends over the 1977–97 period for all published three-digit SIC industries in retail trade that result from using the CPI-U-RS (versus

Table A-1. Percentage point change in labor productivity resulting from revising industry deflators to those based on CPI-U-RS for published three-digit SIC retail trade industries: 1977-97

SIC	Industry	1977–82	1982–87	1987–92	1992–97
521	Lumber and other building materials dealers	–	–	.3	.0
523	Paint, glass, and wallpaper stores	–	–	.2	.0
525	Hardware stores	.6	.5	.5	.0
526	Retail nurseries, lawn, and garden supply stores	–	–	.4	–.1
531	Department stores	.4	.8	.8	.0
533	Variety stores	.7	.5	.5	–.1
539	Miscellaneous general merchandise stores	.6	.8	.8	–.1
541	Grocery stores	.6	.7	.7	–.1
542	Meat and fish (seafood) markets	–	–	.7	–.1
546	Retail bakeries	.3	.6	.6	.0
551	New and used car dealers	.2	.2	.2	.0
553	Auto and home supply stores	.2	.3	.3	.1
554	Gasoline service stations	.0	.0	.0	.0
561	Men's and boys' wear stores	.6	.7	.7	.0
562	Women's clothing stores	1.9	1.6	1.6	.0
565	Family clothing stores	1.2	1.2	1.2	.0
566	Shoe stores	.5	.5	.5	.0
571	Furniture and homefurnishings stores	.6	.7	.7	–.4
572	Household appliance stores	.5	.3	.3	.0
573	Radio, television, computer, and music stores	–.3	–1.0	–1.0	.3
581	Eating and drinking places	.2	.2	.2	.0
591	Drug and proprietary stores	.7	.8	.8	.1
592	Liquor stores	.3	.2	.2	.0
593	Used merchandise stores	–	–	.8	–.2
594	Miscellaneous shopping goods stores	–.1	.7	.7	–.1
596	Nonstore retailers	–	–	.6	.0
598	Fuel dealers	–	–	.0	.0
599	Retail stores, n.e.c.	–	–	.2	–.3

the CPI-U) to construct the benchmark and annual deflators.[4] In general, the revised industry deflators based on the CPI-U-RS grew at a slower rate than those based on the CPI-U. Output and productivity, therefore, increased at faster rates of growth than they did when previously published. Of the 28 published three-digit measures, 14 have average annual revisions greater than 0.5 percentage points for labor productivity from 1987 to 1992. Published data for 20 three-digit retail industries extend back to 1977 or earlier. Eleven of these industries had revisions greater than 0.5 percentage points per year from 1982 to 1987, and nine had revisions greater than 0.5 percentage points from 1977 to 1982. In the 1977–82 period, two industries had labor productivity revisions greater than 1.0 percentage point per year—women's clothing stores, SIC 562 (1.9 percentage points) and family clothing stores, SIC 565 (1.2 percentage points). These same two industries had revisions of 1.6 and 1.2 percentage points per year, respectively, for the 1982–87 and 1987–92 periods.

The relatively large revisions to productivity for these industries reflect a large downward adjustment to the CPI-U-RS detailed apparel indexes because the geometric mean formula assumes a modest amount of consumer substitution. Gasoline service stations (SIC 554) and fuel dealers (SIC 598) had no adjustments to labor productivity due to the incorporation of the CPI-U-RS. Both of these industries were dominated by merchandise lines whose deflators were not affected by the research series revisions. For 27 of the 28 published industries, revisions to productivity growth were much smaller in the 1992–97 period because, beginning with 1992 data, the deflators for published industries already included revisions for the geometric mean calculating procedures.

Notes

[1] For a more detailed description of these procedures, see Kent Kunze, Mary Jablonski, and Virginia Klarquist, "BLS modernizes industry labor productivity program," *Monthly Labor Review*, July 1995, pp. 3–12.

[2] For more on the Consumer Price Index and its methodology, see "The Consumer Price Index," *BLS Handbook of Methods*, Bulletin 2490 (Bureau of Labor Statistics, April 1997), ch. 17, pp. 167–230; for more on deflated value and benchmark indexes, see "Industry Productivity Measures," *BLS Handbook of Methods* (1997), ch. 11, pp. 103–09.

[3] For more on how and why this newly constructed index was calculated, see Kenneth J. Stewart and Stephen B. Reed, "Consumer Price Index research series using current methods, 1978-98," *Monthly Labor Review*, June 1999, pp. 29–38.

[4] In reworking industry deflators and substituting price indexes from the CPI-U-RS, the match of CPI's to the merchandise-line sales used to deflate these sales were reviewed. In some cases, a different price series was matched to the merchandise line sales. For most industries, the revisions due to these substitutions were small. In furniture and

homefurnishings stores, however, nearly all of the modifications to the measures in the 1992–97 period were the result of changes in the price series used with the merchandise-line sales.

Measures were developed for all four-digit, three-digit, and two-digit SIC retail industries. All industry measures that meet BLS publication standards are available on the Division of Industry Productivity website, on the Internet at **http://www.bls.gov/lpc** or by request. Those three-digit and four-digit SIC retail industries that do not meet BLS standards are available by request. All data requests should be directed to dipsweb@bls.gov (e-mail), or call 202–691–5618.

[5] See Stewart and Reed, "Consumer Price Index research series," p. 36.

[6] See Kenneth V. Dalton, John S. Greenlees, and Kenneth J. Stewart, "Incorporating a geometric mean formula in the CPI," *Monthly Labor Review*, October 1998, pp. 3-7.

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