

# Deindustrialization and the shift to services

*Does the employment shift to services imply that the U.S. is losing its industrial base? Data show the industrial sector as a whole in healthy shape, but a few manufacturing industries in deep trouble*

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Much discussion and concern recently has been focused on the deindustrialization of the United States and the need for a national industrial policy.<sup>1</sup> The well-reported growth in employment in the service sector and the relative decline in employment in manufacturing industries implies to some a decrease in our industrial capacity. The deindustrialization argument points to a lack of investment in basic production, plant closings and layoffs, and the large negative merchandise trade balance as evidence that the United States is losing its manufacturing base.

But precisely how can deindustrialization be defined? Does the shift to a service economy imply the erosion of an industrial base? Should deindustrialization be described as a loss of manufacturing jobs or should production changes also be a criterion? Should these changes be measured in absolute terms or relative terms? These are some of the questions we examine in this article by reviewing data on both employment and production for manufacturing and other major sectors, first as a whole, and then for detailed industries.

Our findings indicate that the shift to a service economy is not really evidence of a declining industrial base, or “deindustrialization.” The shift has largely been a relative one. Employment in the manufacturing sector in absolute

terms has not declined appreciably over the last two decades (except cyclically), and the most recent projections by the Bureau of Labor Statistics show manufacturing employment recovering most of its current recession-related losses. Furthermore, while employment in manufacturing is still off its previous peak, the same is not true for output. Manufacturing production in real terms has bounced back from the recession and by 1984 had reached a new peak level, hardly proof of a loss of our industrial base.<sup>2</sup>

While little evidence of deindustrialization is present at the macro or aggregate level, an additional finding is that for about 20 manufacturing industries, including steel, leather, and tires, the past 15 years have seen steady declines in both output and employment. Further, the BLS projections for these industries indicate little prospect for recovery. Thus, while it is possible to say from the data we have examined that the United States is not deindustrializing, this is not to conclude that declines in both production and employment have not hit certain industries particularly hard.

Although it is clear that there is little consensus on what is meant by deindustrialization, certain points in these discussions seem more important than others:

- Industrial base to most means the manufacturing sector.
- An absolute decline is more serious than a relative one.
- Production declines are a more alarming signal of a reduction in the industrial base than employment declines, because through efficiencies it is possible to have increasing output with stable or declining employment. Absolute

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declines in production may result from many factors, such as increasing competition from other products or from foreign producers, or a lack of capital investment. In this article, we only examine the observed production changes without looking at the reasons why.

- Production should be measured in quantity or real terms to eliminate price effects.

**Macro review**

*Shifts in employment.* We begin this examination of America's possible deindustrialization by reviewing employment changes at the macro or most aggregate level over the past 25 years. Our analysis of data on changing job shares clearly indicates significant structural change occurring in the U.S. economy. Does this imply that the United States is losing its industrial capacity?

The goods-producing sector is defined here to include manufacturing, construction, mining, and agriculture; service-producing includes all other industries, including government. While beginning the overview of employment at the broad aggregations of goods-producing and service-producing, this article will focus more on manufacturing, because as noted earlier, this is the sector with which the deindustrialization argument is most concerned.

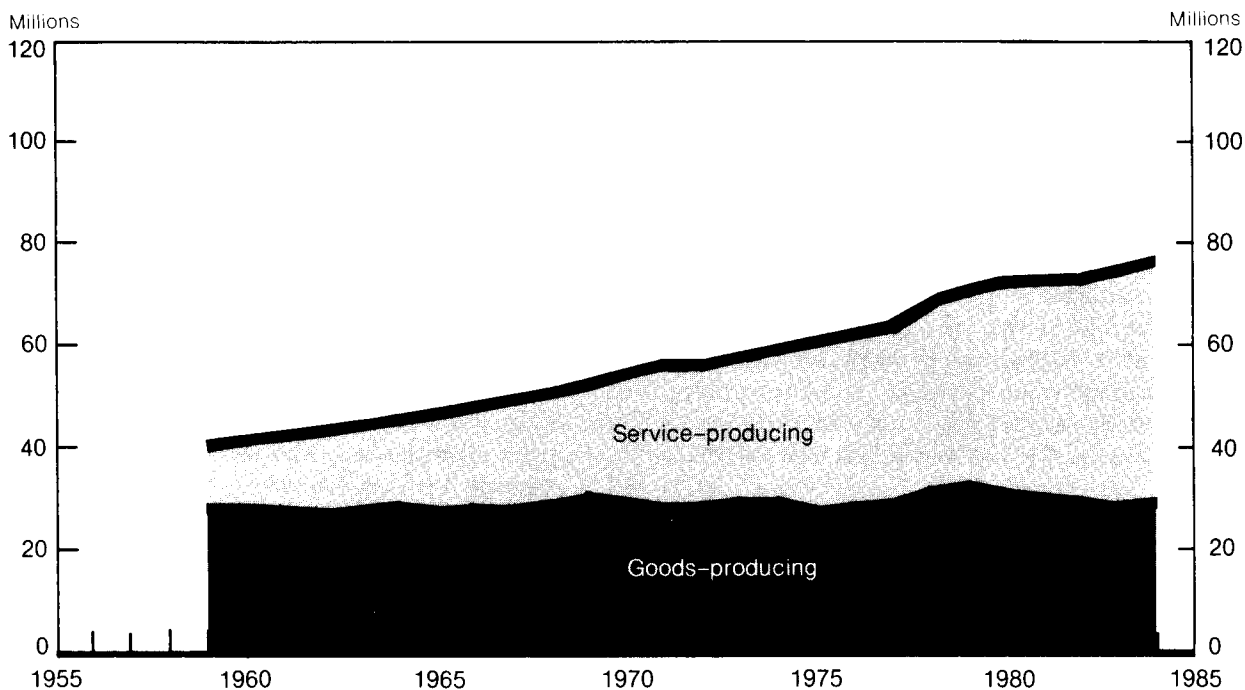
The first point to be made is that the shift to services has been largely a relative shift and not an absolute one. Job

gains in service-producing industries were not accomplished at the expense of any of the major goods-producing industries, except perhaps agriculture. Rather, employment has remained fairly stable in the goods-producing sector as a whole, including manufacturing, while increasing sharply in the service-producing sectors, as chart 1 shows. The stability in the level of jobs in the goods-producing sector and in manufacturing is evident throughout the 1959-84 period, except for times of cyclical decline such as 1974-75 or 1980-82.<sup>3</sup>

The point that the employment shift to services has largely been only a relative one has also been made by Bureau economist Michael Urquhart in a 1984 *Monthly Labor Review* article.<sup>4</sup> His examination of labor force data over the period of 1969 to 1979 showed that there had been no real net migration of workers from the goods to the services sector, but rather most of the growth in service sector jobs was attributable to the increase in women's labor force participation.

Despite the overall stability in the absolute number of goods-producing jobs, the change in shares between the goods- and service-producing sectors has been dramatic. In 1959, the latter sector accounted for 60 percent of all employment and the former, 40 percent; by 1984, that ratio had shifted to 72 percent of employment in the service-producing sector and only 28 percent in the goods-producing sector. (See table 1.)

**Chart 1. Total employment, 1959-84**



**Table 1. Employment by major sector, 1959-84**

Year	Total	Goods-producing							Service-producing		
		Total	Agriculture	Mining	Construction	Manufacturing			Total	Government	Private
						Total	Durable	Nondurable			
<b>Level (in thousands)</b>											
1959	67,784	27,125	5,583	614	3,910	17,018	9,582	7,436	40,659	8,008	32,651
1969	81,508	28,964	3,622	501	4,374	20,467	12,080	8,387	52,544	12,117	40,427
1979	101,471	31,324	3,340	704	5,879	21,401	12,985	8,416	70,147	15,832	54,315
1980	102,146	30,589	3,356	723	5,842	20,668	12,419	8,249	71,557	16,114	55,443
1981	102,972	30,403	3,341	737	5,766	20,559	12,343	8,216	72,569	15,896	56,673
1982	101,643	28,739	3,396	729	5,460	19,154	11,262	7,892	72,904	15,702	57,202
1983	102,528	28,284	3,369	650	5,440	18,825	10,959	7,866	74,244	15,736	58,508
1984	106,841	29,643	3,293	651	5,920	19,779	11,744	8,035	77,198	15,851	61,347
<b>Percent distribution</b>											
1959	100.0	40.0	8.2	0.9	5.8	25.1	14.1	11.0	60.0	11.8	48.2
1969	100.0	35.5	4.4	0.6	5.4	25.1	14.8	10.3	64.5	14.9	49.6
1979	100.0	30.9	3.3	0.7	5.8	21.1	12.8	8.3	69.1	15.6	53.5
1980	100.0	29.9	3.3	0.7	5.7	20.2	12.2	8.1	70.1	15.8	54.3
1981	100.0	29.5	3.2	0.7	5.6	20.0	12.0	8.0	70.5	15.4	55.0
1982	100.0	28.3	3.3	0.7	5.4	18.8	11.1	7.8	71.7	15.4	56.3
1983	100.0	27.6	3.3	0.6	5.3	18.4	10.7	7.7	72.4	15.3	57.1
1984	100.0	27.7	3.1	0.6	5.5	18.5	11.0	7.5	72.3	14.8	57.4
<b>Average annual rate of change</b>											
1959-84	1.8	0.4	-2.1	0.2	1.7	0.6	0.8	0.3	2.6	2.8	2.6
1959-69	1.9	0.7	-4.2	-2.0	1.1	1.9	2.3	1.2	2.6	4.2	2.2
1969-79	2.2	0.8	-0.8	3.5	3.0	0.4	0.7	0.0	2.9	2.7	3.0
1979-84	1.0	-1.1	-0.3	-1.6	0.1	-1.6	-2.0	-0.9	1.9	0.0	2.5

NOTE: Data include wage and salary, self-employed, and unpaid family workers.

For manufacturing alone, the share decline has not been as sharp, but still significant. While remaining fairly level at about the 19 to 20 million mark for the past two decades (except for the recessionary periods noted earlier), manufacturing employment fell from 25.1 percent of all jobs in 1959 to 18.5 percent in 1984. It is this widely reported decline in job share for manufacturing, along with reports of plant closings and high regional unemployment in some heavy manufacturing centers, which may have fostered much of the concern about a loss in our industrial base. Of course, these declines have resulted in many hardships among the workers displaced.<sup>5</sup>

The difference between a 12.3-percentage-point share loss for the goods sector as a whole between 1959 and 1984 and only a 6.6-percentage-point drop for manufacturing by itself is accounted for mostly by the loss of agricultural jobs. Agriculture was the only goods-producing sector to register actual employment decreases over the period. The agricultural sector has been shrinking dramatically since at least the 1940's. Low farm prices during the Great Depression of the 1930's eliminated many farm jobs and forced rapid consolidation, eventually leading to very high productivity gains in farming. The movement away from the farm gradually began to taper, and in the past decade the decline in agricultural employment has slowed appreciably.

It has also seemed that the shift to services has accelerated in recent years because of the 1980-82 recessions and because of the increase in imports, especially of manufactured goods, resulting in part from the high value of the dollar.

Employment in the goods-producing sector declined by 3 million from the pre-recession 1979 level to 1983's trough, while service-producing jobs increased every year during that time span, by a total of 4.1 million. Of the 3-million loss in jobs in the goods-producing sector, 2.6 million were in manufacturing, and only small amounts were in the other goods-producing components. Goods-producing employment recovered somewhat in 1984, rising 1.4 million, but this gain was dwarfed by the almost 3.0 million new service-producing jobs added in that single year. Within the goods sector, construction employment recovered to its pre-recession high, but manufacturing employment was still off 1.6 million.

Thus, from an employment perspective, there clearly has been a large *relative* decline in the share of employment in goods-producing industries and a similar *relative* decline in manufacturing. However, in absolute terms the employment levels in all goods-producing sectors except agriculture were relatively stable prior to 1979, and even increased in construction. Since 1979, manufacturing employment has declined appreciably, however, and only part of the cyclical losses of 1980-82 have been recovered to date.

*Shifts in output.* As noted, it may be more important for an examination of the deindustrialization debate to review production rather than just employment, on which most of the debate seems to have focused thus far. A decline in employment, whether absolute or relative, need not necessarily signify an erosion of the U.S. industrial base if real

output is still increasing. Using production as a criterion, the goods-producing sector, by reaching new peak levels in 1984, has clearly shown that it is not disappearing. In addition, although a shift away from goods production in relative terms has occurred, it can be seen from chart 2 that the magnitude of that relative shift is less for output than it is for employment. The goods-producing sector accounted for 54.9 percent of the real value of all production in 1959 and 46.7 percent in 1984, a drop of 8.2 percentage points. (See table 2.) The decrease in its job share over that span, however, was 12.3 percentage points. This differential comes about because productivity gains, although slowing down over time, have been more rapid in the goods-producing than in the service-producing sector.

These conclusions relating to output are based on data computed for the Bureau's economic and employment projections system.<sup>6</sup> Actual production, rather than sales in nominal dollars, should be the basis for this analysis, because different price movements among goods and services can distort actual production changes. However, it is impossible to measure the output of many industries' goods or services in actual production units.<sup>7</sup> A proxy for production that is widely used is sales or shipments in nominal prices, deflated by a price index appropriate to the particular industry's mix of goods and services. These data on real output, as well as data on employment, are available for each of 150

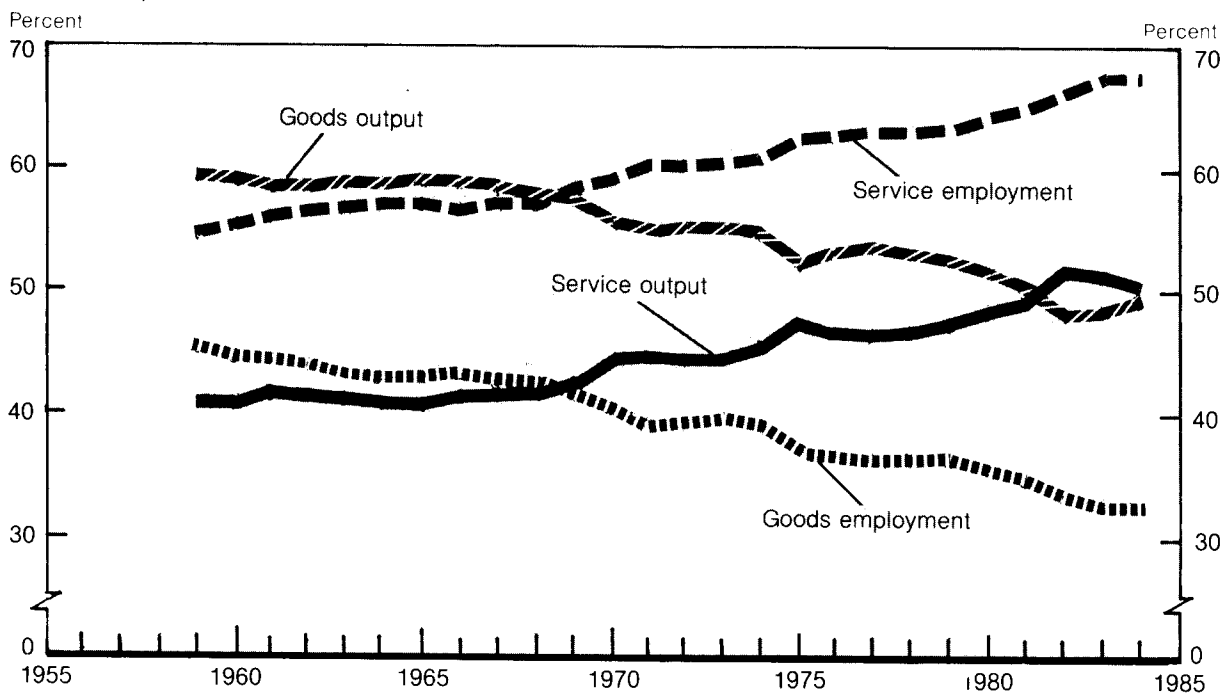
individual industries encompassing the total U.S. economy. Historical data are available from 1958 to 1984 and projected data through 1995.

Another conclusion drawn from looking at this data base is that more of the relative decline in goods-sector output is attributable to agriculture and construction than to manufacturing. In contrast, the loss in employment share occurred primarily for the agriculture and manufacturing components of the goods-producing sector. Manufacturing dropped 6.6 percentage points in its job share between 1959 and 1984, but only 2.3 points in its output share.

The trend for only the more recent 1979-84 span is also more positive for output than it is for employment. By 1984, goods-producing output in constant dollars had recovered from the 1980-82 recessions, surpassing the previous peak reached in 1979 and hitting an all-time high. As mentioned, employment in the goods-producing sector has also recovered from the 1980-82 downturns, but not enough to regain the 1979 level.<sup>8</sup>

Again, the more important point is whether a *relative* decline reflects the erosion of our industrial sector. If manufacturing production is still growing in absolute terms, then we cannot be said to be eliminating our industrial base, even though we are undergoing a relative structural shift in our economy. The data at the aggregate level for each of the major sectors show production levels for all compo-

**Chart 2. Share of private output and employment, goods-versus service-producing industries, 1959-84**



**Table 2. Gross duplicated output (1977 dollars) by major sector, 1959–84**

Year	Total	Goods-producing							Service-producing		
		Total	Agriculture	Mining	Construction	Manufacturing			Total	Government	Private
						Total	Durable	Nondurable			
<b>Level (in millions)</b>											
1959 .....	2,002,527	1,100,342	102,441	55,927	205,398	736,576	375,635	360,941	902,185	151,907	750,278
1969 .....	2,969,101	1,585,583	116,916	79,609	255,346	1,133,712	607,876	525,836	1,383,518	222,002	1,161,516
1979 .....	3,950,145	1,944,892	138,569	83,108	275,190	1,448,025	773,604	674,421	2,005,253	255,706	1,749,547
1980 .....	3,860,734	1,847,174	132,706	82,928	258,543	1,372,997	718,710	654,287	2,013,560	260,851	1,752,709
1981 .....	3,919,714	1,853,677	141,675	82,262	249,458	1,380,282	719,069	661,213	2,066,037	263,066	1,802,971
1982 .....	3,796,261	1,710,370	136,897	80,304	232,300	1,260,869	628,634	632,235	2,085,891	262,277	1,823,614
1983 .....	3,970,865	1,809,382	130,381	78,735	253,667	1,346,599	678,978	667,621	2,161,483	263,017	1,898,466
1984 .....	4,309,342	2,012,679	150,908	82,787	293,618	1,485,366	783,483	701,883	2,296,663	265,023	2,031,640
<b>Percent distribution</b>											
1959 .....	100.0	54.9	5.1	2.8	10.3	36.8	18.8	18.0	45.1	7.6	37.5
1969 .....	100.0	53.4	3.9	2.7	8.6	38.2	20.5	17.7	46.6	7.5	39.1
1979 .....	100.0	49.2	3.5	2.1	7.0	36.7	19.6	17.1	50.8	6.5	44.3
1980 .....	100.0	47.8	3.4	2.1	6.7	35.6	18.6	16.9	52.2	6.8	45.4
1981 .....	100.0	47.3	3.6	2.1	6.4	35.2	18.3	16.9	52.7	6.7	46.0
1982 .....	100.0	45.1	3.6	2.1	6.1	33.2	16.6	16.7	54.9	6.9	48.0
1983 .....	100.0	45.6	3.3	2.0	6.4	33.9	17.1	16.8	54.4	6.6	47.8
1984 .....	100.0	46.7	3.5	1.9	6.8	34.5	18.2	16.3	53.3	6.1	47.1
<b>Average annual rate of change</b>											
1959–84 .....	3.1	2.4	1.6	1.6	1.4	2.8	3.0	2.7	3.8	2.3	4.1
1959–69 .....	4.0	3.7	1.3	3.6	2.2	4.4	4.9	3.8	4.4	3.9	4.5
1969–79 .....	2.9	2.1	1.7	0.4	0.8	2.5	2.4	2.5	3.8	1.4	4.2
1979–84 .....	1.8	0.7	1.7	-0.1	1.3	0.5	0.3	0.8	2.8	0.7	3.0

nents growing in absolute terms. Real output in manufacturing in 1984 was actually more than double what it was in 1959—hardly evidence of a reduction of an industrial base. The impression that deindustrialization has accelerated recently because of the recession is also questionable. Real manufacturing output did drop by almost 13 percent over the 4 years from the 1979 peak to the 1982 trough, but in the 2 years since, it has gained almost 18 percent, surpassing the 1979 level. However, when looking at recent employment trends, the story differs. Manufacturing employment reached its low point in 1983, and in 1984, although 1 million jobs were added, it did not recover to the 1979 peak. Furthermore, preliminary data for 1985 indicate that little further gains in manufacturing employment have occurred. Thus, output increases have been made without corresponding increases in employment, the result of productivity gains. This loss of manufacturing jobs is a severe problem for certain industries and locales; however, the rise in manufacturing output overall seems to preclude a conclusion of deindustrialization—at least at the level of total manufacturing.

Another argument advanced in the discussion about deindustrialization is that the U.S. manufacturing sector has performed poorly in comparison with other industrialized countries. However, the evidence to support this impression is mixed. A recent Bureau study of manufacturing productivity trends in 12 countries shows that while the rate of gain in U.S. manufacturing output over the years 1973–84 was smaller than for four of the other countries, particularly Japan, the rate of employment decline in U.S. manufactur-

ing was the smallest of any of the countries studied.<sup>9</sup>

*Hours.* Another point to be made about the shift to services at the major sector level concerns hours. Because at least part of the growth in employment in the service-producing industries has been in part-time jobs, the amount of the shift can be overemphasized by looking only at employment. The share of worker-hours in the goods-producing sector dropped from 41.1 percent of the total in 1959 to 30.3 percent in 1984, or 10.8 percentage points. (See table 3.) This relative shift in hours is less than for employment, but more than for output.

*Quality of jobs.* One reason for the concern in the popular literature about the shift away from manufacturing industries toward service-producing industries, especially for employment, is the fear that this will lead to the disappearance of well-paying factory jobs. It is argued that the declining smokestack industries have a large proportion of middle-income earners, while the growing service and high-tech industries have a more bipolar wage structure, with more high or low earners. The shift among industries, therefore, will lead to a declining middle class.

Considerable doubt has been cast on this argument, however, by Neal Rosenthal in a previous *Monthly Labor Review* article.<sup>10</sup> He found through an analysis of occupational data that while middle-income jobs have declined slightly as a percentage of total employment, lower-paying jobs have declined even more. Furthermore, declines in high-paying smokestack industries (such as steel) have at least been matched by declines in lower-paying manufacturing indus-

tries (such as textiles, apparel, and leather).<sup>11</sup>

### Micro analysis

**Industry shifts.** In the above section, we discussed output and employment at the major sector or very aggregate level. At that level we showed that while the U.S. economy in relative terms is shifting in a very pronounced way towards the service-producing sector and away from the goods-producing sector, in absolute terms the manufacturing sector is nearly stable in jobs and growing in production—giving little evidence of a loss of the U.S. industrial base. However, this examination at the macro level could be masking important changes at the micro or industry level. In this section, we examine some of these divergent employment and output trends for individual industries, using the level of detail in the BLS projections system.

In reviewing these industry output and employment data closely for the period 1959–84, it appears that the time frame 1959–69 is quite different in its characteristics from either the 1969–79 or 1979–84 span. During the booming 1960's, manufacturing increased its share of output and held steady in its share of employment, whereas after 1969, several recessions and other factors forced manufacturing off its earlier upward path. Economic downturns in 1970, 1974–75, and 1980–82 had a larger impact on the cyclically sensitive manufacturing sector than on the more cyclically resistant service-producing sector. Because of the different characteristics of the earlier years, the analysis in this section of the article will focus on the more recent 1969–84 period. The analysis consisted of examining industries over the 15-year span and categorizing them into 1 of 3

groups: (1) consistent gainers in output and employment, (2) consistent gainers in output but employment losers, and (3) consistent losers of both output and employment.

**Output and employment gainers.** Table 4 lists those industries which have shown a positive trend in both output and employment during the last 15 years. (That is, the least squares rate of change over 1969–84 has been positive. This does not mean that these industries may not have shown declines for a few of the years but only that the overall trend for the span is positive.) One-half of the 150 industries in the data base examined fall into this category. Among the goods-producing industries which are included in the growing industries are 4 of the 7 agricultural industries, 2 mining industries, maintenance construction, and numerous manufacturing industries. Most of the latter on the list of output and employment gainers are durable goods industries, particularly those which are included in 1 of the 3 high-technology definitions developed earlier by BLS.<sup>12</sup> These designations identify high-tech industries on the basis of expenditures for research and development, the ratio of scientific and technical personnel to all workers in the industry, and the degree of product sophistication. Many of the electrical machinery and electronic equipment industries which meet one of the high-tech definitions have experienced both production and employment advances in the last 15 years.

The rest of the industries on the list include virtually all of the individual service-producing industries in the data base. Only a few of the transportation industries, gas utilities, or service industries have lost either jobs or production, or both, between 1969 and 1984. All the communications

**Table 3. Worker hours by major sector, 1959–84**

Year	Total	Goods-producing							Service-producing		
		Total	Agriculture	Mining	Construction	Manufacturing			Total	Government	Private
						Total	Durable	Nondurable			
<b>Level (in millions)</b>											
1959	140,710	57,791	12,991	1,285	7,969	35,546	20,162	15,384	82,919	16,718	66,201
1969	163,320	61,462	8,328	1,109	9,036	42,989	25,671	17,318	101,858	25,159	76,699
1979	196,381	65,805	7,626	1,555	11,956	44,668	27,425	17,243	130,576	32,951	97,625
1980	196,153	63,202	7,574	1,566	11,443	42,619	25,838	16,781	132,951	33,528	99,423
1981	197,268	62,924	7,563	1,603	11,276	42,482	25,723	16,759	134,344	33,070	101,274
1982	192,992	58,639	7,522	1,564	10,591	38,962	23,093	15,869	134,353	32,670	101,683
1983	195,250	58,508	7,362	1,406	10,659	39,081	22,972	16,109	136,742	32,756	103,986
1984	204,741	61,983	7,303	1,427	11,784	41,469	24,938	16,531	142,758	33,020	109,738
<b>Percent distribution</b>											
1959	100.0	41.1	9.2	0.9	5.7	25.3	14.3	10.9	58.9	11.9	47.0
1969	100.0	37.6	5.1	0.7	5.5	26.3	15.7	10.6	62.4	15.4	47.0
1979	100.0	33.5	3.9	0.8	6.1	22.7	14.0	8.8	66.5	16.8	49.7
1980	100.0	32.2	3.9	0.8	5.8	21.7	13.2	8.6	67.8	17.1	50.7
1981	100.0	31.9	3.8	0.8	5.7	21.5	13.0	8.5	68.1	16.8	51.3
1982	100.0	30.4	3.9	0.8	5.5	20.2	12.0	8.2	69.6	16.9	52.7
1983	100.0	30.0	3.8	0.7	5.5	20.0	11.8	8.3	70.0	16.8	53.3
1984	100.0	30.3	3.6	0.7	5.8	20.3	12.2	8.1	69.7	16.1	53.6
<b>Average annual rate of change</b>											
1959–84	1.5	0.3	-2.3	0.4	1.6	0.6	0.9	0.3	2.2	2.8	2.0
1959–69	1.5	0.6	-4.3	-1.5	1.3	1.9	2.4	1.2	2.1	4.2	1.5
1969–79	1.9	0.7	-0.9	3.4	2.8	0.4	0.7	0.0	2.5	2.7	2.4
1979–84	0.8	-1.2	-0.9	-1.7	-0.3	-1.5	-1.9	-0.8	1.8	0.0	2.4

**Table 4. Positive output trend and positive employment trend, average annual rate of change,<sup>1</sup> 1969–84**

Industry	Output	Employment	Industry	Output	Employment
<b>Agriculture:</b>			<b>Durable goods manufacturing—Continued</b>		
Food and feed grains .....	2.4	0.6	Aircraft .....	1.3	0.3
Agricultural products, n.e.c. ....	1.7	1.4	Ship and boat building and repair .....	3.1	1.0
Forestry and fishery products .....	0.3	3.0	Motorcycles, bicycles, and parts .....	2.0	0.1
Agricultural, forestry, and fishery services .....	1.7	3.8	Scientific and controlling instruments .....	4.3	1.9
			Medical and dental instruments and supplies .....	5.5	5.7
<b>Mining:</b>			Optical and ophthalmic equipment .....	8.6	1.5
Coal mining .....	2.8	3.3	Photographic equipment and supplies .....	6.0	1.2
Chemical and fertilizer mineral mining .....	1.6	2.5			
			<b>Transportation and utilities:</b>		
<b>Construction:</b>			Trucking and warehousing .....	2.5	1.7
Maintenance and repair construction .....	2.2	3.3	Air transportation .....	2.8	2.4
			Pipelines, except natural gas .....	2.0	1.4
<b>Nondurable goods manufacturing:</b>			Transportation services .....	4.0	6.1
Meat products .....	2.1	0.3	Radio and television broadcasting .....	2.6	4.1
Canned and frozen foods .....	2.4	0.1	Communication, except radio and television .....	7.5	1.3
Soft drinks and flavorings .....	2.7	0.5	Electric utilities, public and private .....	4.3	2.9
Food products, n.e.c. ....	2.1	0.4	Water and sanitary services .....	4.3	1.8
Fabricated textile products, n.e.c. ....	1.3	0.5			
Paper products .....	2.5	0.1	<b>Trade:</b>		
Periodical and book printing, publishing .....	3.3	2.0	Wholesale trade .....	2.9	2.5
			Eating and drinking places .....	2.5	5.0
Printing and publishing, n.e.c. ....	3.2	2.0	Retail trade, except eating and drinking .....	2.5	1.7
Industrial inorganic and organic chemicals .....	1.4	0.9			
Agricultural chemicals .....	2.2	0.5	<b>Finance, insurance, and real estate:</b>		
Drugs .....	5.0	2.4	Banking .....	5.0	3.8
Cleaning and toilet preparations .....	2.7	1.4	Credit agencies and financial brokers .....	5.7	4.5
Petroleum refining and related products .....	1.6	0.4	Insurance .....	3.3	2.4
Plastics products, n.e.c. ....	4.9	3.7	Real estate .....	4.5	3.6
<b>Durable goods manufacturing:</b>			<b>Services:</b>		
Logging .....	4.5	0.3	Hotels and lodging places .....	2.8	3.9
Millwork, plywood, and wood products, n.e.c. ....	3.1	0.8	Personal and repair services .....	2.0	1.0
Furniture and fixtures, except household .....	3.5	2.1	Business services .....	6.8	7.0
Primary aluminum and aluminum products .....	1.5	0.2	Advertising .....	3.6	3.0
Fabricated structural metal products .....	0.2	0.5	Professional services, n.e.c. ....	5.7	5.6
Fabricated metal products, n.e.c. ....	2.0	0.9	Automobile repair and services .....	2.1	4.2
Construction, mining, and oilfield machinery .....	1.5	0.7	Motion pictures .....	5.6	2.2
Metalworking machinery .....	0.8	0.4			
			Amusements and recreation services .....	6.1	4.2
General industrial machinery .....	1.4	0.2	Doctors' and dentists' services .....	4.3	5.0
Nonelectrical machinery, n.e.c. ....	3.0	2.4	Hospitals .....	5.3	3.9
Computers and peripheral equipment .....	16.3	5.8	Medical services, n.e.c. ....	5.4	6.8
Typewriters and office equipment .....	5.6	0.2	Educational services .....	3.2	3.5
Service industry machines .....	2.1	0.8	Noncommercial and membership organizations .....	4.0	1.7
Electric transmission equipment .....	2.1	1.0			
Radio and communication equipment .....	6.4	1.9	<b>Government:</b>		
Electronic components and accessories .....	11.3	4.2	Local government passenger transit .....	4.5	5.4
			State and local enterprises, n.e.c. ....	1.8	2.3
Electrical machinery and supplies, n.e.c. ....	3.6	1.9	General government .....	1.2	2.0

<sup>1</sup> Based on least squares trend line.

n.e.c. = Not elsewhere classified.

industries, electric and water utilities, trade, finance, and most other service industries have had positive trends in both output and employment during the last 15 years.

Of course, even within services, some industries have not grown as rapidly as others. The biggest gainers in both output and employment were business services and medical services. Personal services and private educational services, in contrast, have posted only moderate growth.

*Output gainers and employment losers.* In the second category of industries selected in our review process are 37 of the 150 industries in the data base. These industries have experienced real production increases between 1969 and 1984 but have had declining job trends. (See table 5.) This category still could indicate relatively healthy industries, where greater efficiency has allowed more output to be produced with fewer workers. Many of the food processing, textile, chemical, metal products, and industrial machinery

industries are on this list, as well as motor vehicles. Demand for these products continued to be strong, but new manufacturing technologies or better use of existing technologies permitted increases in production with less employment.

*Output and employment losers.* Finally, table 6 shows those industries which have declining trends for both production and employment over the 1969-84 period, 24 in all. Chart 3 graphs that decline for a few of these industries. Most of the industries included in table 6 are those well-recognized as having long-term problems. The steel industry, for example, began its decline long before the last recession. Because of large international wage differentials and the failure to invest in more efficient new technologies, the domestic steel industry lost out to cheaper-priced imports or to substitute materials, especially after the energy crisis in 1973-74 forced transportation equipment manufacturers and others to turn to lighter-weight materials. Other

industries on this list of output and employment losers have also faced either declining demand for their products or stiff competition from imports or both, leading to a long-run decline. Included would be some of the mining industries, tobacco, leather products, rubber, wooden containers, metal cans, and watches and clocks.

The troubled industries listed in table 6 lost a combined total of 1.5 million jobs between 1969 and 1984, but of that total, two-fifths was in one industry, the private household industry—and that industry, of course, is not considered part of our industrial base. Of the rest of the troubled industries, blast furnaces and basic steel products dominates in terms of both output and employment lost. The job decline in this industry totaled .3 million between 1969 and 1984, (one-fifth of the total loss for all troubled industries), and production losses were 34 percent. Other industries in table 6 with more than a 20-percent reduction in output over the 15-year span included iron and ferroalloy ores mining, copper ore mining, wooden containers, rubber products except tires, leather tanning and finishing, leather products

**Table 5. Positive output trend and negative employment trend, average annual rate of change,<sup>1</sup> 1969–84**

Industry	Output	Employment
<b>Agriculture:</b>		
Dairy and poultry products	1.0	-4.9
Meat animals and livestock	0.0	-2.9
Cotton	1.9	-8.9
<b>Nondurable goods manufacturing:</b>		
Dairy products	1.6	-2.9
Grain mill products	2.8	-0.1
Bakery products	0.0	-1.6
Confectionery products	3.3	-0.8
Alcoholic beverages	3.1	-1.4
Fabric, yarn, and thread mills	0.6	-2.2
Floor covering mills	3.1	-1.1
Textile mill products, n.e.c.	2.0	-1.8
Hosiery and knit goods	1.1	-1.7
Apparel	1.1	-1.4
Paperboard containers and boxes	1.3	-1.1
Chemical products, n.e.c.	2.2	-0.6
Plastic materials and synthetic rubber	2.3	-1.4
Synthetic fibers	4.0	-2.5
Paints and allied products	1.2	-0.9
<b>Durable goods manufacturing:</b>		
Sawmills and planing mills	0.8	-0.9
Household furniture	1.9	-0.8
Glass	0.6	-0.5
Stone and other mineral products, n.e.c.	1.6	-0.3
Primary copper and copper products	0.1	-1.2
Screw machine products	0.9	-0.6
Cutlery, handtools, and general hardware	0.4	-0.5
Farm and garden machinery	1.0	-0.6
Household appliances	1.5	-1.8
Electric lighting and wiring equipment	0.7	-0.1
Radio and television receiving equipment	5.6	-3.2
Telephone and telegraph apparatus	5.3	-0.5
Motor vehicles	0.9	-0.7
Musical instruments, toys, and sporting goods	3.0	-0.6
Manufactured products, n.e.c.	0.2	-0.5
<b>Transportation and utilities:</b>		
Railroad transportation	0.7	-3.0
Water transportation	2.9	-0.2
<b>Government:</b>		
U.S. Postal Service	2.4	-0.6
Federal enterprises, n.e.c.	3.3	-1.4

<sup>1</sup>Based on least squares trend line.

n.e.c. = Not elsewhere classified.

**Table 6. Negative output trend and negative employment trend, average annual rate of change,<sup>1</sup> 1969–84**

Industry	Output	Employment
<b>Mining:</b>		
Iron and ferroalloy ores mining	-3.9	-3.1
Copper ore mining	-1.7	-4.1
Stone and clay mining and quarrying	-0.8	-0.7
<b>Nondurable goods manufacturing:</b>		
Sugar	-0.2	-2.3
Tobacco manufacturing	-0.2	-1.4
Tires and inner tubes	-1.3	-1.5
Rubber products except tires and tubes	-3.3	-0.9
Leather tanning and finishing	-2.7	-2.9
Leather products including footwear	-1.8	-3.1
<b>Durable goods manufacturing:</b>		
Wooden containers	-4.1	-5.9
Structural clay products	-1.2	-3.6
Pottery and related products	-0.4	-0.1
Blast furnaces and basic steel products	-2.9	-3.5
Iron and steel foundries and forgings	-1.3	-2.3
Primary nonferrous metals and products, n.e.c.	-1.7	-0.2
Metal cans and containers	-0.6	-2.6
Heating equipment and plumbing fixtures	-1.8	-0.9
Metal stampings	-0.2	-1.3
Materials handling equipment	-0.6	-0.5
Special industry machinery	-2.0	-0.6
Railroad equipment	-5.1	-1.6
Transportation equipment, n.e.c.	-0.8	-2.5
Watches, clocks, and clock-operated devices	-1.7	-4.8
<b>Households:</b>		
Household industry	-3.2	-2.7

<sup>1</sup>Based on least squares trend line.

n.e.c. = Not elsewhere classified.

(mainly shoes), primary nonferrous metals and products, heating equipment and plumbing fixtures, railroad equipment, and watches and clocks. Combined, the troubled industries in table 6 accounted for 6.7 percent of total real production in the economy in 1969, but by 1984 they had declined to only 3.7 percent. For jobs, the share drop was equally sharp—from 6.0 to 3.1 percent. For the manufacturing industries only among the group of output and employment losers, output dropped from a 6.1-percent share in 1969 to 3.4 percent in 1984, and employment from 3.5 to 1.8 percent. Thus, while we have shown that restructuring does not necessarily mean “deindustrialization” or the loss of an industrial base at the macro level, these data clearly isolate a group of individual industries within the manufacturing sector which are in deep trouble.

*Recent problem industries.* In addition to the long-term declining industries, several other manufacturing industries seem to have been hit especially hard in the 1980–82 recessions and have not recovered previous production or employment levels. Many machinery producers in addition to those listed in table 6 are in this category, along with basic chemicals, construction-related industries, and some textile industries (but not apparel). The construction-related industries showed good output growth in 1984, however, and are on their way to surpassing 1979’s peaks. The chemical, textile, and many of the metals and machinery industries also showed gains in 1984 and may be expected to eventually fully recover. The exceptions are nonferrous metal ores



mining, petroleum refining, and miscellaneous manufactured products. Demand for these items has not picked up much, and output is still depressed. Also, although all the metal and machinery industries did experience production upturns in 1984, the recovery was weak for many and they are still far from pre-recession levels. Examples not already identified as long-term losers include fabricated structural metal; cutlery and handtools; engines and turbines; farm and garden machinery; construction, mining, and oilfield machinery; electrical transmission equipment; and electrical industrial apparatus. For all of these industries, as well as several on the long-term declining list, production in 1984 was still at least 10 percent below pre-recession levels.

### Outlook for the future

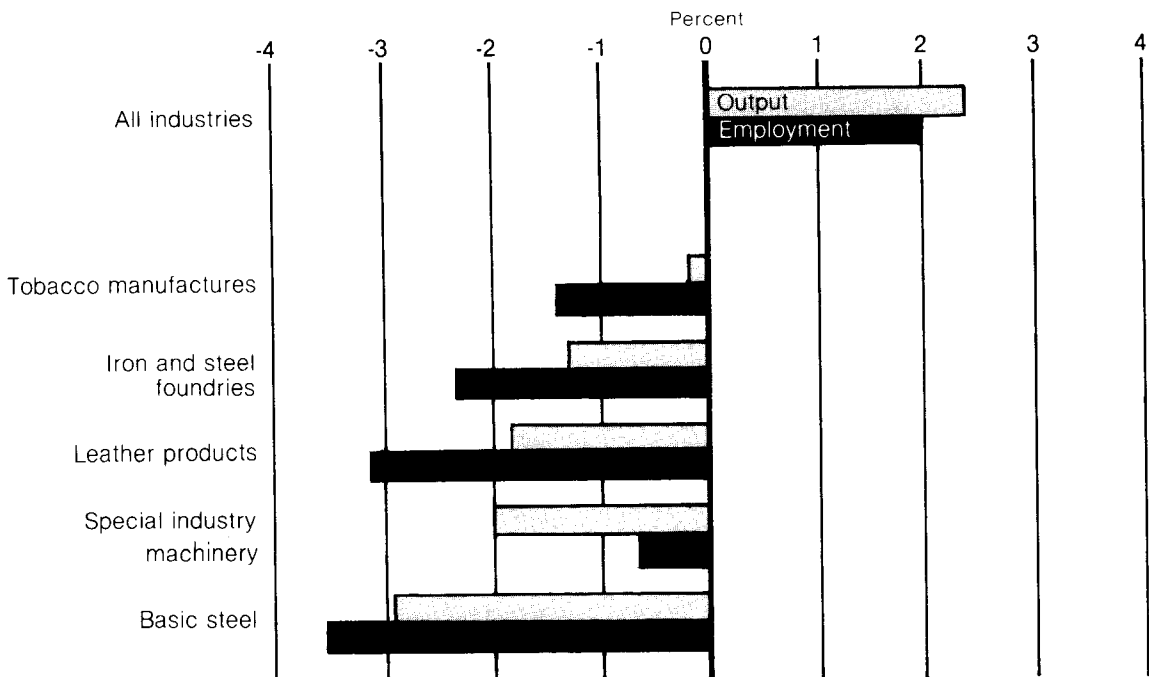
BLS projections of output and employment, published in the November 1985 *Monthly Labor Review*, indicate that the goods-producing sector (under the assumptions of the middle projections scenario) is expected to grow in absolute terms in both production and jobs, but to continue to decline as a share of total. The share decline will be more rapid for employment than for output. The goods-producing sector is projected to gain 1.8 million jobs by 1995, but drop from 27.7 percent of all jobs to just 25.6 percent. Production in goods-producing industries, in contrast, is projected to almost keep pace with total output growth, and the decline in

the goods-producing share of output will be smaller than for employment.

The decrease in the total employment share projected for the goods-producing sector will be concentrated in agriculture, mining, construction, and nondurable manufacturing industries. Durable goods industries, however, are projected to account for greater shares of both output and employment in 1995, contrary to past trends. This results from the macroeconomic assumptions of strong growth in capital spending for producers' durable equipment, continued increases in defense purchases, and relatively faster growth in exports than in imports of manufactured capital goods as the high value of the dollar continues to fall. Productivity is also projected to increase over the next 10 years, but demand for durable manufacturing products is projected to be high enough to stimulate job growth.

A look at the BLS individual industry projections reinforces the conclusion that the goods-producing sector and manufacturing in particular will not be shrinking in absolute terms. (See table 7.) Among the top 15 fastest-growing employment industries projected, 8 are in manufacturing, and for output, that figure is 11 of 15. The manufacturing industries on these lists of fastest-growing output and employment reflect the assumptions of strong demand for sophisticated capital equipment, medical supplies and drugs, and defense materiel.

**Chart 3. Output and job trends, selected long - term declining industries, least squares rate of change, 1969-84**



The outlook for the troubled industries identified in table 6 is not so rosy. Some of the industries experiencing long-term loss of markets are projected to continue their decline through 1995. Some small production increases are expected for the steel industry, but only if more efficient technologies are implemented. Employment in steel is projected to drop by more than 20 percent between 1984 and 1995. No production comebacks are anticipated for wooden containers, leather products, tobacco, or the household industry.

Some of the machinery and defense-related sectors on the list, however, are projected to reverse trend and rebound from current low levels. Demand for materials handling equipment is projected to be so strong as to rank that industry among the top 10 in terms of projected output growth. This turnaround is expected to occur as many factories add new, highly engineered, computer-controlled production systems, incorporating industrial robots and automatic material handling.

OUR ANALYSIS HAS SHOWN that while there has clearly been a long-term employment shift to the service sector, that shift has for the most part been a relative shift only, and not an absolute one. Only with the last cyclical downturn did the manufacturing sector fail to hold a steady job level. Furthermore, the relative shift to services has been far less pronounced for output than for employment, and manufacturing production has even been growing in absolute levels. While some manufacturing industries clearly have been in a long-term decline, and the 1980–82 recessionary period may have exacerbated their problems, our data indicate that the United States is not losing its industrial base. Most manufacturing industries, indeed many that would be considered “heavy” manufacturing, are at least expanding production, if not employment. Higher productivity has allowed domestic production of manufactured

**Table 7. Fastest-growing employment industries and output industries, 1984–95**

Industry	Average annual rate of change
<b>Employment</b>	
Medical services, n.e.c. ....	4.3
Business services ....	4.2
Computers and peripheral equipment ....	3.7
Materials handling equipment ....	3.7
Transportation services ....	3.5
Professional services, n.e.c. ....	3.5
Scientific and controlling instruments ....	2.9
Medical instruments and supplies ....	2.8
Doctors' and dentists' services ....	2.6
Plastics products ....	2.5
Credit agencies and financial brokers ....	2.5
Amusement and recreation services ....	2.5
Radio and communication equipment ....	2.3
Complete guided missiles and space vehicles ....	2.2
Electronic components and accessories ....	2.1
<b>Output</b>	
Computers and peripheral equipment ....	8.4
Electronic components and accessories ....	7.6
Communications except radio and television ....	6.6
Telephone and telegraph apparatus ....	6.0
Complete guided missiles and space vehicles ....	5.7
Materials handling equipment ....	5.6
Business services ....	5.1
Radio and communication equipment ....	5.0
Scientific and controlling instruments ....	4.8
Medical instruments and supplies ....	4.6
Drugs ....	4.5
Medical services, n.e.c. ....	4.5
Optical equipment and supplies ....	4.3
Plastics products ....	4.3
Amusement and recreation services ....	4.2

n.e.c. = Not elsewhere classified.

goods to increase without corresponding increases in employment. Future expenditures for new capital equipment and a return to more balanced international currency exchange rates are projected to boost demand for U.S. goods for many years. □

—FOOTNOTES—

<sup>1</sup> See, for example, Barry Bluestone and Bennett Harrison, *The Deindustrialization of America* (Basic Books, Inc., 1982); Robert B. Reich, “Industrial policy,” *New Republic*, Mar. 31, 1982; “Do we need an industrial policy?” *Harper's*, February 1985; “The hollow corporation,” *Business Week*, Mar. 3, 1986; and numerous other articles.

<sup>2</sup> These conclusions are supported by similar studies of structural change, for example, Robert Z. Lawrence, *Can America Compete?* (The Brookings Institution, 1984); and John E. Cremeans, “Three measures of structural change,” U.S. Department of Commerce Working Paper, 1985.

<sup>3</sup> The last year of actual data referenced in this article is 1984, because even though preliminary 1985 employment data were available at time of publication, 1985 output data were not.

<sup>4</sup> Michael Urquhart, “The employment shift to services: where did it come from?” *Monthly Labor Review*, April 1984, pp. 15–22.

<sup>5</sup> Paul O. Flaim and Ellen Sehgal, “Displaced workers of 1979–83: how well have they fared?” *Monthly Labor Review*, June 1985, pp. 3–16.

<sup>6</sup> For a description of the output data and the latest projections, see “Employment Projections for 1995: Data and Methods,” BLS Bulletin 2253, March 1986.

<sup>7</sup> One limitation in the type of analysis presented in this article is the difficulty of accurately measuring real output. When possible, real output is based on some physical measure of production, such as units in manufacturing, or tons in mining, or passenger- or freight-miles in transportation. In many cases, however, output data are based on sales or receipts, deflated by a producer or consumer price index, if available. In some industries, such as noncommercial (or nonprofit) establishments, for example, output data must be based on changes in employment. When the data are this limited, any measure of productivity change is very questionable. Presentation of these data should not be interpreted to mean all measurement problems have been solved. Many difficult issues still remain for measuring output in many industries, as well as measuring price changes in those industries.

<sup>8</sup> The industry output data used in the BLS projections system can be defined as “gross duplicated output,” because they include not only the value added in each industry but also the value of all intermediate inputs into the production process. A different definition of output, “gross product originating,” measures just that portion of industry output that is value added, that is, labor compensation, profits, rents, interest, and indirect business taxes. This latter measure for all industries sums to Gross National Product (GNP).

Gross product originating, or value added, is not used in the BLS model system for several reasons. For one, it is not available for detailed industries. In addition, total or duplicated output is probably a better variable to use in estimating each industry's demand for labor than just the value-added portion of output. Duplicated output can be more closely related to total demand for an industry's products, whether the demand is from final consumers or from intermediate producers.

Gross product originating data can be used to analyze broad sectoral shifts, however, and the results are quite similar to those just described using duplicated output data. Because the former type of data excludes all intermediate products, for each year the percent of total output (or GNP) accounted for by the goods-producing sector is smaller than the percentage based on gross product originating data (which double counts the value of intermediate inputs, more of which are goods than services). However, over time the percentages for both types of data in the goods-producing sector have declined about the same relative amount.

As noted, the goods-producing gross duplicated output share fell from 54.9 percent of total output in 1959 to 46.7 percent in 1984, a loss of 8.2 percentage points. The gross product originating share fell from 37.8 per-

cent to 32.6 percent, or 5.2 percentage points. However, employment fell from 40 to 27.7 percent, a drop of 12.3 percentage points. Thus, no matter which measure of output is used, the shift between goods- and service-producing industries has been considerably less pronounced for output than it has been for employment.

<sup>9</sup> Edwin Dean, Harry Boissevain, and James Thomas, "Productivity and labor cost trends in manufacturing, 12 countries," *Monthly Labor Review*, March 1986, pp. 3-10.

<sup>10</sup> Neal H. Rosenthal, "The shrinking middle class: myth or reality?" *Monthly Labor Review*, March 1985, pp. 3-10.

<sup>11</sup> This analysis is being extended in a Bureau study by Patrick McMahon and John Tschetter, currently underway. Their study reinforces the conclusions of Rosenthal and further examines earnings shifts based on demographic and structural changes.

<sup>12</sup> Richard W. Riche, Daniel E. Hecker, and John U. Burgan, "High-technology today and tomorrow; a small slice of the employment pie," *Monthly Labor Review*, November 1983, pp. 50-58.

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### A note on communications

The *Monthly Labor Review* welcomes communications that supplement, challenge, or expand on research published in its pages. To be considered for publication, communications should be factual and analytical, not polemical in tone. Communications should be addressed to the Editor-in-Chief, *Monthly Labor Review*, Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C. 20212.

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