

The job outlook through 1995: industry output and employment projections

Recovery is expected in construction and durable goods, but services will continue to lead job growth; several heavy industries will not reach past peaks because changing markets and technologies will dampen expansion

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The Bureau of Labor Statistics' latest projections of industry output and employment indicate that contrary to several popular reports the decade of the 1990's will not see the demise of America's smokestack industries. A sizable portion of the recent factory job loss can be attributed to the 1980-82 recessionary period, and as the economy recovers, heavy manufacturing industries should increase employment. Job gains in manufacturing will account for almost 1 of 6 new jobs between 1982 and 1995. (See table 1.) Manufacturing, which represented 25 percent of all jobs in 1959 but less than 19 percent in 1982, is projected to maintain this steady share throughout the 1982-95 period. (See table 2.)

Because manufacturing job gains primarily reflect a rebound from the low recession levels, much of the growth occurs in the early part of the projection span. About 3 million jobs are projected to be added to factory employment by 1990, but only about 1.3 million between 1990 and 1995. Furthermore, despite the recovery, employment in several key manufacturing industries (for example, autos and steel), are not expected to reach previous peaks, at least not by 1995. A turnaround in demand is projected to boost pro-

duction in these sectors, but productivity improvements and technological change will limit job expansion.

Despite manufacturing's gains, most new job growth is projected to take place in service-producing industries, as it has in the past. Service-producing industries—broadly defined as transportation, communications, public utilities, trade, finance, insurance, real estate, other services, and government—are projected to account for almost 75 percent of all new jobs between 1982 and 1995.

Within the service-producing sector, the miscellaneous or other service component is projected to continue to grow the fastest. Industries such as medical care, business services, professional services, hotels, personal services, and nonprofit organizations are projected to account for more than 1 of 3 new jobs over the projection span, compared with 1 of 6 for manufacturing industries. In addition, the miscellaneous service sector is expected to have smoother job growth than manufacturing. Because miscellaneous service industries were less impacted by the cyclical downturn, they will not be as dramatically affected by the anticipated economic upswing, leading to smoother employment growth.

These findings are from the Bureau's most recent economic and employment projections for the years through 1995. This study of industry output and employment is one in a series of four; the others describe projections of the labor force, gross national product and the distribution of final demand, and employment by occupation.¹

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Underlying assumptions and trends

Because of the unlimited range of actual outcomes in the future, three alternative projections to 1995 were prepared with an eye to suggesting a range of possibilities. These three scenarios, characterized as low growth, moderate growth, and high growth, assume various patterns of economic change. Because they are based on a few specific assumptions about macroeconomic variables, they do not represent the actual bounds to output and employment in 1995. Rather, they show what might happen under alternative responses of the economy to changes in fiscal and monetary policies.²

Unless otherwise noted, this article discusses the moderate growth projection. This case is marked by a period of recovery from the 1982 recession, followed by stable economic growth through the mid-1990's. The civilian unemployment rate, which was 9.7 percent in 1982, is projected to fall to 6.3 percent by 1990, and then dip slightly to 6.0 percent by 1995. Total employment is expected to rise from 102.3 million in 1982 to 127.6 million by 1995, a gain of more than 25 million new jobs. Growth is projected to be faster in the earlier years, as industries rebound from the recent economic downturn. Employment, which expanded by 3.6 percent a year between 1975 and 1979, showed very few gains during the business slump of 1980 or the brief recovery period thereafter. The more severe recession of 1981-82 brought an additional 1.3-percent decline in total jobs. Employment is projected to rebound, averaging growth of 1.8 percent a year from 1982 to 1990, then slow to 1.5 percent annually through 1995.

The slowdown in employment reflects not only the diminishing of the initial surge caused by recovery but, even more significantly, a continuing slowdown in the rate of growth of the labor force.³ Following the rapid expansion of the 1970's, labor force growth has begun to taper as the last members of the baby-boom generation reach working age. The slowdown is projected to continue through the 1980's and 1990's, as the decrease in births between 1960 and 1975 will cause an absolute decline in the number of potential new workers ages 16 to 24. The labor force, which grew 2.3 percent a year between 1970 and 1982, is projected to grow 1.6 percent a year to 1990, and 1.0 percent a year thereafter.

Workweek. Somewhat offsetting the effects of slower labor force growth on job creation is the projection of the workweek. Average weekly hours are projected to continue their long-term downward trend. In the short run, average weekly hours, especially in manufacturing, are used to respond to the pressures of the business cycle. At the beginning of an economic downturn, employers cut back on overtime hours before laying off workers, and as the economy improves, overtime hours are added and the workweek extended before new employees are hired. This recovery will be no excep-

Table 1. Projected job growth, 1982-95

[In thousands]

Industry	1982-95		1982-90		1990-95	
	New jobs	Percent of total	New jobs	Percent of total	New jobs	Percent of total
Total new jobs	25,248	100.0	16,000	100.0	9,248	100.0
Goods-producing:	6,548	25.9	4,350	27.2	2,198	23.8
Farm	-265	-1.0	-163	-1.0	-102	-1.1
Mining	122	.5	39	.2	83	.9
Construction	2,434	9.6	1,472	9.2	962	10.4
Manufacturing	4,257	16.9	3,002	18.8	1,255	13.6
Durable	3,170	12.6	2,224	13.9	946	10.2
Nondurable	1,087	4.3	778	4.9	309	3.3
Service-producing:	18,700	74.1	11,650	72.8	7,050	76.2
Transportation, public utilities	1,094	4.3	659	4.1	435	4.7
Trade	6,009	23.8	3,819	23.9	2,190	23.7
Finance, insurance, and real estate	1,786	7.1	1,214	7.6	572	6.2
Services	8,673	34.4	5,246	32.8	3,427	37.1
Private households	-289	-1.1	-235	-1.5	-54	- .6
Government	1,427	5.7	947	5.9	480	5.2

tion. The factory workweek is projected to expand from 38.9 hours in 1982 to 39.8 hours by 1984; thereafter, the long-term decline will resume, with manufacturing hours averaging 38.8 by 1995. Hours in nonmanufacturing will drop even more rapidly, reflecting both declines in the full-time workweek as well as increases in part-time employment. For the private nonfarm economy as a whole, average weekly hours are projected to fall from 35.1 in 1982 to 33.1 in 1995.

Productivity. Output per worker hour, or productivity, is projected to return to rates of growth more characteristic of the late 1960's and early 1970's. Between 1968 and 1973, output per hour in the private nonfarm sector grew by 2.0 percent a year. Over the same span, employment and real gross national product also enjoyed rapid growth—2.1 percent for jobs and 3.5 percent for GNP. This period of expansion was followed by years of declining productivity. Between 1973 and 1979, productivity grew by only .9 each year, and between 1979 and 1982 the rate dropped further, to .4 percent. This decline is expected to be reversed, however, as new capital investment, strong demand growth, and more efficient utilization of the slowly growing labor force all contribute to a resurgence in productivity. Output per hour is expected to climb to a 1.6-percent annual growth rate during the 1982-90 period, and then grow at a 1.3-percent annual pace between 1990 and 1995.

For manufacturing alone, productivity gains are projected to be just as dramatic. A 2.2-percent annual rise is projected between 1982 and 1995, compared with 1.5 percent over the 1973-79 period and .7 percent during 1979-82.

It should be noted that rising productivity does not necessarily mean layoffs—as noted, 4.3 million new factory jobs will be added between 1982 and 1995. Productivity advances can be accompanied by employment growth, as the general level of production expands. GNP is projected

Table 2. Actual and projected employment by major sectors, 1959–95

Sector	Employment (in thousands)											
	1959	1969	1979	1982	1990			1995				
					Low	Moderate	High	Low	Moderate	High		
Total	67,705	82,401	102,211	102,315	116,943	118,315	119,399	125,251	127,563	130,299		
Farm	5,491	3,495	2,861	2,815	2,630	2,652	2,672	2,500	2,550	2,595		
Nonfarm	62,214	78,906	99,350	99,500	114,313	115,663	116,727	122,751	125,013	127,704		
Government	8,083	12,195	15,947	15,803	16,830	16,750	17,060	17,180	17,230	17,760		
Federal	2,233	2,758	2,773	2,739	3,202	2,989	3,096	3,163	2,960	3,139		
State and local	5,850	9,437	13,174	13,064	13,628	13,761	13,964	14,017	14,270	14,621		
Private	54,131	66,711	83,403	83,697	97,483	98,913	99,667	105,571	107,783	109,944		
Mining	612	501	704	742	775	781	760	842	864	844		
Construction	3,825	4,386	5,903	5,491	7,020	6,963	7,052	7,798	7,925	8,004		
Manufacturing	16,985	20,469	21,406	19,234	21,686	22,236	22,635	22,963	23,491	24,132		
Durable	9,560	12,081	12,989	11,326	13,218	13,550	13,871	14,266	14,496	14,965		
Nondurable	7,425	8,388	8,417	7,908	8,468	8,686	8,764	8,696	8,995	9,167		
Transportation and public utilities	4,304	4,718	5,534	5,543	6,152	6,202	6,287	6,488	6,637	6,746		
Trade	13,245	16,704	22,352	22,536	25,885	26,355	26,649	27,764	28,545	28,859		
Finance, insurance, and real estate	2,923	3,864	5,523	5,899	7,021	7,113	6,667	7,607	7,685	7,788		
Services	9,663	13,747	20,258	22,617	27,501	27,863	28,225	30,814	31,290	32,203		
Private households	2,574	2,322	1,723	1,635	1,443	1,400	1,392	1,295	1,346	1,368		
Percent distribution												
Sector	1959	1969	1979	1982	1990			1995				
					Low	Moderate	High	Low	Moderate	High		
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
Farm	8.1	4.2	2.8	2.8	2.2	2.2	2.2	2.0	2.0	2.0		
Nonfarm	91.9	95.8	97.2	97.2	97.8	97.8	97.8	98.0	98.0	98.0		
Government	11.9	14.8	15.6	15.4	14.4	14.2	14.3	13.7	13.5	13.6		
Federal	3.3	3.3	2.7	2.7	2.7	2.5	2.6	2.5	2.3	2.4		
State and local	8.6	11.5	12.9	12.8	11.7	11.6	11.7	11.2	11.2	11.2		
Private	80.0	81.0	81.6	81.8	83.4	83.6	83.5	84.3	84.5	84.4		
Mining	.9	.6	.7	.7	.7	.7	.6	.7	.7	.6		
Construction	5.6	5.3	5.8	5.4	6.0	5.9	5.9	6.2	6.2	6.1		
Manufacturing	25.1	24.8	20.9	18.8	18.5	18.8	19.0	18.3	18.4	18.5		
Durable	14.1	14.7	12.7	11.1	11.3	11.5	11.6	11.4	11.4	11.5		
Nondurable	11.0	10.2	8.2	7.7	7.2	7.3	7.3	6.9	7.1	7.0		
Transportation and public utilities	6.4	5.7	5.4	5.4	5.3	5.2	5.3	5.2	5.2	5.2		
Trade	19.6	20.3	21.9	22.0	22.1	22.3	22.3	22.2	22.4	22.1		
Finance, insurance, and real estate	4.3	4.7	5.4	5.8	6.0	6.0	5.6	6.1	6.0	6.0		
Services	14.3	16.7	19.8	22.1	23.5	23.5	23.6	24.6	24.5	24.7		
Private households	3.8	2.8	1.7	1.6	1.2	1.2	1.2	1.0	1.1	1.0		
Average annual rate of change												
Sector	1959–69	1969–79	1979–82	1982–90			1990–95			1982–95		
				Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Total	2.0	2.2	.0	1.7	1.8	1.9	1.4	1.5	1.8	1.6	1.7	1.9
Farm	-4.4	-2.0	-.5	-.8	-.7	-.6	-1.0	-.8	-.6	-.9	-.8	-.6
Nonfarm	2.4	2.3	.1	1.7	1.9	2.0	1.4	1.6	1.8	1.6	1.8	1.9
Government	4.2	2.7	-.3	.8	.7	1.0	.4	.6	.8	.6	.7	.9
Federal	2.1	.1	-.4	2.0	1.1	1.5	-.2	-.2	.3	1.1	.6	1.1
State and local	4.9	3.4	-.3	.5	.7	.8	.6	.7	.9	.5	.7	.9
Private	2.1	2.3	.1	1.9	2.1	2.2	1.6	1.7	2.0	1.8	2.0	2.1
Mining	-2.0	3.5	1.8	.6	.7	.3	1.7	2.0	2.1	1.0	1.2	1.0
Construction	1.4	3.0	-2.4	3.1	3.0	3.2	2.1	2.6	2.6	2.7	2.9	2.9
Manufacturing	1.9	.4	-3.5	1.5	1.8	2.1	1.2	1.1	1.3	1.4	1.5	1.8
Durable	2.4	.7	-4.5	1.9	2.3	2.6	1.5	1.4	1.5	1.8	1.9	2.2
Nondurable	1.2	.0	-2.1	.9	1.2	1.3	.5	.7	.9	.7	1.0	1.1
Transportation and public utilities	.9	1.6	.1	1.3	1.4	1.6	1.1	1.4	1.4	1.2	1.4	1.5
Trade	2.3	3.0	.3	1.7	2.0	2.1	1.4	1.6	1.6	1.6	1.8	1.9
Finance, insurance, and real estate	2.8	3.6	2.2	2.2	2.4	1.5	1.6	1.6	3.2	2.0	2.1	2.2
Services	3.6	4.0	3.7	2.5	2.6	2.8	2.3	2.3	2.7	2.4	2.5	2.8
Private households	-1.0	-2.9	-1.7	-1.6	-1.9	-2.0	-2.1	-.8	-.3	-1.8	-1.5	-1.4

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

to grow 2.9 percent a year between 1982 and 1995, compared with 3.1 percent during the 1969–79 period, and .1 percent during the 1979–82 period. However, it is expected that new labor-saving technologies will cause shifts to occur among industries, with many of the old-line factory jobs giving way to new industries and occupations.

Technology and changing demand. Labor-saving technologies are not the only cause of employment shifts among industries. Another determinant obviously is the demand for an industry's products. It is useful to separate aggregate demand into two categories—final demand and intermediate demand. Final demand includes consumer expenditures,

government purchases, investment in capital equipment and structures, exports, and imports. Intermediate demand refers to purchases necessary in the production process; for example, final demand by consumers for cars leads to intermediate demand by auto producers for steel, glass, plastic, and so forth.

Intermediate demand changes over time for several reasons. New technology is but one. Other reasons include substitutions necessitated by the changing relative prices of inputs, or scarcity of inputs, or changes in the relative distribution of goods which the industry produces.

Many times, a large increase or decline in demand for one product of an industry can have an impact on the supplying industries, even when the technology is not changing. When this demand change is coupled with a change in the production process, the impact can be even larger.

The energy crisis of the 1970's has led to some of these changes. As gasoline became more expensive, and the Congress mandated better fuel efficiency in domestic cars, the inputs to the production of autos changed. Cars became smaller, taking less steel (and lighter weight steel). Spare tires were replaced with smaller tires, and electronic ignition systems and "computers" were added to make cars more fuel efficient. Also, businesses were forced to be more energy efficient. Over time, they reduced their demand for electricity, gas, and oil by replacing older machines with more efficient models, renovating heating systems, and increasing building insulation.

Some changes occurred because of new technologies, and because these technologies were becoming more affordable. Advances in electronic components and computer chips made small business computers more prevalent and personal computers and video games quite common in private homes. Although this is reflected mainly as a final demand change, these same electronic components led to "smarter" machinery, which can do more. This trend will accelerate in the 1980's—most types of machinery are projected to include electronic components in the future.

Changing intermediate demand also affects the projection of miscellaneous business services. Many firms contract out for the services of this industry—computer software and services, mailing and reproduction services, building services, and personnel, management, and public relations services. As the demand for computers grows, obviously the demand for software will also grow. Businesses are finding that it is more efficient to get specialized services from professionals, instead of trying to do everything in-house.

Another growing component in business overhead is telephone communications. Firms have become increasingly dependent on telephone communication as business travel became more expensive and establishments more geographically spread out. As the capability of computers to "talk" to one another expands, this should become even more important. We have only begun to see the advances which are possible in this industry.

Most machinery is becoming smaller and being built with less steel. This change is reflected in the inputs to most industries, but causes a secondary impact on the demand for iron ore and coal.

Other changes in intermediate demand are not expected to be as large as those just described. The age structure of the population and health concerns are likely to cause some changes in the kinds of foods consumed and how they are packaged—less sugar and salt, more microwave and frozen foods. Food and beverages will be packaged more in plastic and paper products, less in metal cans. Plastics are likely to become even more commonplace and used in a multitude of new ways, as their cost comes down and durability improves. The radial tire and lower annual car mileage should slow down the domestic tire industry. As consumers keep their cars longer, maintenance and repair of vehicles will increase.

A continuation in the substitution of synthetic fibers for natural fibers (cotton and wool) in clothing and textile products is projected, although this trend is expected to slow.

Also projected is a change in how the advertising dollar is spent in the future. There will be a drop in the proportion spent on newspaper advertising, and an increase in that spent on radio and on commercial and cable television. This goes along with the closing of many afternoon newspapers, as the trend to watching news on television increases.

Output and employment: selected industries

Many industries are projected to show very rapid output and employment growth over the next several years but, for a lot of them, growth mainly represents a catchup following the severe 1980–82 recessionary period. (See table 3.) A list of the top 10 growth industries for the 1982–95 period illustrates how the recession and its subsequent recovery can impact the long-range growth outlook. (See table 4.) Several industries are on the list solely because their 1982 level of output or employment was so drastically reduced, and not because they are expected to be the high-growth industries of the 1980's. Examples are iron and ferroalloy ores mining (1982 output was half the 1981 level and employment less than two-thirds), and new construction. In addition, other industries not on the fastest-growing list may have faster growth rates projected for the years from 1982 to 1990 as they recover from recession, but their overall 1982–95 rate is projected to be lower than those industries on the list. Examples are chemical and fertilizer mining, fabricated metal stampings, engines and turbines, material handling equipment, household appliances, and miscellaneous transportation equipment.

New construction, along with the motor vehicle industry, actually led the recent downturn, as high inflation and interest rates constricted purchases of new homes and new cars. As the recession spread to supplier industries and to other areas of the economy, high unemployment and resulting concern over job security added to consumers' re-

Table 3. Gross product by major sector, actual and projected, 1959-95

Sector	Billions of 1972 dollars											
	1959	1969	1979	1982	1990			1995				
					Low	Moderate	High	Low	Moderate	High		
Total private	\$629.5	\$951.9	\$1,326.4	\$1,329.4	\$1,690.0	\$1,753.8	\$1,838.4	\$1,976.8	\$2,001.3	\$2,113.3		
Farm	27.8	29.5	34.2	39.0	40.6	41.6	41.9	41.8	43.1	43.4		
Nonfarm	601.7	922.4	1,292.2	1,290.4	1,649.4	1,712.2	1,796.5	1,935.0	1,958.2	2,069.9		
Mining	13.3	18.2	20.8	21.6	24.3	25.1	25.3	26.4	27.0	27.3		
Construction	45.5	55.8	58.2	47.7	56.3	64.3	73.2	63.1	73.8	86.5		
Manufacturing	171.2	277.2	367.0	336.1	448.4	470.4	490.7	535.5	548.7	572.6		
Durable	100.9	170.3	223.4	197.4	280.7	296.1	312.3	344.8	353.4	372.7		
Nondurable	70.3	106.8	143.6	138.7	167.7	174.3	178.4	190.7	195.3	199.9		
Transportation and public utilities	55.4	92.6	140.0	138.9	192.8	203.3	213.0	234.3	239.7	251.9		
Transportation	29.9	43.4	56.3	46.8	60.7	63.6	66.0	71.4	73.0	76.1		
Communications	11.5	23.8	49.0	57.2	91.2	97.5	103.5	117.5	120.3	127.8		
Public utilities	14.0	25.3	34.7	34.9	40.9	42.2	43.5	45.4	46.4	48.0		
Trade	115.4	173.6	250.7	248.0	297.8	314.9	332.4	336.2	353.1	376.3		
Wholesale	42.0	70.6	106.5	106.3	126.5	132.6	140.0	142.4	147.8	157.6		
Retail	73.4	103.0	144.2	141.7	171.3	182.3	192.4	193.8	205.3	218.7		
Finance, insurance, and real estate	98.5	152.9	229.4	251.0	325.4	340.9	351.5	384.6	391.4	405.5		
Services	76.9	121.4	184.1	205.6	260.4	270.7	283.5	303.3	307.8	323.9		
Government enterprises	11.8	16.8	21.2	21.6	23.2	24.0	24.9	24.5	25.3	26.6		
Private households	6.7	5.8	3.6	3.1	2.8	2.9	3.0	2.6	2.8	3.0		
Rest of world and statistical discrepancy	7.0	8.1	17.2	16.8	18.0	-4.3	-1.0	24.5	-11.4	-3.7		
	Average annual rate of change											
	1959-69	1969-79	1979-82	1982-90			1990-95			1982-95		
				Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Total private	4.2	3.4	0.1	3.0	3.5	4.1	3.2	2.7	2.8	3.1	3.2	3.6
Farm	.6	1.5	4.5	.5	.8	.9	.6	.7	.7	.6	.7	.8
Nonfarm	4.4	3.4	-0	3.1	3.6	4.2	3.2	2.7	2.9	3.2	3.3	3.7
Mining	3.2	1.3	1.3	1.5	1.9	2.0	1.7	1.5	1.5	1.6	1.8	1.9
Construction	2.1	.4	-6.4	2.1	3.8	5.5	2.3	2.8	3.4	2.2	3.4	4.7
Manufacturing	4.9	2.8	-2.9	3.7	4.3	4.8	3.6	3.1	3.1	3.6	3.8	4.2
Durable	5.4	2.8	-4.0	4.5	5.2	5.9	4.2	3.6	3.6	4.4	4.6	5.0
Nondurable	4.3	3.0	-1.2	2.4	2.9	3.2	2.6	2.3	2.3	2.5	2.7	2.8
Transportation and public utilities	5.3	4.2	-3	4.2	4.9	5.5	4.0	3.3	3.4	4.1	4.3	4.7
Transportation	3.8	2.6	-6.0	3.3	3.9	4.4	3.3	2.8	2.9	3.3	3.5	3.8
Communications	7.5	7.5	5.3	6.0	6.9	7.7	5.2	4.3	4.3	5.7	5.9	6.4
Public utilities	6.1	3.2	-2	2.0	2.4	2.8	2.1	1.9	2.0	2.0	2.2	2.5
Trade	4.2	3.7	-4	2.3	3.0	3.7	2.5	2.3	2.5	2.4	2.8	3.3
Wholesale	5.3	4.2	-1	2.2	2.8	3.5	2.4	2.2	2.4	2.3	2.5	3.1
Retail	3.4	3.4	-6	2.4	3.2	3.9	2.5	2.4	2.6	2.4	2.9	3.4
Finance, insurance, and real estate	4.5	4.1	3.0	3.3	3.9	4.3	3.4	2.8	2.9	3.3	3.5	3.7
Services	4.7	4.3	3.8	3.0	3.5	4.1	3.1	2.6	2.7	3.0	3.2	3.6
Government enterprises	3.6	2.4	-6	.9	1.3	1.8	1.1	1.1	1.3	1.0	1.2	1.6
Private households	-1.4	-4.7	-4.9	-1.1	-9	-3	-1.4	-8	-3	-1.2	-9	-3
Rest of world and statistical discrepancy	1.5	7.8	-8	9	(¹)	(¹)	6.4	-21.3	-29.9	2.9	(¹)	(¹)

¹Not computable.

SOURCE: Historical data are from the U.S. Department of Commerce, Bureau of Economic Analysis.

luctance to make major spending commitments. Investment in residential construction and motor vehicle production each dropped by almost a third between 1979 and 1982.

Employment is projected to fare better in 1983 and succeeding years. As unemployment falls and the economy recovers, many durable goods industries will at first rebound strongly and then eventually resume long-term growth patterns. Some sectors, however, will not be able to recover to long-term growth paths, as changing markets and technologies crimp expansion. (See table 5 for employment by industry.)

Recovery in construction. Housing starts plunged from 2 million units in 1978 to fewer than 1.1 million in 1982, the result of high interest rates which drove many families out of the market for a new home. Pent-up demand will spur new home sales as interest rates fall, but by the late 1980's, a slowdown in the rate of new household formation will dampen these demand pressures. New housing starts are projected to climb steadily to 2.2 million by 1988, but then

taper to 1.9 million by 1995.

While new housing construction was in a severe slump, maintenance and repair construction was buoyant. As one might expect, the inability to purchase a new house led many consumers to renovate their present dwellings. In addition, high oil prices and energy tax credits resulted in substantial investments in energy conservation measures. The output of maintenance and repair construction (almost two-thirds of which is for residences) rose 4.6 percent a year from 1979 to 1981, more than three times as fast as its long-term expansion rate of 1.5 percent. Employment dropped in 1982 as the industry succumbed to the general economic recession. A turnaround is projected, with the output of maintenance and repair construction projected to grow 2.2 percent a year through 1995.

Unlike new residential construction, nonresidential construction suffered a setback in the mid-1970's, and has already begun the recovery anticipated for homebuilding. A 2.1-percent growth rate is projected for nonresidential construction between 1982 and 1995. Growth of industrial

structures such as plants and utilities will exceed 5 percent a year, while commercial buildings and other structures will grow much more slowly.

Total employment in new and repair construction peaked at 5.9 million in 1979, but fell to 5.5 million in 1982. The job picture will brighten as the industry recovers, with employment projected to reach 7.9 million by 1995. Growth will be faster between 1982 and 1990, rising 3.0 percent a year, then taper to a 2.6-percent annual rate between 1990 and 1995.

Construction-related industries. Output and employment trends in many construction-related industries mirror the patterns just described. Logging, sawmills, planing mills, and other wood product industries, which are heavily dependent on residential construction, suffered sizable output and employment losses between 1979 and 1982. These industries as a group took a 20-percent job cutback over that period. As residential construction improves, jobs in wood products industries should reappear. Employment is projected to grow 2.0 percent a year from 1982 to 1990 and .6 percent a year during the 1990–95 period. Almost all the growth is projected to be in millwork and plywood shops. Employment in logging, sawmills, and planing mills, which had been declining slightly even before the recession, will hold about level.

Most other construction-related industries will also show recovery from 1982's depressed levels. Included in this group are stone and clay products, fabricated structural metal, electric lighting and wiring, household appliances, furniture, and mobile homes. Most of the rebound occurs by 1988 or 1989, after which growth tapers off.

Motor vehicles. Like home construction, the motor vehicle industry was hit especially hard by high inflation and interest rates. The value of domestic production was cut by one-fourth in 1980, followed by an additional 10-percent drop in 1982. Workers in the industry suffered massive layoffs—284,000 jobs were lost over the 3-year span, with employment falling to a level of 707,000 by 1982 from 991,000 in 1979.

Consumers are projected to increase demand for motor vehicles as interest rates fall. New car sales are expected to climb to more than 12 million vehicles per year by 1988, compared with just 8 million in 1982.

After the catchup from 1982's depressed sales levels, however, new car sales are projected to plateau because of long-term demographic shifts which have already begun. The large numbers of new car buyers who flooded showrooms in the 1970's to purchase their first cars are now in older age groups. This surge of first-time buyers will not be seen again, at least not for several decades.

Imported autos held steady throughout the recession at 2.3 million units, as the drop in purchases occurred solely among domestic models. Imports are projected to stabilize

at 3.6 million units, or 30 percent of all new car sales after 1989, as more foreign automakers open plants in the United States.

Flat demand after the recovery period, foreign competition, and new automated methods of production do not bode well for employment in the auto industry. Only 127,000 of the 284,000 jobs lost between 1979 and 1982 are projected to be recovered by 1990. After 1990, employment increases will be moderate through 1995. The projected 1995 level of 860,000 jobs for the motor vehicle industry falls short of the 1 million peak recorded in 1978.

High-tech industries. BLS has developed three definitions of high technology industries based on the utilization of workers in technology-oriented occupations and on expenditures for research and development.⁴ In addition, some judgments were made to include or exclude industries based on the major product or activity of the industry. Whichever definition is used, employment in high technology industries is projected to increase faster than total employment between 1982 and 1995; however, the contribution of high-tech industries to total job growth will be relatively small. Under the broadest of the three definitions, high-tech industries account for 17 percent of all new jobs between 1982 and 1995; under the second definition, they account for 8 percent; while under the narrowest definition, they represent slightly more than 3 percent. These ratios are about in line with the industries' share of new jobs over the previous decade.

Projected employment growth rates vary widely among high-technology industries. Computer and data processing services and research and development laboratories, the only nonmanufacturing industries in the group, will show some

Table 4. Projected employment changes for selected industries, 1982–95

Industry	Average annual rate of change		
	1982–95	1982–90	1990–95
Fastest growing:			
Medical and dental instruments	4.3	3.2	6.1
Business services	3.9	4.1	3.6
Iron and ferroalloy ores mining	3.9	5.7	1.1
Computers and peripheral equipment	3.8	4.0	3.4
Radio and television broadcasting	3.8	4.2	3.0
Other medical services	3.8	3.6	4.0
Plastic products	3.5	4.1	2.4
Scientific and controlling instruments	3.4	3.2	3.7
Electronic components	3.2	3.6	2.7
New construction	3.1	3.3	2.8
Most rapidly declining:			
Leather tanning and industrial leather	-3.3	-2.3	-4.9
Dairy products (processed)	-2.3	-2.1	-2.6
Wooden containers	-2.3	-2.3	-2.2
Leather products, including footwear	-2.2	-2.4	-1.9
Tobacco manufacturers	-2.1	-1.2	-3.4
Bakery products	-2.0	-1.0	-3.7
Railroad transportation	-1.6	-1.8	-1.2
Cotton	-1.5	-1.5	-1.5
Private households	-1.5	-1.9	-8
Dairy and poultry products (farm)	-1.3	-1.4	-1.3

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

Table 5. Actual and projected employment by industry, 1959-95

[In thousands]

Industry	Actual				Projected					
	1959	1969	1979	1982	1990			1995		
					Low	Moderate	High	Low	Moderate	High
Agriculture:										
Dairy and poultry products	1,551	813	463	429	378	384	387	344	360	367
Meat animals and livestock	979	756	544	524	474	473	475	439	445	450
Cotton	565	172	60	61	55	54	55	50	50	51
Food and feed grains	960	635	602	603	585	589	593	571	577	585
Other agricultural products	1,436	1,119	1,192	1,198	1,138	1,151	1,162	1,096	1,118	1,141
Mining:										
Iron and ferroalloy ores mining	33	30	31	16	25	25	22	25	26	23
Copper ore mining	23	34	33	25	27	27	26	33	35	36
Nonferrous metal ores mining, except copper	31	25	38	34	34	34	33	35	34	34
Coal mining	201	138	261	242	299	286	275	310	317	322
Crude petroleum and natural gas (except drilling)	200	157	212	311	275	291	282	332	338	307
Stone and clay mining and quarrying	105	99	104	90	85	87	92	72	77	87
Chemical and fertilizer mineral mining	19	18	25	24	31	31	31	35	35	35
Construction:										
New construction (including oil well drilling)	3,163	3,594	4,679	4,067	5,242	5,263	5,366	5,936	6,043	6,091
Maintenance and repair construction	662	792	1,224	1,424	1,778	1,700	1,685	1,861	1,882	1,912
Manufacturing:										
Durable goods:										
Ordnance	50	175	73	79	90	87	88	88	85	90
Complete guided missiles and space vehicles	94	107	81	105	130	130	127	149	140	143
Logging	143	138	150	126	130	131	133	124	128	130
Sawmills and planing mills	305	230	237	179	192	196	210	206	209	215
Other millwork, plywood, and wood products	261	310	394	317	400	406	416	414	419	427
Wooden containers	43	36	19	15	12	12	13	10	11	12
Household furniture	259	316	329	270	334	346	368	346	357	392
Furniture and fixtures, except household	124	153	176	180	193	199	205	200	206	208
Glass	153	188	202	173	198	201	205	211	212	214
Cement and concrete products	209	228	255	209	222	240	250	215	240	257
Structural clay products	78	64	52	34	35	37	39	29	30	33
Pottery and related products	49	45	52	40	44	45	46	46	49	50
Other stone and clay products	125	140	165	132	156	164	173	175	182	191
Blast furnaces and basic steel products	588	644	571	394	420	435	430	433	447	444
Iron and steel foundries and forgings	269	312	324	221	247	255	258	264	270	275
Primary copper and copper products	137	160	161	135	157	160	164	166	170	178
Primary aluminum and aluminum products	111	153	170	140	167	174	175	168	178	183
Primary nonferrous metals and products	78	93	93	80	83	84	86	83	85	90
Metal containers	75	87	80	64	67	69	70	61	62	66
Heating apparatus and plumbing fixtures	71	76	76	61	72	73	80	77	78	88
Fabricated structural metal products	344	440	535	461	537	572	598	563	619	664
Screw machine products	88	114	117	92	112	115	117	118	121	122
Metal stampings	189	255	245	187	234	249	253	236	252	259
Cutlery, handtools, and general hardware	135	165	185	143	177	184	188	198	200	204
Other fabricated metal products	231	315	376	331	388	414	413	399	430	436
Engines, turbines, and generators	90	112	145	113	151	152	152	165	167	170
Farm machinery	128	141	184	139	164	170	173	167	172	178
Construction, mining, and oilfield machinery	162	202	276	254	315	321	325	343	357	368
Material handling equipment	65	95	106	87	110	113	120	123	125	136
Metalworking machinery	251	347	379	319	371	388	393	373	400	415
Special industry machinery	164	206	205	176	206	207	211	210	213	221
General industrial machinery	221	291	329	288	336	342	343	350	356	362
Other nonelectrical machinery	166	246	313	292	323	331	341	339	345	362
Computers and peripheral equipment	111	224	339	428	586	586	593	665	694	706
Typewriters and other office equipment	28	52	59	47	55	60	64	67	69	73
Service industry machines	97	147	188	159	190	199	211	208	214	232
Electric transmission equipment	157	207	221	215	235	245	246	246	256	263
Electrical industrial apparatus	176	223	251	206	255	261	275	284	288	313
Household appliances	157	187	178	142	175	183	193	185	188	202
Electric lighting and wiring	134	205	225	187	229	239	246	251	253	253
Radio and television receiving sets	114	156	116	93	95	106	110	106	113	116
Telephone and telegraph apparatus	105	146	165	148	177	185	199	208	209	230
Radio and communication equipment	252	409	357	424	452	433	440	532	460	463
Electronic components	213	394	525	561	725	745	793	862	850	855
Other electrical machinery and equipment	111	125	176	153	162	170	180	192	194	209
Motor vehicles	696	912	991	707	794	834	828	847	860	871
Aircraft	722	805	632	629	716	680	664	761	709	701
Ship and boat building and repair	151	193	230	223	260	254	248	277	270	263
Railroad equipment	41	51	74	37	45	47	47	47	50	52
Motorcycles, bicycles, and parts	9	14	20	14	17	18	19	19	20	21
Other transportation equipment	23	89	103	74	87	96	108	104	109	121
Scientific and controlling instruments	166	195	215	226	294	292	292	345	349	359
Medical and dental instruments	45	82	144	158	205	203	210	270	272	274
Optical and ophthalmic equipment	85	75	81	77	83	86	89	88	92	98
Photographic equipment and supplies	69	111	134	140	167	169	173	175	177	184
Watches, clocks, and clock-operated devices	30	35	28	18	22	22	23	23	21	22
Jewelry and silverware	67	78	92	76	75	82	88	96	98	109
Musical instruments and sporting goods	116	149	145	130	134	140	144	143	146	150

Table 5. Continued— Actual and projected employment by industry, 1959–95

[In thousands]

Industry	Actual				Projected					
	1959	1969	1979	1982	1990			1995		
					Low	Moderate	High	Low	Moderate	High
Other manufactured products	229	233	245	218	210	214	224	216	218	238
Nondurable goods:										
Meat products	324	344	363	352	359	357	359	368	372	380
Dairy products	326	260	189	171	137	144	156	119	127	131
Canned and frozen foods	249	291	316	293	331	335	341	336	341	353
Grain mill products	139	137	147	135	143	145	145	140	144	147
Bakery products	313	286	238	227	203	210	209	164	174	177
Sugar	38	36	31	29	30	30	31	27	28	30
Confectionery products	79	87	80	73	77	78	80	69	71	76
Alcoholic beverages	107	97	86	87	83	86	85	76	80	83
Soft drinks and flavorings	111	142	153	145	164	168	169	159	167	171
Other food products	144	151	160	152	171	171	168	177	182	182
Tobacco manufacturing	95	83	70	68	61	62	64	50	52	58
Fabric, yarn, and thread mills	619	616	531	442	448	461	457	471	474	482
Floor covering mills	39	58	61	49	52	56	63	57	58	62
Other textile mill products	74	82	71	60	69	72	75	65	67	74
Hosiery and knit goods	221	251	227	205	207	218	218	224	236	240
Apparel	1,100	1,244	1,125	1,009	1,056	1,074	1,061	1,117	1,125	1,093
Other fabricated textile products	143	182	198	171	220	223	228	234	238	243
Paper products	415	483	494	475	513	516	524	526	533	551
Paperboard	175	231	214	189	190	201	209	179	192	208
Newspaper printing and publishing	328	376	432	445	492	494	491	517	535	543
Periodical and book printing and publishing	156	210	230	248	296	298	304	330	338	344
Other printing and publishing	446	550	640	668	733	758	751	745	789	803
Industrial inorganic and organic chemicals	260	296	328	329	362	358	353	371	379	381
Agricultural chemicals	54	65	70	65	81	84	84	82	88	93
Other chemical products	82	124	99	95	107	111	121	116	120	121
Plastic materials and synthetic rubber	81	108	100	89	110	114	119	113	116	124
Synthetic fibers	79	132	112	97	110	116	124	121	124	134
Drugs	106	143	193	199	253	254	252	276	281	284
Cleaning and toilet preparations	89	123	140	147	166	168	166	167	176	178
Paints and allied products	62	72	69	62	68	71	72	65	70	73
Petroleum refining and related products	217	182	210	202	185	183	182	179	182	183
Tires and inner tubes	105	119	127	105	100	102	104	101	104	108
Rubber products except tires and tubes	178	162	167	140	147	151	157	146	150	159
Plastic products	94	320	494	460	565	636	653	654	716	741
Leather tanning and industrial leather	36	29	20	19	15	16	16	11	12	14
Leather products including footwear	341	316	232	206	166	170	172	147	154	144
Transportation:										
Railroad transportation	930	651	559	433	353	373	429	327	351	377
Local transit and intercity buses	311	315	303	314	345	341	345	350	361	385
Truck transportation	1,001	1,214	1,555	1,454	1,720	1,701	1,702	1,750	1,774	1,793
Water transportation	239	234	222	206	197	210	214	204	214	216
Air transportation	184	357	443	450	522	532	528	561	568	573
Pipeline transportation	24	18	20	22	22	24	25	24	24	27
Transportation services	70	111	198	224	261	269	250	295	302	302
Communications:										
Radio and television broadcasting	90	131	191	221	301	308	292	355	357	359
Communications except radio and television	749	919	1,121	1,199	1,384	1,379	1,434	1,543	1,593	1,603
Public utilities:										
Electric utilities, public and private	430	460	608	684	686	712	714	730	740	746
Gas utilities, excluding public	215	220	220	230	220	218	219	205	207	211
Water and sanitary services, except public	61	88	94	106	140	133	135	144	147	154
Trade:										
Wholesale trade	3,349	4,163	5,507	5,585	6,162	6,298	6,387	6,622	6,734	6,745
Eating and drinking places	1,960	2,812	4,864	5,159	5,908	5,951	5,959	6,669	6,742	6,772
Retail trade, except eating and drinking places	7,936	9,729	11,981	11,792	13,815	14,106	14,303	14,473	15,070	15,342
Finance, insurance, and real estate:										
Banking	644	987	1,498	1,655	1,954	1,954	1,968	2,098	2,120	2,146
Credit agencies and financial brokers	389	652	901	1,038	1,313	1,350	1,364	1,507	1,518	1,549
Insurance	1,137	1,370	1,750	1,870	2,187	2,169	2,168	2,237	2,272	2,307
Real estate	753	855	1,374	1,336	1,567	1,640	1,168	1,764	1,774	1,787
Services:										
Hotels and lodging places	868	1,065	1,549	1,693	1,914	1,915	1,891	2,004	2,010	2,034
Personal and repair services	1,157	1,232	1,239	1,305	1,466	1,519	1,621	1,547	1,592	1,734
Barber and beauty shops	538	634	632	624	652	660	685	707	733	760
Miscellaneous business services	814	1,691	3,178	3,743	4,951	5,172	5,331	6,148	6,183	6,229
Advertising	121	134	165	186	213	278	221	228	234	238
Miscellaneous professional services	746	1,046	1,814	2,147	2,573	2,640	2,620	2,916	3,004	3,099
Automobile repair	422	569	839	910	965	1,029	1,101	1,113	1,141	1,186
Motion pictures	228	248	311	310	325	315	316	323	326	337
Amusements and recreation services	372	497	769	870	1,035	1,059	1,082	1,173	1,193	1,248
Doctors' and dentists' services	605	806	1,351	1,503	1,876	1,897	2,036	1,971	2,005	2,095
Hospitals	974	1,776	2,614	3,016	3,895	3,963	3,889	4,471	4,477	4,665
Medical services, except hospitals	303	672	1,431	1,664	2,089	2,208	2,279	2,649	2,688	2,744

Table 5. Continued— Actual and projected employment by industry, 1959–95

(In thousands)

Industry	Actual				Projected					
	1959	1969	1979	1982	1990			1995		
					Low	Moderate	High	Low	Moderate	High
Educational services (private)	839	1,229	1,721	1,882	2,447	2,157	2,001	2,311	2,396	2,411
Nonprofit organizations	1,331	1,764	2,073	2,095	2,387	2,406	2,449	2,455	2,505	2,606
Private households	2,574	2,322	1,723	1,635	1,443	1,400	1,392	1,295	1,346	1,368
Forestry and fishery products	60	55	83	84	73	79	89	96	92	99
Agricultural, forestry, and fishery services	285	329	489	585	640	623	613	704	711	716
Government enterprises:										
Post office	574	732	661	662	629	597	595	537	581	594
Other federal enterprises	104	152	155	150	182	178	182	182	189	198
Local government passenger transit	71	87	130	173	207	209	215	228	233	251
Other state and local government enterprises	225	351	541	496	610	623	649	700	723	781

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

of the highest annual rates of increase, 5.2 percent and 3.9 percent respectively. Other rapid gainers are medical and dental instruments (4.2 percent), office and computing machines (3.7 percent), electronic components (3.2 percent), and engines and turbines (3.1 percent). On the other hand, the chemical industries as a group and petroleum refining are projected to have much lower growth rates because of oil price effects. In fact, employment in petroleum refining is projected to decline 1.6 percent a year.

Computers. Demand for computers and related equipment such as data storage devices, printers, calculators, and similar items is projected to continue to boom through the 1990's. Computer process control and computer-assisted design and manufacture will be widespread. Purchases of computer equipment will represent about one-fifth of all capital expenditures by businesses, by far their largest item of durable equipment spending. Investment, export, and government demand for computers will soon be supplemented by personal consumption expenditures. Foreign competition, although projected to rise, is not expected to significantly hamper the expansion of domestic output. Imports will continue to represent about 7 percent of total output. The value of domestic production of computers and peripheral equipment is projected to post a 6.9-percent yearly growth rate, ranking it among the top five output gainers.

Employment in computer manufacturing is projected to grow 3.8 percent a year. Productivity gains have typically been very rapid in this industry, and this will continue.

Electronic components. Electronic components are expected to become an even more integral part of consumer and capital goods than they are now. Domestic production will expand by 7.6 percent a year between 1982 and 1995. Imports are projected to grow at about the same rate, keeping the import share of total output of electronic components at about 14 percent. Employment is projected to rise from 561,000 in 1982 to 850,000 by 1995, a 3.2-percent yearly gain.

Communication equipment. Demand for communication equipment such as radios, televisions, telephone apparatus, radar, laser systems, satellites, and similar items will almost double between 1982 and 1995. New telecommunications services required by businesses and consumers will be augmented by increasing defense expenditures, at least in the earlier years. Imports are not expected to make additional inroads into the market but rather are projected to hold a smaller share of total output by 1995.

Employment, on the other hand, will not rise as rapidly as output. Productivity gains have typically been rapid in the manufacture of communications equipment, and this trend will hold. Employment in radio and television set production, which had suffered because of import competition and slack demand for all consumer durables during the recession, is projected to rebound and grow 1.5 percent a year between 1982 and 1995. The 1995 level, however, will still fall far short of the previous peak. Jobs in telephone apparatus manufacturing are projected to grow 2.7 percent a year, while in radio and other communications equipment, productivity advances will limit job gains to .6 percent a year.

Aerospace. Defense demand is also expected to boost production in the aircraft and guided missiles and space vehicles industries. Most of this growth will occur by the mid-1980's, after which real defense expenditures are projected to moderate sharply. Commercial aircraft manufacturers are expected to meet serious competition from foreign producers, both in their domestic and overseas markets. Output of the aircraft industry is projected to expand 1.8 percent a year during 1982–95, while employment grows at a .9 percent rate.

Machinery. Other nonelectrical machinery (besides computers, typewriters, and other office equipment) is projected to experience a strong rebound in demand as businesses begin to invest in new capital equipment. The sector is projected to enjoy a 4.3-percent average rate of output growth

between 1982 and 1995 (4.8 percent in the early years). Growth of domestic production occurs despite substantial import gains, because projected demand is so strong. Imports are expected to account for larger shares of most nonelectrical machinery industries than they do now, but for no industry will the share top 15 percent.

Leading the gains in domestic output will be engines and turbines and construction, mining, and oilfield machinery. Output of engines and turbines grows rapidly because of expected strong export demand, while the projected rebound in construction spurs demand for construction machinery. The metalworking machinery industry, which produces industrial robots, is projected to expand production by 3.5 percent a year through 1995, compared with declines or marginal growth since the mid-1960's.

Employment in nonelectrical machinery industries is projected to recover from 1982's cutbacks and resume long-term trends. Productivity gains are expected to be more rapid than for the durable goods sector as a whole, but because output also grows faster, there are opportunities for employment recovery. Most nonelectrical machinery industries will record new employment peaks by 1995.

Steel and other primary metals. Because of the strong growth projected for new construction, autos, nonelectrical machinery, and other industrial apparatus, the primary metals industries are expected to expand production over the next several years following the 1980-82 recession. However, recovery is not expected to be complete. Competition from foreign suppliers as well as continued substitution of alternative materials, such as plastics or ceramics, will limit the markets for domestic primary metals producers.

In the steel industry, which once employed 726,000 workers, output dropped by half over the late 1970's and early 1980's, and employment declined to 394,000 by 1982. Many steel mills were closed during the 1975-82 period. Recovery is expected, but neither production nor employment are projected to reach prerecession levels by 1995. Further, the gains in employment are projected to be less rapid than the gains in output, as it is assumed that production can only expand if new technologies such as continuous casting, the direct reduction of iron ore, and the electric arc furnace are used. Minimills which can specialize and use the latest technologies will become more important. Employment in the steel industry is projected to reach 447,000 by 1995.

Two primary metals, copper and aluminum manufacturing, have a better outlook than iron and steel. Demand for copper will be boosted by the rebound in residential construction, while aluminum will enjoy growth as a substitute for steel.

Nondurable goods. Nondurable manufactured goods are projected to experience modest growth over the next decade and a half. Food products industries can expect a 1.9-percent annual rate of increase in output, but little change in total

employment from the 1982 level. Some food industries (dairy products, bakery products, sugar, confectionery products, and alcoholic beverages) will actually lose jobs, while others (canned and frozen foods, soft drinks, meat products, grain mill products, and other miscellaneous food items) are projected to post slight job gains.

Clothing purchases are projected to grow 2.6 percent a year between 1982 and 1995, but the share accounted for by imports will almost double, from 11 percent in 1977 to almost 22 percent by 1995. This shift in the site of production will limit employment gains in the industry. Jobs are projected to increase from 1.0 million in 1982 to only 1.1 million in 1995.

Some nondurable sectors are expected to enjoy considerable output growth, such as drugs, chemicals, synthetic fibers, and plastics. Output in each of these industries is projected to grow by more than 4 percent a year. Employment growth in these sectors shows a wider range because of differing projections of productivity—jobs grow by 3.5 percent a year in plastic products (the seventh fastest of all industries studied), but only by 1.4 percent in chemicals.

Miscellaneous services—most new jobs

The miscellaneous service sector will provide the most new job opportunities over the next decade and a half, with about twice as many new jobs as manufacturing. These jobs will be spread among various service industries, from medical care to business and professional services to amusements and recreation. In sum, miscellaneous or "other service" industries will account for more than 31 million jobs in 1995, almost one-fourth of total employment.

Service industries are least affected by cyclical movements, and the recent recession was no exception. While declines in employment were reported for almost every other sector, jobs in the other services sector expanded 3.7 percent a year throughout the 1979-82 recessionary period. Of course, job growth might have been even stronger without the economic downturn, but almost 2.4 million jobs were added in these service industries during the period in which other sectors experienced layoffs.

Business services. The largest industry in the "other service" category, miscellaneous business services, will have the most new jobs between 1982 and 1995. Employment is projected to grow from 3.7 million in 1982 to 6.2 million in 1995. A wide variety of services are included in this sector, such as personnel supply, business consultants (providing management services or public relations advice), janitorial and protective services, and computer and data processing services. All are expected to show rapid growth. Total output for the industry is projected to grow 5.3 percent a year and employment, 3.9 percent. These rates, although among the highest of all industries studied, are still lower than the historical growth rates for the industry. Since 1958, output growth in business services has averaged 9.4 percent

a year and employment, 7.0 percent. The slowdown is projected to occur as the industry matures and the shift from in-house services to contracting-out by businesses reaches a saturation point.

Professional services. A related industry, miscellaneous professional services, is expected to follow the same trends. More than 850,000 jobs will be added to the sector between 1982 and 1995, but the rate of growth of both output and employment is projected to be smaller than the historical rates. This industry provides legal, engineering, architectural, accounting, and other professional services to businesses. Employment is projected to top 3 million in 1995.

Medical care. A very significant sector in terms of both number of jobs and rate of expansion has been the health field. Jobs in doctors' and dentists' offices more than doubled during the 1960's and 1970's, rising 4.2 percent a year to 1.5 million in 1982. Hospital employment tripled, growing 5.1 percent a year between 1958 and 1982 to 3 million jobs. The other medical services industry had the most rapid growth—jobs in nursing homes and personal care facilities, outpatient clinics run by health maintenance organizations or group health associations, and drug or alcohol rehabilitation centers, increased more than five times, with employment reaching 1.7 million in 1982.

Growth in health care employment was the result of many factors, chief among them the more widespread coverage of private medical insurance and the introduction of government health benefits programs such as medicare and medicaid. The projections assume no change in current law—that government funding will be maintained at its present level, except for changes stemming from inflation.

Inflation in medical care costs poses the greatest uncertainty in the projections of medical services output and employment. While the overall consumer price index has tripled since 1965, the index for medical care services has quadrupled. Despite these sharply increased costs, demand is projected to be even stronger in the projection period, as the population ages and as new, expensive technologies are used in life-saving treatments.

Because of higher costs and the assumption of no new government programs, it is expected that output and employment in medical care services will slow from historical rates. Doctors' and dentists' office jobs are projected to grow 2.2 percent a year over the 13 years through 1995, or an increase of 500,000. By comparison, over the previous 13-year period (1969–82), 700,000 jobs were added in medical offices. Hospital employment is projected to grow 3.1 percent a year, from 3 million in 1982 to 4.5 million in 1995. Jobs in other medical services will expand by 3.8 percent a year to almost 2.7 million in 1995. Overall, the 3 million new health care jobs projected to be added between 1982 and 1995 represent almost 12 percent of the total number of new jobs.

Growth slows in trade, government

Employment in wholesale and retail trade is projected to grow along with the rest of the economy, increasing from 22.5 million in 1982 to 28.5 million in 1995. Because total employment growth is slowing down, the rate of job growth in trade is also slower than it has been historically. Retail trade employment is projected to grow 2.0 percent a year, compared with 2.4 percent between 1958 and 1982; jobs in wholesale trade are projected to expand 1.4 percent annually, compared with 2.5 percent in the past.

The largest number of new job openings, about 1.6 million, will be in eating and drinking establishments. Other retail firms posting large gains will be department stores, grocery stores, new car dealers, miscellaneous shopping goods stores (such as jewelry, books, cameras, and sporting goods), and drug and proprietary stores. Retail shops projected to actually lose jobs include mobile home dealers, variety stores, general merchandise stores, candy stores, dairy products stores, women's accessory stores (such as millinery shops), children's wear stores, and fur shops.

In wholesale trade, the largest employment increases will be found in establishments selling machinery and equipment, motor vehicles, miscellaneous nondurable goods, and electrical goods.

Government. Employment in government is projected to grow more slowly than private sector jobs, as has been true since 1975, but the opposite of the expansionary 1950's and 1960's. The state and local sector represents most of the slowdown, as only 1.2 million new jobs will be added over the next 13 years, compared with 3.6 million during the preceding 13-year period.

Although job growth is slower than in the 1960's, it still represents a reversal from the actual declines of the late 1970's. In addition to tight budgets during the recession, declining school enrollments caused many state and local governments to reduce hiring. Beginning in 1984, however, enrollment in public elementary and secondary schools is projected to turn up again as the children of the baby-boom generation advance through school, leading to a slight upturn in employment.

Banking and transportation and utilities

The output of financial and banking services is projected to show very large gains over the next decade and a half with the introduction of new consumer services such as automatic funds transfers and the more widespread use of investment counseling. The output of the banking industry and of credit agencies and financial brokers is projected to grow by 4.1 percent a year.

Employment growth, on the other hand, will be very modest. Automatic teller machines and computerized banking and stock transactions will limit job gains to 1.9 percent a year. By comparison, employment in banking grew 4.4

percent through the 1960's and 1970's, as the expanding use of checking accounts created the need for large numbers of new hires for check processing. That impetus will not be repeated, however, as checking account use is now commonplace, and as automatic transfers replace manual check processing.

The transportation, communications, and public utilities sector is not projected to contribute significantly to overall job growth, only adding slightly more than 1 million extra workers. However, output of this sector is projected to lead all other sectors in growth, reflecting the strong demand for new telecommunications services, as well as the divestiture of the telephone company. Output of the communications sector, which includes radio and television broadcasting in addition to telephone and telegraph communications, is projected to expand by 5.9 percent a year, compared with 2.9 percent for the economy as a whole.

Low and high alternative projections

Different industry employment levels in the low and high alternatives are primarily the result of two factors—(1) the unemployment rate and the size of the labor force are different in each case than in the moderate growth projection, leading to different levels of total employment, and (2) the distribution of final demand is markedly different, causing output and, therefore, employment at the industry level to vary significantly from the base case. (See table 6.)

In the low-growth alternative, a smaller labor force and more unemployment results in 2.3 million fewer jobs. Although total employment is only about 2 percent lower, at the industry level the difference between the base case and the low trend alternative ranges over a much broader band. For some industries, employment is almost 10 percent lower, while in others, it is actually higher than in the base case. This span results from the sharp differences in final demand and in projections of productivity.

A disproportionate share of the job difference occurs in durable manufacturing industries because interest rates are higher than in the base case. Only manufacturing industries dependent on defense demand do not show this drop; defense expenditures, as well as other federal government purchases, are actually higher in the low-growth scenario than in the base case because it is assumed that the federal government increases spending to try to stimulate the sluggish economy. Examples of defense demand boosting output and employment to higher levels than in the base projection are in ordnance, guided missiles, radio and communication equipment, electronic components, aircraft, and shipbuilding industries.

Table 6. Gross national product, moderate growth path and high and low alternatives

[In billions of 1972 dollars]

Component	1982	1995			Percent difference from moderate	
		Low	Moderate	High	Low	High
Gross national product	\$1,485.4	\$2,148.7	\$2,166.9	\$2,284.6	-0.8	5.4
Personal consumption	970.2	1,371.1	1,412.4	1,504.6	-2.9	6.5
Durables	139.8	223.8	240.4	279.8	-6.9	16.4
Nondurables	364.2	449.4	468.0	485.4	-4.0	3.7
Services	466.2	697.9	704.0	739.4	-9	5.0
Gross private investment	194.5	285.7	337.2	408.6	-15.3	21.2
Equipment	112.7	159.6	177.2	204.6	-9.9	15.5
Structures	53.4	44.6	70.1	77.6	-36.4	10.7
Residential	37.8	69.6	78.1	114.1	-10.9	46.1
Inventory change	-9.4	11.9	11.8	12.3	.8	4.2
Net exports	28.9	148.4	85.9	23.0	72.8	-73.2
Exports	147.3	267.9	260.0	264.0	3.0	1.5
Imports	118.4	119.4	174.1	241.0	-31.4	38.4
Government	291.8	343.5	331.4	348.4	3.7	5.1
Federal	116.6	157.0	139.2	145.9	12.8	4.8
Defense	78.8	113.2	98.9	103.9	14.5	5.1
Nondefense	37.8	43.8	40.3	41.9	8.7	4.0
State and local	175.2	186.5	192.2	202.5	-3.0	5.4

SOURCE: 1982 data are from the U.S. Department of Commerce, Bureau of Economic Analysis.

In addition, lower income growth results in much lower imports, leading to instances where domestic production of import-sensitive industries is higher in the low-growth alternative than in the base case. This occurs in forestry and fishery products, nonferrous metal ores mining, chemical and fertilizer mining, and watches and clocks.

In the high-growth alternative, many of these assumptions are reversed. Total employment in 1995 is 2.7 million higher than in the moderate case, based on a larger labor force and less unemployment. Like the low-growth alternative, although total employment varies from the base case by about 2 percent, jobs at the industry level have a much broader range, in some instances topping the base case by as much as 13 percent.

Monetary policy is assumed to be less restrictive in the high-growth alternative, resulting in a higher rate of inflation. Inflation, however, contributes to making imports more attractive, and the rise in imports more than offsets increased domestic demand in several industries. Because of imports, domestic production in the high alternative is lower than in the base case for iron mining, crude petroleum, sugar, confectionery products, apparel, leather tanning, leather products, and steel. Employment is also correspondingly lower; however, for sugar and confectionery products, lower productivity keeps employment levels higher than in the base case. □

—FOOTNOTES—

¹See the following articles in this issue: Howard N Fullerton, Jr. and John H. Tschetter, "The 1995 labor force: a second look", pp. 3-10; Arthur J. Andreassen, Norman C. Saunders, and Betty U. Su, "The economic outlook for the 1990's: three scenarios for economic growth"; pp. 11-23; and George Silvestri, John M. Lukasiewicz, and Marcus E. Einstein, "Occupational employment projections through 1995", pp. 37-49.

²See Andreassen and others, "The economic outlook for the 1990's", for specific assumptions.

³See Fullerton and Tschetter, "The 1995 labor force".

⁴See Richard Riche, Daniel Hecker, and John Burgan, "High technology today and tomorrow: a small slice of the employment pie," pp. 50-58, this issue.

The decade of the 1980's

The maturing products of the baby boom continue to dominate the age-structure changes—the bulk of the bulge will have aged to between 35 and 44 years of age by 1990. Indeed, the 11-million person increase in this cohort will account for over 60 percent of the national growth increment between 1980 and 1990. This will undoubtedly place enormous stress on the Nation's economic system to satisfy the mid-level career aspirations of this fabled generation. Ever greater pressures for entrance into the executive suite will continue, a phenomenon only partially alleviated by a decline in the 55-to-64-years-of-age group.

In contrast to the expansion represented by maturing baby boomers will be the sharp contraction of the 15-to-24-years-of-age segment by approximately 7.7 million people; the baby bust, then, will finally be impacting American society in full force. Who will inherit—and support—the infrastructure built for the baby-boom generation? Between 1980 and 1990, it is entirely possible that the college-age population will decline by over 18 percent, fostering significant adjustments for higher-education institutions and services. At the same time, the numbers of new entrants to the labor force will shrink over the decade (ignoring labor-force-participation rates), alleviating the entry-level job pressures that characterized the 1970's. The entry-level housing built for a larger generation may provide a redundancy of certain forms of shelter as the decade evolves.

Concurrently, with the stabilization in size of the 5-to-14-years-of-age sector—which will remain at the 35-million-person level throughout the decade of the 1980's—the Nation's elementary and high schools will face diminished downward demographic pressure (although spatial population shifts will exert differential effects on a geographic base). In the aggregate, the three-decade-long stress of a boom-bust cycle should be greatly alleviated.

Once again, the elderly are a significant growth sector with a net increase of 4.3 million people expected—or roughly 450,000 persons a year reaching the nominal retirement age and surviving between 1980 and 1990. And the under-5-years-of-age population will begin to grow in size. Thus, a baby-boom "echo" will become etched into the Nation's age structure. But this will not preserve the United States population as a whole from a decided increase in median age to above 32 years.

—GEORGE STERNLIEB, JAMES W. HUGHES,
and CONNIE O. HUGHES, *Demographic Trends and
Economic Reality: Planning and Markets in the '80s*
(New Brunswick, N.J., Rutgers, The State University
of New Jersey, Center for Urban Policy Research,
1982), pp. 15 and 17.
