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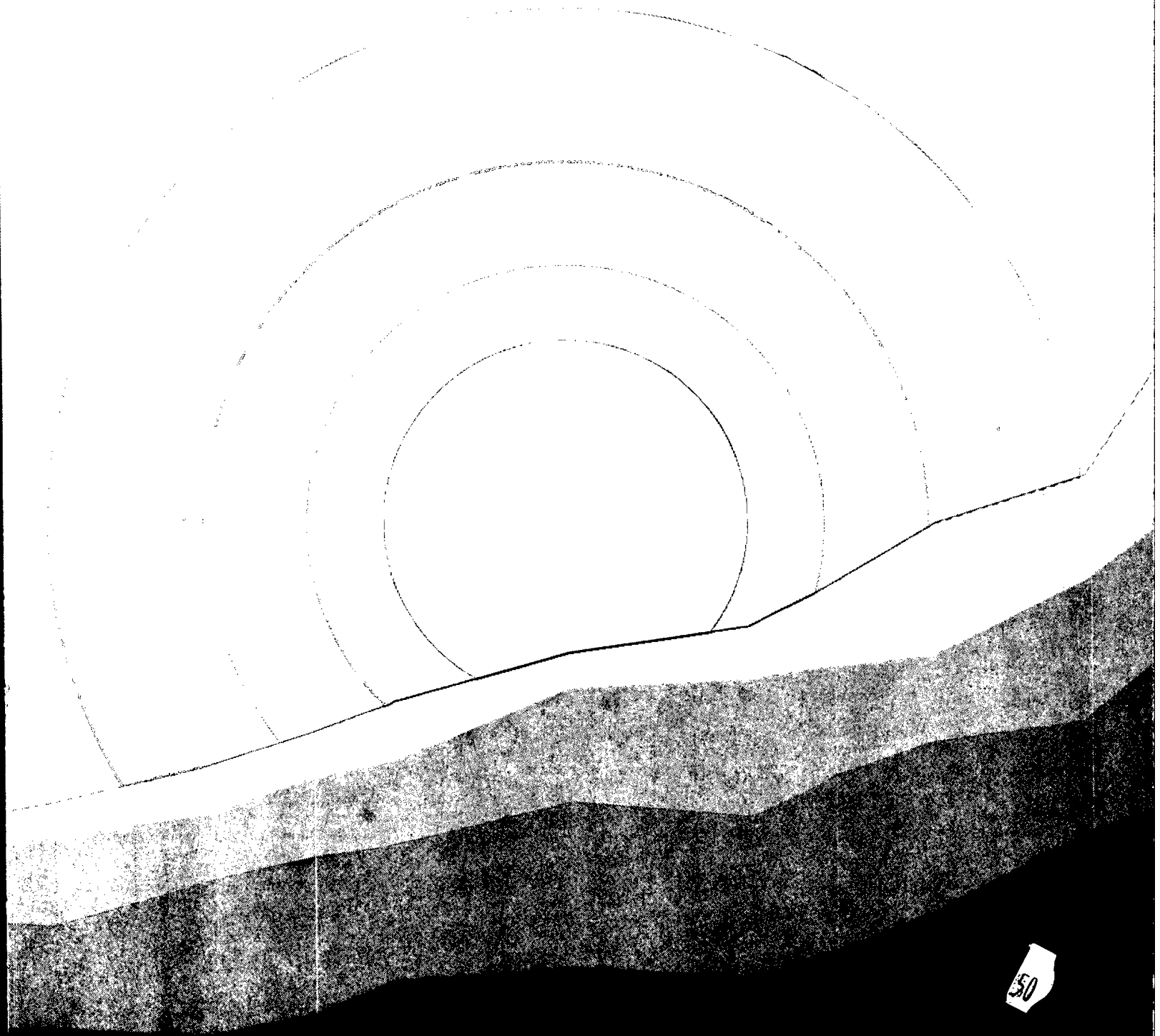
Projections 2000

U.S. Department of Labor
Bureau of Labor Statistics
March 1988

Bulletin 2302



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Projections 2000

U.S. Department of Labor
Ann McLaughlin, Secretary

Bureau of Labor Statistics
Janet L. Norwood

March 1988

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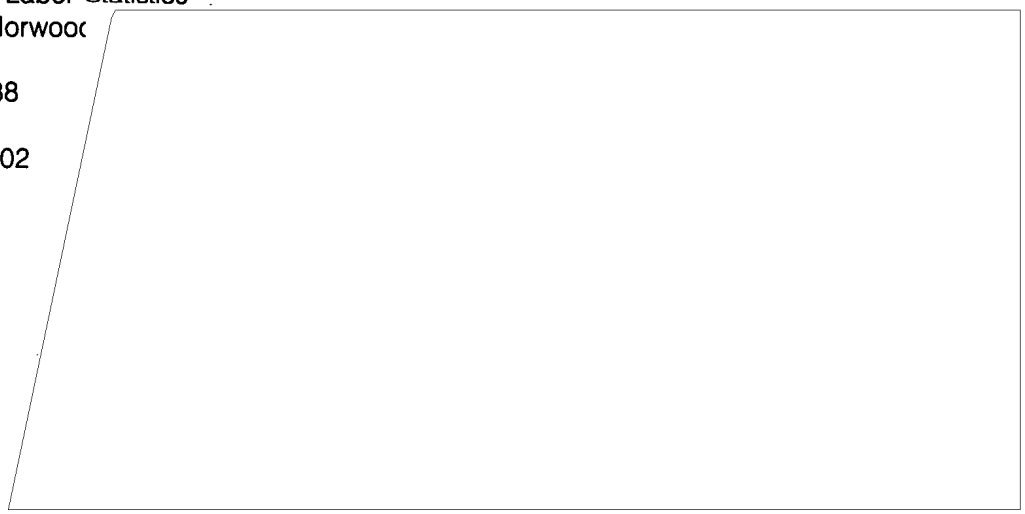

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Preface

This bulletin presents Bureau of Labor Statistics employment projections for the year 2000. Three alternative growth patterns provide estimates of overall and sector economic growth with consistent industry and occupational employment projections. Part I consists of five articles reprinted from the September 1987 issue of the *Monthly Labor Review*. Part II provides a brief review of the methodology. Part III presents the assumptions underlying the specific industry and occupational employment estimates. The appendix provides more detailed data frequently requested by users.

These projections are the latest product of a program initiated more than 25 years ago to study alternative growth conditions and their effects on employment by industry and occupation. Previous economic and employment projections in this series have been published for the years 1970, 1975, 1980, 1985, 1990, and 1995. Labor force and occupational projections have been made in BLS for a somewhat longer period.

Although this bulletin provides extensive coverage, further detailed data and information are available. Data in machine-readable form are available from the BLS Office of Economic Growth and Employment Projections. An order form is provided on the last page of the bulletin for convenience.

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Part I. Economic and Employment Projections to 2000

Overview and implications of the projections to 2000

Bureau of Labor Statistics moderate projections show 21 million new jobs over the 1986–2000 period, mostly in service-producing industries; the black and Hispanic labor force is estimated to increase much faster than that of whites

RONALD E. KUTSCHER

The Bureau of Labor Statistics has prepared projections of the U.S. economy to 2000. Three alternative projections were developed, based on a range of assumptions which result in high, moderate, and low rates of economic growth. The projections encompass the future demographic structure of the labor force, economic rate of growth and composition of demand, and industrial and occupational composition of employment. The Bureau prepares projections biennially; this latest outlook replaces the projections to 1995, published in 1985.[1] This article summarizes the moderate projections of the labor force, economic growth, and industry and occupational employment, and discusses some important implications of the projections. The four articles that follow present the projections in considerably more detail.

Labor force overview

According to the moderate growth projections, the labor force is expected to expand by nearly 21 million, or 18 percent, over the 1986-2000 period. This represents a slowdown in both the number to be added to the labor force and in the rate of growth achieved in the previous 14-year period, 1972 to 1986, when the labor force increased by almost 31 million, or 35 percent. The projected growth also represents a slowing from the more recent 1979–86 period. Consequently, the projected slower growth is a continuation of a trend that started in the late 1970's. The rapid increases in the past were the result of the very large baby-boom generation (those born between 1946 and 1964) entering the labor force, accompanied by rapid increases in women's labor force participation rates. The recent slowdown and that projected for the remainder of the century reflect the entry of the smaller numbers from the "birth dearth" generation (those born over the 1965–78 period) along with the slower rate of projected growth in the participation rates of women. (See table 1.)

Not only is the labor force expected to continued to slow its rate of increase over the 1986–2000 period, but it is projected to become increasingly minority and female. For example, the white labor force is projected to increase less than 15 percent, while the black labor force is expected to grow by nearly 29 percent, or 3.7 million workers, more than 17 percent of the projected total labor force increase. The Hispanic labor force is projected to grow by about 6 million, or more than 74 percent, and to account for nearly 29 percent of labor force growth over this period. The Asian and other races group (American Indians, Alaskan Natives,

Ronald E. Kutscher is Associate Commissioner, Office of Economic Growth and Employment Projections, Bureau of Labor Statistics.

Asians, and Pacific Islanders) is projected to grow by nearly 2.4 million, or 70 percent, and account for more than 11 percent of labor force growth. Blacks, Hispanics, and Asians and other races are projected to account for 57 percent of labor force growth; if non-Hispanic white women are included, the combined share of future growth reaches more than 90 percent.

Women are projected to account for 64 percent of the net increase in the labor force—slightly more than their share of the 1972–86 labor force growth. Consequently, by 2000, women are expected to make up more than 47 percent of the labor force, up from 39 percent in 1972 and 45 percent in 1986.

The age composition of the projected work force is expected to continue some of the current trends at least through the mid-1990's, after which a number of these trends will begin to reverse—some sharply. After the very large baby-boom generation was born, a period of significantly lower numbers of births prevailed until the late 1970's. From 1978 to the present, births increased (even though the birth rate was stable or declining) as women of the baby-boom generation began having children. As a result of the fewer births during the 1965–78 period, the number of 16-year-olds in the population as well as in the labor force began a decline in 1976, which is expected to continue until about 1992. The number of 17-year-olds began a decline in about 1977 which is expected to continue until about 1993. Each group 1 year older is expected to follow the same pattern, but 1 year later—for example, the number of 18-year-olds is expected to continue to decline until about 1994.

The differing birth cohorts moving into older age groups have two important consequences for the age composition of the labor force. (1) By the year 2000, the share of the labor force age 16 to 34 and over age 55 is projected to decline, and the share of 35- to 54-year-olds is expected to increase. (2) For some age groups in the labor force, sharp changes are expected to take place during the 1986–2000 period. For example, the number of

- 16- to 24-year-olds is projected to decline until the mid-1990's, then reverse and begin to increase;
- 25- to 34-year-olds is projected to increase through the early 1990's, then show a very sharp decline; and
- 55- to 64-year-olds is projected to decline through the mid-1990's, then increase very rapidly.

Economic growth and structural changes

According to the moderate projections, the rate of economic growth, as measured by real GNP, is expected to increase by 40 percent, or 2.4 percent a year over the 1986–2000 period. This is only slightly less than the 2.5-percent annual growth rate over the 1972–86 period, but slightly more than the 2.0 percent achieved over the 1979–86 period, which included two recessions. The rate of economic growth through the year 2000 results from an acceleration

Table 1. Civilian labor force, by sex, age, race, and Hispanic origin, 1972–86, and moderate growth projections 2000

[Numbers in thousands]

Group	Actual			Projected, 2000	Change, 1986–2000	Growth rate, 1986–2000
	1972	1979	1986			
Total, 16 and older	87,037	104,960	117,837	138,775	20,938	1.2
Men, 16 and older	53,556	60,727	65,423	73,136	7,713	.8
16 to 24	11,243	13,645	12,251	11,506	−745	−.4
25 to 54	33,133	37,926	44,406	53,024	8,618	1.3
55 and older	9,180	9.156	8,766	8,606	−160	−.1
Women, 16 and older	33,481	44,233	52,414	65,639	13,225	1.6
16 to 24	8,943	11,760	11,117	11,125	8	.0
25 to 54	19,192	26,594	35,159	47,756	12,597	2.2
55 and older	5,346	5,879	6,138	6,758	620	.7
White, 16 and older	77,275	91,922	101,801	116,701	14,900	1.0
Black, 16 and older	8,748	10,665	12,684	16,334	3,650	1.8
Other, 16 and older[1]	–	2,373	3,352	5,740	2,388	3.9
Hispanic origin, 16 and older	–	5,215	8,076	14,086	6,010	4.1

[1] Includes American Indians, Alaskan Natives, Asians, and Pacific Islanders.

NOTE: Detail for race and Hispanic groups may not add to total because Hispanics are included in both the white and black population groups. Dash indicates data not available.

SOURCE: Historical data are from the Current Population Survey.

projected for productivity, even as the rate of labor force growth is projected to slow. Many factors account for the faster productivity growth incorporated in these projections: a more mature, educated, and experienced labor force; greater stability in projected energy prices over the 1986–2000 period than prevailed in the 1972–86 period; and more favorable growth in the projected capital-labor ratio, in particular, a slowing of labor force growth and a somewhat larger increase in the share of investment in producers' durable equipment.

Changes also are projected in demand structure of GNP over the 1986–2000 period. Among the most important are:

- Stabilization of the share of consumer durables, which increased considerably during the 1972–86 period.
- A modest increase in the share of GNP allocated to producers' durable equipment.
- An increase in the export share of GNP, a reversal from the trend of the 1979–86 period.
- No change in the import share of GNP, even though the import share of GNP increased nearly 5 percentage points over the 1972–86 period.
- A decline in the share of GNP devoted to defense expenditures—a reversal of the 1979–86 trend.
- An increase in the growth rate of State and local government spending, larger than the rate over the 1979–86 period, but not enough to halt the declining share of GNP allocated to spending by States and localities.

On the income side of GNP, the projections show a relatively constant share going to disposable personal income. Real disposable personal income per capita is projected to grow 1.6 percent per year, about the same as in the 1972–86 period, but more than the 1.3-percent a year gain over the

1979–86 period. The greater growth rate reflects primarily the projected faster rate of productivity growth.

Employment changes

Of the 21 million new jobs projected for the 1986–2000 period, 20.1 million are expected to be nonagricultural wage and salary jobs, and 1.7 million nonagricultural self-employed and unpaid family jobs. These gains are expected to be offset slightly by a decline in agricultural employment. The projected employment increase—more than 19 percent between 1986 and 2000, or 1.3 percent a year—represents a slowing of employment growth, reflecting, in large part, slower labor force growth. In terms of absolute growth, nonagricultural wage and salary workers increased by nearly 26 million over the 1972 to 1986 period, an expansion of almost 35 percent, or 2.2 percent a year. The projected slowdown in employment growth is not quite so dramatic when compared to the more recent 1979–86 period in which nonagricultural wage and salary jobs grew 1.5 percent a year.

Table 2. Employment by major sector, 1972, 1986, and projected to 2000 low, moderate, and high alternatives
[In thousands]

Industry	1972	1986	Projected, 2000		
			Low	Moderate	High
Total	84,549	111,623	126,432	133,030	137,533
Nonfarm wage and salary[1]	73,514	99,044	113,554	119,156	123,013
Goods-producing	23,668	24,681	23,148	24,678	25,906
Mining	628	783	672	724	779
Construction	3,889	4,904	5,643	5,794	6,077
Manufacturing	19,151	18,994	16,833	18,160	19,050
Service-producing[1]	49,846	74,363	90,406	94,478	97,107
Transportation and public utilities	4,541	5,244	5,410	5,719	5,903
Wholesale trade	4,113	5,735	7,015	7,266	7,361
Retail trade	11,835	17,845	21,795	22,702	23,079
Finance, insurance, and real estate	3,907	6,297	7,508	7,917	8,159
Services[1]	12,117	22,531	30,778	32,545	33,708
Government	13,333	16,711	17,900	18,329	18,897
Agriculture	3,523	3,252	2,784	2,917	3,009
Private households	1,693	1,241	1,122	1,215	1,234
Nonfarm self-employed and unpaid family workers	5,819	8,086	8,972	9,742	10,277

[1] Excludes SIC 074, 5, 8 (agricultural services), and 99 (nonclassifiable establishments); therefore data are not directly comparable with those from the Current Employment Survey.

By industry. Goods-producing industries are projected to experience almost no change in employment over the 1986–2000 period. Service-producing industries, therefore, will account for nearly all of the projected growth. Among major groups in the goods-producing industry, the projections show increasing employment only in construction—nearly 900,000 jobs. (See table 2.) Although agriculture is projected to increase its wage and salary jobs, that increase is expected to be more than offset by declines among the self-employed, so that total agriculture is projected to decline by more than 300,000 jobs.

Manufacturing employment is projected to decline by more than 800,000 jobs over the 1986–2000 period. Declines are projected even though output is expected to increase 2.3 percent a year. However, productivity in manufacturing is projected to grow even faster. Large job growth is projected for both wholesale and retail trade; more than 1.5 million wage and salary jobs are expected in wholesale trade and almost 4.9 million in retail trade. This is consistent with the long-term trend of this industry growing the same or slightly faster than the economy. The finance, insurance, and real estate industry also is projected to add more than 1.6 million jobs. However, this represents a considerable slowing in this sector when compared with the nearly 2.4 million jobs added over the previous 14 years. The service industries will expand by more than 10 million jobs, with health care services and business services important contributors as they continue to produce new services that greatly add to their overall demand and employment growth. Government is expected to expand by about 1.6 million jobs—nearly all at the State and local level.

Although manufacturing employment as a whole is projected to decline through 2000, many of its industries are projected to grow, quite rapidly in some cases. It is important to note that in 2000, manufacturing is projected to provide more than 18 million wage and salary jobs, or 15.2 percent of all wage and salary employment. Generally, manufacturing industries that are expected to experience employment declines are those that have been declining for years, such as basic steel, leather goods, shoes, tobacco, some of the textile and most of the basic metal processing industries, and many of the food processing industries. Employment gains are expected among printing and publishing, drugs and pharmaceutical products, computers, plastic products, and instruments industries. Some occupations within manufacturing are projected to grow, even as the overall employment in manufacturing industries declines. For example, the engineering and related occupations are projected to increase by more than 165,000 jobs and managerial jobs, by 85,000.

By occupation. Five occupational groups are projected to experience faster than average employment growth over the 1986–2000 period—technicians, service workers, professional workers, salesworkers, and executive and managerial employees. (See table 3.) Only two groups—farming, forestry, and fishing workers and private household workers—are expected to have absolute declines. Three broad occupational groups are expected to experience below-average growth: precision production, craft, and repair workers; administrative support workers, including clerical; and operators, fabricators, and laborers.

When employment by major occupational group is distributed in 1986 and 2000 by the most prevalent 1986 educational level, the projections show a growth in the share of jobs requiring most workers to have at least 1 year of college. The share of jobs requiring high school completion as the predominant educational level declines slightly. How-

ever, there is a sharper decline in the share of jobs where less than a high school education is currently the most prevalent educational requirement.

If projected employment growth by major occupational group is compared with jobs currently held by blacks and Hispanics, a disparity is shown—neither group is well represented in the fast-growing occupations and both groups are overrepresented in the slow-growing or declining occupations. When a similar analysis is done for women, a disparity also is shown, although it is not nearly as great as that for blacks and Hispanics. Still, women are not well represented in some fast-growing occupations such as natural scientists and the architectural occupations.

High and low projections

The high and low alternatives show a relatively broad band around the moderate alternative. The annual growth rate of real GNP ranges from 1.6 percent in the low alternative to 3.0 percent in the high. For the labor force, the difference between the low and high is nearly 6.6 million workers in 2000. The unemployment rate in 2000 is 7.7 percent in the low alternative, 6 percent in the moderate, and 4.5 percent in the high. In 2000, the low alternative has a level of employment 6.6 million lower than the moderate level; the high alternative is 4.5 million higher than the moderate. The employment range in 2000 is 11.1 million.

Labor force implications

A slower growing labor force along with the changes expected in its age, sex, and racial composition has several important implications. For instance, the projected decline of jobseekers age 16 to 19 offers an opportunity for lowering the unemployment rate for a labor force group that historically has had a high rate. This is particularly true in light of the projected large employment increases in eating and drinking places, retail sales, and many service industries which typically employ first-time jobseekers. As noted, the share of labor force growth among blacks and Hispanics is also projected to increase. These groups traditionally have had higher unemployment rates than those for whites, which may make the lowering of the overall unemployment rate more difficult. This follows unless, of course, past problems of jobs for minorities can be dealt with, including educational requirements and geographic location of jobs.

Other important implications are drawn from the changes expected for the 20 to 24 age group, whose number is expected to continue to decline until the late 1990's. In addition to employers who are looking for first-time jobseekers, many others who have a primary interest in this age group—for example, community and 4-year colleges and the military—will see the population from which they primarily seek students and recruits shrink throughout most of the 1986–2000 period. Also, producers of goods and services primarily targeted at 16- to 24-year-olds, from specialized magazines, cassette tapes, and clothing to motorcycles and compact discs, can expect their market base to continue to decline.

Table 3. Employment by broad occupational group, 1986 and moderate growth projections 2000

[Numbers in thousands]

Major occupational group	1986	Projected, 2000	Percent change, 1986–2000
Total employment	111,623	133,030	19.2
Technicians and related support workers	3,726	5,151	38.2
Service workers, except private household workers	16,555	21,962	32.7
Salesworkers	12,606	16,334	29.6
Executive, administrative, and managerial workers	10,583	13,616	28.7
Professional workers	13,538	17,192	27.0
Precision production, craft, and repair workers	13,924	15,590	12.0
Administrative support workers, including clerical	19,851	22,109	11.4
Operators, fabricators, and laborers	16,300	16,724	2.6
Private household workers	981	955	−2.7
Farming, forestry, and fishing workers	3,556	3,393	−4.6

NOTE: Estimates of 1986 employment, the base year for the 2000 projections, were derived from data collected in the Occupational Employment Statistics Surveys.

Considerable attention already has been focused on a potential shortage of workers. Often, this does not reflect an overall lack of workers, but the declining numbers in the younger age groups. As a result, in a number of instances, employers have turned to other sources of workers, such as immigrants or the recently retired.

The implications of the large baby-boom generation have been widely discussed. Less well-known and, consequently, not often discussed is the younger birth dearth group. The maturation of the birth dearth group already has caused a decline, first in the number of 16- to 19-year-olds in the population and in the labor force, and then in 20- to 24-year-olds. In the late 1980's, that decline will extend to older groups. Other results will likely occur from the decline in these age groups. Because they are beyond the age for first-time jobseekers might mean faster promotions for this age group, as firms compete for a shrinking labor pool of managers or skilled technicians and professionals. However, it is important to remember that this group is following on the heels of the very large baby-boom group, and such scarcities may never materialize.

Immigrants are projected to account for more than 23 percent of the change in the labor force over the 1986–2000 period. Several important considerations with regard to the large projected immigrant share of labor force growth are: (1) to the extent they are not English-speaking, their integration into the work force is considerably more difficult, (2) given the skill shifts which are implied by the occupational projections, many immigrants may not possess the job skills which are in high demand in the U.S. economy, and (3) the geographic distribution of immigrants is more concentrated than that for the total labor force and, consequently, may complicate immigrants' search for jobs.

The growing share of blacks and Hispanics in the projected labor force poses two important considerations. First,

both groups historically have had higher unemployment rates than those for whites. Thus, the opportunity for a lower unemployment rate with the shrinkage of the youth cohort (with its significantly higher unemployment rates) could be negated if solutions cannot be found for the high unemployment among blacks and Hispanics. The second consideration raised by the faster labor force growth for blacks and Hispanics is the disparity between their current occupation and the projected growth in occupational employment. Policymaking will need to focus on ensuring that all youth, particularly minorities, are given sufficient education to ease their entry into the job market and to equip them with the skills needed to advance to better jobs. While education alone is not the solution to all labor market problems, it is clearly important in the solution. Information on future job growth and the education and training necessary for the new jobs are important for all labor force aspirants.

The increasingly larger role that women are projected to play in the future labor force raises some of the same considerations as those noted for blacks and Hispanics. The gap between the male and female unemployment rates has narrowed—more from an increase in the male rate than from lowering of the female rate. While in the 1960's and 1970's, unemployment rates for women were typically 1 to 2 percentage points higher than those for men, that gap has narrowed in the 1980's. During the 1984–86 period, female unemployment rates ranged from 0.2 to 0.4 percentage points higher than those for men. However, the occupational distribution of jobs still shows some disparities, even though the differences have narrowed over the last decade. An opportunity exists for future improvements, in that an important source of job growth over the 1986–2000 period is professional, technical, and managerial jobs, and women are projected to constitute more than three-fifths of net additions to the labor force.

Economic implications

Several implications can be drawn from the projected overall economic growth and the changes expected in the structure of demand over the 1986–2000 period. The projections call for an increase in the rate of productivity growth. It should be noted that the projected productivity growth is more uncertain than the projected labor force growth. Therefore, the economic growth projections can be viewed as having a higher degree of uncertainty. Consequently, users should carefully examine all three projection alternatives and their implications. For example, the low projection alternative, which has a rate of real GNP growth of 1.6 percent per year over the 1986–2000 period, results from a productivity growth rate consistent with the 1972–86 productivity trend. One very important implication of this projected trend is that real disposable income per capita (one measure of well-being in the economy) only increases 0.7 percent per year under this alternative, much slower than the 1.7-percent growth during the 1972–86 period, and less than one-half the rate of increase projected in the moderate alternative. Of course, if a faster rate of productivity increase should prevail, it would be more favorable for the economy because that is the primary factor leading to gains in living standards of the population.

Perhaps the most significant change in trend projected in the composition of demand for the 1986–2000 period is in foreign trade. As a result of changes in exchange rates, exports are projected to increase faster than imports. This is important both to exporting industries as well as other industries which have been pressured by the very rapid growth of imports over the last decade, in particular. However, the extent of the slowdown in import growth and the increase in export growth varies considerably among industries. The projections of exports and imports are uncertain, with trends more volatile than most other demand categories because numerous factors in many countries influence trends for U.S. exports and imports. Another difficulty in developing foreign trade projections is the capacity of some U.S. industries to recover their export markets once they have been lost—even though a significant turnaround in the value of the dollar has occurred.

The projected shifts in the structure of demand result in several other important relationships. The projected lack of any growth of the younger age groups in the population and the resulting modest slowdown in household and family formation will affect expenditure patterns. This is most noticeable in consumer durables, particularly in automobile purchases and new housing construction. Another impact related to demographic changes in the population is the health care expenditures of older age groups, particularly the expected very rapid growth between now and 2000 in the over age 85 population—projected to increase 3.7 percent annually, compared with 0.8 percent for the overall population. Not only is this older group expected to keep health care expenditures among the most rapidly growing demand categories, but the distribution of health care purchases also is projected to shift toward nursing homes and home health care expenditures.

Another important change in trend included in the projections is the expected slowing of defense expenditures. Real defense expenditures declined over the 1972–79 period, but then reversed over the 1979–86 period and have shown an appreciable increase of 6.2 percent a year. In these projections, defense spending is projected to slow in the late 1980's, and then gradually decline in the 1990's such that by 2000, the level of real defense expenditures is projected to return to near the 1986 level. These projected trends are particularly important to industries such as aircraft, missiles, ships, and electronics which sell a high proportion of their output to the U.S. Department of Defense.

Industry employment impact

Employment is projected to grow, albeit slower than it has in the past. Most of the growth is expected among

service-producing industries. Further employment declines are projected for many industries including agriculture, many mining industries, a significant number of manufacturing industries, and a few service industries. Consequently, workers are expected to continue to be displaced. Further, because of the geographic concentration of many of the declining industries, some localities will be hard hit from these displacements. Although some displaced workers may obtain related jobs and maintain their standard of living, others may require further training or education, or both, or may have to relocate geographically to do so.

Some of those displaced from their jobs, of course, may not find similar employment, given the occupational shifts that are projected to occur between now and 2000, particularly if they lack the education and training required for the emerging jobs. Jobs for displaced workers are a problem for which an easy solution has not been found. Although much occupational mobility exists in this economy, it is concentrated primarily among the young. Thus, while it is important that entry level workers be provided with as high a level of education as possible, this helps little in finding the best mechanism for providing the right mix of education and training needed for displaced workers, particularly if those displaced are over age 40 and have relatively low educational attainment.[2]

High tech employment in manufacturing is projected to slow from the above-average growth of the past decade, as these industries mature and as several of them continue to face stiff competition in foreign markets. The computer manufacturing industry, in particular, accounted for a significant proportion of total high tech employment growth in the 1970's and early 1980's, but a projected slowing in this industry's employment growth is expected to be a major factor in the high tech future for the rest of this century.

The expected continuation of employment changes in service-producing industries has several important implications. Firms in some of these industries are likely to be small. Because small firms have a higher turnover rate, they may, as a consequence, be less likely to provide a lifetime employment opportunity for workers. Consequently, workers will need to be prepared through education and training for more frequent changes of employers and occupations. Also, many smaller firms are often less able to provide other benefits, such as health care, that large firms may provide.[3] A benefit of the increasing share of employment in the service-producing industries is that the effect of any future business cycle downturn is likely to be moderated because the variability of employment is lower in services than in goods-producing industries such as manufacturing and construction.

Another trend is developing that will, in all likelihood, require adjustments in the future. As the work force declines among the younger age groups and as women increasingly seek full-time work, a conflict emerges between industries which traditionally demand a large number of part-time workers and the economy's ability to supply those workers. This conflict could be resolved by these industries moving back to providing a larger share of full-time jobs, expanding self-service stores, or drawing older workers into the work force. If these changes do not occur, one consequence could be that some seekers of full-time work might be able to find only part-time employment. Another likely implication is a slowing, or possibly even a reversal, in the decline of average hours of work, because the share of part-time employment was the primary factor behind past declines in average hours.

Occupational employment implications

Shifts in industry employment and changes in the staffing patterns of industries are expected to affect the occupational structure of employment. Generally, occupations in which current participants have the most education are projected to have the most rapid growth rates, even if their relative growth is slower. Jobs are expected to continue to be available for those with only a high school education. However, persons with less than a high school education will find it more difficult to find a job—particularly a job with good pay and chances for advancement—than those with more education. Those with less education will continue to have more labor market problems and less opportunity for advancement because they frequently do not have the education or training needed to adapt to the continuing changes in employment resulting from technology advances and changes in the structure of demand, and to the employment displacement which may follow these changes. The fact that large numbers continue to drop out of high school clearly signals that an important problem remains.[4] As pointed out earlier, blacks and Hispanics are disproportionately represented among those with less education and are projected to account for an increasing share of workers. Given this trend, the recent data on declining college enrollment of blacks are unfortunate.[5]

Despite the faster than average employment growth for occupations requiring at least a bachelor's degree, the surplus of college graduates that began in the early 1970's is expected to continue through the end of the century. However, the balance between supply and demand for new college graduates is expected to narrow considerably as we enter the 1990's, partly because of the decline of college graduates stemming from the shrinkage in college-age population.[6]

Occupations that are generally filled by young workers, such as food service, retail sales, and construction labor, are projected to continue to generate many jobs and, as discussed earlier, the declining number of young workers could offer the opportunity to improve the youth labor market situation. At the same time, given the expected sharp decline in the number of youths, it could also provide employment opportunities for others not often employed in those jobs, such as those recently retired who desire some work.

Further, this also could offer the opportunity to increase the labor market participation of some groups such as black men who currently have much lower labor force participation rates than do white men of the same age.

Women and blacks traditionally have been highly concentrated in certain occupations. Although some improvements have occurred in the past decade in changing this occupational segregation, the future offers a chance for further improvement because employment growth is projected to be most rapid in occupations not traditionallly filled by Hispanics, blacks, and, to some extent, women—and labor force growth will be predominantly from these groups. □

——FOOTNOTES——

[1] For the last report on the 1995 projections, see the following articles in the November 1985 *Monthly Labor Review*: Betty W. Su, "The economic outlook to 1995: new assumptions and projections," pp. 3–16; Howard N Fullerton, Jr., "The 1995 labor force: BLS' latest projections," pp.17–25; Valerie A. Personick, "A second look at industry output and employment trends through 1995," pp. 26–41; and George T. Silvestri and John Lukasiewicz, "Occupational employment projections: the 1985–95 outlook," pp. 42–57.

[2] See *Displaced Workers, 1979–83*, Bulletin 2240 (Bureau of Labor Statistics, July 1985). For results of 1986 surveys on displaced workers, see the following articles in the June 1987 *Monthly Labor Review:* Francis W. Horvath, "The pulse of economic change: displaced workers of 1981–85," pp. 3–12; and Sharon P. Brown, "How often do workers receive advance notice of layoffs?" pp. 13–17.

[3] See Employee Benefit Research Institute's tabulations of the May 1983 Current Population Survey.

[4] *Elementary and Secondary Education Indicators in Brief* (Office of Educational Research and Improvement, 1987).

[5] *Elementary and Secondary Education*.

[6] See *Trends in Education, 1975–76—1995–96* (U.S. Department of Education, Center for Education Statistics, 1987).

Economic projections to the year 2000

Real gross national product growth averages 2.4 percent a year, according to moderate projections, reflecting a slowly improving foreign trade decifit, higher productivity, and a continued shift to a more service-oriented economy

NORMAN C. SAUNDERS

The Bureau of Labor Statistics has prepared projections of the U.S. economy to the year 2000, our first look at the remainder of this century. The new projections, with 1986 as the base historical year, update and extend the previously published projections.[1] As with earlier projections, three alternatives—termed moderate growth, low growth, and high growth—were estimated. The alternatives are designed to provide a range of estimates with variations in those assumptions to which the aggregate model is the most sensitive.

The moderate-growth alternative is characterized by a gross national product (GNP) influenced by greater productivity increase and slowing labor force growth, a moderately tapering unemployment rate, and a slowly improving foreign trade situation. In comparison, the high-growth model has stronger overall demand, higher inflation, and lower unemployment, but less favorable foreign trade balances; while the low-growth version has deeper recessions, slower productivity growth, declining government spending, and a higher unemployment rate. Projected real GNP growth for the 1986–2000 period ranges between 1.6 percent for the low-growth alternative and 3.0 percent for the high-growth scenario, providing a spread of $1 trillion in the real GNP estimates for 2000.

By 2000, under the assumptions used by the Bureau in developing these projections, GNP is expected to range between $4.6 trillion and $5.6 trillion (in 1982 dollars), with disposable personal income between $3.2 trillion and $3.9 trillion. The annual employment increase ranges between 1 million persons in the low-growth scenario and 1.6 million persons in the high-growth scenario. The unemployment rate ranges between 4.5 percent in the high projection and 7.7 percent in the low. The following tabulation shows the levels and percent growth rates for selected key economic variables, 1982–86 and projected to 2000:[2]

			Projected, 2000		
	1972	*1986*	*Low*	*Moderate*	*High*
Civilian unemployment rate	5.6	7.0	7.7	6.0	4.5
Federal deficit (billions of current dollars)	−16.8	−204.0	−289.1	−89.3	−44.1
Net exports (billions of 1982 dollars)	−48.8	−149.7	−39.1	−98.6	−150.2

	Annual growth rate			
		Projected, 2000		
	1972–86	*Low*	*Moderate*	*High*
Real GNP	2.5	1.6	2.4	3.0
GNP implicit deflator	6.6	2.3	3.4	4.9
Civilian labor force	2.2	1.0	1.2	1.3
Employment (from household survey)	2.1	.9	1.2	1.5
Real disposable personal income	2.7	1.5	2.4	3.0
Real disposable per capita income	1.7	.7	1.6	1.9

Norman C. Saunders is an economist in the Office of Economic Growth and Employment Projections, Bureau of Labor Statistics.

Projections framework

The aggregate economic projections are prepared using the Wharton Long-Term Model of the U.S. Economy as a starting point.[3] Many exogenously specified variables must be provided to the model, but analysis has shown that a relatively small number of these assumptions significantly affect long-term projections.[4] These variables are summarized in table 1 and are discussed below.

In addition, the projections are generally approached with certain results in mind, such as the level of the unemployment rate, the rate of growth of labor productivity, inflation, the presence or absence of a business cycle, and the sectoral distribution of employment.

In a change from prior BLS projections, a business cycle was assumed for the 1986–2000 projection period. Reviews of past projection efforts have indicated that by assuming steady uninterrupted growth in the economy, growth is overestimated in the more volatile and cyclically sensitive GNP components, in particular, consumer durables, producers' durable equipment, and construction.[5] Two recessions are assumed to occur between 1986 and 2000. This should not be read as a prediction of a recession in any specific year; instead, it is a bow to the inevitability of business cycle fluctuations and the effect the cycle has on long-term demand growth and on the distribution of demand.

Second, the unemployment rate in 2000 is assumed to be slightly below current levels. In spite of temporary increases in unemployment induced by the assumed business cycle fluctuations, the moderate scenario has the unemployment rate declining to 6 percent in 2000, down a percentage point from the 1986 rate of 7.0 percent.

A third important modification to the model is to impose the industry distribution of production and employment on the aggregate projections at a major sector level to reflect the more detailed analysis carried out at the industry level. The aggregate projections thus provide control values to the industry projections but are, in turn, affected by those projections.

Underlying assumptions—moderate scenario

Many assumptions must be spelled out in very specific terms to generate an estimate of future growth. The following discussion focuses on the more important assumptions underlying the moderate-growth projections.

Fiscal policy. Plans for new defense programs are expected to be gradually curtailed in the coming decade. Projects for which appropriations have already been made or planned are expected to keep real defense spending growing through the end of this decade, when it is projected to peak at $268 billion. Thereafter, smooth declines are assumed over the remainder of the projection period, as defense spending drops to $251 billion in 2000, roughly the same level as in 1986.

Real nondefense purchases of goods and services are assumed to drop to $78.8 billion by 1990, approximately the 1981–82 level of spending. After 1990, growth returns as these purchases increase at a relatively smooth average annual rate of 2.8 percent over the decade of the 1990's.

The realities of recent large Federal deficits bring a sense of general fiscal conservatism to the assumptions affecting other Federal expenditure categories. No real growth is assumed during the 1986–95 period for food stamp benefits, military retirement and veterans' benefits, medicare payments, and Social Security benefits. Growth in these categories is a combination of inflation adjustment and client population shifts only. After 1995, some resumption of growth in all of these benefits categories is expected—but still only a modest 1 to 2 percent annually.

Federal subsidies are assumed to be flat in real terms throughout the period, as are Federal grants-in-aid to State and local governments.

On the revenue side, the Tax Simplification Act of 1986 has the initial impact of increasing effective personal tax rates from 10.4 percent in 1986 to 11.2 percent in 1987. Thereafter, as taxpayers make shifts in their tax strategies, the effective rate declines steadily over the entire projection period, reaching 8.9 percent in 2000.

The effective corporate tax rate has increased steadily from 27 percent in the late 1970's to its current level of 37 percent. The rate is assumed to remain at this level through 1990, followed by gradual declines to 26 percent by 2000. The Social Security wage base and combined tax rates are as mandated by the Social Security Act of 1978.

State and local government spending increased at an annual 1.5-percent real rate between 1979 and 1986, less than the 2-percent rate during the 1972–79 period. Slower growth from 1979 to 1986 than from 1972 to 1979 resulted from declining school enrollments and a general trend toward slower growth in government provided services. This pattern is expected to reverse over the next 14 years in response to several factors.

First, the baby-boom generation has been having children. These children, the so-called "echo," are now beginning to affect school enrollments, which are already climbing in the early grades. Elementary school enrollments are expected to peak in 1996 and secondary attendance, around 2000. Over the decade of the 1990's, demand for educational services will increase as a result. However, the echo will not affect postsecondary education until after 2000.

Further, it is expected that cutbacks or slower growth in many State-provided services will be tempered in the coming years. The net effect of these assumptions is to pull real State and local spending up to a 2-percent annual rate of growth, comparable with the 1972–79 period and 0.5 percentage points higher than the growth during the 1979–86 period.

Monetary policy. Monetary policy in the moderate-growth projection is best described as accommodative.

Growth of M2, the broadly defined money supply, has been set to parallel projected growth in nominal GNP so that monetary policy will not choke growth by being too restrictive, nor re-initiate the inflationary spiral of the 1970's by being too loose. The velocity of M2 remains roughly constant, in the 1.60 to 1.65 range, throughout the projection period.

Both short- and long-term interest rates remain flat in real terms, rising about 1 percentage point over the 14-year horizon of the projections in response to the expected rate of increase in prices.

Demographic. The population estimates underlying the aggregate projections are the middle-growth series developed by the Bureau of Census.[6] These new population projections have been developed with higher immigration and slightly lower birth rates than in earlier Census Bureau efforts. The middle-level civilian labor force projections, developed by BLS to be consistent with the new Census Bureau population estimates, are incorporated in the moderate-growth aggregate projections.[7]

Other demographic assumptions, such as the number of households, the number of families, and the number of unrelated individuals, have all been derived from earlier Census Bureau projections, modified by BLS to reflect the new population projections.

Foreign economic activity. World gross domestic product, less that of the United States and centrally-planned economies, is assumed to grow at a real annual rate of 2.6 percent over the 1986–2000 period, paralleling the performance of this measure during the 1972–86 period. Some slowdowns are assumed for interim years in response to recessions in the U.S. economy, but the drop in growth is relatively small and easily recovered in the following years.

The projections encompass an assumed annual inflation rate of 5 percent for the same world area, slightly less than the 5.7-percent inflation rate during the 1979–86 period and well below the disastrously high 15.3-percent annual inflation during the 1972–79 period, which was caused primarily by rapid increases in oil prices.

In 1981, the exchange value of the dollar began a sharp and steady increase, culminating in 1985 with the U.S. dollar valued almost 64 percent higher than in 1980. As a result, imports became less expensive and flooded the United States while the Nation's exports, now more expensive, were choked out of many of their traditional foreign markets. The dollar's exchange value dropped 22 percent in 1986. It has been assumed that the exchange rate will stabilize at its 1982 level and remain steady at that level for the remainder of the decade.

Table 1. Major assumptions affecting aggregate economic projections, 1972, 1979, 1986, and projected to 2000
[In billions, unless noted otherwise]

Item	1972	1979	1986	Projected, 2000		
				Low	Moderate	High
Federal Government:						
Defense purchases, 1982 dollars	185.3	164.3	251.0	222.5	251.0	263.0
Nondefense purchases, 1982 dollars	60.7	71.9	82.4	97.3	103.4	108.2
Food stamps, 1982 dollars	6.5	7.7	9.6	10.4	12.2	14.9
Military retirement, 1982 dollars	29.4	30.2	28.1	28.4	30.1	32.1
Medicare, 1982 dollars	18.5	37.8	57.9	75.2	83.0	94.1
Social Security, 1982 dollars	116.3	131.3	169.7	209.0	243.4	293.9
Other transfers, 1982 dollars	39.6	43.6	53.5	55.5	58.6	61.3
Old Age, Survivors, and Disability Insurance taxable income, current dollars	10,800	22,900	41,500	89,700	89,700	89,700
Old Age, Survivors, and Disability Insurance tax rate	9.0	12.3	14.3	15.5	15.5	15.5
Grants-in-aid, current dollars	37.5	80.5	104.0	143.0	192.1	235.1
Subsidies, current dollars	7.9	9.2	25.6	20.2	26.1	29.4
Transfers to foreigners, current dollars	2.9	5.2	13.7	14.8	15.2	17.3
Interest to foreigners, current dollars	2.7	11.1	23.0	49.2	48.7	46.3
State and local government:						
Education, 1982 dollars	146.8	165.0	178.7	195.3	223.1	232.5
Health and welfare, 1982 dollars	41.8	67.9	73.7	86.3	103.4	108.2
Safety, 1982 dollars	26.2	31.4	40.5	45.4	54.2	56.8
Other purchases, 1982 dollars	109.9	108.8	121.6	140.8	163.3	171.1
Transfer payments, 1982 dollars	59.1	73.2	93.4	110.3	117.3	121.5
Dividends, current dollars	.3	2.0	6.6	7.3	7.3	7.3
Net interest, current dollars	−1.5	−11.8	−26.0	−45.2	−49.6	−57.6
Demographic (in millions):						
Number of families	52.1	59.3	63.2	73.1	73.1	74.8
Number of households	69.0	78.8	88.6	109.0	109.0	111.5
Number of unrelated individuals	21.4	24.4	32.2	40.4	40.4	40.8
Civilian labor force	86.6	104.9	117.9	134.5	138.8	141.1
Armed Forces	2.6	2.1	2.2	2.3	2.3	2.3
Self-employed persons	5.4	6.8	7.9	8.9	9.7	10.2
Unpaid family workers	.5	.5	.3	.1	.2	.2
Adjustment factor	−.9	−1.6	−1.9	−1.7	−1.9	−2.1
Foreign:						
World gross domestic product, 1982 dollars	5,571.9	6,946.4	7,930.1	9,082.2	11,314.2	12,836.4
World gross domestic product, deflator (1982 = 100)	29.5	80.0	117.6	203.6	232.6	266.0
Exchange rate of the U.S. dollar	132.4	131.9	103.5	97.3	97.3	97.3
Crude oil imports, million barrels per day	3.1	6.5	4.8	6.3	7.6	8.5
Import oil price, dollars per barrel	5.74	21.67	15.88	43.71	48.40	53.10

SOURCE: Historical data are from the Bureau of the Census and the Bureau of Economic Analysis, U.S. Department of Commerce; Wharton Econometric Forecasting Associates, Inc.; U.S. Department of Energy; and the Bureau of Labor Statistics. Projected data are from the Bureau of Labor Statistics and the Bureau of Census.

Energy. Assumptions regarding oil prices, import levels of crude petroleum and natural gas, and domestic production levels of crude petroleum, natural gas, and coal have been set in accordance with projections prepared by the U.S. Department of Energy.[8] These projections assume a nominal crude oil import price of $48.40 per barrel in 2000. In constant 1986 prices, this translates to a barrel price of $30.90 in 2000, roughly a doubling of real imported oil prices in the next 14 years.

General assumptions. It was assumed that there would be no major wars, oil embargoes, other major price shocks, or serious natural catastrophes during the projection period.

Moderate growth results

Real GNP is projected to increase 2.4 percent a year between 1986 and 2000, for a 40-percent increase over the period. This compares to the 2.5-percent growth rate over the 1972–86 period and the 2-percent rate over the 1979–86 period. A summary of demand growth is shown in table 2.

A change from historical behavior is reflected in the fact that half of the projected growth in real GNP is attributable to growth in labor productivity and half to growth in employment. During the 1972–86 period, only 28 percent of the change in real GNP was contributed by productivity increase.

Personal consumption. As in the past, the personal consumption expenditures (PCE) component is projected to grow slightly more rapidly than overall GNP, increasing its share of GNP from 65.8 percent in 1986 to 66.4 percent by 2000. This results largely from cuts in personal taxes over the 1987–90 period, spurring further increases in consumption.

Spending for durable goods is projected to account for a fixed share of the consumer budget over the next decade, as purchases of consumer electronics and the specialized furniture necessary to house the new equipment grow rapidly, offsetting expected slowdowns in auto sales.

Consumer spending for autos and parts is projected to grow 0.9 percent a year between 1986 and 2000, down considerably from the 4.6-percent pace over the 1979–86 period. The sluggish expansion is attributed to a slowdown in the growth of the "new driver" population and to the two assumed recessions over the projection horizon. Durable consumption as a whole continues to account for just more than 15 percent of total consumer spending, unchanged from 1986. (See table 3.)

Nondurable consumption continues to account for a smaller share of aggregate PCE over time. Many nondurable items, such as clothing and food, represent basic necessities of living and, as such, are relatively income inelastic. As family incomes rise beyond certain basic subsistence levels, the increases tend to be spent more on luxury items than on the basic necessities.

Nondurables accounted for 38.2 percent of real consumption in 1979, dropped to a 36.1-percent share by 1986, and are projected to account for just 32.6 percent by 2000. All of the major nondurable subcategories decline in share terms except for other nondurables, which include purchases of cleaning products and toiletry articles, drug preparations, paper products, and a long list of other nondurable household items. Strong growth in the purchases of cleaning items and drug preparations raise the other nondurables category to a 7.1-percent share of total PCE in 2000, up from a 6.3-

Table 2. Gross national product by major demand categories, 1972, 1979, 1986, and projected to 2000
[Billions of 1982 dollars]

Item	1972	1979	1986	Projected, 2000		
				Low	Moderate	High
Gross national product	2,608.5	3,192.4	3,678.5	4,617.5	5,161.4	5,552.4
Personal consumption	1,621.9	2,004.4	2,418.7	3,101.2	3,429.4	3,659.7
Durables	200.4	266.5	368.9	472.9	527.2	589.0
Nondurables	665.5	766.6	872.4	1,038.3	1,116.4	1,204.6
Services	756.0	971.2	1,177.4	1,590.0	1,785.9	1,866.1
Gross private domestic investment	465.4	575.2	659.7	767.8	932.1	1,103.2
Equipment	167.5	258.8	320.3	424.8	504.2	560.8
Structures	109.5	130.6	134.7	146.5	198.8	224.6
Residential	166.6	170.8	193.9	190.9	202.1	279.6
Inventory change	21.8	15.0	10.8	5.6	27.0	38.2
Exports	195.2	356.8	371.3	516.8	634.5	712.0
Imports	244.6	353.2	521.0	555.9	733.0	862.2
Federal Government	246.0	236.2	333.4	319.8	354.4	371.2
Defense	185.3	164.3	251.0	222.5	251.0	263.0
Nondefense	60.7	71.9	82.4	97.3	103.4	108.2
State and local government	324.7	373.0	414.5	467.8	544.0	568.6
	Percent distribution					
Gross national product	100.0	100.0	100.0	100.0	100.0	100.0
Personal consumption	62.2	62.8	65.8	67.2	66.4	65.9
Durables	7.7	8.3	10.0	10.2	10.2	10.6
Nondurables	25.5	24.0	23.7	22.5	21.6	21.7
Services	29.0	30.4	32.0	34.4	34.6	33.6
Gross private domestic investment	17.8	18.0	17.9	16.6	18.1	19.9
Equipment	6.4	8.1	8.7	9.2	9.8	10.1
Structures	4.2	4.1	3.7	3.2	3.9	4.0
Residential	6.2	5.4	5.3	4.1	3.9	5.0
Inventory change	.8	.5	.3	.1	.5	.7
Exports	7.5	11.2	10.1	11.2	12.3	12.8
Imports	9.4	11.1	14.2	12.0	14.2	15.5
Federal Government	9.4	7.4	9.6	6.9	6.9	6.7
Defense	7.1	5.2	6.8	4.8	4.9	4.7
Nondefense	2.3	2.3	2.2	2.1	2.0	1.9
State and local government	12.4	11.7	11.3	10.1	10.5	10.2
	Average annual rate of growth (in percent)					
	1972–79	1979–86	1972–86	1986–2000		
				Low	Moderate	High
Gross national product	2.9	2.0	2.5	1.6	2.4	3.0
Personal consumption	3.1	2.7	2.9	1.8	2.5	3.0
Durables	4.2	4.8	4.5	1.8	2.6	3.4
Nondurables	2.0	1.9	2.0	1.2	1.8	2.3
Services	3.6	2.8	3.2	2.2	3.0	3.3
Gross private domestic investment	3.1	2.0	2.5	1.1	2.5	3.7
Equipment	6.4	3.1	4.7	2.0	3.3	4.1
Structures	2.5	.4	1.5	.6	2.8	3.7
Residential	.8	1.8	1.3	−.1	.4	2.6
Inventory change	−5.2	−4.6	−4.9	−5.1	5.0	9.3
Exports	9.0	.6	4.7	2.4	3.9	4.8
Imports	5.4	5.7	5.5	.5	2.5	3.7
Federal Government	−.6	5.0	2.2	−.3	.4	.8
Defense	−1.7	6.2	2.2	−.9	0	.3
Nondefense	2.4	2.0	2.2	1.2	1.6	2.0
State and local government	2.0	1.5	1.8	.9	2.0	2.3

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

percent share in 1986, and reversing a slowing trend apparent over the 1970's and early 1980's. (See table 3.)

Because of slowing growth in auto sales, more efficient engines, and the general energy conservation awareness of the 1980's, real spending on gasoline and oil is expected to remain virtually unchanged in real terms over the projection horizon.

Purchases of consumer services are projected to grow quite strongly over the 1986–2000 period, increasing from 48.7 percent of total consumption in 1986 to 52.1 percent in 2000. Spending for housing, household operation, and transportation will remain a virtually fixed share of consumption during this period. All of the share growth occurs in health and other consumer services, which covers a range of recreational, social, educational, personal, and professional activities.

Health services are projected to grow at a real rate of 3.5 percent a year, increasing their share of overall consumption to 10.8 percent in 2000 from 9.5 percent in 1986. This is attributable to both the generally aging population and the expected continued development of new, but increasingly more expensive, medical procedures. Very sharp increases are expected in spending for a variety of consumer entertainment—legitimate theater, commercial sporting events, and health clubs and spas, to name a few. Also expected to grow faster than average is personal spending on all types of financial services, as the level of sophistication with which consumers approach money management continues to increase.

Table 3. Durable, nondurable, and services consumption in 1972, 1979, 1986, and projected to 2000

Item	Level (billions of 1982 dollars)				Percent distribution			
	1972	1979	1986	Projected, 2000	1972	1979	1986	Projected, 2000
Durable consumption	$200.4	$266.5	$368.9	$527.2	100.0	100.0	100.0	100.0
Autos and parts	98.3	119.4	164.0	187.0	49.1	44.8	44.6	35.5
Household furniture	70.2	97.1	140.3	226.3	35.0	36.4	38.0	42.9
Other durables	31.8	50.1	64.5	113.9	15.9	18.8	17.4	21.6
Nondurable consumption	665.5	766.3	872.4	1,116.4	100.0	100.0	100.0	100.0
Food and beverages	344.2	387.5	440.7	541.6	51.7	50.6	50.5	48.5
Clothing and shoes	80.3	112.1	155.5	201.3	12.1	14.6	17.8	18.0
Gasoline and oil	87.0	97.1	105.2	105.8	13.1	12.7	12.1	9.5
Fuel oil and coal	28.6	26.2	18.7	24.4	4.3	3.4	2.1	2.2
Other nondurables	125.3	143.7	152.3	243.2	18.8	18.8	17.5	21.8
Services consumption	756.0	971.2	1,177.4	1,785.9	100.0	100.0	100.0	100.0
Housing	235.5	304.1	351.4	510.9	31.2	31.3	29.8	28.6
Household operation	108.6	138.3	150.7	218.4	14.4	14.2	12.8	12.2
Transportation	66.0	82.9	85.0	118.4	8.7	8.5	7.2	6.6
Health	136.0	192.2	229.8	371.7	18.0	19.8	19.5	20.8
Other services	210.0	253.7	360.5	566.5	27.8	26.1	30.6	31.7

Investment. Although PCE still accounts for the lion's share of GNP, the moderate projections are also characterized by strong, sustained growth in business fixed investment. Purchases of producers' durable equipment are expected to increase at an annual real rate of 2.5 percent over the projection period, or about $19 billion each year.

Although off sharply during both of the assumed recessionary periods, purchases of producers' durable equipment are expected to recover strongly from both downturns and to grow more rapidly than overall GNP during the recovery years. Producers' durable equipment will continue the trend evident in the late 1970's and early 1980's in which it accounted for an increasing share of real GNP. This upward shift principally reflects slowing growth in the sector-level user cost of capital. Declining corporate tax rates, lower inflation, and lower long-term interest rates all serve to make the expected stream of services from current investment relatively less expensive than during the 1970's and 1980's, thus leading to more rapid growth in capital accumulation over the projection period. Equipment purchases accounted for 8.7 percent of GNP in 1986 and are expected to account for more than 10 percent by 2000.

By major consuming sector, the most rapid growth in spending for equipment is projected for durable manufacturing and communications, both expected to spend at a real rate of 4.5 percent between 1986 and 2000. The slowest growth sectors are transportation (0.8-percent annual growth) and agriculture and public utilities (both exhibiting 2.5-percent annual growth). Nondurable manufacturing industries are expected to buy new equipment at a 3.5-percent rate of increase, not as fast as the growth of equipment purchases by durable goods producers, but still above the overall average growth rate for this component of demand.

Almost one-fifth of the total expenditures for producers' durable equipment is expected to be for computers, the largest single item of all the equipment commodities. Heavy investment in factory automation and robotics also leads to large purchases of certain types of industrial machinery, particularly metalworking machinery and material moving equipment, and of scientific and controlling devices. Communications equipment is projected to be the most rapidly growing, and the third largest producers' durable equipment purchase, as the demand for telecommunications services leads to high levels of spending on satellites and other communications equipment. Investment demand for motor vehicles, including trucks, is projected to grow more slowly than total equipment spending, but will still rank second in terms of overall levels.

Overall capital accumulation accelerates throughout the projection period in most sectors of the economy, leading to strong growth in labor productivity, especially in the manufacturing industries.

A recovery from the commercial building glut of the late 1970's and early 1980's is also projected, as investment in nonresidential structures increases 2.8 percent each year between 1986 and 2000, up sharply from the 0.4-percent annual growth in the 1979–86 period.

Residential construction is expected to slow over the next 14 years, growing at an average real rate of 0.4 percent between 1986 and 2000. As with autos, the slowdown is determined by both cyclical and demographic factors, as the formation of new households is projected to slow dramatically during the 1990's, pulling down the level of housing

starts over the projection period. The aging of the population, particularly among those of retirement age, is expected to increase demand for multi-unit starts relative to single-unit starts.

Foreign trade. The sharp reduction in the exchange value of the dollar seen in 1986 is assumed to continue until 1990, but at a much slower rate. This drop in the value of the dollar, accompanied by relatively robust assumptions regarding foreign economic growth, leads to almost 4-percent annual real growth projected for exports of goods and services between 1986 and 2000. Although substantially better than export performance in the early 1980's, the dramatic improvement in exports expected by many economic analysts in response to declining dollar values fails to materialize in the projections because of changes in foreign markets and in U.S. industries during the period of reduced export trade.

Many of the countries which, during the 1960's and 1970's, maintained large agricultural import balances with the United States have now not only developed the capability to feed their own populations from within but are, quite often, becoming net agricultural exporters. It is unlikely, therefore, that the United States has any chance of replicating the past booms in agricultural exports.

Many export markets in less-developed countries were also lost during the early 1980's. However, now that U.S. exports are again becoming price-competitive, many of these countries are facing serious debt problems, effectively locking them out of foreign markets.

Most significantly, however, a large number of already vulnerable industries, such as farm and garden equipment, engines, turbines, and generators, and other nonelectrical machinery producers, were hit hard by the strong dollar of the early 1980's, forcing them to shrink at an accelerated pace and making it highly unlikely at this point that they will be able to respond as strongly as in past periods to increasing foreign demand. (See table 4 for exports by major end-use categories.)

Imports, in contrast, are expected to grow much less rapidly, as the value of the dollar is assumed to decline. The slowdown in import growth due to financial considerations is, however, at least partially offset as softening oil prices are assumed to lead to major reductions in domestic exploration for and production of crude petroleum and natural gas. As the demand for primary and secondary energy products continues to expand over the 1990's, it is assumed that the shortfall in domestic production is made up entirely from imports.

As a result, the grave trade imbalances of the mid-1980's improve substantially over the projection period, but are not fully resolved. The real net export balance is expected to decline slowly to $99 billion in 2000. (See table 4 for imports by major end-use categories.) The drop in auto imports reflects the assumption that the dollar's decline will result in less competitive prices for foreign cars and in more foreign automakers setting up factories in the United States.

Table 4. Exports and imports by major end-use categories, 1972, 1986, and projected to 2000
[In billions of 1982 dollars]

Item	1972	1986	Projected, 2000	Annual growth rate (in percent)	
				1972–86	Projected, 1986–2000
Total exports	$195.2	$371.3	$634.5	4.7	3.9
Merchandise	131.3	237.5	416.4	4.3	4.1
Food, feed, and beverages	16.3	25.7	51.6	3.3	5.1
Consumer goods	7.5	13.9	22.8	4.5	3.6
Industrial supplies	39.5	62.1	96.8	3.3	3.2
Capital goods	39.7	90.1	167.3	6.0	4.5
Autos and parts	17.0	21.1	26.0	1.6	1.6
Other merchandise	11.3	24.7	51.8	5.7	5.3
Services	64.0	133.8	218.1	5.4	3.6
Factor income	33.9	76.9	134.3	6.0	4.1
Military sales	3.1	8.1	5.4	7.1	−2.9
Other services	27.0	46.1	78.3	3.9	3.9
Total imports	244.6	521.0	733.0	5.5	2.5
Merchandise	190.7	420.4	563.8	5.8	2.1
Food, feed, and beverages	17.4	23.1	30.0	2.0	1.9
Consumer goods	25.4	73.6	111.2	7.9	3.0
Industrial supplies	46.9	73.9	86.5	3.3	1.1
Petroleum products	56.0	75.9	122.1	2.2	3.5
Capital goods	10.9	90.9	111.7	16.4	1.5
Autos and parts	26.6	66.7	56.5	6.8	−1.2
Other merchandise	7.7	16.2	45.8	5.5	7.7
Services	53.9	100.7	169.2	4.6	3.8
Factor income	11.1	44.2	80.1	11.1	4.3
Defense purchases	4.8	10.6	16.2	4.8	3.1
Other services	38.9	44.5	72.9	1.0	3.6

Government. As a whole, government purchases of goods and services are expected to account for a smaller share of GNP over time, dropping from almost 21 percent of GNP in 1986 to 17.4 percent by 2000. Most of the declining share is accounted for by Federal Government spending slowdowns. Defense spending is expected to account for 4.8 percent of GNP in 2000, down from a share of almost 7 percent in 1986, while nondefense spending drops off slightly in importance, from 2.2 percent of GNP in 1986 to 1.9 percent in 2000.

Other Federal expenditure categories are also projected to account for a declining share of GNP during the next 14 years, as shown in the following tabulation:

	Percent of nominal GNP		
	1972	*1986*	*Projected, 2000*
Total Federal expenditures	20.5	24.5	20.5
Goods and services	8.7	8.7	6.7
Transfer payments	6.9	9.1	8.9
Net interest	1.2	3.2	2.5
Other spending	3.7	3.1	2.3
Total Federal receipts	19.1	19.6	19.6
Personal taxes	8.9	8.6	7.3
Corporate taxes	3.0	2.0	2.1
Indirect business taxes	1.6	1.2	1.4
Social insurance contributions	1.6	7.8	8.7
Federal deficit	1.4	4.9	1.0

Federal receipts are expected to account for a fixed share of GNP, just under 20 percent. The burden is expected to shift, however, as personal, corporate, and indirect business taxes together account for 55.4 percent of total Federal revenues in 2000, down from the 60.2 percent accounted for by these three tax categories in 1986. The burden is shifted to social insurance contributions, which are expected to account for almost 45 percent of Federal tax collections in 2000 (up from 39.8 percent in 1986), and by the early 1990's are expected to become a more important source of Federal revenues than personal income taxes.

The net effect of these changes is that, in the BLS projections, a gradually shrinking deficit results, declining from $204 billion in 1986 (4.9 percent of GNP) to $85.6 billion in 2000 (0.9 percent of GNP).

As the following tabulation shows, State and local spending is up slightly in share terms, as increasing demand for educational services in the mid- to late 1990's temporarily expands government educational shares, which are offsetting slower growth elsewhere:

	Percent of nominal GNP		
	1972	*1986*	*Projected, 2000*
Total State and local expenditures	13.7	13.3	14.4
Goods and services	11.9	11.8	12.9
Other spending	1.8	1.5	1.5
Total State and local receipts	14.8	14.7	15.0
Personal taxes	2.8	3.6	3.7
Corporate taxes	.4	.5	.5
Indirect business taxes	7.5	7.0	7.3
Social insurance contributions	.9	1.1	1.4
Grants-in-aid	3.1	2.5	2.0

Inflation. The rate of growth of prices, as reflected by the implicit GNP deflator, is projected to moderate from the 1972–86 pace of 6.6 percent to a 3.5-percent rate over the 1986–2000 period. As noted earlier, monetary policy has been assumed that will be stimulative to growth without providing enough pressure to re-ignite the inflationary spiral of the 1970's.

Labor productivity. Productivity, represented in the model and in these projections by real GNP per employee, increased at a dismal rate of 0.3 percent each year between 1972 and 1979. During the next 7 years, productivity fared only slightly better, growing at an average rate of 0.5 percent between 1979 and 1986. Sustained growth in investment and the movement of much of the labor force into prime working-age years is expected to cause a modest recovery in labor productivity. GNP per employee is projected to increase at an average annual rate of 1.2 percent between 1986 and 2000.[9]

Productivity growth in the manufacturing sector is projected to be much more robust than for the economy as a whole, continuing a historical trend that has been especially pronounced in recent years. Capital investment in factory automation, continued energy substitution, contracting out, restructuring of inefficient operations, and other factors noted over the 1986 to 2000 period are expected to continue to contribute to high growth in manufacturing productivity.

Employment. Between 1979 and 1986, civilian household employment expanded at an annual average rate of 1.5 percent, or about 1.5 million persons. This was just slightly lower than the rate of increase in the civilian labor force over the same period. Employment is projected to increase by just under 21 million persons between 1986 and 2000, an annual average increase of almost 1.5 million employed persons. The civilian unemployment rate, at 7 percent in 1986, is expected to reach 6 percent in the year 2000. (See table 5.)

Income. No particular surprises are projected for income distributions over the decade of the 1990's. Personal income accounts for virtually the same share of GNP in the year 2000 as in 1986. Disposable personal income, in contrast, accounts for a slightly greater share of GNP in 2000 than in 1986, because of the declines in effective personal tax rates as a result of tax changes enacted in 1986.

Real per capita disposable income is expected to reach $13,421 by 2000, reflecting a continuation of the rate of increase noted over the 1972–86 period, but a resurgence from the slower growth this measure experienced between 1979 and 1986. The personal savings rate is projected to

Table 5. Labor force, employment, and labor productivity 1972, 1979, 1986 and projected to 2000
[In millions, unless noted otherwise]

Item	1972	1979	1986	Projected, 2000		
				Low	Moderate	High
Civilian labor force	87.0	104.9	117.8	134.5	138.8	141.1
Civilian employment (from household survey)	82.2	98.8	109.6	124.1	130.4	134.8
Unemployed	4.9	6.1	8.2	10.4	8.3	6.4
Unemployment rate (percent)	5.6	5.8	7.0	7.7	6.0	4.5
Nonagricultural establishment employment	73.7	89.8	100.2	114.1	119.7	123.6
GNP per employee (thousands of 1982 dollars)	30.25	32.30	33.55	37.20	39.57	41.20
	Average annual rate of growth (in percent)					
	1972–79	1979–86	1972–86	1986–2000		
				Low	Moderate	High
Civilian labor force	2.7	1.7	2.2	1.0	1.2	1.3
Civilian employment (from household survey)	2.7	1.5	2.1	.9	1.2	1.5
Nonagricultural establishment employment	2.9	1.6	2.2	.9	1.3	1.5
GNP per employee (thousands of 1982 dollars)	.9	.5	.7	.7	1.2	1.5

Table 6. Gross national product as income, 1972, 1979, 1986, and projected to 2000
[Billions of current dollars, except where noted]

Item	1972	1979	1986	2000		
				Low	Moderate	High
Gross national product	1,212.8	2,508.2	4,208.5	7,312.4	9,455.0	12,637.5
Net national product	1,104.8	2,242.2	3,753.4	6,722.7	8,710.7	11,587.9
National income	994.1	2,047.3	3,387.4	5,993.3	7,852.8	10,482.5
Compensation	726.2	1,491.2	2,498.3	4,661.9	5,676.0	7,530.3
Proprietors' income	98.3	191.9	278.9	407.5	602.5	833.3
Rental income	17.9	5.6	15.6	59.0	61.7	36.9
Corporate profits	100.7	200.1	299.7	579.3	791.4	1,097.2
Net interest income	51.0	158.3	294.9	708.3	721.2	984.7
Personal income	981.6	2,034.0	3,487.0	5,961.2	7,752.1	10,433.3
Disposable personal income	839.6	1,729.3	2,973.7	5,178.9	6,705.6	8,908.2
Billions of 1982 dollars	1,794.4	2,212.6	2,603.7	3,218.8	3,626.1	3,938.1
Per capita, current dollars	4,000.0	7,628.0	12,312.0	19,168.0	24,819.0	31,782.0
Per capita, 1982 dollars	8,562.0	9,829.0	10,780.0	11,914.0	13,421.0	14,050.0
	Percent distribution					
Gross national product	100.0	100.0	100.0	100.0	100.0	100.0
Net national product	91.1	89.4	89.2	91.9	92.1	91.7
National income	82.0	81.6	80.5	82.0	83.1	82.9
Compensation	59.9	59.5	59.4	63.8	60.0	59.6
Proprietors' income	8.1	7.7	6.6	5.6	6.4	6.6
Rental income	1.5	.2	.4	.8	.7	.3
Corporate profits	8.3	7.8	7.1	7.9	8.4	8.7
Net interest income	4.2	6.3	7.0	9.7	7.6	7.8
Personal income	80.9	81.1	82.9	81.5	82.0	82.6
Disposal personal income	69.2	68.9	70.7	70.8	70.9	70.5
	Average annual rate of change (in percent)					
	1972–79	1979–86	1972–86	1986–2000		
				Low	Moderate	High
Gross national product	10.9	7.7	9.3	4.0	6.0	8.2
Net national product	10.6	7.6	9.1	4.3	6.2	8.4
National income	10.9	7.5	9.2	4.2	6.2	8.4
Compensation	10.8	7.6	9.2	4.6	6.0	8.2
Proprietors' Income	10.0	5.5	7.7	2.7	5.7	8.1
Rental income	−15.3	15.8	−1.0	10.0	10.3	6.3
Corporate profits	10.3	5.9	8.1	4.8	7.2	9.7
Net interest income	17.6	9.3	13.4	6.5	6.6	9.0
Personal income	11.0	8.0	9.5	3.9	5.9	8.1
Disposable personal income	10.9	8.1	9.5	4.0	6.0	8.2
Billions of 1982 dollars	3.0	2.4	2.7	1.5	2.4	3.0
Per capita, current dollars	9.8	7.0	8.4	3.2	5.1	7.0
Per capita, 1982 dollars	2.0	1.3	1.7	.7	1.6	1.9

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

range between 3.7 percent and 6.0 percent over the 1986–2000 period, generally higher than the 1986 rate of 3.9 percent.

IN SUMMARY, the moderate-growth scenario describes a growing economy characterized by a slowly improving Federal deficit, a return to higher productivity growth, and a continuation of the shift to a more service-oriented economy. The most pervasive problem facing the U.S. economy over the next decade will be our chronic trade deficit. Reductions in the value of the dollar are seen as only the first step necessary to forge a recovery from the current wide trade gap.

High and low scenarios

A high- and a low-growth scenario, providing bounds around the moderate-growth aggregate projection, have been estimated based on differing sets of assumptions outlined in table 1.

The low-growth projection was designed primarily to provide a scenario over the decade of the 1990's in which many current problems persist without much improvement. Labor productivity is assumed to grow at the same rate as it did during the 1972–86 period—0.7 percent annually. Combined with an assumption of deeper recessions and relatively sluggish recoveries, this leads to a real GNP almost $550 billion lower in 2000 than in the moderate projection, with employment lower by 6.3 million.

The high-growth projection, on the contrary, assumes labor productivity growth of 1.5 percent each year between 1986 and 2000, only minor slowdowns in GNP increase, and strong, sustained recoveries in other years, resulting in a GNP of $5.6 trillion in 2000, almost $500 billion higher than in the moderate projection. The sustained growth leads to an unemployment rate of 4.5 percent in 2000, implying 4.1 million more employed persons that year than in the moderate projection.

The two alternatives encompass a $935 billion spread in real GNP, a 6.3 million difference in the civilian labor force, and a 10.4 million range in the number of employed persons. Major results of the alternatives, compared with the moderate-growth projection, are as follows:

	2000		
	Low	*Moderate*	*High*
Civilian unemployment rate	7.7	6.0	4.5
Federal deficit, billions of current dollars	−289.1	−89.3	44.1
Net exports, billions of 1982 dollars	−39.1	−98.6	−150.2
	Annual rate of growth, 1986–2000		
	Low	*Moderate*	*High*
Real GNP	1.6	2.4	3.0
GNP implicit deflator	3.3	3.5	5.0
Civilian labor force	1.0	1.2	1.3
Employment (from household survey)	.9	1.2	1.5
GNP per employee	.7	1.2	1.5

Major demand category summaries are provided in table 2, employment summaries in table 5, and income comparisons in table 6.

Underlying assumptions. Federal Government expenditures are higher in the high-trend and lower in the low-trend alternatives than in the base projections. Conversely, spending as a share of nominal GNP shows the opposite relationship: high-trend government spending accounts for a smaller

proportion of GNP and low-growth government spending a higher proportion of GNP than in the base projection. The following tabulation shows projected Federal spending in 2000, total and as a share of GNP:

	Billions of current dollars		*Share of GNP (in percent)*	
	Low	*High*	*Low*	*High*
Federal spending	$1,588.0	$2,549.8	21.8	20.3
Goods	491.3	827.8	6.8	6.6
Transfers	651.3	1179.4	9.0	9.4
Other	445.4	542.6	6.0	4.3

In other words, faster or slower GNP growth in the alternatives is attributed, not to fiscal stimulus, but to other causes, primarily the wide range of productivity growth assumptions.

Higher rates of inflation, combined through the tax system with higher private incomes, yield much higher Federal revenues in the high-trend projection, resulting in a balanced Federal budget in 2000. The opposite effect is apparent in the low-trend projection, resulting in a Federal deficit of $289 billion in the year 2000.

In the low-growth projection, the same population levels are assumed as in the moderate-growth scenario, but an assumption of a lower labor force participation rate results in slower labor force growth. Alternatively, the high-growth scenario assumes a participation rate identical to the moderate-growth projection, but assumes a larger population, resulting from a more rapid than expected influx of immigrants, both documented and undocumented.

A projected unemployment rate of 7.7 percent in 2000 for the low-growth alternative leads to employment levels 6.3 million lower than in the moderate-growth projection. Conversely, in the high-growth scenario, an unemployment rate of 4.5 percent, combined with the larger labor force, yields employment higher by 4.1 million in 2000. Thus, the projections allow for a range of possible employment levels in the year 2000 of 10.4 million.

Sluggish foreign economic growth combined with lower world inflation serves to dampen exports somewhat in the low-growth alternative. However, imports drop off even more sharply in this alternative in response to lower GNP growth in the United States, leading to a much improved foreign trade balance.

Faster GNP growth in the high alternative elicits far greater import levels. Correspondingly higher rates of foreign economic growth have a much smaller effect on exports, leading to a steadily deteriorating trade balance in the high-growth projection. □

FOOTNOTES

[1] For previous projection articles, see the November 1985 issue of the *Monthly Labor Review*.

[2] In this tabulation, and elsewhere in the article, labor productivity is represented by real gross national product per employee. It is important to note that this measure of productivity is not comparable with those developed within the Office of Productivity and Technology, Bureau of Labor Statistics. For the definitions of labor productivity, multifactor productivity, and other related measures, and their historical data series, see the Current Labor Statistics sections of the *Review*.

[3] The Wharton model was selected from the commercial models offered to the Bureau on the basis of a competitive procurement and should not be deemed either more or less suitable, on a theoretical basis, than the other models considered in the procurement action. A detailed description of the Wharton model is provided in *Long-Term Model Structure and Specification* (Philadelphia, Wharton Econometric Forecasting Associates, 1982). A concise statement of BLS' overall projection methodology is contained in *Employment Projections for 1995: Data and Methods*, Bulletin 2253 (Bureau of Labor Statistics, 1986).

[4] For a detailed description of the analysis and results of this study, see Norman C. Saunders, "Sensitivity of BLS economic projections to exogenous variables," *Monthly Labor Review*, December 1986, pp. 23–29.

[5] As part of an ongoing effort to improve the projection methods and results, the BLS has evaluated the accuracy of earlier projection estimates. See the following *Monthly Labor Review* articles: John Tschetter, "An evaluation of BLS' projections of 1980 industry employment," August 1984, pp. 12–22; Howard N Fullerton, Jr., "How accurate were the 1980 labor force projections?" July 1982, pp. 15–21; and Max Carey and Kevin Kasunic, "Evaluating the 1980 projections of occupational employment," July 1982, pp. 22–30. Analyses of the various projections for 1985 published by BLS are being prepared.

[6] See *Projections of the Population of the United States, 1987 to 2080, Current Population Reports*, Series P-25, No. 1018 (Bureau of Census, forthcoming).

[7] See Howard N Fullerton, Jr., "Labor force projections: 1986 to 2000," *Monthly Labor Review*, September 1987, pp. 19–29.

[8] See *Annual Energy Outlook 1986* (U.S. Department of Energy, 1987). The Energy Department publishes each year a range of alternative energy scenarios. Scenarios consistent with the BLS estimates of GNP and inflation were chosen to fill in the energy assumptions.

[9] Based on historical relationships between GNP and the private business sector, the Office of Productivity and Technology, Bureau of Labor Statistics, has adjusted the projected 1986–2000 "GNP per employee" growth rate of 1.2 percent to "business sector output per employee" and "output per hour" estimates. The adjusted rates of growth, placed in a historical perspective, are as follow:

	Business sector output	
	Per hour	*Per employee*
1948–73	2.9	2.5
1973–86	.9	.4
1973–79	.6	.1
1979–86	1.0	.7
1986–2000	1.6	1.2 to 1.3

Labor force projections: 1986 to 2000

According to BLS projections, there will be 139 million persons in the 2000 labor force, representing a slowdown in the rate of growth after 1986; because of population or participation growth rates, blacks, Hispanics, and Asians and others are expected to increase their representation in the labor pool

HOWARD N FULLERTON, JR.

The labor force is projected by the Bureau of Labor Statistics to be 139 million persons in the year 2000. This represents growth of 21 million persons between 1986 to 2000 in the moderate of three alternative labor force projections; well below the 31 million added to the labor force between 1972 and 1986. The projected growth rate of 1.2 percent annually is less than the 2.2-percent annual rate over the 1972–86 period. (See table 1.)

Some trends in the labor force projections—the expected growth in the share of women in the labor force and the drop in the share of workers 55 and older—are the result of anticipated changes in participation rates. Women were only 39 percent of the labor force as recently as 1972; by 2000, they are projected to be 47 percent. The older population, which is growing as a share of the overall population, is projected to have lower labor force participation rates in 2000 and, as a consequence, a smaller share of the labor force. (See table 2.)

Other changes expected between 1986 and 2000 reflect underlying population changes. The proportion of youths (those 16 to 24 years) dropped from 23 percent of the labor force in 1972 to 20 percent in 1986 and is projected to fall further to 16 percent by 2000. The drop in the youth share of the labor force for the 1972–86 period reflects the end of the entry of the baby-boomers, while the projected drop reflects the lower numbers of births in the 1970's. Blacks, who were 10 percent of the labor force in 1972 and 11 percent in 1986, are projected to be 12 percent by 2000. The increased share of the labor force for blacks results from their population growth. Hispanics also are projected to increase their share of the labor force from 7 percent in 1986 to 10 percent by 2000, reflecting both population and participation growth. Asians and others are projected to increase their labor force share from 3 percent in 1986 to 4 percent in 2000, as the result of rapid population increase.[1]

This article presents BLS' first look at the 2000 labor force.[2] The alternative labor force projections are presented by age, sex, race and Hispanic origin. They are based on the Bureau of Census middle population projection and BLS projections of future trends in labor force participation.[3]

Components of labor force projections

Population. There are two major factors that determine labor force growth: changes in population and in labor force participation rates. The process of making projections is not exact; to indicate the possible range of uncertainty, BLS (and the Census Bureau) prepares alternative projections.[4] Labor

Howard N Fullerton, Jr. is a demographic statistician in the Office of Economic Growth and Employment Projections, Bureau of Labor Statistics.

force participation rate projections were prepared for three racial groups and independently for Hispanics by sex and age.[5]

To prepare population projections, assumptions about the future paths of births, deaths, and net migration must be made. The Bureau of Census new population projections used in the labor force projections (and in the other projection articles in this issue) are based on the following assumptions about these major elements needed to project population change:

Net migration. The Bureau of Census assumption for the middle scenario is that both immigration and emigration will be high. The higher immigration assumption reflects the inclusion of undocumented aliens who are added in the middle population projections for the first time. The higher emigration assumption reflects the greater return migration of foreign-born persons to their native countries. The net migration (immigration less emigration) scenario reflects an assumption that new immigration legislation, which will not be fully implemented until the end of 1988, will reduce the level of undocumented migration, but not entirely end it.

Fertility. In the long run, fertility changes are always most important for projecting the population. Between now and 2000, the fertility assumptions would not affect the size of the 2000 population over the age of 16.

There is no Hispanic population projection available that is consistent with the current Bureau of the Census population projection. BLS has decided to use the high migration scenario from the Census Bureau's most recent Hispanic population projection.[6] The assumptions for this projection are for Hispanics to have an ultimate cohort fertility rate of 1.9 children per woman, an ultimate life expectancy at birth of 81.0 years, and yearly net migration of 361,000.[7] The latter number is assumed to include 212,000 undocumented immigrants, consistent with the initial years, but not with the later years of the current overall projection. Future direction and magnitude of immigration, both documented and undocumented, is uncertain at this time. As a consequence, projections of the Hispanic population, because they are affected so much by immigration, are subject to more uncertainty than the overall population.

Table 1. Civilian labor force by sex, age, race, and Hispanic origin, actual 1972, 1979, and moderate growth projections 2000

Group	Level (In thousands)				Change (In thousands)			Percent change		
	1972	1979	1986	Projected, 2000	1972–79	1979–86	1986–2000	1972–79	1979–86	1986–2000
Total, 16 and over	87,037	104,960	117,837	138,775	17,923	12,877	20,938	20.6	12.3	17.8
Men, 16 and over	53,556	60,727	65,423	73,136	7,171	4,696	7,713	13.4	7.7	11.8
16 to 24	11,243	13,645	12,251	11,506	2,402	−1,394	−745	21.4	−10.2	−6.1
25 to 54	33,133	37,926	44,406	53,024	4,793	6,480	8,618	14.5	17.1	19.4
55 and over	9,180	9,156	8,766	8,606	−24	−390	−160	−.3	−4.3	−1.8
Women, 16 and over	33,481	44,233	52,414	65,639	10,752	8,181	13,225	32.1	18.5	25.2
16 to 24	8,943	11,760	11,117	11,125	2,817	−643	8	31.5	−5.5	.1
25 to 54	19,192	26,594	35,159	47,756	7,402	8,565	12,597	38.6	32.2	35.8
55 and over	5,346	5,879	6,138	6,758	533	259	620	10.0	4.4	10.1
White, 16 and over	77,275	91,922	101,801	116,701	14,647	9,879	14,900	19.0	10.7	14.6
Black, 16 and over	8,748	10,665	12,684	16,334	1,917	2,019	3,650	21.9	18.9	28.8
Asian and other,[1] 16 and over	—	2,373	3,352	5,740	—	979	2,388	—	41.3	71.2
Hispanic,[2] 16 and over	—	5,215	8,076	14,086	—	2,861	6,010	—	54.9	74.4

Group	Percent distribution				Growth rate		
	1972	1979	1986	Projected, 2000	1972–79	1979–86	1986–2000
Total, 16 and over	100.0	100.0	100.0	100.0	2.7	1.7	1.2
Men, 16 and over	61.5	57.9	55.5	52.7	1.8	1.1	.8
16 to 25	12.9	13.0	10.4	8.3	2.8	−1.5	−.4
25 to 54	38.1	36.1	37.7	38.2	1.9	2.3	1.3
55 and over	10.5	8.7	7.4	6.2	(3)	−.6	−.1
Women, 16 and over	38.5	42.1	44.5	47.3	4.1	2.5	1.6
16 to 24	10.3	11.2	9.4	8.0	4.0	−.8	(3)
25 to 54	22.1	25.3	29.8	34.4	4.8	4.1	2.2
55 and over	6.1	5.6	5.2	4.9	1.4	.6	.7
White, 16 and over	88.8	87.6	86.4	84.1	2.5	1.5	1.0
Black, 16 and over	10.1	10.2	10.8	11.8	2.9	2.5	1.8
Asian and other,[1] 16 and over	—	2.3	2.8	4.1	—	5.1	3.9
Hispanic,[2] 16 and over	—	5.0	6.9	10.2	—	6.4	4.1

[1] The "Asian and other" group includes American Indians, Alaskan Natives, Asians, and Pacific Islanders. The historic data are derived by subtracting "Black" from the "Black and other" group; projections are made directly.

[2] Persons of Hispanic origin may be of any race. Labor force data for Hispanics are not available before 1976.

[3] The rate is −0.05 to 0.05 percent.

NOTE: Dash indicates data not available.

Table 2. Civilian labor force participation, by sex, age, race, and Hispanic origin, actual 1972, 1979, and 1986, and moderate growth projections 2000

Group	Actual			Projected, 2000	Growth rate		
	1972	1979	1986		1972–79	1979–86	1986–2000
Total, 16 and over	60.4	63.7	65.3	67.8	0.8	0.4	0.3
Men, 16 and over	79.0	77.8	76.3	74.7	−.2	−.3	−.2
16 to 24	71.3	75.0	73.0	74.3	.7	−.4	.1
25 to 54	95.1	94.4	93.8	92.6	−.1	−.1	−.1
55 and over	53.3	46.6	40.4	34.1	−1.9	−2.0	−1.2
Women, 16 and over	43.9	50.9	55.3	61.5	2.1	1.2	.8
16 to 24	53.0	62.5	64.3	69.5	2.4	.4	.6
25 to 54	51.0	62.3	70.8	80.8	2.9	1.8	.9
55 and over	24.5	23.2	22.1	21.4	−.8	−.7	−.2
White, 16 and over	60.4	63.9	65.5	68.2	.8	.4	.3
Black, 16 and over	60.2	61.4	63.5	66.0	.3	.5	.3
Asian and other,[1] 16 and over	—	65.9	64.9	65.8	—	−.2	.1
Hispanic,[2] 16 and over	—	63.5	65.4	68.7	—	.4	.4

[1] The "Asian and other" group includes American Indians, Alaskan Natives, Asians, and Pacific Islanders. The historic data are derived by subtracting "Black" from the "Black and other" group; projections are made directly.

[2] Persons of Hispanic origin may be of any race. Labor force data for Hispanics are not available before 1976.

NOTE: Dash indicates data not available.

Summary of population changes, 1986–2000. The overall U.S. population, which increased by 1 percent annually between 1972 and 1986, is projected to grow by 0.8 percent yearly to 2000. This slowing reflects the anticipated drop in births as well as the slight drop in net migration. The rate of increase will not be uniform across age, race, or Hispanic origin groups.

As the following tabulation indicates, over the 1972–86 period, the number of persons (ages 18 to 24) entering college or their first job rose, while the number of those (ages 14 to 17) in high school dropped slightly. The number of those (ages 5 to 13) in elementary school dropped more substantially, while the number of preschoolers increased. Over the 1986–2000 period, many of these younger age groups show a reversal of trend; the number of persons ages 18 to 24, which had been increasing during the 1972–86 period, is projected to drop through 2000:

	1972	*1986*	*2000*
Total population (millions)	209.9	241.6	268.3
White	183.3	204.7	221.5
Black	23.6	29.4	35.1
Asian and other	2.9	7.5	11.6
Hispanic	–	18.5	30.3
Years of age:			
0 to 4	17.1	18.1	16.9
5 to 13	39.9	34.2	33.5
14 to 17	16.6	14.8	15.3
18 to 24	26.1	28.0	25.2
65 and older	21.0	29.2	34.9
85 and older	1.5	2.8	4.6
Civilian noninstitutional population 16 and older (millions)	144.1	180.6	204.7

The number of persons ages 65 and older increased more than twice as fast as the overall population during the 1972–86 period; those 85 and older increased more than four times as fast.

Changes in the total population are reflected in the civilian noninstitutional population 16 and older with a lag. Between 1972 and 1986, the civilian noninstitutional population grew by 1.6 percent annually, while over the 1986–2000 horizon, the population is projected to grow significantly more slowly, by 0.9 percent. (See table 3.)

An important event of the post-World War II period is the great flows of migrants documented and undocumented, into and out of this country. In the future, according to these population projections, immigration would be an increasing share of population growth. Immigrants are generally of working age. There are slightly more women than men among the documented entrants. As a consequence of the projected overall decrease in births, net migration, even though declining somewhat, still is projected to continue to be an increasing share of population growth:

	1972–79	*1979–84*	*1986–95*	*1995–2000*
Percent of population	17.2	25.7	29.9	32.2

The effect of the higher net migration is an increase in the number of people of working age and a decrease in the number of older people. To the extent that immigrants have different age, educational, and occupational compositions than the resident population, this would affect the future work force. A summary of the Census Bureau's projections for 2000 and estimates for the 1986 and related earlier years population are displayed in table 4.[8]

Projections of labor force participation change. Trends in labor force participation rates—the second important factor affecting the size of the labor force of the future—were projected by BLS for 114 groups by age, sex, and race or ethnicity. After the rate of change for each sex and race group for the 1979–86 period was estimated, the labor force participation rate for the group was extrapolated by age. The resulting cross-sectional patterns for specific race-sex groups were examined for 2000 and, when these patterns were inconsistent with historical patterns, they were modified. The cohort participation rates were also plotted and, if inconsistent with historic patterns, the projected participation rates were modified. For these two reasons, adjustments mainly affected participation rates for women in the preretirement years. The projected pattern of participation for white women did not result in a drop in participation between ages 25 to 29 and 30 to 34 as it has in the past. However, this was accepted as consistent with developing patterns, though it has yet to manifest itself, reflecting primarily the fact that women increasingly are less likely to withdraw from the labor force after children are born.

The primary methodological change in this set of projections involved the development of projections for five-year-of-age groups for blacks. Participation rates were also calculated for the Asian and other labor force, but after examination of the historical data, there was so much year-to-year variation that the growth patterns in labor force participation of whites were used instead to project the Asian and other labor force.

Labor force participation rates for women of prime working age (25 to 54) and older ages were assumed not to exceed that of men. After examination of the preliminary employment projections, the assumed participation rate of young whites was adjusted upward to reflect anticipated growth in job opportunities for first-time jobseekers and the declining number of youth available for those jobs.

Compositional changes in the labor force

Age. By 2000, prime working-age persons would make up 73 percent of the labor force, up from 67 percent in 1986 (table 1). This reflects underlying demographic changes; the baby-boom generation will still be in the prime working ages, but between 1995 and 2000, the "echo" of the baby boom (their children) are projected to begin entering the labor force. Despite this, the youth in the labor force are still projected to account for a smaller share of the labor force in 2000 than in 1986, 16 percent, compared with 20 percent—although their share is expected to be even lower in 1995. The share of older workers (55 and older) also is projected to shrink between 1986 and 2000 by about $1\frac{1}{2}$ percentage points. The share of workers 55 and older is projected to be slightly lower in 1995, because that is when the group known as the "birth dearth of the 1930's" enters the retirement years. The following tabulation shows the number, in millions, of persons in each major age group for 1972–86 and the rate of growth for 1986–2000.

	Youth	*Prime working age*	*Older*
Period:			
1972	20.2	52.3	14.5
1986	23.4	79.6	14.9
2000	22.6	100.8	15.4
Growth rate:			
1972–86	1.1	3.0	.2
1986–2000	−.2	1.7	.2

The labor force group age 55 and older is projected to decrease between 1986 and 1995, but then increase between 1995 and 2000. During the latter period, this group would be the fastest growing component of the labor force. The youth labor force, which has been decreasing since 1980, is also projected to decline until 1995, before increasing more rapidly than the overall labor force. The prime working-age group is the only one that is projected to grow throughout the period, even though some age groups within this broader age group are expected to decline for at least part of the 1986–2000 period. The prime age work force grew by 3 percent annually between 1980 and 1986; this growth rate is projected to drop to 2.6 percent for the rest of this decade, 1.8 percent for the early 1990's, and less than 1 percent yearly until 2000.

The changes in such broad age groups are a reflection of the changing size of underlying finer age groups, which are, in turn, a reflection of past variability in births. To further explicate the process, we describe the changes in various detailed age groups.

After the baby boom (defined by the Census Bureau as starting in 1946 and ending in 1964), the number of births dropped until 1975, with a modest upswing in 1968–70. Since 1976, births have increased as the women of the baby boom became mothers, the "echo" to the baby boom. As a result of the drop in births that started in 1960, the number of 16-year-olds in the population and labor force began to decline about 1976 and is expected to continue to decline until 1992. (There was a short-lived "boomlet" between 1968 and 1970, resulting in an increase in the number of teenagers during 1986–88.) The number of 17-year-olds began to decline in 1977, 1 year after the number of 16-year-olds. The decline should end 1 year later than for 16-year-olds, or 1993. Looking at larger age groups which are less sensitive to yearly variations in births, we see that the number of 16- to 19-year-olds began dropping in the late 1970's and is projected to continue to do so until the mid-1990's. Thereafter, this age group is projected to increase as the larger number born after 1978—the echo to the baby boom—begins to enter the labor force. The teenage labor force is projected to drop by nearly 1.5 million between 1986 and 1992 and then to increase by 1.4 million between 1992 and 2000.

This effect—reversal in direction over the 1986 and 2000 period—also is projected to prevail for other age groups. Numbers of labor force participants 20 to 24 years of age began to drop in the early 1980's and are projected to decline by 2.4 million people between 1986 and 1997 before beginning to increase. The labor force ages 25 to 29, which has been growing rapidly, is projected to decline from the late 1980's until after 2000. The drop would be 2.9 million between 1986 and 2000. For those in the labor force who are 30 to 34 years old, the projected decline begins in the early 1990's. In the late 1990's, the next older group, ages 35 to 39 starts its decline in absolute numbers. The 30-to-34-year-olds are projected to increase by 2.1 million through the early 1990's and then decline by 2.2 million by 2000. The 35 to 39 group is projected to increase by 4.2 million between 1986 and the mid-1990's and then to decline only slightly by the year 2000.

Race or ethnicity. Blacks are projected to account for 18 percent of labor force growth between now and the end of the century. This would be significantly above their current share of the overall labor force. Blacks made up 11 percent of labor force growth between 1972 and 1979, 16 percent

Table 3. Civilian noninstitutional population, by sex, age, race, and Hispanic origin, actual 1972, 1979, and 1986, and projected to 2000

Group	Level (in thousands)				Change (in thousands)			Growth rate		
	1972	1979	1986	Projected, 2000	1972–79	1979–86	1986–2000	1972–79	1979–86	1986–2000
Total, 16 and over	144,122	164,865	180,589	204,699	20,743	15,723	24,110	1.9	1.3	0.9
Men, 16 and over	67,835	78,021	85,799	97,962	10,186	7,778	12,163	2.0	1.4	1.0
16 to 24	15,768	18,184	16,773	15,489	2,416	−1,411	−1,284	2.1	−1.1	− .6
25 to 54	34,840	40,184	47,343	57,250	5,344	7,159	9,907	2.1	2.4	1.4
55 and over	17,227	19,653	21,683	25,223	2,426	2,030	3,540	1.9	1.4	1.1
Women, 16 and over	76,287	86,844	94,790	106,737	10,557	7,946	11,947	1.9	1.3	.9
16 to 24	16,887	18,827	17,293	15,999	1,940	−1,534	−1,294	1.6	−1.2	− .6
25 to 54	37,595	42,692	49,672	59,094	5,097	6,980	9,422	1.8	2.2	1.2
55 and over	21,805	25,325	27,825	31,644	3,520	2,500	3,819	2.2	1.4	.9
White, 16 and over	127,904	143,898	155,433	171,230	15,994	11,535	15,797	1.7	1.1	.7
Black, 16 and over	14,543	17,366	19,989	24,750	2,823	2,623	4,761	2.6	2.0	1.5
Asian and other,[1] 16 and over	–	3,601	5,164	8,719	–	1,562	3,555	–	5.3	3.8
Hispanic,[2] 16 and over	–	8,208	12,343	20,490	–	4,135	8,147	–	6.0	3.7

[1] The "Asian and other" group includes American Indians, Alaskan Natives, Asians, and Pacific Islanders. The historic data are derived by subtracting "Black" from the "Black and other" group; projections are made directly.

[2] Persons of Hispanic origin may be of any race. Data for Hispanics are not available before 1976.

NOTE: Dash indicates data not available.

SOURCE: Based on U.S. Bureau of Census "middle" population projections.

between 1980 and 1986, and are projected to account for 17 percent between 1986 and 1990. The following tabulation shows the number, in millions, of persons in the labor force and the growth rate, in percent, by race or ethnic origin, 1972–86 and 1986–2000:

	Labor force			*Growth rate*	
Group	*1972*	*1986*	*2000*	*1972-86*	*1986-2000*
Total	87.0	117.8	138.8	2.2	1.2
White	77.3	101.8	116.7	2.0	1.0
Black	8.7	12.7	16.3	2.7	1.8
Asian and other	–	3.4	5.7	–	3.9
Hispanic	–	8.1	14.1	–	4.1

There are projected to be 16.3 million blacks in the labor force in 2000, up 3.7 million from 1986. This represents a higher annual growth rate, 1.8 percent, than those projected for whites and for the overall labor force. Black labor force participation is projected to grow 0.3 percent annually, as is that of whites. By 2000, blacks are projected to account for 12 percent of the labor force, up 1 percentage point from 1986.

The white labor force is projected to grow by 15 million between 1986 and 2000, reaching a level of 117 million. Whites have historically been the largest share of the labor force, but this share has been dropping and is projected to continue to do so—in 1972 it was 89 percent and by 2000, it should be 84 percent. Thus, the white labor force, which also includes nearly all of the Hispanics, is growing more slowly than the overall labor force, 0.2 percent per year less over both the historical period, 1972–86, and the projected period, 1986–2000. This slower growth reflects slower population increases (table 2), because labor force participation of whites is projected to grow at the same rate as the overall labor force.

The Asian and other labor force is projected to increase 71 percent, or by 2.4 million persons, between 1986 and 2000. This increase reflects a high rate of population growth, which, in turn, reflects higher births and immigration of this group. By 2000, persons of Asian and other races would constitute 4 percent of the labor force, up from less than 3 percent in 1986. Over the 1986–2000 period, Asians and others account for 11 percent of the projected growth in the labor force. This represents a slowing in their growth rate from the 1979–86 period during which their population was increasing rapidly due to the entry of refugees. This entry of refugees has virtually stopped, and it is assumed not to occur again over the projection period.

Labor force participation of the Asian and other group is assumed to increase at the same rate as whites at the individual age-sex level. Their participation rate is projected to be lower than that of whites in 2000. This reflects their lower participation in 1986. The lower rate of increase for their overall labor force participation reflects the different age and sex composition of this population group.

The Hispanic labor force is projected to increase 74 percent between 1986 and 2000; among the largest increases projected for any group. By 2000, Hispanics are projected to be 10 percent of the labor force, up from 7 percent in 1986. This increase results in 6 million more Hispanics entering the labor force, for a total of 14 million in 2000.

Hispanic labor force participation, which increased 0.4 percent annually between 1979 and 1986, is projected to continue to increase at that rate over the next 14 years. This reflects the younger age of the Hispanic population—with more young women, overall participation rises as their participation is projected to rise. By contrast, whites and blacks are projected to have slower rates of increase in participation.

Hispanics' share of labor force growth was 22 percent between 1979 and 1986. Given their more rapid population growth, their share of the labor force increment between 1986 and 2000 is projected to be 29 percent. The size of the share is more impressive by subperiod—27 percent for the years 1986 to 1995 and 32 percent for 1995 to 2000. More than a third of population growth in the late 1990's is projected to be Hispanic. As noted earlier, the number of Hispanics is affected by the assumption made regarding future levels of immigration; projections of the share of Hispanics in the labor force could *vary considerably*.

Sex. As in the past, women are projected to account for more than 60 percent of the labor force growth. Over the past 16 years, women have also made up 60 percent of the additions to the labor force. This share is projected to be 64 percent between now and the end of the century. It may be more useful to indicate that since 1979, when the baby-boom generation had almost completed their entry into the labor force, women accounted for 64 percent of labor force additions. For the rest of this decade, and in the early 1990's, women are projected also to make up 64 percent of the net growth in the labor force. In the late 1990's, as the "echo" to the baby boom reaches labor force age and begins entering the labor force, women's share of growth is projected to drop slightly to 62 percent.

These projections show 66 million women in the labor force in 2000, up 13.2 million from 1986 (table 1). This represents an annual rate of growth of 1.6 percent which is below the 3.3-percent rate of the 1972–86 period, during which young women of the baby boom were entering the labor force. With the growth shown in these projections, women would make up 47 percent of the labor force in 2000, up from 39 percent in 1972 and 45 percent in 1986.

Women's labor force participation is projected to increase by 0.8 percent annually—more than twice the overall rate of increase in participation, but half the rate of growth in women's participation over the 1972–86 period. The primary factor behind the slower rate of increase is the level of labor force participation already achieved by women; future increases above past rates are unlikely. The labor force participation rate of women ages 25 to 54, at 70.8 percent in 1986, is projected to reach 80.8 percent by 2000.

The labor force participation of black women has typically been greater than that of white women, except at the younger ages. This is projected to continue through 2000, but the difference is expected to diminish significantly. In 1972, the participation rate of black women—48.8 percent—was 4.6 percentage points above that of white women. By 2000, the difference would be 0.6 points. This reflects the somewhat slower growth in participation by black women and the greater number of young persons in the black female population. Because younger black women's participation is lower than that of white women, this also lowers the difference in participation.

Black women are projected to account for a tenth of labor force growth over the 1986–2000 period; their projected growth rate, 2.1 percent, is greater than that for white women. (See table 5.) For black women, the higher growth rate represents faster population growth as well as growing participation. Thus, the proportion of the labor force made up of black women would increase from 4.5 percent in 1972 to 6.1 percent in 2000.

Table 4. Total population, including armed forces overseas, by age, sex, and race, actual 1972, 1979, and 1986, and projected to 2000

Group	Level (In thousands)				Change (In thousands)			Growth rate		
	1972	1979	1986	Projected, 2000	1972–79	1979–86	1986–2000	1972–79	1979–86	1986–2000
Total	209,896	225,055	241,596	268,264	15,159	16,541	26,668	1.0	1.0	0.8
Years of age:										
0 to 4	17,101	16,063	18,128	16,898	− 1,038	2,065	− 1,230	− .9	1.7	− .5
5 to 13	39,936	35,592	34,193	33,483	− 4,344	− 1,399	− 710	− 1.6	− .6	− .1
14 to 17	16,640	16,611	14,796	15,332	− 29	− 1,815	536	(1)	− 1.6	.3
18 to 24	26,077	30,048	27,973	25,231	3,971	− 2,075	− 2,742	2.0	− 1.0	− .7
25 to 34	27,623	36,203	42,984	37,149	8,580	6,781	− 5,835	3.9	2.5	− 1.0
35 to 44	22,859	25,176	33,142	43,911	2,317	7,966	10,769	1.4	4.0	2.0
45 to 54	23,687	22,942	22,823	37,223	− 745	− 119	14,400	− .5	− .1	3.6
55 to 64	19,211	21,448	22,230	24,157	2,237	782	1,927	1.6	.5	.6
65 to 74	12,922	15,338	17,325	18,242	2,416	1,987	917	2.5	1.8	.4
75 to 84	6,555	7,599	9,049	12,017	1,044	1,450	2,968	2.1	2.5	2.0
85 and over	1,542	2,197	2,796	4,621	655	599	1,825	5.2	3.5	3.7
Men	102,591	109,584	117,820	131,185	6,993	8,236	13,365	.9	1.0	.8
Women	107,305	115,472	123,776	137,072	8,167	8,304	13,296	1.1	1.0	.7
White	183,326	194,098	204,671	221,512	10,772	10,573	16,841	.8	.8	.6
Black	23,646	26,417	29,427	35,122	2,771	3,010	5,695	1.6	1.6	1.3
Asian and other[2]	2,924	4,540	7,498	11,630	1,616	2,958	4,132	6.5	7.4	3.2

[1] The rate is −0.05 to 0.05.

[2] The "Asian and other" group includes American Indians, Alaskan Natives, Asians, and Pacific Islanders.

SOURCE: U.S. Bureau of Census. For 1972 and 1979 data, *Preliminary Estimates of the Population of the United States, by Age, Sex, and Race: 1970 to 1981, Current Population Reports*, Series P-25, No. 917; for 1986 data, *Estimates of the Population of the United States, by Age, Sex, and Race: 1980 to 1986, Current Population Reports*, Series P-25, No. 1000; and for 2000 data, *Projections of the Population of the United States, by Age, Sex, and Race 1987 to 2080*, Series No. 1018.

Table 5. Civilian labor force and participation rates by sex, age, race, and Hispanic origin, actual 1972, 1979, and 1986, and moderate growth projections 2000

Group	Participation rate				Level (in thousands)				Change (thousands)		Percent change		Growth rate	
	Actual			Projected	Actual			Projected						
	1972	1979	1986	2000	1972	1979	1986	2000	1972–86	1986–2000	1972–86	1986–2000	1972–86	1986–2000
Total, 16 and over	60.4	63.7	65.3	67.8	87,037	104,960	117,837	138,775	30,800	20,938	35.4	17.8	2.2	1.2
Men, 16 and over	79.0	77.8	76.3	74.7	53,556	60,727	65,423	73,136	11,867	7,713	22.2	11.8	1.4	.8
16 to 19	58.1	61.5	56.4	60.2	4,478	5,111	4,102	4,501	− 376	399	− 8.4	9.7	− .6	.7
20 to 24	83.9	86.4	85.8	87.5	6,765	8,534	8,149	7,005	1,384	− 1,144	20.5	− 14.0	1.3	− 1.1
25 to 34	95.7	95.3	94.6	93.6	12,349	16,386	19,383	16,559	7,034	− 2,824	57.0	− 14.6	3.3	− 1.1
35 to 44	96.4	95.7	94.8	93.9	10,372	11,532	15,029	20,133	4,657	5,104	44.9	34.0	2.7	2.1
45 to 54	93.2	91.4	91.0	90.1	10,412	10,008	9,994	16,332	− 418	6,338	− 4.0	63.4	− .3	3.6
55 to 64	80.4	72.8	67.3	63.2	7,155	7,213	6,954	7,238	− 201	284	− 2.8	4.1	− .2	.3
65 and over	24.3	19.9	16.0	9.9	2,025	1,943	1,812	1,368	− 213	− 444	− 10.5	− 24.5	− .8	− 2.0
Women, 16 and over	43.9	50.9	55.3	61.5	33,481	44,233	52,414	65,639	18,933	13,225	56.5	25.2	3.3	1.6
16 to 19	45.8	54.2	52.9	59.2	3,578	4,527	3,824	4,379	246	555	6.9	14.5	.5	1.0
20 to 24	59.1	69.0	72.4	78.4	5,365	7,233	7,293	6,746	1,928	− 547	35.9	− 7.5	2.2	− .6
25 to 34	47.8	63.9	71.6	82.3	6,609	11,550	15,209	15,098	8,600	− 111	130.1	− .7	6.1	− .1
35 to 44	52.0	63.6	73.1	84.2	6,028	8,153	12,204	18,438	6,176	6,234	102.5	51.1	5.2	3.0
45 to 54	53.9	58.4	65.9	75.4	6,555	6,891	7,746	14,220	1,191	6,474	18.2	83.6	1.2	4.4
55 to 64	42.1	41.7	42.3	45.8	4,257	4,718	4,940	5,732	683	792	16.0	16.0	1.1	1.1
65 and over	9.3	8.3	7.4	5.4	1,089	1,161	1,198	1,026	109	− 172	10.0	− 14.4	.7	− 1.1
Whites, 16 and over	60.4	63.9	65.5	68.2	77,275	91,922	101,801	116,701	24,526	14,900	31.7	14.6	2.0	1.0
Men	79.6	78.6	76.9	75.3	48,118	53,857	57,216	62,252	9,098	5,036	18.9	8.8	1.2	.6
Women	43.2	50.5	55.0	61.5	29,157	38,065	44,585	54,449	15,428	9,864	52.9	22.1	3.1	1.4
Blacks, 16 and over	60.2	61.4	63.5	66.0	8,748	10,665	12,684	16,334	3,936	3,650	45.0	28.8	2.7	1.8
Men	73.9	71.6	71.2	70.7	4,855	5,556	6,373	7,926	1,518	1,553	31.3	24.4	2.0	1.6
Women	48.8	53.2	57.2	62.1	3,893	5,109	6,311	8,408	2,418	2,097	62.1	33.2	3.5	2.1
Asian and other,[1] 16 and over	–	65.9	64.9	65.8	–	2,373	3,352	5,740	–	2,388	–	71.2	–	3.9
Men	–	76.7	74.9	72.4	–	1,314	1,834	2,958	–	1,124	–	61.3	–	3.5
Women	–	56.0	55.9	60.1	–	1,059	1,518	2,782	–	1,264	–	83.3	–	4.5
Hispanics,[2] 16 and over	–	63.5	65.4	68.7	–	5,215	8,076	14,086	–	6,010	–	74.4	–	4.1
Men	–	81.2	81.0	80.4	–	3,182	4,948	8,303	–	3,355	–	67.8	–	3.8
Women	–	47.4	50.1	56.9	–	2,033	3,128	5,783	–	2,655	–	84.9	–	4.5

[1] The "Asian and other" group includes American Indians, Alaskan Natives, Asians, and Pacific Islanders. The historic data are derived by subtracting "Black" from the "Black and other" group; projections are made directly.

[2] Persons of Hispanic origin may be of any race. Labor force data for Hispanics are not available before 1976.

NOTE: Dash indicates data not available.

White women (including most of the Hispanic women), who accounted for half the labor force growth during the 1972–86 period, are projected to account for less than half of the projected labor force increase over the next 14 years. Their participation rate, which grew by 12 percentage points between 1972 and 1986, is projected to grow more slowly to the year 2000. During both periods, this was a greater increase than for black women, but by 2000, black women are projected to still have slightly greater participation.

The labor force of Hispanic women is projected to increase by 2.7 million to 5.8 million in 2000, an 85-percent increase. Numerically, this growth is projected to exceed that of black women, even though the female Hispanic labor force would still be smaller than that of black women. The growth reflects both population and participation rate increases.

Men have been and are projected to be a majority of the labor force; even though the number of men in the labor force is not changing as dynamically as that of women, it still is changing. It is projected to grow more slowly, by 7.7 million, or 12 percent, during the 1986–2000 period (this compares with 25 percent for women during the same period). Different components of the labor force are growing at different rates; both the older and younger male labor force are projected to drop in size between 1986 and 2000, but both groups are projected to actually increase between 1995 and 2000.

The change in the size of the young male labor force represents the interplay of population dynamics—the echo of the baby boom and projected participation rate increases. The participation of young men is projected to increase modestly over the entire projection period. However, between 1986 and 1995, the number of young men is projected to drop by 1.1 percent yearly, more than offsetting the anticipated rise in participation. By 1995, however, the number of younger groups is projected to increase, and with an increase in participation rates, the number of those in the labor force would then rise.

The change in the number of the older men in the labor force also represents the interplay of population and participation. The 55 to 65 age group, whose population is projected to decrease over the 1986–95 period, is projected to grow more rapidly than the 65 and older group during the 1995–2000 period. Because the younger group has a higher participation rate and their participation is projected to drop more slowly than that of men over age 65, the entire older male labor force is projected to grow over the 1995–2000 period. However, this growth would not be enough to offset the earlier drop; over the 1986–2000 period, the older male labor force is projected to decline by 160,000.

Over the 1986-2000 period, the fastest growing group among men would be ages 45 to 54, the consequence of the aging of the baby-boom generation. This group is above the age of peak participation, but, because baby-boom men would still be in their prime working years in 2000, the prime age male labor force is projected to be a greater proportion of the labor force than in 1986, 1972, or 1979. The labor force of men ages 45 to 54 is projected to grow 6.3 million, and constitute 30 percent of the 1986–2000 labor force increment.

The labor force of black men is projected to grow more rapidly than the overall labor force (1.6 percent annually, compared with 1.2 percent), despite falling participation. This reflects their higher population growth rates. The number of white men in the labor force (including most Hispanics) is projected to grow at only half the rate of the overall labor force. Despite this, white men are projected to account for a quarter of labor force growth and are projected to be 45 percent of the 2000 labor force.

The number of Hispanic men in the labor force is projected to increase by 3.4 million between 1986 and 2000, a greater absolute change than for black men. Their growth rate would be three times that of the overall labor force and more than twice that of black men. By 2000, there are projected to be more Hispanic than black men in the labor force. Hispanic men would make up 6 percent of the 2000 labor force and 16 percent of the labor force growth over the rest of the century. Despite this increase, their participation is anticipated to drop slightly.

Alternative scenarios

The actual world of work in 2000 will certainly be different from that in 1986 in ways that we cannot anticipate. To give an idea of at least some of the uncertainty, two alternative projections of the labor force were prepared. (See table 6.) One assumes slower participation rate changes which is applied to the middle population series, and the other assumes a higher immigration rate and uses the middle participation rate series.

Under the low alternative, the overall 2000 labor force would be 135 million, an expansion of 14 percent over the 1986 level. This slow growth, 1.0 percent annually, is a consequence of the participation rate growing slowly or dropping rapidly. In the middle scenario, overall participation is projected to increase 0.3 percent annually. Under this scenario, it would drop at the same rate.

Also under the low alternative, labor force participation among women is projected to rise more slowly. This is consistent with the view that the rapid increases of the 1970's completed their increase in participation. The rapid rise of the past 2 years would be a cyclical response to the recession of the early 1980's—not a resumption of the high growth of the early and middle 1970's.

Using the participation rates of the middle scenario with the Census Bureau's high migration series, we find that the labor force increases to 141 million in 2000—2 million greater than the middle scenario. The only difference between the middle and the high migration population projections is in the net migration assumption. Despite the higher level of immigration, 160 percent greater, the resulting growth rate of the labor force is only 0.2 percent higher.

For the high migration scenario, it was assumed that Hispanics would be the same proportion of the civilian noninstititional population in any new projection as they had been in the previous high migration projection. Under this assumption, this Hispanic labor force would grow at the same rate under both the middle and high scenarios and the Hispanic labor force would be the same share under both scenarios. Under the low participation scenario, Hispanics would initially account for 9.4 percent of the labor force and that share would grow by 3.3 percent yearly to 2000, compared with the 4.1-percent gain attained in the middle and high scenarios.

This analysis suggests that Asians and others are a more significant source of labor force growth in the high migration scenario; their share of the labor force would be the same under all three scenarios, but the growth rate is much higher under the high migration scenario—4.4 percent, compared with 3.9 percent in the middle growth scenario, and 3.7 percent in the low scenario.

Other insights

The median age of the labor force in the post-World War II era peaked in 1962, at 40.6 years. With the entry of the baby-boom generation into the labor force, the median age dropped, reaching a low in 1980 of 34.6 years. By 1986, the median age had risen to 35.3 years, an increase of less than 1 year. The median age of the labor force is projected to reach 38.9 years in 2000, 3.6 years above the 1986 level. Even though the age of the population is increasing rapidly, unless older workers remain in the labor force in greater numbers, the 1962 median is not likely to be attained again. As the population ages, more would be in the ages which had—and are projected to continue to have—declining labor force participation. Table 7 shows median ages of the labor force by race and Hispanic origin, for selected historical years and for projected years.

To reinforce the point about older workers, persons ages 55 and older constituted 16.7 percent of the labor force in 1972. With the entry of the baby-boom generation (and the continuing drop in participation of older men), workers 55 and over made up only 14.3 percent in 1979. In 1986, after the baby-boom generation had completed their entry, the older group was only 12.6 percent of the labor force.

Share of labor force growth

If we consider the components of labor force growth, starting in a year for which we have data for all groups, shares of labor force growth for 1976–86 can be compared with the projected share for 1986–2000. Women are pro-

Table 6. Three scenarios of the civilian labor force by sex, age, race, and Hispanic origin, projections 2000

Group	Participation rate			Level (in thousands)		
	High	Moderate	Low	High	Moderate	Low
Total	68.0	67.8	65.7	141,107	138,775	134,517
Men:	74.8	74.7	73.2	74,464	73,136	71,729
16 to 24 years	74.4	74.3	72.7	11,811	11,506	11,261
25 to 54 years	92.6	92.6	90.9	54,009	53,024	52,043
55 years and over	34.2	34.1	33.4	8,644	8,606	8,425
Women:	61.7	61.5	58.8	66,643	65,639	62,788
16 to 24 years	69.6	69.5	68.1	11,365	11,125	10,898
25 to 54 years	80.8	80.8	76.2	48,487	47,756	45,007
55 years and over	21.4	21.4	21.8	6,791	6,758	6,883
White	68.4	68.2	65.9	118,474	116,701	112,918
Black	66.1	66.0	64.8	16,518	16,334	16,031
Asian and other[1]	66.0	65.8	63.9	6,115	5,740	5,568
Hispanic[2]	68.8	68.7	61.9	14,122	14,086	12,675

[1] The "Asian and other" group includes American Indians, Alaskan Natives, Asians, and Pacific Islanders.

[2] Persons of Hispanic origin may be of any race.

jected to account for about the same share of labor force growth as they have in the past. The white share of labor force growth is projected to drop. The black, the Asian and other, and the Hispanic shares are each projected to increase, with the Hispanic share increasing the most. These calculations show that Hispanics, most of whom are white, are sustaining the white share of growth.[9] The non-Hispanic white share (43 percent) is projected to be 18 percentage points less than the 1976–86 share; however, the overall white share is projected to fall only by 7 percentage points. These projections show that non-Hispanic white men, who accounted for 18 percent of labor force growth from 1976 to 1986 when the baby-boom generation was completing its entry into the labor force, would drop to 8 percent of the 1986–2000 increase. This reflects the fact that most non-Hispanic white men are already in the labor force and a slight drop in the participation of older white men. The following tabulation shows the percentage distribution of the labor force by sex, race, and Hispanic origin, and by residency status, 1976–86, and projected, 1986–2000:

Group	*1976–86*	*1986–2000*
Men	38.0	36.8
Women	62.0	63.2
White	78.6	71.2
Black	14.5	17.4
Asian and other	6.9	11.4
Hispanic	17.5	28.7
Non-Hispanic white	61.6	43.3
Men	18.1	8.5
Women	43.5	34.8
Residents	–	76.6
Net migrants	–	23.4

Over the 1972–86 period, the white female labor force of prime working age grew by 12.2 million and that of their white counterparts, by 9.0 million, the second greatest increase. White persons of prime age are projected to have the greatest increment to the 1982–2000 labor force, with the number of women increasing by 9.8 million and men, 6.3 million. Because of the birth dearth, the number of younger white men in the labor force is projected to drop. Because of continuing decreases in participation, the number of older white men in the labor force is also expected to drop. These decreases in the number of younger and older white men offset the prime age white male growth in the labor force. One further refinement indicates that the number of non-Hispanic prime age white men would increase by 4.9 million or 23.4 percent of the 1986-2000 labor force growth.

Over the 1986–2000 period, net migration accounts for almost a fourth of labor force growth. Somewhat more men than women immigrants would join the labor force—the 23.4-percent net migration would be divided into 12.8 percent for men versus 10.6 for women. As the following tabulations shows, most migration is projected to be by whites, with Asians and others having a greater share than blacks (because the migration scenario used for Hispanics is not consistent with that for the main projection, it is not possible to provide a projection of the Hispanic share of labor force growth due to net migration):

	Migrant	*Resident*
Total	23.4	76.6
Men	12.8	24.0
Women	10.6	52.6
White	14.4	56.8
Black	2.3	15.1
Asian and other	6.7	4.7

Dependency ratio. With the baby-boom generation in their prime working years and with the small number of births projected between 1986 and 2000, persons who are working are expected to exceed those who do not:

	Economic dependency ratio (by age)			
	Total	*Under 16*	*16–64*	*Age 65 and over*
1972	134.6	62.3	54.1	18.2
1979	110.2	52.0	37.6	20.6
1986	101.2	46.5	32.9	21.8
1995	94.2	44.0	27.0	23.2
2000	89.8	40.8	26.0	23.0

The economic dependency ratio is the number of those in the total population (including Armed Forces overseas) who are not in the total labor force per 100 persons in the total labor force. This ratio declined steadily over the 1972–86 period as the baby-boom generation entered the labor force. The largest component of the dependency ratio is made up of persons under age 16. However, this ratio has been dropping and is expected to continue to do so throughout the

Table 7. Median ages of the labor force, by sex, race, and Hispanic origin, selected historical years and projected years, 1995 and 2000

Group	Historical				Projected	
	1962	1972	1979	1986	1995	2000
Total	40.5	37.7	34.7	35.3	37.6	38.9
Men	40.5	38.1	35.3	35.6	37.9	39.3
Women	40.4	37.0	33.9	34.9	37.1	38.6
White	40.9	38.0	34.9	35.5	37.9	39.2
Black	38.3	35.4	33.5	33.8	36.1	37.2
Asian and others	–	–	–	35.5	37.2	38.0
Hispanic	–	–	32.2	32.6	34.1	35.1

NOTE: Dash indicates data not available.

entire projection period. With the rising participation of women, the component of the dependency ratio attributed to those ages 16 to 64 has also declined steadily. The change between 1995 and 2000 is modest, reflecting slightly lower participation rates of the largest age group of men, those 45 to 54. The dependency ratio for all persons over 65 has been rising over the entire historical period, a trend projected to continue. The slight drop between 1995 and 2000 reflects the aging of the smaller birth cohort of the 1930's.

Employment-population ratio. WIth the rise in participation, the employment-population ratio is projected to rise. It has been growing over the last 14 years; like overall labor force participation, the rate of increase is projected to slow:[10]

	1972	*1979*	*1986*	*2000*
Employment-population ratio	57.0	59.9	60.7	63.7

Keeping in mind the 14-year span of the projections, we can look at 15-year cohorts—those 15 to 29, 30 to 44, 45 to 59, and 60 to 74. Each cohort in the labor force will be in the next older group by the end of each of the time intervals discussed here:

Year of birth	*Labor force share*		
	1972	*1986*	*2000*
1955–69	–	34.9	39.9
1940–54	35.2	37.4	28.3
1925–39	28.6	21.2	4.5
1910–24	27.2	6.2	0.3
1895–1909	8.4	0.3	–

The combination of cohort size and stage in the life cycle explain the share of labor force. When a cohort is large, but is at a stage in life when participation is low, such as when entering or leaving the labor force, their share will be small. Those born during 1895–1909 were in the retirement years in 1972, but still accounted for 8.4 percent of the labor force in that year. Those born 1910–24 who entered the labor force in the late 1920's and 1930's, were still almost the same share of the labor force in 1972 as the next generation, despite being in the preretirement years. Those born into this group in the United States were joined by migrants from Europe at a level exceeding the immigration of the 1980's. By 1986, the group born during the 1910–24 period were 6 percent of the labor force and virtually all are projected to be out of the labor force in 2000. Those born during the 1925–39 period could be described as part of the 1930's birth dearth. Although in their prime working-age years in 1972, they made up less than a third of the work force; this share dropped to a fifth by 1986. As they retire, their share drops to less than 5 percent by 2000. Those born during 1940–55 are considered pre- and early baby-boom generation. They also were more than a third of the labor force when they entered the labor force (in 1972). Like the younger edge of the baby-boom generation, their share grew by 1986. However, as they continue to age, their share is projected to drop and in 2000, they are projected to make up less than a third of the labor force. Those born during the 1955–69 period entered the labor force between 1972 and 1986. Once this entry was complete, they accounted for more than a third of the labor force. They may be considered the last part of the baby-boom generation. Their labor force share is projected to increase between now and 2000 as the women in this group continue entering the labor force and as younger smaller cohorts reach working age.

Where are they now?

These changes projected in the labor force by age suggest that it would be interesting to look at some of the major cohorts of the past. Four groups are nominated: the birth dearth of the 1930's, the baby boom of the late 1940's, 1950's, and early 1960's, the birth dearth of the late 1960's and early 1970's, and the echo group of the late 1970's and the 1980's. The following tabulation illustrates the passage of these groups through the labor force:

	Percent of labor force			*Growth rate (percent)*	
	1972	*1986*	*2000*	*1972–86*	*1986–2000*
1930's dearth	18.8	15.1	1.7	.6	−13.3
Baby boom	–	55.5	49.8	–	0.4
1970's dearth	–	6.7	22.8	–	10.4
Echo	–	–	11.2	–	–

The persons in the 1930's birth-dearth group are now in their preretirement years and are projected to be in their late sixties by 2000. The number of these persons in the labor force is projected to plunge in the next 14 years. Their share of the labor force—small in 1986 because of the size of the baby boom—is projected to diminish to near zero by 2000. The baby-boom generation, more than half of the labor force now, will begin shrinking as a share of the labor force as they move towards the years when some may be taking early retirement. Their 2000 labor force is projected to be slightly larger than now—although a smaller percent. The persons in the 1970's birth dearth group are in their teens and their share of labor force is projected to grow as they begin

working; despite their relatively small size, they are expected to represent a fifth of the labor force in 2000. Not all the echo to the baby-boom group has been born as of 1986; in 2000, they are projected to still be entering the labor force, of which they are projected to make up just over a tenth. □

FOOTNOTES

[1] The Asian and other race group consists of American Indians, Native Alaskans, Asians, and Pacific Islanders.

[2] These projections replace those described by Howard N Fullerton, Jr. in "The 1995 labor force: BLS's latest projections," *Monthly Labor Review*, November 1985, pp. 17–26; and Howard N Fullerton, Jr. and John Tschetter, "The 1995 labor force: a second look," *Monthly Labor Review*, November 1983, pp. 3–10.

[3] *Projections of the Population of the United States by Age, Sex and Race: 1987 to 2080, Current Population Reports*, Series P-25, No. 1018 (Bureau of Census, forthcoming).

[4] For the most recent evaluation of BLS labor force projections, see Howard N Fullerton, Jr., "How accurate were the 1980 labor force projections?" *Monthly Labor Review*, July 1982, pp. 15–21. An evaluation of the labor force projections to 1985 is in progress. For a description of BLS's current projection methodology, see *Employment Projections for 1995: Data and Methods*, Bulletin 2253 (Bureau of Labor Statistics, 1986).

[5] Hispanics may be of any race; their population and labor force numbers are also included in those for whites, blacks, and Asians and others.

[6] Gregory Spencer, *Projections of the Hispanic Population, 1983 to 2080, Current Population Reports*, Series P-25, No. 995 (Bureau of Census, 1986).

[7] A cohort is a group experiencing the same event during the same time period—for example, immigrants to the United States during the 1960–64 period or those born 1930–34. In this article, only birth cohorts are discussed.

[8] See the following articles in the *Monthly Labor Review*, September 1987: Ronald E. Kutscher, "Overview and implications of the projections to 2000," pp. 3–9; Norman C. Saunders, "Economic projections to the year 2000," pp. 10–18; Valerie A. Personick, "Industry output and employment through the end of the century," pp. 30–45; and George T. Silvestri and John M. Lukasiewicz, "A look at occupational employment trends to the year 2000," pp. 46–63.

[9] For the purpose of deriving the share of non-Hispanic whites, it is assumed that 97 percent of Hispanics are white.

[10] The employment for 2000 is projected to be 130.4 million, with an unemployment rate of 6.0 percent. See Norman C. Saunders, "Economic projections," pp. 10–18.

Industry output and employment through the end of the century

Service-producing industries add more than 20 million jobs; employment in manufacturing declines, but the output share of the Nation's factories is projected to hold steady

VALERIE A. PERSONICK

More than 21 million new jobs are projected to be added to the U.S. economy between 1986 and the year 2000, bringing total employment to just over 133 million. Many industries are projected to share in this expansion and enjoy strong job growth, but several, especially some in manufacturing, are not. This article describes the trends of industry output and job growth projected by the Bureau of Labor Statistics for the remainder of the 20th century.

The 21 million new jobs translate into an increase of 19.2 percent over the projection period, or annual growth of 1.3 percent. This compares to annual rates of job growth of 2.6 percent over the 1972–79 period, and 1.4 percent over the 1979–86 period. Thus, projected employment increases are expected to occur at a slower pace than in the past.

Three projections of employment were prepared—a moderate, a low, and a high. This article focuses on the moderate growth scenario. The demographic and economic assumptions of this scenario are described in detail in companion articles by Howard N Fullerton, Jr., and Norman C. Saunders, on pp. 10–29 of this issue. Some of the key trends which especially affect the industry projections are:

- A continued slowdown in labor force growth following the 1970's surge, during which the baby-boom generation entered the work force and women's labor force participation rose dramatically;
- Average growth of 2.4 percent a year in real gross national product (GNP) between 1986 and 2000, and unemployment tapering from a 7.0-percent rate in 1986 to 6.0 percent by 2000;
- Higher productivity growth, especially in manufacturing, which allows production to expand without corresponding job gains;
- Improvements in the Nation's international trade balance, as the exchange value of the dollar is projected to return to a level more consistent with long-term relationships; imports will continue to make inroads in some key sectors, but the export market, especially for U.S. capital goods, should expand faster;
- Defense spending growing in real terms, at least through 1990, because of projects already approved, but beginning a modest decline after that.

Valerie A. Personick is an economist in the Office of Economic Growth and Employment Projections, Bureau of Labor Statistics.

Goods versus services

The 133 million jobs in the year 2000 will be even more concentrated in service-producing sectors than are jobs today, because virtually all of the net increase of 21 million jobs are in the service-producing sector; although some goods-producing industries are projected to grow, others are projected to decline, with a net employment change of zero. As table 1 shows, 119 million of the 133 million total jobs are expected to be nonfarm wage and salary jobs, or payroll employment. The rest are in nonfarm self-employment and unpaid family work, 9.7 million; private household work, 1.2 million; and agriculture (both payroll and self-employed), 2.9 million. Of the nonfarm wage and salary jobs, 3 out of 4 were in service-producing industries in 1986; by the year 2000, almost 4 out of 5 are projected to be. The goods-producing sector, in contrast, is expected to show virtually no net change, as declines in manufacturing and mining just offset projected increases in construction. Manufacturing employment is projected to fall from 19 million in 1986 to 18.2 million by 2000.

The structural drop in total factory jobs has been occurring since 1979, and for many individual manufacturing industries, the decline started much earlier. In 1979, manufacturing employment peaked at just over 21 million jobs, but over the 1980 and 1981–82 recessions, about 2.8 million of those jobs were lost. Since the trough of the last recession in November 1982, employment in manufacturing has made a partial comeback, but new economic conditions have suppressed full recovery. The high value of the dollar compared to foreign currencies, for example, resulted in unprecedented levels of merchandise imports into the United States, and domestic firms tended to find that their long-established cost structures prevented them from competing with these cheaper imports. Many firms engaged in cost-cutting and restructuring, closing some older plants and streamlining others. This restructuring and cost-cutting, along with other factors such as contracting out, technological advances, new capital investment, and energy substitution, to name a few, pushed productivity gains in manufacturing to a brisk 3.4-percent pace between 1983 and 1986, compared to 2.3 percent in the 1970's. Output reached record high levels in 1986.

The projections of manufacturing employment incorporate a continued restructuring, but the rate of job contraction is expected to slow in the future. The average annual rate of decline in factory jobs was −1.4 percent during the years 1979–86; the 1986–2000 projected rate is just −0.3 percent.

In contrast to jobs, factory output is projected to show very strong growth during the 1986–2000 period. At 2.3 percent a year, it is expected to be only slightly below the rate of increase in total GNP. Demand for U.S. manufactured products is projected to be high for a number of reasons. First, exports are projected to recover some of their markets as the value of the dollar continues to fall, with the rate of growth exceeding that projected for imports. Second, domestic demand for capital goods is expected to be robust as low real interest rates spur investment. Finally, already scheduled defense expenditures for communications equipment, missiles, and aircraft should stimulate those sectors for several years to come. As a result of these factors, manufacturing production, especially of durable goods, is projected to hold a steady 33-percent share of total output through the next decade. Manufacturing jobs, by comparison, are projected to drop from 19 percent of total payroll employment in 1986 to 15 percent by 2000.

Industry output and employment trends

Agriculture. Agricultural production is projected to recover from its 1983–86 slump as the declining dollar stimulates a modest recovery of agricultural exports. However, it is not expected that U.S. exports can regain the world dominance they once enjoyed. This is because several former customer nations have not only achieved self-sufficiency but have in fact become net exporters of the agricultural products they once imported.

One portion of the agricultural sector—the agricultural services, forestry, and fishery products industry—has been posting very rapid growth and is projected to continue to do so. Employment in this industry has been growing, in contrast to long-term steady declines in farm production jobs. About 245,000 new jobs are projected to be added in agricultural services between 1986 and 2000, compared to losses of 585,000 in crop and livestock production. Most of the gains in agricultural services are in landscaping and horticultural services (such as lawn services). Thus, even within the agricultural sector, the shift to services is inexorable.

The overall decline in total agricultural jobs from 1972 to 1986 occurred entirely among the self-employed and unpaid family workers. In contrast, wage and salary farm jobs have actually increased, and are expected to continue to do so, as the following tabulation shows:

	Change in employment (thousands)	
	1972–86	*1986–2000*
Total agriculture	−266	−340
Self-employed and unpaid family jobs	−619	−488
Wage and salary jobs	353	148

This reflects the closure of many smaller, family-owned farms, and the increasing concentration of farming operations among fewer, larger producers.

Mining. The BLS projections for the mining sector incorporate the latest energy assumptions for the year 2000 from the U.S. Department of Energy.[1] In this scenario, imports of crude petroleum rise enormously from present levels, reflecting the assumption that the current worldwide oil glut will be absorbed. Domestic production of crude oil is projected to drop by almost one-fourth over the 1986–2000 period, while imports are projected to more than double. Correspondingly, employment in crude oil production is projected to fall even further below 1986's depressed level, but some of the recent job loss in exploration services is expected to be made up by the year 2000 because of higher oil prices in the 1990's. Coal production is projected to grow as an alternative energy source, but high productivity in this industry results in the continued shrinking of employment. (See table 6 for detailed projections of industry employment.)

Metal mining is not projected to recover any of the deep cuts experienced in both output and employment since 1979. Demand for U.S. primary metals and, in turn, metal mining activity were severely reduced in the 1980–82 recessions, and did not pick up again in the recovery period. In 1986, output of U.S. metal mines was less than three-fourths of the 1979 level, and employment was only about two-fifths. Further losses are projected, although at a much slower rate. The primary metals manufacturing industries are projected to either decline or to be among the slowest-

growing of all the industries studied in the BLS projections. As a result, production of U.S. metal mines is projected to decline and another 14,000 jobs are projected to be lost.

Construction. The real value of new and maintenance construction is projected to grow by 1.4 percent a year between 1986 and 2000, slightly faster than long-term historical trends but slower than the 2.4-percent projected for overall GNP growth. New construction is especially sensitive to cyclical fluctuations, but demographic factors play a part as well. Because of an expected slowdown in the rate of new household formation in the 1990's, residential construction is projected to slow dramatically. A little growth is expected for new single-family homes and for residential alterations and additions, but this will be just about offset by declines in new apartment and condominium construction and in farm housing. Nonresidential construction is projected to recover from the recent oversupply of office and commercial space, and will grow about 2.0 percent a year during the 1986–2000 period.

Construction employment is projected to rise by 890,000 between 1986 and 2000, to 5.8 million wage and salary jobs. The rate of increase, 1.2 percent a year, is just slightly below the projected total job growth in the economy.

Manufacturing. Manufacturing is projected to lose 834,000 jobs by 2000, a rate of decline of −0.3 percent a year. Output, in contrast, is projected to almost keep pace with total GNP growth, averaging 2.3 percent a year. Heavy investment in capital accumulation and the continued winnowing out of less efficient operations, among other factors, are expected to result in substantial productivity growth. The following tabulation presents wage and salary employment estimates (in thousands) for 1979 and 1986, and projected to 2000:

	1979	*1986*	*2000*
Manufacturing	21,042	18,994	18,160
Durables	12,762	11,244	10,731
Nondurables	8,280	7,750	7,429

Table 1. Employment by major sector, 1972, 1979, 1986, and projected to 2000

Sector	Employment (in thousands)								
	1972	1979	1986	Projected, 2000			Change, 1986–2000		
				Low	Moderate	High	Low	Moderate	High
Total	84,549	101,353	111,623	126,432	133,030	137,533	14,809	21,407	25,910
Nonfarm wage and salary[1]	73,514	89,481	99,044	113,554	119,156	123,013	14,510	20,112	23,969
Goods-producing	23,668	26,463	24,681	23,148	24,678	25,906	−1,533	−3	1,225
Mining	628	958	783	672	724	779	−111	−59	−4
Construction	3,889	4,463	4,904	5,643	5,794	6,077	739	890	1,173
Manufacturing	19,151	21,042	18,994	16,833	18,160	19,050	−2,161	−834	56
Durable	11,050	12,762	11,244	9,654	10,731	11,193	−1,590	−513	−51
Nondurable	8,101	8,280	7,750	7,179	7,429	7,857	−571	−321	107
Service-producing[1]	49,846	63,018	74,363	90,406	94,478	97,107	16,043	20,115	22,744
Transportation and public utilities	4,541	5,135	5,244	5,410	5,719	5,903	166	475	659
Wholesale trade	4,113	5,204	5,735	7,015	7,266	7,361	1,280	1,531	1,626
Retail trade	11,835	14,989	17,845	21,795	22,702	23,079	3,950	4,857	5,234
Finance, insurance, and real estate	3,907	4,975	6,297	7,508	7,917	8,159	1,211	1,620	1,862
Services[1]	12,117	16,768	22,531	30,778	32,545	33,708	8,247	10,014	11,177
Government	13,333	15,947	16,711	17,900	18,329	18,897	1,189	1,618	2,186
Agriculture	3,523	3,401	3,252	2,784	2,917	3,009	−478	−335	−253
Private households	1,693	1,326	1,241	1,122	1,215	1,234	−119	−26	−7
Nonfarm self-employed and unpaid family workers	5,819	7,145	8,086	8,972	9,742	10,277	886	1,656	2,191

Sector	Average annual rate of change (in percent)					Percent distribution of wage and salary employment					
	1972–79	1979–86	1986–2000			1972	1979	1986	Projected, 2000		
			Low	Moderate	High				Low	Moderate	High
Total	2.6	1.4	0.9	1.3	1.5	—	—	—	—	—	—
Nonfarm wage and salary[1]	2.8	1.5	1.0	1.3	1.6	100.0	100.0	100.0	100.0	100.0	100.0
Goods-producing	1.6	−1.0	− .5	.0	.3	32.2	29.6	24.9	20.4	20.7	21.1
Mining	6.2	−2.8	−1.1	− .6	.0	.9	1.1	.8	.6	.6	.6
Construction	2.0	1.4	1.0	1.2	1.5	5.3	5.0	5.0	5.0	4.9	4.9
Manufacturing	1.4	−1.4	− .9	− .3	.0	26.1	23.5	19.2	14.8	15.2	15.5
Durable	2.1	−1.8	−1.1	− .3	.0	15.0	14.3	11.4	8.5	9.0	9.1
Nondurable	.3	− .9	− .5	− .3	.1	11.0	9.3	7.8	6.3	6.2	6.4
Service-producing[1]	3.4	2.4	1.4	1.7	1.9	67.8	70.4	75.1	79.6	79.3	78.9
Transportation and public utilities	1.8	.3	.2	.6	.8	6.2	5.7	5.3	4.8	4.8	4.8
Wholesale trade	3.4	1.4	1.4	1.7	1.8	5.6	5.8	5.8	6.2	6.1	6.0
Retail trade	3.4	2.5	1.4	1.7	1.9	16.1	16.8	18.0	19.2	19.1	18.8
Finance, insurance, and real estate	3.5	3.4	1.3	1.7	1.9	5.3	5.6	6.4	6.6	6.6	6.6
Services[1]	4.8	4.3	2.3	2.7	2.9	16.5	18.7	22.7	27.1	27.3	27.4
Government	2.6	.7	.5	.7	.9	18.1	17.8	16.9	15.8	15.4	15.4
Agriculture	− .5	− .6	−1.1	− .8	− .6	—	—	—	—	—	—
Private households	−3.4	− .9	− .7	− .1	.0	—	—	—	—	—	—
Nonfarm self-employed and unpaid family workers	3.0	1.8	.8	1.3	1.7	—	—	—	—	—	—

[1] Excludes Standard Industrial Classifications 074,5,8 (agricultural services) and 99 (nonclassifiable establishments). Therefore, the estimates are not exactly comparable with data published in *Employment and Earnings.*

Table 2. Distribution and growth of real domestic output by major sector, 1972, 1979, 1986, and projected to 2000

Sector	Percent distribution					
	1972	1979	1986	Projected, 2000		
				Low	Moderate	High
Total	100.0	100.0	100.0	100.0	100.0	100.0
Goods-producing	48.3	46.5	43.5	41.0	41.5	42.1
Mining	4.8	4.0	3.3	2.4	2.3	2.3
Construction	7.9	6.9	6.8	5.7	6.0	6.5
Manufacturing	35.6	35.6	33.4	33.0	33.2	33.2
Durable	18.0	18.3	17.0	17.6	17.9	17.8
Nondurable	17.6	17.3	16.4	15.3	15.3	15.4
Service-producing	47.9	50.0	53.1	55.6	55.1	54.4
Transportation and public utilities	8.6	9.1	8.1	8.3	8.4	8.4
Wholesale trade	4.8	4.9	5.6	5.8	5.9	6.0
Retail trade	6.6	6.7	7.4	7.8	7.5	7.5
Finance, insurance, and real estate	10.0	10.8	11.6	11.8	12.0	11.7
Services	10.8	12.0	13.8	15.4	15.4	15.1
Government	7.1	6.5	6.6	6.5	6.0	5.7
Agriculture	3.6	3.3	3.3	3.3	3.3	3.4
Private households	.2	.1	.1	.1	.1	.1

	Average annual rate of change (in percent)				
	1972–79	1979–86	1986–2000		
			Low	Moderate	High
Total	2.9	1.6	1.6	2.4	3.0
Goods-producing	2.3	.6	1.0	2.0	2.7
Mining	.3	−1.4	−.9	−.2	.4
Construction	1.0	1.3	.1	1.4	2.6
Manufacturing	2.9	.6	1.3	2.3	2.9
Durable	3.1	.5	1.7	2.7	3.3
Nondurable	2.6	.8	.9	1.8	2.5
Service-producing	3.5	2.4	1.8	2.6	3.1
Transportation and public utilities	3.6	.0	1.6	2.6	3.2
Wholesale trade	3.1	3.6	1.6	2.7	3.4
Retail trade	3.2	3.0	1.8	2.4	3.1
Finance, insurance, and real estate	4.1	2.5	1.6	2.6	3.0
Services	4.4	3.6	2.3	3.2	3.7
Government	1.7	1.8	1.2	1.5	1.8
Agriculture	1.7	1.4	1.5	2.4	3.3
Private households	−3.7	3.0	−.8	.2	.4

Because most of the driving force behind the strong manufacturing output growth stems from investment in and exports of capital equipment, output growth is projected to be sharper for durable goods than for nondurables. Durable manufacturing industries are projected to average production growth of 2.7 percent a year, while nondurables will average 1.8 percent a year. In fact, of the 79 separate durable manufacturing industries in the economic projections system, only 5 are not expected to post any output gains. The exceptions are railroad equipment and four of the primary metals industries; all the other durable goods industries are projected to expand. Similarly, productivity gains are expected to be higher in durable goods industries, resulting in a net decline of 513,000 jobs, compared with a drop of 321,000 in nondurable manufacturing.

At the same time, it should be noted that the occupational composition of the remaining 18.2 million manufacturing jobs in 2000 is expected to change. More details can be found in the George T. Silvestri and John M. Lukasiewicz article on occupational projections (pp. 46–63 of this issue), but in general, manufacturing employment is expected to shift away from production and assembly-line jobs toward professional, managerial, and technical occupations:

	Percent of employment			
	Durables		*Nondurables*	
	1986	*2000*	*1986*	*2000*
All manufacturing occupations	100.0	100.0	100.0	100.0
Managerial, professional, technical	19.9	23.4	12.8	14.7
Marketing and sales	2.2	2.3	4.1	4.6
Administrative support, clerical	11.3	10.2	12.6	12.2
Precision production	11.0	11.2	6.6	6.8
Other production type jobs*	47.3	44.9	55.5	53.6

*Mechanics, machine operators, hand assemblers, material movers, laborers.

In fact, although manufacturing in total is projected to drop 834,000 jobs, there will actually be an increase of 258,000 engineering, scientific, and technical positions and 85,000 more managerial jobs.

The shift is more pronounced in industries where imports play a significant role. In some cases, design and engineering are done domestically, but much of the actual assembly is performed overseas. The product is then brought into this country under the brand name of the domestic parent. In these cases—electronic home entertainment equipment as an example—the U.S. firm acts essentially as a design and marketing agent.

Following is a discussion of the outlook for selected manufacturing industries. (See table 6 for the full output and employment detail.)

Industrial machinery (except computers and office equipment). Despite some growth in 1984, 1985, and 1986, virtually all of the heavy industrial machinery industries have yet to regain 1979's peak production levels. Many of them rely on exports for a large share of their markets (between 10 and 30 percent of output), and with the wide disequilibrium in the price of the dollar in recent years, exports fell and imports gained ground—considerable ground in some industries. In addition, primary domestic markets for some of the machinery manufacturers have been depressed, particularly farming and mining.

Similarly, employment is still far below 1979's levels. About 500,000 fewer jobs were found in heavy machinery industries in 1986 than in 1979, shrinking demand having forced the closing of inefficient plants, complete restructuring of some industries, and the drastic streamlining of others.

The outlook for machinery, except electrical, is for a recovery in production to new peak levels (except in a few of the sectors), rapid productivity growth, and some job gains—but not enough to even come close to 1979's employment levels.

This projection varies among the individual machinery producers. General industrial machinery (pumps, compressors, industrial ovens, fans, general purpose robots, and so forth) is projected to post 1.9-percent annual output growth (somewhat slower than prerecession trends) and to add about 13,000 jobs to 1986's employment level of 255,000. Exports rise above 1985's depressed level but imports are projected to increase their market share from about 22 percent in 1985 to more than 26 percent by 2000. (Imports are calculated as a percent of the total value of output in constant 1982 dollars.) Miscellaneous nonelectric machinery (which includes such items as pistons, valves, and carburetors) is projected to have 2.2-percent annual output growth, which again is slower than past trends, and to add about 26,000 jobs to reach an employment level of 301,000 by 2000. Exports and imports are relatively small in this sector. The employment level represents a new peak for the industry, because productivity growth is projected to be rather low; the large number of small firms and the diversity of products limit widespread automation. Metalworking machinery is also characterized by low productivity growth because of the many job shops in the industry, but sluggish growth in domestic output (because of weak demand and rising imports) causes employment in the BLS projections to fall from 304,000 in 1986 to 281,000 by 2000.

Computers and office equipment. The computer manufacturing industry has been one of the fastest growing U.S. industries over the last 25 years and, despite rising imports, it is one of the few manufacturing industries to show a consistently large trade surplus. Job gains have been rapid in the industry since the mid-1970's, but since 1984, employment levels have fallen as the growth of domestic output slowed. The nature of work in this industry is uncharacteristic of manufacturing industries as a whole as reflected in its high concentration of scientific personnel and its relatively low concentration of production workers.[2] More than 25 percent of employment in computer manufacturing consists of engineers, technicians, and systems analysts, while production workers represent only 35 percent. For manufacturing as a whole, production workers accounted for 68 percent of all jobs in 1986, although, as noted earlier, occupational shifts away from production-type occupations are projected to occur.

Output growth for computers is expected to slow considerably over the next 14 years, although the industry is still projected to be the fastest growing in the economy in terms of output. The slowdown occurs as the industry matures and its size makes it difficult to expand at past rates of growth; future technological advances are not assumed to have the same dramatic impact as the introduction of the minicomputer or the microcomputer. However, demand is expected to be buoyed by rapidly expanding purchases by private consumers. Employment is projected to expand by about 85,000 jobs to 503,000 in 2000, with even more of a shift from production to research and development occupations.

Electrical and electronic equipment. The fastest growing industries within this sector are projected to be semiconductors and miscellaneous electronic components. Despite significant import growth, domestic production increases in these industries will rank them among the top five of all U.S. industries. Also enjoying rapid output growth of more than 5 percent a year will be the X-ray and electromedical apparatus industry, as demand for sophisticated health equipment continues unabated. Defense demand will not have as much of an impact on the communications equipment industry as in the past, but the slack is expected to be taken up by increases in private investment purchases of such items as satellites, fiber optics systems, broadcasting equipment, and industrial laser systems.

The rapid production gains in these electrical equipment industries are expected to lead to some job growth, but it is almost totally offset by declines in other, related industries. Overall employment in electrical equipment manufacturing is projected to remain at 2.1 million jobs.

Table 3. Projected output trends for selected industries, 1986–2000

Fastest growing	Average annual rate of change (percent)
Electronic computing equipment	7.4
Arrangement of passenger transportation	5.9
Semiconductors and related devices	5.8
Miscellaneous electronic components	5.5
Amusement and recreation services, n.e.c.	5.5
X-ray and other electromedical apparatus	5.2
Optical and ophthalmic products	5.1
Child day care services	5.1
Computer and data processing services	4.9
Electronic home entertainment equipment	4.9
Residential care	4.9
Medical instruments and supplies	4.4
Outpatient facilities and health services, n.e.c.	4.4
Research, management, and consulting services	4.3
Radio and TV communication equipment	4.2
Oil and gas field services	4.1
Telephone and telegraph apparatus	4.1
Partitions and fixtures	4.0
Office and miscellaneous furniture and fixtures	4.0
Drugs	4.0
Slowest growing or most rapidly declining	**Average annual rate of change (percent)**
New farm housing, alterations, and additions	−3.2
Crude petroleum, natural gas, and gas liquids	−2.0
Footwear except rubber and plastic	−2.0
New nonfarm housing, n.e.c.	−1.7
Railroad equipment	−1.3
Luggage, handbags, and leather products, n.e.c.	−1.0
Metal mining	− .8
Blast furnaces and basic steel products	− .8
Iron and steel foundries	− .7
New conservation and development facilities	− .4
Tobacco manufactures	− .2
Watch, clock, jewelry, and furniture repair	− .2
New local transit facilities	− .1
New gas utility and pipeline facilities	− .0
Ship and boat building and repairing	.2
Private households	.2
Miscellaneous primary and secondary metals	.3
Mobile homes	.4
Jewelry, silverware, and plated ware	.4
New nonbuilding facilities, n.e.c.	.5

n.e.c. = not elsewhere classified.

Table 4. Projected employment trends for wage and salary workers, selected industries, 1986–2000

Fastest growing	Average annual rate of change (percent)
Computer and data processing services	5.2
Outpatient facilities and health services, n.e.c.	4.6
Personnel supply services	4.4
Offices of health practitioners	4.4
Credit reporting and business services, n.e.c.	4.1
Legal services	3.8
Nursing and personal care facilities	3.8
Research, management, and consulting services	3.6
Residential care	3.5
Miscellaneous publishing	3.4
Equipment rental and leasing	3.4
Accounting, auditing, and services, n.e.c.	3.2
Personal services, n.e.c.	3.1
Detective and protective services	3.1
Credit agencies and investment offices	2.9
Advertising	2.9
Services to dwellings and other buildings	2.9
Individual and miscellaneous social services	2.9
Automotive rentals, without drivers	2.7
Arrangement of passenger transportation	2.6
Most rapidly declining	**Average annual rate of change (percent)**
Railroad transportation	−3.9
Footwear except rubber and plastic	−3.6
Railroad equipment	−3.4
Metal mining	−3.1
Miscellaneous primary and secondary metals	−2.3
Luggage, handbags, and leather products, n.e.c.	−2.3
Blast furnaces and basic steel products	−2.2
Iron and steel foundries	−2.1
Electronic home entertainment equipment	−2.1
Agricultural chemicals	−1.9
Dairy products	−1.9
Petroleum refining	−1.9
Grain mill products and fats and oils	−1.8
Tobacco manufactures	−1.8
Tires and inner tubes	−1.8
Plastics materials and synthetics	−1.7
Coal mining	−1.6
Ship and boat building and repairing	−1.6
Sugar and confectionery products	−1.6
Aircraft	−1.5

n.e.c. = not elsewhere classified.

Transportation equipment. BLS projects that employment in the auto industry will fall below the 1986 level, as tapering demand and higher productivity offset the trend toward more domestic-based production of foreign automobiles. Domestic production is expected to slow to about 2.0 percent a year, somewhat below pre-1979 rates of growth and trailing the 2.4-percent projected growth rate of GNP.

The slowdown reflects a projected absolute decline in the size of the 16- to 34-year-old population, which accounts for the majority of first-time car buyers. This dampening trend offsets the expectation that there will be a larger number of older car buyers, who generally buy higher priced cars. At the same time, investment in new auto plants with the latest automated production techniques leads to a projected 3.2-percent gain in productivity. Slower demand and high productivity outweigh the assumption that Japanese automakers will expand their U.S. operations—a likely event as the rising value of the yen relative to the dollar forces Japanese car prices to less competitive levels. Imports (in dollar terms) are projected to hold a slightly smaller share of the market than at present, about 22 percent in 2000, as imports from Japan shrink but those from the Third World rise. In total, domestic output of the motor vehicle industry is projected to grow only about 2.0 percent a year during the 1986–2000 period (compared to 2.4 percent for GNP), and employment to fall from 865,000 to 749,000 jobs.

The aircraft industry is expected to see production gains of only 0.8 percent a year, considerably slower than recent trends. The turnabout mainly results from the assumption of tapering defense demand following current high levels, but it is tempered somewhat by accelerated export growth. The industry is expected to be able to remain competitive in the export market through cost-cutting and productivity improvements—jobs are projected to shrink from 339,000 in 1986 to 274,000 in 2000. Similar trends apply in the aircraft and missile engines and equipment industry—an increase in exports buoy output growth but the numbers of jobs fall from 385,000 in 1986 to 330,000 in 2000.

Instruments and related products. Demand is projected to be very high for many products in this industry, especially for optical instruments (in particular, spectrographs and electron microscopes), medical instruments, measuring and controlling devices, and engineering and scientific instruments. These industries have typically experienced very rapid output growth, and continued strong demand reflects the assumed high levels of research and development spending by U.S. manufacturers on this type of equipment in the future. Employment will grow from 707,000 in 1986 to 771,000 in 2000, or about 9 percent over the entire period.

Primary and fabricated metals. Primary metals have suffered by far the largest job contraction of all the manufacturing sectors in the 1979–86 period, shrinking by 40 percent. All the primary metals industries have been affected, but basic steel and iron and steel foundries have lost the most jobs. The 1980–82 recessions accelerated a long-term decline in steel—the peak employment year for steel was 1965 and for production, 1974—and the industry closed many of its plants and cut production and jobs drastically. Large capital expenditures would be necessary to improve the competitiveness of raw steel production in the United States, but recent financial losses by most of the large steel companies have led instead to reduced capital expenditures. Also, this industry is faced by worldwide excess capacity, making needed capital improvements very risky.

The industry's declines are projected to ease in the future because most of the more inefficient mills have already closed, but no rebound is anticipated. U.S. steel output in real terms is projected to fall −0.8 percent a year over the 1986–2000 period (compared to −8.9 percent during the 1979–86 period), and employment to deline by −2.2 percent annually (versus −10.3 percent over the 1979–86 period). (The year 1986 may have been atypical because of a strike in the industry, but clearly, long-term trends are

sharply negative.) Imports are projected to rise in value from 22.5 percent of total output in 1985 to almost 31 percent by 2000. Most of the import increases are expected to be in the form of semifinished steel for further processing in U.S. finishing mills, which are relatively more efficient than the Nation's raw steel manufacturing plants. Demand for steel and other primary metals will be sharply limited by the continued shift to other inputs (such as plastics and composites) in transportation equipment, machinery, and other manufactured goods.

Fabricated metal products lost 285,000 jobs between 1979 and 1986, and the sector is projected to lose another 120,000 by 2000. Among the fabricated metals industries, structural metal products of the type used in construction are projected to post output growth at about the same rate as new construction, 1.7 percent a year, but more efficient production techniques will result in continued employment declines. Metal coating, engraving, and allied services is the only fabricated metals industry projected to add jobs. It is expected to enjoy fairly strong output growth (2.9 percent a year), because about 10 percent of its output is purchased by the fast-growing electronic components industry. Productivity advances in this industry are limited by the large number of small firms and by product diversity.

Food products. Overall output of food products is projected to grow slower than past trends, reflecting the future slowdown in population growth. Changing demographics and consumer preferences will boost demand for higher valued food items, such as prepared convenience foods, while limiting growth for others, such as sugar and confectionery products.

The meat products industry is projected to register 1.6-percent annual output growth, with exports rising faster than domestic consumption. Canned, dried, and frozen foods is projected to have the fastest output growth of all the food sectors, 2.2 percent a year. Strong demand for high-priced frozen dinners and other frozen specialties will more than offset diminishing purchases of canned fruits and vegetables. The market for alcoholic beverages is expected to erode further as consumers continue to change their drinking habits. Output of domestic beer, wine, and liquor has shown no growth in real terms since 1979, and is projected to recover to only 1.0-percent annual growth over the 1986–2000 period. This compares to 3- to 4-percent average growth for the industry prior to 1979. Soft drinks and flavorings (including carbonated waters) are projected to reap some of the benefits of flat beer and liquor sales, but because of slow growth in both the teen population and the number of fast food establishments, output of soft drinks will grow much slower than historically.

Efficiencies in food production are projected to continue to increase over the next decade, especially in grain mill products and in dairy products. Employment has been declining or has remained essentially unchanged in most food industries over the past 25 years, and this trend is expected to continue. Meat products, the largest food industry in terms of employment, is projected to add 10,000 jobs to reach 382,000 by 2000, but overall, food industries combined are estimated to lose 161,000 jobs between 1986 and 2000.

Table 5. Industries projected to generate the largest numbers of new wage and salary jobs, 1986–2000

Industry	New jobs (thousands)
Eating and drinking places	2,486
Offices of health practitioners	1,389
New and repair construction	890
Nursing and personal care facilities	847
Personnel supply services	834
State and local government education	784
Machinery and equipment wholesalers	614
Computer and data processing services	612
Grocery stores	598
Hotels and other lodging places	570
State and local general government, n.e.c.	537
Legal services	519
Outpatient facilities and health services, n.e.c.	513
Research, management, and consulting services	513
Credit reporting and business services, n.e.c.	507
Credit agencies and investment offices	495
Hospitals, private	475
Department stores	386
Real estate	348
Services to dwellings and other buildings	339

n.e.c. = not elsewhere classified.

Apparel and textiles. Rising real disposable income will boost consumer demand for apparel, but a larger proportion of output will come from foreign suppliers. Clothing imports are expected to claim a 37-percent market share by 2000, compared to an already high 28 percent in 1985. Despite rising imports, domestic production of apparel is projected to expand by 1.1 percent a year, because of the strong consumer demand and because continued cost-cutting measures will keep U.S. apparel prices competitive. Nevertheless, employment in the industry is projected to fall from 921,000 in 1986 to 763,000 in 2000, a cutback of 158,000 jobs.

Textile mill products will benefit from both the steady growth in domestic apparel production and from the continued diffusion of new, automated technologies. Although imports are expected to increase their market share slightly, U.S. textile manufacturers are projected to be able to enjoy a healthy expansion of production. Floor covering mills are expected to be the fastest growing of the textile industries, with output rising 3.0 percent a year. Employment in textiles will continue to fall, however. About 300,000 jobs have been cut back in textile industries since the peak year 1973, and 99,000 fewer jobs are expected by 2000.

Printing and publishing. Printing and publishing is one of the few manufacturing sectors to have registered consistent job gains in the last few years. Even during the recession, both output and employment increased steadily. Despite the introduction of electronic composition systems and other

new technologies in the larger firms, employment gains in printing and publishing have actually accelerated from past rates to average 2.6 percent a year over the 1979–86 period.

The explanation for this growth lies in sharp increases in demand for new trade journals and newsletters, catalogs and directories, software manuals, new specialty magazines such as health and fitness and regional magazines, commercial printing and business forms, elementary school textbooks, and greeting cards. Also, the industry encompasses a large number of small, widely scattered firms, which often have only limited capacity to invest in the newer technologies. Occupational shifts also are occurring within the printing trades industries, from fewer typesetters and other craftworkers to more front-office personnel such as writers, editors, managers, and salesworkers.

Growth is projected to continue to be strong through the 1990's, and all of the printing and publishing industries are projected to show increases in both output and employment between 1986 and 2000. The most rapid growth will be for miscellaneous publishing, with 3.6-percent per year output gains and 3.4-percent employment growth.

Chemicals and allied products. The chemical industry encompasses a variety of products, each with a somewhat different outlook. Industrial chemicals are projected to continue their upswing from the 1980–82 recessions, but future expansion is limited. Once an important export industry, the domestic chemical sector has seen a weakening in worldwide demand as many foreign countries have invested in their own chemical manufacturing facilities. In contrast, substantial output growth is projected for plastics materials and synthetics, reflecting for the most part gains for plastics and resins (such as carbon fiber resin for autos and airplanes), but little or no growth in synthetic fibers. The plastics materials and synthetics industry traditionally has enjoyed high productivity, however, and employment is expected to continue to fall despite sharp output advances.

The fastest growing chemical industry, and indeed one of the fastest growing industries in the whole economy in terms of output, is drugs and pharmaceutical products. Advances in biomedical research have led to a vast array of important new drugs, and it is expected that these will be adopted widely in coming years. Also, an expanding elderly population which spends more of its income on medicines than any other age group will boost demand. Output of drug products is projected to grow 4.0 percent a year, and employment is expected to rise by 17,000 to 224,000 in 2000.

Service-producing industries

Overall trends for the service-producing sector are projected to be vastly different from those in the goods sector. Payroll job growth will be very strong for almost all of the service-producing industries, particularly health services, business services, and trade. Service-producing employment will constitute about 80 percent of all wage and salary jobs by the year 2000. More than 20 million new jobs are projected to be added to the service-producing sector between 1986 and 2000.

Transportation. In recent years, deregulation has boosted employment in the air transportation industry as many smaller firms entered the market and price competition stimulated demand. But, in the long-run, consolidation and takeovers are expected to dampen the rate of job growth. Employment has been growing by more than 7 percent a year since 1983, but future increases are expected to be limited to 1.7 percent annually. This represents a gain of 151,000 jobs between 1986 and 2000. The slowdown occurs as unsuccessful competitors cut back on routes or merge with larger companies.

Along with the recent rise in airline transportation output and employment, there has been a corresponding boom in the arrangement of passenger transportation (travel agencies). With the proliferation and constant revision of new routes and new fares, the traveler has turned from the airline itself to an independent travel agent to make reservations. Employment in travel agencies and independent ticket offices rose from 99,000 in 1980 (the first year for which separate data were available for the industry) to 158,000 in 1986, and an additional 69,000 jobs are projected to be added by 2000.

Demand for truck transportation is generally dependent on the state of the economy; the value of trucking output is projected to post 2.2-percent annual growth over the 1986–2000 period. Consolidations are anticipated to have an impact in this industry as well, and projected employment growth is limited to 1.5 percent annually. Greater efficiencies in scheduling, marketing, and cost control are expected to make possible greater gains in output than in employment.

Communications. The breakup of the telephone service monopoly in 1983 thus far has not led to real output gains, and employment in communications (except broadcasting) is beginning to edge downward from the 1.1 million mark maintained through most of the 1970's and 1980's. Competition in the 1990's is expected to lead to an employment decline of about 121,000 (or −0.9 percent a year), but real output is projected to advance 3.9 percent a year as demand for telecommunications surges.

Radio and television broadcasting has seen the development of cable TV systems, which provided a further boost to already expanding output and employment. Growth should taper as the market becomes saturated, and the projections show a deceleration to 1.7-percent annual job gains during the 1986–2000 period, compared to 2.6 percent over the 1982–86 period.

Wholesale trade. Over the projection period, wholesale trade is expected to add 1.5 million jobs, about 600,000 of them among machinery and equipment suppliers. This gain

is a consequence of the earlier described assumptions of strong capital investment and export growth in these manufacturing industries.

Retail trade. In retail trade, 4.9 million jobs will be added. Although a very sizable number, the rate of gain projected for retail jobs falls considerably below historical trends for two reasons: (1) the trade division generally mirrors overall economic patterns, and as growth in the labor force and total employment moderates, retail trade can be expected to do likewise; and (2) a large part of the past additions to retail trade employment have been part-time workers, about 40 percent during the 1973–85 period,[3] but trends indicate that this growth in the part-time labor force may not continue indefinitely.

As the following tabulation shows, part-time employment is mainly concentrated among teenagers and women in the 25-to-54 and 55-and-older age groups:

	Part-time workers, 1986[4]	
	Number (thousands)	*Percent of total*
Total	20,598	100.0
16–19:		
Men	2,326	11.3
Women	2,468	12.0
20–24:		
Men	1,300	6.3
Women	1,841	8.9
25–54:		
Men	1,758	8.5
Women	7,399	35.9
55 and over:		
Men	1,438	7.0
Women	2,068	10.0

However, the supply of these workers is projected to be very limited in the future. The teenage labor force will show a net increase of only 195,000 between 1986 and 2000—consisting of an absolute decline of 1.5 million over the 1986–92 period (resulting from the "birth dearth" of the 1960's and 1970's) and an increase of 1.7 million over the 1992–2000 period (reflecting the larger numbers of births to baby-boom parents in the 1980's). The net impact of teenage labor force changes is to shrink this age group from 6.9 percent of all workers in 1986 to 6.0 percent by 2000.

Additionally, data clearly indicate a declining preference by women for part-time work. The following tabulation shows women voluntarily working part time as a percentage of all employed women for selected recent years:

	Percent part-time
1976	24.1
1978	23.7
1980	23.2
1982	22.9
1984	21.9
1986	21.7

Retailers in some areas have already found it difficult to staff their part-time positions, and there is much discussion about alternative sources of labor, such as older workers, to fill these jobs. This might be a partial solution in the longer term, as the labor force age 55 and over is projected to increase dramatically between 1986 and 2000. However, it does not seem a promising interim solution unless many early retirees can be induced to return to part-time work within the next few years. Although the number of workers aged 55 to 64 is projected to increase by 1.7 million between 1986 and 2000—an unprecedented addition—it does not come close to matching the expected increase in retail trade jobs. Furthermore, all of the increase in the labor force of older persons begins to occur only after 1995.

The projected employment data in this article do not distinguish between part-time and full-time jobs, but an examination of the average workweek can provide some indication of expected trends. Average weekly hours in retail trade dropped from 35.6 in 1972 to 29.2 in 1986 (and to 25.6 in eating and drinking places), clearly a reflection of the growth in part-time employment. This decline, however, is beginning to moderate and is assumed to slow further in the projections. The rate of decline in the workweek averaged −0.8 percent a year from 1972 to 1979 for retail trade (other than eating and drinking places) and −2.1 percent for eating and drinking establishments. Over the more recent period 1979–86, the workweek decline averaged −0.7 and −0.6 percent, respectively. The projected decline is only −0.2 percent a year for retail trade and −0.3 percent for eating and drinking establishments.

Among individual retail industries, eating and drinking places will have the most growth in jobs, 2.5 million, but the rate of increase will be much slower than historically. In particular, the proliferation of fast-food establishments, which generated many jobs in the past, should taper off as the market becomes saturated and as population growth slows, especially that of the teenage population. Some additional growth is expected for eating and drinking places as the practice of contracting out food service operations reaches more markets, such as hospitals, residential institutions, and schools.

Grocery stores are projected to add 598,000 new jobs by 2000, reflecting both a trend toward providing more labor-intensive services (such as carry-out prepared meals, meat and deli counters, fish counters, and salad bars), as well as the continued expansion of store hours. Department stores will gain 386,000 jobs, and miscellaneous shopping goods stores are projected to add 339,000. (This latter sector includes such establishments as sporting goods, jewelry, book, gift, and stationery stores.)

Finance and insurance. Banking, credit agencies, and investment offices should enjoy very substantial rates of output growth, but consolidation and technological advances in automatic banking and other financial transactions will sharply slow past rates of employment gain. The output

growth is expected as demand for financial services continues unabated, although the projected rates of increase are not expected to match those of recent years. In 1985 and 1986, falling interest rates and a bull market caused a surge in mortgage banking services and brokerage services. The projected long-term rates of output growth for these services are more in line with past longer term trends. Employment in finance is expected to grow less rapidly than in the past, but even so, there are projected to be 262,000 more jobs in banking, 495,000 more in credit agencies and investment offices, and 134,000 more in security and commodity brokers and exchanges by the year 2000. It should be noted that the distinctions among these sectors are blurring, as deregulation eliminates many restrictions on financial services.

The value of insurance services is projected to grow at about the same rate as GNP, 2.3 percent a year during the 1986–2000 period. Because of greater efficiencies in computerized underwriting, job gains will be limited—only 168,000 for insurance carriers and 214,000 for independent agents and brokers.

Services division. The major industry division, services, is composed of many different types of activities—business, health, professional, recreational, personal, and educational, to name a few. Overall, services has been and is projected to be the fastest growing division in terms of employment, adding 10 million new jobs between 1986 and 2000. In 1986, it accounted for about 23 percent of all nonfarm wage and salary jobs; in 2000, it will account for more than 27 percent. More than 32 million payroll jobs will be in the services division in the year 2000.

Despite such awesome growth, the projected gains do not match past increases, due to the overall slowdown of labor force and employment growth expected in the 1990's. Over the period 1972–86, the services division added 10.4 million new jobs; its rate of growth averaged 4.5 percent a year. The projected rate of increase 1986–2000 is 2.7 percent a year.

Following is a discussion of some of the major industries within the services division.

Business and professional services. For the current set of projections, it has been possible because of an expansion in BLS data series to study more of the detailed business services industries to try to get a clearer picture of where growth will occur. As can be seen in table 6, virtually all the business services industries are projected to have very rapid rates of output and employment growth, much faster than the increases in GNP or overall employment. The development of new types of specialized services continues to accelerate, thereby boosting employment in the business services sector.

The most rapidly growing business services industry and, in fact, the most rapidly growing of all the industries in the projections system in terms of employment, will be computer and data processing services. The need for systems design and analysis, programming, and software development is certain to be very strong, reflecting the demand for specialized systems by business and government as well as the proliferation of packaged software for a wide variety of users. The heavy investment in computer-assisted design and manufacturing techniques which is assumed for the 1990's inevitably will lead to a sharp increase in demand for computer specialists. Employment in the industry is projected to swell by 5.2 percent a year, just about doubling its 1986 level to reach 1.2 million by 2000.

The business services industry with the biggest absolute increase in employment will be personnel supply services, gaining more than 800,000 jobs over 1986's 1.0 million level by the year 2000. This industry has been one of the most rapidly expanding in recent years, almost doubling in employment over the period 1982–86.

Several factors help explain the phenomenal growth in personnel services. Most important has been the expansion in the temporary help industry.[5] The demand for temporary help has been very strong because of lower fringe benefit costs—"temps" typically have fewer benefits than permanent employees—and because of employers' need to meet peak workloads under uncertain economic conditions. On the supply side, many workers have been willing to work as temporaries because of the opportunities for flexible scheduling of assignments and the chance for skill enhancement. The temporary field is not limited only to office workers; the market is expanding to include industrial, medical, managerial, and engineering and technical occupations as well. The projected rate of job growth for temporary help, however, is not expected to match the gains of 1982–86 because a large part of that surge was associated with cyclical recovery from the 1980–82 downturns. Despite a slowdown, however, growth of the temporary help industry will still be very strong.

Another factor contributing to growth in personnel supply services has been the trend by government to contract out operations previously performed by public employees. The operation of private prisons under contract with State and local governments is an example. The rise in public facilities management by private firms will foster additional growth in the personnel supply industry.

Contracting out, not only by government agencies but also by private business establishments, has also had an impact on the building services and protective services industries. In addition, the office and commercial building boom in recent years boosted the demand for contract cleaning and guard services. Future gains should be slower as construction tapers and the trend toward contracting out levels off. Thus, projected increases for the services to dwellings industry and the detective and protective services industry are not expected to match historical rates. Some new growth is anticipated for protective services in the field of mechanical protective devices and polygraph services, but these two areas are relatively small compared to building guard services.

The development of new services should keep demand for the research, management, and consulting services industry very strong. Included in this industry are independent laboratories for research and development (nonmedical, and not manufacturing auxiliaries), market research, personnel training or management, economic research, efficiency experts, lobbyists, and other business consultants. Output is projected to grow 4.3 percent a year during the 1986–2000 period, a rate second only to that of computer services among all the business services industries. Some 513,000 new jobs are projected to be added to 1986's level of 788,000, an increase of nearly two-thirds over the period 1986–2000.

The equipment rental and leasing sector shows very high projected output and employment growth rates (ranking among the top 20 for employment) primarily because of video tape rentals. The rest of this industry includes the leasing of tools and heavy construction equipment, which is not expected to be a high-growth service. (Computer leasing is not included here; rather, it is accounted for either in the computer services industry or in the computer manufacturing industry.)

The credit reporting and business services not-elsewhere-classified sector has very rapid projected growth primarily because of the "not-elsewhere-classified" designation. All the new business services that do not fit any other category are included in this industry. Examples are mailing list compilers, word processing services (typing), building inspectors, tourist and convention bureaus, restaurant reservation services, speakers' bureaus, merchandise liquidators, check validating services, and so on. Historically, employment growth in this industry has been very sharp, averaging about 60,000 new jobs each year since 1983. Future gains for miscellaneous business services should be more limited as the size of the industry reaches some upward limit. Employment increases in credit reporting and miscellaneous business services over the next 14 years are projected to average about 36,000 a year, for a total employment level of 1.2 million by 2000.

The legal services industry has been booming, reflecting the increasing incidence of liability litigation; corporate mergers and acquisitions; high divorce levels; the geographic expansion of law firms; a greater degree of legal specialization within firms; and an increase in litigation in general. In addition, trends in the industry indicate a shift from self-employed workers toward more wage and salary personnel. Payroll employment in legal services grew by 7.4 percent each year between 1972 and 1986, while the number of self-employed (plus unpaid family workers) posted only 0.7-percent annual growth. These trends—very rapid demand growth and fewer self-employed lawyers—are projected to continue in the legal services industry. An additional 519,000 payroll jobs are projected for the legal services industry by the year 2000. This represents a 3.8-percent annual rate of increase, ranking legal services among the top 10 fastest growing employment industries. A rising proportion of these jobs are expected to be filled by legal assistants, rather than attorneys.

Like factory automation in manufacturing industries, office automation in business (and financial) service industries will have a significant impact on the occupational structure of those industries. It is expected that administrative support occupations, mainly in the clerical field, will account for a much smaller share of the work force. In some cases, even the absolute numbers of such jobs will decline, for example, stenographers, payroll and timekeeping clerks, typists and word processors, data entry keyers, and statistical clerks.

Health services. Industries providing medical care are undergoing very pronounced changes having important implications for future growth. Cost containment policies have halted—at least temporarily—the expansion of hospital output and employment, and more of the services once performed in a hospital now are being performed in doctors' offices and in outpatient facilities. Patient care is generally cheaper in these centers than in traditional hospitals, providing an impetus for future growth. New group practices such as emergency care clinics, surgicenters, and walk-in treatment centers, are becoming commonplace. Often these establishments perform their own radiological and laboratory work. This shift from hospital to outpatient care is projected to continue and, coupled with an increasing demand for medical care services, will significantly boost employment in establishments classified as offices of health practitioners. It is projected that 1.4 million new payroll jobs will be added to this industry between 1986 and 2000, reflecting a rate of growth of 4.4 percent a year.

Demand for health care is projected to be very strong in the 1990's because of the aging of the population and because of dramatic advances in medical technologies. The following tabulations illustrate the large projected increase in the elderly population and the reasons why this factor is so significant for the health industries:

	Population (millions)		*As percent of total*	
	65 and older	*85 and older*	*65 and older*	*85 and older*
1970	20.1	1.4	9.8	0.7
1975	22.7	1.8	10.5	.8
1980	25.7	2.3	11.3	1.0
1985	28.5	2.7	11.9	1.1
Projected 2000	34.9	4.9	13.0	1.8

	1982–83 health expenditures as a percent of total expenditures	
	All consumer units	*Consumer unit head age 65 or over*
Total health care	4.4	9.9
Medical services	2.4	4.1
Drugs and supplies	.7	2.0
Health insurance	1.2	3.8

Table 6. Employment by selected industry, 1972, 1979, 1986, and projected to 2000

Industry	Standard Industrial Classification	Employment (thousands)						Annual rate of change, 1986–2000[1] (percent)	
		1972	1979	1986	Projected, 2000				
					Low	Moderate	High	Employment	Output
Total	—	84,549	101,353	111,623	126,432	133,030	137,533	1.3	2.4
Agriculture	01,2,7,8,9	3,523	3,401	3,252	2,784	2,917	3,009	- .8	2.4
Livestock and livestock products	01 pt., 02 pt.	1,365	988	848	629	677	745	-1.6	1.4
Other agricultural products	01 pt., 02 pt.	1,699	1,785	1,534	1,045	1,120	1,087	-2.2	3.0
Agricultural services, forestry, and fishing	07,08,09	459	628	875	1,110	1,120	1,177	1.8	3.0
Private households	88	1,693	1,326	1,241	1,122	1,215	1,234	- .1	.2
Nonfarm self-employed and unpaid family workers	—	5,819	7,145	8,086	8,972	9,742	10,277	1.3	-
Nonfarm wage and salary	—	73,514	89,481	99,044	113,554	119,156	123,013	1.3	-
Mining	10–14	628	958	783	672	724	779	- .6	- .2
Metal mining	10	83	101	41	20	27	29	-3.1	- .8
Coal mining	11,12	161	259	176	140	141	149	-1.6	2.2
Crude petroleum, natural gas, and gas liquids	131,2	143	198	224	169	184	192	-1.4	-2.0
Oil and gas field services	138	125	276	233	253	271	302	1.1	4.1
Nonmetallic minerals, except fuels	14	116	124	109	91	102	106	- .5	1.4
Construction	15,16,17	3,889	4,463	4,904	5,643	5,794	6,077	1.2	1.4
Manufacturing	20–39	19,151	21,042	18,994	16,833	18,160	19,050	- .3	2.3
Durable manufacturing	24,25,32–39	11,050	12,762	11,244	9,654	10,731	11,193	- .3	2.7
Lumber and wood products	24	726	767	711	603	693	763	- .2	1.9
Logging camps and logging contractors	241	69	89	83	67	71	72	-1.1	2.7
Sawmills and planing mills	242	225	237	194	137	173	188	- .8	1.5
Millwork and structural wood members, n.e.c.	2431,4,9	122	150	184	209	227	254	1.5	1.7
Veneer and plywood	2435,6	75	77	61	44	57	68	- .5	2.6
Wood containers and miscellaneous wood products	244,9	124	132	118	96	106	109	- .8	2.1
Mobile homes	2451	80	57	49	34	42	50	-1.1	.4
Furniture and fixtures	25	484	498	497	515	563	607	.9	3.1
Household furniture	251	337	329	294	280	311	351	.4	2.2
Partitions and fixtures	254	56	65	72	72	80	81	.7	4.0
Office and miscellaneous furniture and fixtures	252,3,9	91	104	131	163	172	175	2.0	4.0
Stone, clay, and glass products	32	678	710	586	483	535	560	- .6	1.4
Glass and glass products	321,2,3	193	199	155	121	138	146	- .8	1.2
Concrete, gypsum, and plaster products	327	210	216	209	184	206	217	- .1	1.5
Stone, clay, and miscellaneous mineral products	325,6,8,9	243	262	199	162	173	179	-1.0	1.6
Primary metal industries	33	1,173	1,254	753	489	574	646	-1.9	.1
Blast furnaces and basic steel products	331	568	571	275	166	202	229	-2.2	- .8
Iron and steel foundries	332	219	241	131	81	97	109	-2.1	- .7
Miscellaneous primary and secondary metals	334,9	36	51	42	25	30	37	-2.3	.3
Aluminum rolling and drawing	3353,4,5	-	76	65	53	55	60	-1.2	1.1
Nonferrous wire drawing and insulating	3357	85	89	77	60	68	71	- .9	1.6
Aluminum foundries	3361	46	58	53	40	45	46	-1.2	1.4
Fabricated metal products	34	1,547	1,718	1,433	1,172	1,313	1,361	- .6	1.8
Metal cans and shipping containers	341	85	80	58	45	50	52	-1.1	1.3
Cutlery, hand tools, and hardware	342	161	184	136	115	127	130	- .5	1.9
Plumbing and nonelectric heating equipment	343	71	76	61	53	56	59	- .6	1.4
Fabricated structural metal products	344	444	523	438	340	385	394	- .9	1.7
Screw machine products, bolts, rivets, and so forth	345	100	116	93	73	84	88	- .7	1.6
Forgings	3462,3	-	63	39	34	38	41	- .1	1.0
Automotive stampings	3465	104	118	105	75	91	104	-1.0	1.4
Stampings, except automotive	3466,9	-	124	100	85	88	90	- .9	2.4
Metal coating, engraving, and allied services	347	88	107	110	112	126	129	1.0	2.9
Ordnance, except vehicles and missiles	348	82	64	77	67	74	77	- .2	2.7
Miscellaneous fabricated metal products	349	224	264	216	174	193	197	- .8	1.9
Machinery, except electrical	35	1,889	2,485	2,059	1,951	2,129	2,171	.2	4.5
Engines and turbines	351	115	145	102	85	93	92	- .6	1.4
Farm and garden machinery	352	135	182	91	80	80	85	-1.0	1.2
Construction machinery	3531	139	156	80	71	76	76	- .4	1.8
Mining and oilfield machinery	3532,3	65	120	68	74	83	95	1.4	2.0
Materials handling machinery and equipment	3534,5,6,7	89	106	79	75	87	92	.7	3.1
Metalworking machinery	354	286	369	304	250	281	286	- .6	1.8
Special industry machinery	355	177	205	159	130	140	138	- .9	.9
General industrial machinery	356	267	329	255	242	268	273	.3	1.9
Electronic computing equipment	3573	182	319	418	466	503	510	1.3	7.4
Office and accounting machines	3572,4,6,9	77	78	57	43	51	49	- .7	3.7
Refrigeration and service industry machinery	358	164	188	171	149	166	169	- .2	2.9
Miscellaneous nonelectrical machinery	359	191	286	275	287	301	306	.7	2.2
Electrical and electronic equipment	36	1,813	2,117	2,124	1,927	2,128	2,222	.0	3.9
Electric distributing equipment	361	128	126	107	79	99	110	- .6	2.4
Electrical industrial apparatus	362	209	251	187	159	175	178	- .5	2.0
Household appliances	363	187	178	135	112	121	132	- .8	2.5
Electric lighting and wiring equipment	364	204	225	196	163	185	191	- .4	1.6
Electronic home entertainment equipment	365	139	115	82	61	61	67	-2.1	4.9
Telephone and telegraph apparatus	3661	160	165	127	94	116	132	- .6	4.1
Radio and TV communication equipment	3662	299	357	505	472	542	585	.5	4.2
Electronic tubes	3671,2,3	46	42	40	26	34	36	-1.1	.6
Semiconductors and related devices	3674	115	201	268	280	289	276	.5	5.8
Miscellaneous electronic components	3675,6,7,8,9	193	281	323	343	352	354	.6	5.5
Storage batteries and engine electrical parts	3691,4	94	118	95	74	86	89	- .7	2.3

Table 6. Continued—Employment by selected industry, 1972, 1979, 1986, and projected to 2000

Industry	Standard Industrial Classification	Employment (thousands)						Annual rate of change, 1986–2000[1] (percent)	
		1972	1979	1986	Projected, 2000			Employment	Output
					Low	Moderate	High		
X-ray and other electromedical apparatus	3693	–	26	32	41	45	46	2.5	5.2
Electrical equipment and supplies, n.e.c.	3692,9	–	30	27	23	24	25	– .9	3.0
Transportation equipment	37	1,790	2,077	2,016	1,516	1,697	1,742	–1.2	1.7
Motor vehicles	371	875	990	865	679	749	770	–1.0	2.0
Motor vehicles and car bodies	3711	415	463	396	307	335	343	–1.2	1.9
Motor vehicle parts and accessories	3714	383	441	387	306	340	350	– .9	2.1
Truck and bus bodies, trailers, and motor homes	3713,5,6	77	86	82	67	75	78	– .7	3.0
Aircraft	3721	287	333	339	243	274	282	–1.5	.8
Aircraft and missile engines and equipment	3724,8,3764,9	224	298	385	282	330	339	–1.1	2.0
Guided missiles and space vehicles	3761	76	81	153	120	124	129	–1.5	.8
Ship and boat building and repairing	373	193	226	185	129	147	151	–1.6	.2
Railroad equipment	374	49	74	28	16	17	17	–3.4	–1.3
Miscellaneous transportation equipment	375,9	86	74	61	47	55	55	– .7	3.4
Instruments and related products	38	517	691	707	692	771	791	.6	3.7
Engineering and scientific instruments	381	65	72	84	89	94	96	.8	3.3
Measuring and controlling devices	382	160	236	246	227	267	272	.6	3.4
Optical and ophthalmic products	383,5	55	77	71	74	79	80	.8	5.1
Medical instruments and supplies	384	90	144	180	204	226	234	1.6	4.4
Photographic equipment and supplies	386	117	134	115	90	97	102	–1.2	2.9
Miscellaneous manufacturing	39	433	445	362	306	329	329	– .7	1.9
Jewelry, silverware, and plated ware	391	52	61	54	50	52	48	– .3	.4
Toys and sporting goods	394	126	121	94	76	85	86	– .7	3.1
Manufactured products, n.e.c.	393,5,6,9	255	263	214	179	192	195	– .8	1.9
Nondurable manufacturing	20–23,26–31	8,101	8,280	7,750	7,179	7,429	7,857	– .3	1.8
Food and kindred products	20	1,745	1,733	1,617	1,421	1,456	1,512	– .7	1.5
Meat products	201	347	358	372	380	382	390	.2	1.6
Dairy products	202	217	180	163	123	125	129	–1.9	1.2
Canned, dried, and frozen foods	203	255	261	238	227	235	252	– .1	2.2
Grain mill products and fats and oils	204,7	172	189	156	120	122	124	–1.8	1.7
Bakery products	205	258	231	210	180	182	188	–1.0	.9
Sugar and confectionery products	206	117	110	97	76	78	82	–1.6	.5
Alcoholic beverages	2082,3,4,5	91	85	71	56	59	64	–1.3	1.0
Soft drinks and flavorings	2086,7	137	153	141	117	122	131	–1.0	1.5
Miscellaneous foods and kindred products	209	152	166	169	142	150	153	– .8	1.8
Tobacco manufactures	21	75	70	59	40	46	47	–1.8	– .2
Textile mill products	22	985	886	706	582	607	653	–1.1	1.6
Weaving, finishing, yarn and thread mills	221,2,3,4,6,8	583	528	388	302	316	337	–1.5	1.4
Knitting mills	225	268	227	207	183	186	198	– .8	1.4
Floor covering mills	227	62	61	56	56	60	68	.5	3.0
Miscellaneous textile goods	229	72	70	55	42	46	51	–1.3	1.7
Apparel and other textile products	23	1,382	1,304	1,105	903	924	965	–1.3	1.3
Apparel	231-8	1,206	1,115	921	744	763	799	–1.3	1.1
Miscellaneous fabricated textile products	239	176	189	184	158	161	166	–1.0	2.1
Paper and allied products	26	689	706	675	633	655	715	– .2	2.4
Pulp, paper, and paperboard mills	261,2,3,6	273	271	249	218	223	233	– .8	2.6
Converted paper products except containers	264	196	221	230	243	256	284	.8	2.7
Paperboard containers and boxes	265	220	214	196	172	176	198	– .8	1.8
Printing and publishing	27	1,094	1,235	1,458	1,643	1,706	1,798	1.1	3.0
Newspapers	271	382	420	458	508	520	541	.9	1.7
Periodicals	272	63	82	115	131	137	147	1.3	3.1
Books	273	96	102	109	121	126	133	1.1	2.4
Miscellaneous publishing	274	38	46	72	106	115	125	3.4	3.6
Commercial printing and business forms	275,6	394	455	557	612	635	671	.9	3.6
Blankbooks and bookbinding	278	58	63	73	82	86	90	1.2	3.1
Printing trade services	279	41	43	51	65	67	69	1.9	3.5
Chemicals and allied products	28	1,009	1,109	1,023	912	950	1,017	– .5	2.6
Industrial chemicals	281,6	284	333	291	250	258	272	– .9	1.9
Plastics materials and synthetics	282	229	212	167	125	132	143	–1.7	3.0
Drugs	283	159	192	207	217	224	235	.6	4.0
Soap, cleaners, and toilet goods	284	122	139	147	147	154	167	.3	2.4
Paints and allied products	285	69	69	63	50	53	58	–1.2	1.6
Agricultural chemicals	287	56	70	55	39	42	47	–1.9	1.6
Miscellaneous chemical products	289	90	93	93	86	89	95	– .3	2.9
Petroleum and coal products	29	195	210	169	120	127	134	–2.0	.6
Petroleum refining	291	151	165	131	96	100	106	–1.9	.6
Rubber and miscellaneous plastics products	30	631	781	789	825	861	913	.6	3.1
Tires and inner tubes	301	122	127	88	65	69	75	–1.8	1.4
Rubber products and plastic hose and footwear	302,3,4,6	166	166	135	108	112	119	–1.4	2.0
Miscellaneous plastics products	307	343	488	566	653	680	720	1.3	3.7
Leather and leather products	31	296	246	152	99	98	103	–3.1	–1.5
Footwear except rubber and plastic	313,4	–	161	96	61	58	58	–3.6	–2.0
Luggage, handbags, and leather products, n.e.c.	311,5,6,7,9	–	85	56	38	40	45	–2.3	–1.0
Transportation and public utilities	40-42,44-49	4,541	5,135	5,244	5,410	5,719	5,903	.6	2.6
Transportation	40-42,44-47	2,678	3,021	3,041	3,315	3,500	3,568	1.0	2.4

Table 6. Continued—Employment by selected industry, 1972, 1979, 1986, and projected to 2000

Industry	Standard Industrial Classification	Employment (thousands)						Annual rate of change, 1986–2000[1] (percent)	
		1972	1979	1986	Projected, 2000				
					Low	Moderate	High	Employment	Output
Railroad transportation	40	582	556	331	167	190	203	−3.9	.7
Local and interurban passenger transit	41	276	263	282	300	308	315	.6	1.3
Trucking and warehousing	42	1,124	1,339	1,382	1,627	1,713	1,740	1.5	2.2
Water transportation	44	212	216	174	146	159	167	− .6	1.7
Air transportation	45	348	438	570	690	721	725	1.7	3.7
Arrangement of passenger transportation	4722	–	–	158	217	227	230	2.6	5.9
Miscellaneous transportation services	471,2,3,4,8	–	–	126	153	164	172	1.9	3.0
Communications	48	1,152	1,309	1,279	1,130	1,222	1,320	− .3	3.9
Communications except broadcasting	481,2,9	1,009	1,121	1,041	845	920	978	− .9	3.9
Radio and television broadcasting	483	143	188	238	284	302	342	1.7	3.9
Public utilities	49	711	805	924	965	998	1,015	.6	2.1
Electric utilities including combined services	491,493 pt.	420	493	582	602	613	621	.4	2.4
Gas utilities including combined services	492, 493 pt.	216	220	216	200	210	214	− .2	1.5
Water and sanitation including combined services	494-7, 493 pt.	75	92	126	164	175	180	2.4	3.4
Wholesale trade	50,1	4,113	5,204	5,735	7,015	7,266	7,361	1.7	2.7
Motor vehicles and automotive equipment	501	353	439	431	479	496	502	1.0	–
Machinery, equipment, and supplies	508	869	1,261	1,445	1,988	2,059	2,086	2.6	–
Groceries and related products	514	536	648	757	876	907	919	1.3	–
Petroleum and products	517	225	225	200	187	194	197	− .2	–
Retail trade	52-59	11,835	14,989	17,845	21,795	22,702	23,079	1.7	2.4
Department stores	531	1,706	1,878	1,978	2,261	2,364	2,404	1.3	–
Grocery stores	541	1,578	2,002	2,523	2,984	3,121	3,174	1.5	–
New and used car dealers	551,2	814	881	947	906	947	963	.0	–
Gasoline service stations	554	649	577	596	387	502	412	−1.2	–
Apparel and accessory stores	56	784	949	1,070	1,292	1,351	1,374	1.7	–
Eating and drinking places	58	2,860	4,513	5,879	8,084	8,365	8,501	2.6	1.9
Drug and proprietary stores	591	452	489	563	647	677	688	1.3	–
Miscellaneous shopping goods stores	594	375	569	746	1,038	1,085	1,103	2.7	–
Finance, insurance, and real estate	60-67	3,907	4,975	6,297	7,508	7,917	8,159	1.7	2.6
Banking	60	1,115	1,499	1,736	1,930	1,998	2,060	1.0	2.8
Credit agencies and investment offices	61,7	458	665	1,023	1,364	1,518	1,610	2.9	3.1
Security and commodity brokers and exchanges	62	203	204	392	517	526	543	2.1	2.2
Insurance carriers	63	1,054	1,200	1,364	1,454	1,532	1,566	.8	2.3
Insurance agents, brokers, and service	64	301	430	581	767	795	808	2.3	2.3
Real estate	65,6	776	977	1,200	1,476	1,548	1,572	1.8	2.5
Services[2]	70-86,89	12,117	16,768	22,531	30,545	32,545	33,708	2.7	3.2
Hotels and other lodging places	70	813	1,060	1,401	1,848	1,971	2,061	2.5	1.9
Personal services	72	912	904	1,104	1,298	1,357	1,391	1.5	1.6
Laundry, cleaning, and shoe repair	721,5	–	367	393	400	434	445	.7	.8
Personal services, n.e.c.	722,9	–	150	267	406	411	422	3.1	3.2
Beauty and barber shops	723,4	–	319	367	410	423	430	1.0	.7
Funeral service and crematories	726	64	69	77	82	89	94	1.0	1.1
Business services	73	1,790	2,906	4,781	7,593	8,121	8,533	3.9	4.2
Advertising	731	121	146	202	284	302	310	2.9	3.5
Services to dwellings and other buildings	734	336	487	681	995	1,020	1,046	2.9	3.2
Personnel supply services	736	221	527	1,017	1,730	1,851	1,908	4.4	3.6
Computer and data processing services	737	107	271	591	1,090	1,203	1,281	5.2	5.0
Research, management, and consulting services	7391,2,7	–	–	788	1,186	1,301	1,394	3.6	4.3
Detective and protective services	7393	–	–	445	658	687	709	3.1	3.9
Equipment rental and leasing	7394	–	–	208	314	330	396	3.4	4.1
Photocopying, commercial art, photofinishing	7332,3,95	–	–	174	199	244	257	2.4	4.1
Credit reporting and business services, n.e.c.	732,5; 7331,39; 7396,99	–	–	677	1,137	1,184	1,233	4.1	4.0
Auto repair, services, and garages	75	399	575	762	919	1,016	1,040	2.1	2.2
Automotive rentals, without drivers	751	–	120	161	210	233	241	2.7	2.6
Automobile parking, repair, and services	752,3,4	–	455	601	709	783	799	1.9	2.2
Miscellaneous repair shops	76	199	282	320	352	397	416	1.5	1.2
Electrical repair shops	762	–	79	104	125	142	146	2.3	.8
Watch, clock, jewelry, and furniture repair	763,4	–	29	28	26	28	29	.0	− .2
Miscellaneous repair shops and related services	769	–	174	188	201	226	240	1.3	1.6
Motion pictures	78	205	228	227	207	248	266	.6	2.0
Amusement and recreation services	79	504	712	915	1,143	1,204	1,235	2.0	4.6
Theatrical producers and entertainers	792	–	85	121	159	165	167	2.2	4.0
Bowling alleys and billiard establishments	793	–	110	95	72	82	85	−1.1	.6
Commercial sports	794	–	72	99	126	133	143	2.1	1.5
Amusement and recreation services, n.e.c.	791,9	–	445	600	785	824	840	2.3	5.5
Health services	80	3,412	4,993	6,551	9,369	9,774	10,039	2.9	3.4
Offices of health practitioners	801,2,3,4	694	1,150	1,672	2,901	3,061	3,137	4.4	3.7
Nursing and personal care facilities	805	591	951	1,250	1,992	2,097	2,124	3.8	3.6
Hospitals, private	806	1,980	2,608	3,038	3,438	3,513	3,611	1.0	2.8
Outpatient facilities and health services, n.e.c.	807,8,9	146	284	591	1,038	1,103	1,167	4.6	4.4
Legal services	81	271	460	748	1,191	1,267	1,317	3.8	2.5
Educational services	82	958	1,090	1,428	1,532	1,620	1,666	.9	1.8
Social, membership, and miscellaneous services	83,4,6,9	–	3,571	4,296	5,326	5,569	5,745	1.9	3.0
Individual and miscellaneous social services	832,9	–	393	528	755	790	798	2.9	2.9
Job training and related services	833	–	–	256	333	337	389	2.0	2.6
Child day care services	[3]835	146	303	354	467	478	495	2.2	5.1

Table 6. Continued—Employment by selected industry, 1972, 1979, 1986, and projected to 2000

Industry	Standard Industrial Classification	Employment (thousands)						Annual rate of change, 1986–2000[1] (percent)	
		1972	1979	1986	Projected, 2000				
					Low	Moderate	High	Employment	Output
Residential care	836	–	202	319	500	519	532	3.5	4.9
Museums and noncommercial organizations, n.e.c.	84,865,9,892	–	195	263	334	355	357	2.2	3.4
Business and professional associations	861,2	–	118	135	144	159	165	1.2	2.2
Labor, civic, and social organizations	863,4	–	464	485	507	531	537	.7	1.9
Engineering and architectural services	891	339	515	678	887	936	957	2.3	2.9
Accounting, auditing, and services, n.e.c.	893,9	–	316	458	673	711	742	3.2	3.5
Government	—	13,333	15,947	16,711	17,900	18,329	18,897	.7	1.5
Federal Government	—	2,684	2,773	2,899	2,900	3,000	3,093	.2	1.3
Federal enterprises	—	888	876	1,000	1,001	1,031	1,087	.2	2.7
U.S. Postal Service	—	698	661	789	832	845	886	.5	3.0
Federal electric utilities	—	29	52	39	32	33	37	−1.3	1.4
Federal Government enterprises, n.e.c.	—	161	163	172	137	153	164	− .8	2.5
Federal general government	—	1,796	1,897	1,899	1,899	1,969	2,006	.3	.7
State and local government	—	10,649	13,174	13,812	15,000	15,329	15,804	.7	1.7
State and local enterprises	—	547	733	831	973	1,004	1,023	1.4	1.5
Local government passenger transit	—	100	130	174	207	212	218	1.4	1.0
State and local electric utilities	—	59	63	69	69	75	79	.6	1.4
State and local government enterprises, n.e.c.	—	388	540	588	697	716	726	1.4	1.7
State and local general government	—	10,102	12,441	12,981	14,027	14,325	14,781	.7	1.7
State and local government hospitals	—	926	1,108	1,047	1,047	1,070	1,103	.2	2.6
State and local government education	—	5,550	6,486	7,058	7,674	7,842	8,085	.8	1.6
State and local general government, n.e.c.	—	3,625	4,847	4,876	5,306	5,413	5,593	.7	1.7

[1] As projected in the moderate alternative.

[2] Excludes Standard Industrial Classifications 074,5,8 (agricultural services) and 99 (nonclassifiable establishments). Therefore the estimates are not exactly comparable with data published in *Employment and Earnings*.

[3] Does not meet usual publication criteria of BLS Current Employment Statistics survey.

n.e.c. = not elsewhere classified.

NOTE: Dash indicates data not available.

In addition to offices of health practitioners, the outpatient facilities and health services not elsewhere classified industry is also expected to show enormous growth. The absolute increases in numbers of jobs are not projected to be as great as for doctors' offices because outpatient facilities and miscellaneous health services is a smaller industry, but the 4.6-percent annual rate of gain ranks it as the second fastest growing industry in the economy in terms of employment. This industry includes such services as group health associations (GHA's), health maintenance organizations (HMO's), alcohol and drug treatment centers, family planning clinics, home health agencies, and visiting nurse associations. Clearly, these services will balloon as the preferred method of treatment shifts from lengthy hospital care to outpatient or home care.

Nursing and personal care facilities are also expected to benefit from the shift away from hospital treatment. Nursing homes will see very rapid growth through 2000 as the population aged 85 and over (the primary age group for nursing home care) rises from 2.7 million in 1985 (or 1.1 percent of the total population) to 4.9 million in 2000 (1.8 percent of total population). Personal care facilities will grow faster than nursing homes; the former include extended care facilities, convalescent homes, and hospices. Jobs in the nursing home and personal care sector as a whole are projected to grow 3.8 percent a year, with employment rising to a level of 2.1 million by 2000.

Hospitals are projected to show some job gains over the 1986–2000 period, despite the shift to outpatient care. The increase in the number of persons over age 65, plus rapid advances in new complex technologies, will cause an expansion in hospitals. At 1.0 percent a year, however, projected job growth in private hospitals is just a fraction of the rate expected for other health sectors through the year 2000 and of the historical rate of gain in the industry. Still, almost 500,000 new jobs are expected to be added in hospitals over the projection period.

Personal, repair, and recreation services. Traditional personal and repair service industries are projected to have only very modest output growth through the 1990's, but the newer types of services in the industry termed "personal services not elsewhere classified" are projected to have fairly good growth, increasing faster than GNP. This catch-all group includes health, beauty, and reducing clubs or salons; dating services; tax return preparation services (non-accountants); convenience services for two-earner families; and a wide variety of other personal services. Payroll employment in this industry is projected to rise by 144,000, to 411,000 by 2000. This industry also includes many self-employed workers; their numbers are projected at about 110,000 in 2000.

The small gains expected in the laundry and cleaning industry reflect some growth for industrial launderers, as more hospitals and institutions contract out laundry operations. Consumer demand for commercial laundry and dry cleaning services is expected to remain rather flat.

In contrast, consumers are expected to have high levels of demand for amusement and recreation services. Output of the industry "amusements and recreation, not elsewhere

classified," is projected to grow more than twice as fast as GNP (5.5 percent a year from 1986 to 2000), and 224,000 wage and salary jobs are expected to be added. The output growth rate ranks this sector among the top five of all the industries studied. Included are golf courses, membership sports and recreation clubs, tennis and racquetball facilities, swimming pools, gyms, ski lifts, gambling establishments, recreational classes or instruction, and numerous other recreational services.

The rate of output growth projected for theatrical producers and entertainers also is very high—4.0 percent a year—reflecting the demand for more programming for expanding cable TV networks.

Social, membership, and miscellaneous services. Several of the social service industries are expected to have employment increases of more than 100,000 between 1986 and 2000. The number of jobs in the individual and miscellaneous social services sector, for example, is projected to rise from 528,000 in 1986 to 790,000 in 2000. This industry includes individual and family counseling, disaster relief, adult day care, senior citizens associations, fundraising organizations, and other related social services. Employment growth in the industry averaged 4.3 percent a year over the 1979–86 period. Thus, while projected growth is large in absolute numbers, the 2.9-percent annual increase projected represents a slowdown from historical trends.

Residential care is another social service industry projected to show a large employment gain, 200,000 more jobs by 2000. This industry provides residential care where medical care is not a major element, as in group homes, halfway houses, and rehabilitation centers. The rising demand for these services reflects the growing number of elderly who may need to reside in a home for the aged but who do not require intensive nursing care, as well as an increase in the use of drug and alcohol residential treatment centers.

Government. Total public employment is projected to rise by 1.6 million between 1986 and 2000, with almost all of the increase occurring in State and local governments. Federal employment is expected to remain virtually level, as it has for most of the 1970's and 1980's.

The job gains in State and local governments reflect an additional 784,000 workers in education and 537,000 in other governmental functions except hospitals. The rising level of educational staff occurs as the population of elementary and secondary school-age children, offspring of the baby-boom cohort, edges up. The following tabulation presents estimates of the school-age population for selected years 1970–85, and projected to 2000 (in millions):

	Population	
	5 to 13	*14 to 17*
1970	36.7	15.9
1975	33.9	17.1
1980	31.1	16.1
1985	30.1	14.9
Projected 2000	34.4	15.4

Other increases are related to the assumption that some past cutbacks in local government services will be reversed in coming years.

Alternatives

This article has focused on the results of the moderate growth projection scenario, but two alternatives were also prepared. The alternatives show the effects of changes in some of the key assumptions of the macroeconomic model discussed by Norman C. Saunders elsewhere in this issue. In the low-growth scenario, GNP expands by only 1.6 percent a year, 1986–2000, compared to 2.4 percent in the moderate case, and the unemployment rate in 2000 reaches 7.7 percent, versus 6.0 percent in the moderate scenario. In the high-growth scenario, GNP grows by 3.0 percent a year, and the unemployment rate falls to 4.5 percent.

Because of the sluggish growth and high unemployment in the low scenario, total employment only rises to 126.4 million, compared to 133 million in the moderate case discussed in this article. Manufacturing employment falls proportionately more in the low scenario because of slower growth in equipment purchases and an actual decrease in nonresidential construction. Durable goods employment is 10 percent less than in the moderate case; nondurables employment, 3 percent less; and nonmanufacturing employment, about 5 percent less.

In the high scenario, employment rises to 137.5 million in the year 2000, 4.5 million more than in the moderate case. Again, more of the difference is concentrated in manufacturing. Employment in that sector is 5 percent higher than in the moderate scenario, while nonmanufacturing employment is 3 percent higher. □

——— *FOOTNOTES* ———

[1] *Annual Energy Outlook 1986* (U.S. Department of Energy, Energy Information Administration, 1986).

[2] Marcus E. Einstein and James C. Franklin, "Computer manufacturing enters a new era of growth," *Monthly Labor Review*, September 1986, pp. 9–16.

[3] Steven E. Haugen, "The employment expansion in retail trade, 1973–85," *Monthly Labor Review*, August 1986, pp. 9–16.

[4] Includes voluntary part-time employed, part time for economic reasons who usually work part time, and unemployed looking for part-time work. For more information, see Thomas J. Nardone, "Part-time workers: who are they?" *Monthly Labor Review*, February 1986, pp. 13–19.

[5] Max L. Carey and Kim L. Hazelbaker, "Employment growth in the temporary help industry," *Monthly Labor Review*, April 1986, pp. 37–44.

A look at occupational employment trends to the year 2000

High-skill job groups are projected to continue pacing occupational growth as groups requiring the most education and training are estimated to grow faster than average

GEORGE T. SILVESTRI and JOHN M. LUKASIEWICZ

The Nation's economy is projected to generate more than 21 million jobs between 1986 and 2000. While a considerable number, this 19-percent increase is only about half the average annual rate of increase that occurred over the previous 14-year period, 1972 to 1986. (See table 1.) An accompanying article by Valerie Personick, pp. 30–45, discusses the projected changes in the industrial composition of employment. Our article presents the 1986–2000 occupational projections.

The Bureau of Labor Statistics has developed three sets of occupational projections, with each set tied to the high, moderate, or low economic and industry employment projections alternatives presented elsewhere in this issue of the *Review*. However, the basic changes in the occupational structure of the economy from 1986 to 2000 among the three alternatives are similar. Thus, for ease of presentation, we focus on the moderate alternative, because the discussion would be similar if either of the other scenarios was highlighted. The major differences among the alternatives are discussed briefly at the end of the article.

Broad occupational group changes

The structure of occupational employment over the 1986–2000 period is expected to shift because the change in total employment will not be evenly distributed among the broad occupational groups. For example, each of the three broad occupational groups with the most highly trained workers in terms of educational attainment (executive, administrative, and managerial workers; professional workers; and technicians and related support workers) is projected to continue to grow more rapidly than the average for total employment. Collectively, these three groups, which accounted for 25 percent of total employment in 1986, are expected to account for almost 40 percent of the total job growth between 1986 and 2000. In contrast, many factors, such as office and factory automation, changes in consumer demand, and import substitution are expected to lead to relatively slow growth or a decline for occupational groups requiring less education (administrative support workers, including clerical; farming, forestry, and fishing workers; and operators, fabricators, and laborers). The service workers group (except private household workers), which is expected to grow at a faster rate than total employment and account for more of the total growth in employment than any other broad occupational group, is an important exception to the general trend, because its educational attainment is not in the high group. The expected shift away from low-skill jobs to high-skill jobs is discussed in greater detail later in this article. The following discussion on each broad occupational group is based on data found in table 1. Historical trends in table 1 are based on data from the Current Population Survey,

George T. Silvestri and John M. Lukasiewicz are economists in the Division of Occupational Outlook, Bureau of Labor Statistics.

Table 1. Employment by broad occupational group, 1986 and projected to 2000 moderate alternative, and percent change in employment for selected periods
[Numbers in thousands]

Occupation	1986		Projected, 2000		Percent change			
	Number	Percent	Number	Percent	1972–79	1979–86	1972–86	1986–2000
Total employment	111,623	100.0	133,030	100.0	20.3	10.9	33.4	19.2
Executive, administrative, and managerial workers	10,583	9.5	13,616	10.2	34.9	28.7	73.7	28.7
Professional workers	13,538	12.1	17,192	12.9	29.8	21.4	57.5	27.0
Technicians and related support workers	3,726	3.3	5,151	3.9	39.9	24.7	74.5	38.2
Salesworkers	12,606	11.3	16,334	12.3	24.3	24.4	54.6	29.6
Administrative support workers, including clerical	19,851	17.8	22,109	16.6	23.5	9.5	35.2	11.4
Private household workers	981	.9	955	.7	−23.0	−11.5	−31.9	−2.7
Service workers, except private household workers	16,555	14.8	21,962	16.5	25.7	16.0	45.9	32.7
Precision production, craft, and repair workers	13,924	12.5	15,590	11.7	21.7	6.5	29.6	12.0
Operators, fabricators, and laborers	16,300	14.6	16,724	12.6	8.7	−9.2	−1.3	2.6
Farming, forestry, and fishing workers	3,556	3.2	3,393	2.6	−5.1	−5.6	−10.4	−4.6

NOTE: Estimates of 1986 employment, the base year for the 2000 projections, were derived primarily from data collected in the Occupational Employment Statistics surveys. The 1972–79, 1979–86, and 1972–86 rates of change were derived from the Current Population Survey data because comparable Occupational Employment Statistics survey data were not available for 1972 and 1979.

whereas projected trends are based on data from the National Industry-Occupation Matrix. In order to compare data from both sources in table 1, the occupational categories from the Current Population Survey were selected. Table 8 also is based on the Current Population Survey occupational categories and data. In all other tables in this article, the National Industry-Occupation Matrix occupational classification and data were used.

Employment of executive, administrative, and managerial workers is expected to increase by more than 3 million jobs from 1986 to 2000 due to the ever-increasing complexity of business operations and the large employment gains in the wholesale and retail trade and services sectors. The rate of increase for this group is expected to be about 29 percent, or about one and one-half the average for all occupations. The relative growth rate for this occupational group is projected to be less than it was from 1972 to 1986 when executive, administrative, and managerial workers grew twice as fast as did total employment.

The number of professional workers is expected to continue to grow more rapidly than total employment, or by 27 percent, from 1986 to 2000. Employment in many of the occupations in this group is expected to surge, including the engineering, computer specialty, and health professional occupations, which together are expected to account for more than one-half of the 3.7 million new professional jobs added by the year 2000.

Employment in the technicians and related support workers category is projected to grow faster than any other major occupational group (38 percent), or more than twice as fast as total employment. The technicians occupational group also was the fastest growing group from 1972 to 1986. Jobs for health technologists and technicians are expected to account for 47 percent of the 1.4 million new technician jobs that will be added over the 1986–2000 period.

Employment in the salesworkers group is expected to increase by 30 percent, or by 3.7 million jobs, due mainly to the large employment gains in wholesale and retail trade where salesworkers are concentrated. The share of total employment accounted for by these workers is projected to increase from 11.3 percent of the total in 1986 to 12.3 percent by the year 2000. This is the only major occupational group that grew as fast during the 1979–86 period as it did from 1972 to 1979, even though total employment had grown only half as fast in the latter period.

The number of administrative support workers, including clerical, which grew as fast as total employment in the 1972–86 period, is projected to increase significantly more slowly than the average for total employment from 1986 to 2000, or by only 11 percent. This slowing of growth was evident in the 1979–86 period when this occupational group grew slightly slower than the average for total employment; in the previous 7 years it had grown slightly faster than total employment. Although this group is projected to add 2 million jobs by the year 2000, its share of total employment is expected to decline from 17.8 percent to 16.6 percent because of its slow growth. Office automation and other technological changes are expected to cause employment to decline in several detailed occupations within this group, such as typists and word processors. Employment in several clerical occupations, however, is projected to grow faster than the average for total employment due to rapid growth in the industries that employ clerical workers such as hotel desk clerks and new account clerks in banking. Other occupations in this group are also expected to be favorably affected by technological change, such as the computer and peripheral equipment operators group, which is expected to grow rapidly due to the ever-increasing use of computers throughout the economy.

Employment in the service workers group (except private household workers) is expected to rise faster than the average for total employment, increasing by more than 5 million jobs—more than any other broad occupational group from 1986 to 2000. The projected growth rate of 33 percent for 1986–2000 is faster than total employment and, consequently, the share of total employment accounted for by

Table 2. Projected 1986–2000 employment change (number and percent) for wage and salary workers, by major industry division and for self-employed and unpaid family workers, in major occupational groups, moderate trend

Occupation	Total, all classes of workers	Total, wage and salary workers	Agriculture	Mining	Construction	Manufacturing	Transportation, communications, and public utilities	Wholesale and retail trade	Finance, insurance, and real estate	Services	Government	Self-employed and unpaid family workers
All occupations (thousands)	21,407	20,221	149	−58	891	−830	475	6,388	1,620	10,774	811	1,185
Managerial and management-related occupations	3,033	2,677	14	−2	111	85	76	619	479	1,128	167	356
Engineers, architects, and surveyors	495	470	4	−0	12	165	16	17	7	213	36	25
Natural, computer, and mathematical scientists	339	324	3	−1	1	23	12	25	41	199	21	15
Teachers, librarians, and counselors	772	751	0	0	0	0	1	0	0	743	6	21
Health diagnosing and treating occupations	1,081	1,072	7	0	0	0	0	29	1	1,013	22	9
Other professional specialists	967	811	3	0	0	28	29	46	30	582	93	156
Technician occupations	1,403	1,374	4	−2	4	70	28	86	51	1,070	63	28
Marketing and sales occupations	3,728	3,168	4	1	13	17	76	2,408	286	357	5	560
Administrative support occupations, including clerical	2,258	2,327	5	−19	0	−238	−27	287	551	1,815	−45	−69
Service occupations	5 381	5,205	2	−1	2	−31	37	2,251	74	2,596	276	176
Agriculture, forestry, fishing, and related occupations	−163	194	83	0	2	−8	1	21	26	55	15	−357
Blue-collar worker supervisors	144	138	3	−2	52	−58	15	41	4	65	17	5
Construction trades and extractive workers	704	537	1	−5	437	−18	−14	19	11	66	39	167
Mechanics, installers, and repairers	687	677	3	−4	64	−7	−2	217	52	317	37	11
Precision production and plant systems occupations	134	111	0	−2	26	−52	1	48	2	74	15	23
Machine setters, set-up operators, operators, and tenders	−194	−201	3	−2	5	−319	0	21	1	89	1	7
Assemblers and other handwork occupations	−113	−108	1	0	11	−203	2	32	0	47	2	−4
Transportation and material moving machine and vehicle operators	500	443	6	−12	62	−137	193	157	4	141	30	57
Helpers, laborers, and material movers, hand	249	251	4	−7	90	−147	32	65	2	204	9	−2

service workers is expected to jump from 14.8 percent in 1986 to 16.5 percent in 2000. Most of the large projected employment gain in this occupational group is concentrated in food service and health service occupations.

The number of private household workers is projected to decline by 2.7 percent. This is more in line with the recent moderate decline that occurred between 1979 and 1986 than it is with the rapid declines that occurred from 1972 to 1979 and in earlier periods.

The number of precision production, craft, and repair workers is projected to increase more slowly than the average for total employment, or by only 12 percent. From 1972 to 1986, employment in this group grew about as fast as the average for total employment, although during the latter part of the 1979–86 period, its employment growth was slower than that for the total economy. Within this group, the rate of growth for the construction trades is projected to be close to the 19-percent growth rate of the overall economy. This increase is expected to be offset, however, by occupations concentrated in manufacturing that are expected to grow more slowly than the average for total employment or to decline over the 1986–2000 period. Employment decreases are expected in occupations such as precision food, metal, printing, textile, and apparel workers.

Employment in the operators, fabricators, and laborers group is projected to be at virtually the same level in 2000 as it was in 1986. The stable employment level for this occupational group is a reversal of the decline of more than 9 percent that this group suffered from 1979 to 1986, which offset an approximately equal increase from 1972 to 1979. Its share of total employment is expected to decrease significantly from 14.6 percent to 12.6 percent. The drop in manufacturing employment and increasing factory automation are largely responsible for the lack of employment

Table 2. Continued—Projected 1986–2000 employment change (number and percent) for wage and salary workers, by major industry division and for self-employed and unpaid family workers, in major occupational groups, moderate trend

Occupation	Total, all classes of workers	Total, wage and salary workers	Agriculture	Mining	Construction	Manufacturing	Transportation, communications, and public utilities	Wholesale and retail trade	Finance, insurance, and real estate	Services	Government	Self-employed and unpaid family workers
All occupations (percent)	19.2	19.8	9.4	−7.4	18.2	−4.4	9.1	27.1	25.7	33.8	9.4	12.2
Managerial and management-related occupations	28.7	28.9	36.9	−2.7	23.7	5.5	18.1	28.8	39.4	47.9	16.7	27.1
Engineers, architects, and surveyors	31.6	31.6	35.4	−0.4	26.2	24.0	18.9	67.6	54.6	54.5	18.2	31.6
Natural, computer, and mathematical scientists	45.9	46.3	33.3	−2.8	47.8	15.3	50.6	80.8	58.6	85.9	13.4	39.8
Teachers, librarians, and counselors	15.6	15.6	7.5	–	–	8.9	10.4	28.3	24.6	15.8	6.1	17.2
Health diagnosing and treating occupations	41.7	46.3	32.0	−19.6	16.9	2.3	20.0	28.5	34.5	50.2	12.9	3.1
Other professional specialists	26.2	27.4	27.9	−4.5	13.9	11.0	22.2	30.8	41.1	35.9	13.0	21.4
Technician occupations	38.4	38.6	28.8	−6.6	10.4	11.7	17.7	57.1	43.7	52.2	15.2	32.6
Marketing and sales occupations	29.6	29.3	21.9	11.2	18.8	3.0	29.8	29.3	34.0	46.0	8.5	31.3
Administrative support occupations, including clerical	11.4	12.0	6.6	−19.6	−0.1	−10.6	−2.1	9.1	16.6	29.1	−1.7	−16.8
Service occupations	30.7	31.5	11.4	−14.6	5.6	−9.2	21.0	39.4	22.5	31.4	16.8	17.2
Agriculture, forestry, fishing, and related occupations	−4.6	10.0	6.6	−11.5	14.3	−8.3	17.8	32.7	29.1	17.9	12.5	−22.1
Blue-collar worker supervisors	7.9	8.2	31.6	−5.0	23.8	−7.3	8.0	25.9	35.2	44.8	14.3	4.1
Construction trades and extractive workers	17.6	17.2	19.9	−2.9	22.0	−6.6	−17.5	28.1	31.5	36.8	12.2	18.8
Mechanics, installers, and repairers	14.7	15.9	18.8	−7.1	21.9	−0.9	−.3	20.1	34.3	38.6	12.0	2.4
Precision production and plant systems occupations	4.4	3.9	14.0	−12.5	20.9	−2.9	.5	13.3	23.4	29.3	9.6	10.5
Machine setters, set-up operators, operators, and tenders	−3.9	−4.1	16.9	−9.1	19.4	−7.3	1.1	23.5	29.6	26.9	5.2	8.0
Assemblers and other handwork occupations	−4.2	−4.1	16.6	2.1	26.7	−8.8	9.2	30.9	43.6	41.9	7.6	−4.9
Transportation and material moving machine and vehicle operators	10.4	9.9	16.9	−9.7	18.5	−18.5	15.9	13.5	34.7	24.2	11.8	17.0
Helpers, laborers, and material movers, hand	5.8	6.0	9.2	−14.3	11.9	−10.3	9.4	8.0	12.3	40.9	3.5	−2.5

NOTE: Dash indicates division by zero.

growth for this group. Several transportation occupations, however, are not expected to be affected by these factors, including the truck and bus drivers and aircraft pilots and flight engineers occupations.

The number of farming, forestry, and fishing workers is projected to decrease 5 percent between 1986 and 2000. This represents a continuation of a very long-term decline, but nevertheless a slowing of the rate of decline that occurred during the previous 14 years.

Trends by industry

Occupational projections were developed through the use of an industry-occupation employment matrix. The 1986 matrix used as the base year of the projections presents the occupational structure of 258 detailed industries. These data were derived primarily from the Bureau's Occupational Employment Statistics Survey, which obtains data on the occupational staffing patterns of industries.[1] The 1986 occupational structure of each industry was projected to 2000 through analysis of the factors that are expected to change the structure, such as changes in technology, business practices and methods of operation, and product demand. The projected structure was then applied to projections of total employment for each industry described in Personick's article. To derive the projections of total employment by occupation, the detailed cells of the matrix were aggregated across all industries.[2]

Table 2, derived from the National Industry-Occupation Matrix, shows the absolute and percent changes in employment between 1986 and 2000 for major occupational groups

by major industry division. More than 80 percent of the rise in total employment is projected to occur among wage and salary workers in wholesale and retail trade and in services. Increases in the number of marketing and sales and service workers are expected to account for almost half of the employment gains in these two industry divisions. This is as one would expect because of the high concentration of these two groups. What is not so obvious, however, is the impact that these two divisions may have on other occupational groups. For example, employment gains in wholesale and retail trade and services are expected to account for nearly all of the job growth for the teachers, librarians, and counselors occupation and workers in the health diagnosing and treating occupation;[3] 82 percent of the growth for the technicians occupation; 66 percent of the increase in the scientists and computer specialists occupation; 65 percent of the rise in the other professionals occupation; and 58 percent of the growth in managers. Except for teachers in services, each of these occupational groups has a projected growth rate that is faster than that projected for total employment in the trade and services divisions.

Although most of the total employment change is projected to occur in trade and services, several other industry divisions have notable changes. Finance, insurance, and real estate is projected to account for 8 percent of the growth in total employment or 1.6 million jobs. Most of the growth in this industry division is expected to occur among workers in managerial and management-related occupations and workers in administrative support, including clerical workers. The increase in the number of clerical workers is projected to exceed that of managers within the finance, insurance, and real estate division. However, the overall rate of growth for clerical occupations is less than that for managers due to office automation in banking, credit reporting agencies, and insurance.

Another industry division adding significant numbers of jobs is construction, which accounts for 4 percent of the growth in total jobs (891,000). Nearly half of this industry's growth is expected to occur among the construction trades and extractive occupations.

Government (excluding State and local government employees in education and hospitals) is projected to account for 4 percent of total employment growth (811,000 jobs); this increase is expected to occur mainly among State and local government service workers, such as police and firefighters. Also noteworthy in government is the projected loss of 45,000 jobs among administrative support workers, including clerical. This loss is largely due to projected declines in typists, stenographers, payroll and timekeeping clerks, and statistical clerks.

The manufacturing industry division is projected to decrease by more than 800,000 jobs. The largest employment declines in manufacturing are projected to be for machine setters, set-up operators, operators, and tenders; assemblers and other handwork occupations; administrative support workers, including clerical; helpers, laborers, and material movers, hand; and transportation and material moving machine and vehicle operators. Many of the detailed occupations in these groups are expected to be affected by automation and a decrease in demand for the products of industries in which they are concentrated because of changes in consumer tastes, shifts in governmental priorities, and increases in foreign competition. Despite the drop in employment, some occupational groups within manufacturing are expected to grow. The group with the largest job increase is engineers (165,000), followed by managers (85,000) and technicians (70,000).

The agriculture, forestry, and fishing division has a projected increase in employment among wage and salary workers, but if self-employed agriculture workers are included, the industry shows a decrease.

The number of self-employed workers and unpaid family workers combined is projected to increase by 12.2 percent, from 9.8 million in 1986 to 10.9 million in the year 2000. This estimate refers to both nonfarm and agricultural industries. All of this growth is expected to occur among self-employed workers, because jobs for unpaid family workers are projected to decline by a quarter of a million. For self-employed workers and unpaid family workers combined, sales occupations are expected to account for 560,000 of the total increase of 1.2 million jobs. The occupational group expected to add the next largest number of self-employed and unpaid family worker jobs is managers and management-related workers (356,000), followed by service workers (176,000), and construction trades and extractive workers (167,000).

Trends for occupational clusters

The Bureau has developed projections for 480 detailed occupations, which are grouped into clusters that conform to the Standard Occupational Classification system. (See table 3.) These clusters are discussed in terms of employment change, factors affecting change, and significant detailed occupational components. The occupational groups in this section below are based on the occupational classification used in the National Industry-Occupation Matrix. They differ somewhat from previously discussed groups based on the Current Population Survey, which is the only source of comparable occupational employment data for the entire 1972–86 period.

Managerial and management-related occupations. Several managerial occupations are expected to grow rapidly from 1986 to 2000 due to the increasing complexity of business operations and the large employment gains in trade and service industries where, because of small firm size, a higher than average proportion of employment is in management occupations. For example, the number of employment interviewers, private or public employment service, is projected to increase by 71 percent, largely as a result

Table 3. Civilian employment in occupations with 25,000 workers or more, actual 1986 and projected to 2000
[Numbers in thousands]

Occupation	Total employment				1986–2000 employment change					
	1986	Projected, 2000			Number			Percent		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Total, all occupations	111,623	126,432	133,030	137,533	14,809	21,407	25,910	13	19	23
Managerial and management-related occupations	10,583	12,900	13,616	14,105	2,316	3,033	3,521	22	29	33
Managerial and administrative occupations	7,369	8,939	9,441	9,780	1,570	2,071	2,411	21	28	33
Education administrators	288	316	325	336	28	37	48	10	13	17
Financial managers	638	747	792	824	109	154	185	17	24	29
Food service and lodging managers	509	628	663	685	120	154	176	24	30	35
General managers and top executives	2,383	2,820	2,965	3,052	437	582	669	18	24	28
Marketing, advertising, and public relations managers	323	402	427	444	80	105	122	25	32	38
Personnel, training, and labor relations managers	151	183	194	201	32	43	50	21	28	33
Postmasters and mail superintendents	28	29	30	31	2	2	4	7	8	14
Property and real estate managers	128	166	178	184	38	50	56	30	39	44
Public administration chief executives, legislators, and general administrators	66	73	75	77	7	9	11	11	14	17
Purchasing managers	230	248	260	266	18	30	36	8	13	16
Management support occupations	3,214	3,961	4,175	4,324	747	962	1,110	23	30	35
Accountants and auditors	945	1,251	1,322	1,371	306	376	426	32	40	45
Claims examiners, property and casualty insurance	34	43	45	46	9	11	12	27	33	36
Inspectors and compliance officers, except construction	125	137	142	146	12	17	21	9	13	17
Construction and building inspectors	50	54	55	57	4	5	7	8	11	14
Cost estimators	157	180	188	197	23	31	39	15	20	25
Employment interviewers, private or public employment service	75	122	129	134	47	54	58	62	71	77
Loan officers and counselors	98	123	131	137	26	33	39	26	34	40
Management analysts	126	155	165	173	29	40	47	23	31	38
Personnel, training, and labor relations specialists	230	264	278	288	34	49	58	15	21	25
Purchasing agents, except wholesale, retail, and farm products	188	181	193	200	−7	5	12	−3	3	7
Tax examiners, collectors, and revenue agents	57	65	67	69	8	10	12	13	17	20
Underwriters	99	127	134	136	28	34	37	28	34	37
Wholesale and retail buyers, except farm products	192	200	209	213	8	17	21	4	9	11
Engineers, architects, and surveyors	1,567	1,917	2,062	2,138	350	495	571	22	32	36
Engineers	1,371	1,683	1,815	1,883	312	444	512	23	32	37
Aeronautical and astronautical engineers	53	53	58	60	0	6	8	1	11	15
Chemical engineers	52	57	60	64	5	8	11	9	15	21
Civil engineers, including traffic engineers	199	238	249	257	39	50	58	20	25	29
Electrical and electronics engineers	401	544	592	616	143	192	215	36	48	54
Industrial engineers, except safety engineers	117	140	152	158	22	35	41	19	30	35
Mechanical engineers	233	286	309	320	53	76	87	23	33	37
Architects, except landscape and marine	84	102	108	112	18	25	29	22	30	34
Surveyors	94	108	113	117	13	19	22	14	20	24
Natural, computer, and mathematical scientists	738	1,014	1,077	1,122	275	339	384	37	46	52
Computer systems analysts, electronic data processing	331	544	582	607	212	251	276	64	76	83
Life scientists	140	163	170	176	23	30	35	16	21	25
Biological scientists	61	72	75	62	11	14	16	18	23	27
Mathematical scientists, actuaries and statisticians	48	58	61	63	11	14	16	22	29	33
Operations and systems researchers	38	55	59	62	17	21	23	44	54	61
Physical scientists	180	194	205	214	13	24	34	7	13	19
Chemists	86	92	96	95	5	10	15	6	11	17
Geologists, geophysicists, and oceanographers	44	46	50	49	2	6	8	6	13	19
Teachers, librarians, and counselors	4,949	5,558	5,720	5,906	610	772	957	12	16	19
Teachers, preschool, kindergarten, and elementary	1,702	2,011	2,066	2,131	308	363	428	18	21	25
Teachers, preschool	176	233	240	248	57	64	72	33	36	41
Teachers, kindergarten and elementary	1,527	1,778	1,826	1,883	251	299	356	16	20	23
Teachers, secondary school	1,128	1,246	1,280	1,320	118	152	192	10	13	17
College and university faculty	754	703	722	745	−51	−32	−9	−7	−4	−1
Other teachers and instructors	1,097	1,296	1,340	1,386	199	243	289	18	22	26
Adult and vocational education teachers	427	489	509	529	62	82	102	14	19	24
Instructors, adult (nonvocational) education	202	229	241	251	26	39	49	13	19	24
Teachers and instructors, vocational education and training	225	260	268	278	35	43	53	16	19	24
Librarians, archivists, curators, and related workers	144	159	165	170	15	20	25	10	14	18
Librarians, professional	136	150	155	159	14	18	23	10	13	17
Counselors	123	144	148	154	21	25	32	17	21	26
Health diagnosing and treating occupations	2,592	3,528	3,674	3,785	935	1,081	1,192	36	42	46
Dentists	151	184	196	203	33	45	52	22	30	34
Dietitians and nutritionists	40	52	54	55	12	14	15	29	34	38
Optometrists	37	52	55	57	15	18	20	40	49	54
Pharmacists	151	179	187	191	29	36	41	19	24	27
Physician assistants	26	39	41	42	13	15	16	49	57	62
Physicians and surgeons	491	645	679	700	154	188	209	31	38	43
Registered nurses	1,406	1,951	2,018	2,077	546	612	671	39	44	48
Therapists	240	352	366	378	112	126	138	46	52	57
Occupational therapists	29	43	45	46	14	15	17	46	52	58
Physical therapists	61	109	115	118	48	53	57	79	87	94
Recreational therapists	29	41	43	44	12	14	15	42	49	52
Respiratory therapists	56	74	76	78	17	19	22	30	34	38
Speech pathologists and audiologists	45	58	61	63	13	15	18	29	34	39
Veterinarians and veterinary inspectors	37	52	54	57	15	17	19	39	46	52
Other professional specialists	3,692	4,421	4,660	4,842	729	967	1,150	20	26	31
Artists and commercial artists	176	218	235	246	43	59	70	24	34	40
Designers	259	322	343	357	63	84	97	24	32	38
Musicians	189	218	231	239	30	42	50	16	23	27
Photographers and camera operators	109	137	146	153	28	37	44	25	33	41

Table 3. Continued—Civilian employment in occupations with 25,000 workers or more, actual 1986 and projected to 2000
[Numbers in thousands]

Occupation	Total employment				1986–2000 employment change					
	1986	Projected, 2000			Number			Percent		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Photographers	100	126	133	140	25	33	40	25	33	40
Producers, directors, actors, and entertainers	73	87	97	103	15	24	30	20	34	41
Public relations specialists and publicity writers	87	115	122	127	28	35	39	32	40	45
Radio and TV announcers and newscasters	61	71	76	84	10	15	23	16	24	38
Reporters and correspondents	75	84	88	93	9	13	19	12	18	25
Writers and editors, including technical writers	214	268	287	301	54	73	88	25	34	41
Economists	37	47	50	52	10	13	15	27	34	40
Psychologists	110	140	148	153	30	37	43	27	34	39
Clergy	295	291	304	313	−4	9	18	−1	3	6
Directors, religious activities and education	46	43	45	46	−3	−1	0	−7	−3	0
Recreation workers	164	190	196	202	26	33	38	16	20	23
Social service technicians	88	117	122	125	29	34	37	33	38	42
Social workers	365	468	485	500	103	120	134	28	33	37
Judges, magistrates, and other judicial workers	38	46	47	48	8	9	10	21	23	27
Lawyers	527	676	718	748	149	191	221	28	36	42
Technician occupations	3,650	4,791	5,053	5,226	1,141	1,403	1,576	31	38	43
Health technicians and technologists	1,598	2,171	2,261	2,326	573	663	728	36	41	46
Dental hygienists	87	134	141	145	47	54	58	54	63	67
Emergency medical technicians	65	73	75	77	8	10	12	12	15	18
Licensed practical nurses	631	835	869	891	204	238	260	32	38	41
Medical and clinical lab technologists and technicians	239	285	296	307	46	57	67	19	24	28
Medical records technicians	40	67	70	72	28	30	32	69	75	80
Opticians, dispensing and measuring	50	69	72	74	19	23	24	39	46	49
Radiologic technologists and technicians	115	183	190	196	67	75	80	58	65	70
Surgical technicians	37	48	49	51	11	12	14	30	33	37
Engineering and science technicians and technologists	1,264	1,454	1,549	1,604	190	285	340	15	23	27
Engineering technicians	689	874	933	964	185	245	276	27	35	40
Electrical and electronic technicians and technologists	313	428	459	473	114	145	160	37	46	51
Drafters	348	331	354	366	−17	5	17	−5	2	5
Physical and life science technicians, technologists, and mathematical technicians	227	250	262	274	23	35	47	10	15	21
Technicians, except health and engineering and science	788	1,166	1,243	1,297	377	454	509	48	58	65
Air traffic controllers	26	27	28	29	1	2	3	4	8	10
Broadcast technicians	27	31	33	37	3	5	9	12	20	34
Computer programmers	479	758	813	850	279	335	371	58	70	78
Legal assistants and technicians, except clerical	170	258	272	282	87	102	112	51	60	66
Paralegal personnel	61	118	125	130	56	64	68	92	104	112
Title examiners and searchers	30	34	36	37	5	6	7	15	22	25
Technical assistants, library	51	56	57	59	5	7	8	10	13	16
Marketing and sales occupations	12,606	15,522	16,334	16,760	2,916	3,728	4,153	23	30	33
Cashiers	2,165	2,616	2,740	2,798	450	575	633	21	27	29
Counter and rental clerks	178	221	238	246	43	60	68	24	34	38
Insurance salesworkers	463	535	565	581	73	102	118	16	22	25
Real estate agents and brokers	376	507	542	562	131	166	186	35	44	49
Brokers, real estate	63	86	91	94	23	28	31	36	45	49
Sales agents, real estate	313	422	451	468	108	138	155	35	44	49
Real estate appraisers	36	48	51	53	12	15	17	33	41	46
Salespersons, retail	3,579	4,563	4,780	4,871	984	1,201	1,291	28	34	36
Securities and financial services salesworkers	197	266	279	290	69	82	93	35	42	47
Stock clerks, sales floor	1,087	1,255	1,312	1,333	168	225	246	15	21	23
Travel agents	105	146	154	159	41	49	53	39	46	51
Administrative support occupations, including clerical	19,851	21,028	22,109	22,885	1,177	2,258	3,034	6	11	15
Adjusters, investigators, and collectors	762	852	894	920	90	132	158	12	17	21
Adjustments clerks	136	157	165	170	20	29	34	15	21	25
Bill and account collectors	126	157	167	174	32	42	49	25	33	39
Insurance claims and policy processing occupations	355	367	385	393	13	30	38	4	9	11
Insurance adjusters, examiners, and investigators	119	147	154	158	29	36	39	24	30	33
Insurance claims clerks	85	84	88	90	−1	3	5	−1	4	6
Insurance policy processing clerks	151	136	142	145	−15	−9	−6	−10	−6	−4
Welfare eligibility workers and interviewers	86	98	100	103	12	14	17	14	16	20
Communications equipment operators	365	381	404	422	16	39	57	4	11	16
Telephone operators	353	369	391	408	15	38	55	4	11	16
Central office operators	42	32	34	37	−10	−8	−5	−25	−18	−13
Directory assistance operators	32	24	27	28	−8	−6	−4	−24	−18	−12
Switchboard operators	279	313	330	343	34	51	64	12	18	23
Computer operators and peripheral equipment operators	309	430	457	475	121	148	166	39	48	54
Computer operators, except peripheral equipment	263	364	387	403	101	124	140	39	47	53
Peripheral electronic data processing equipment operators	46	66	70	73	19	24	26	42	51	57
Duplicating, mail, and other office machine operators	166	169	178	185	3	12	19	2	7	11
Financial records processing occupations	5,093	5,350	5,637	5,832	257	544	739	5	11	15
Billing, cost, and rate clerks	307	298	313	322	−10	5	14	−3	2	5
Billing, posting, and calculating machine operators	105	108	114	117	4	9	12	4	9	12
Bookkeeping, accounting, and auditing clerks	2,116	2,085	2,208	2,291	−31	92	175	−1	4	8
Payroll and timekeeping clerks	204	171	180	186	−34	−25	−18	−16	−12	−9
General office clerks	2,361	2,688	2,824	2,916	327	462	554	14	20	23
Information clerks	1,111	1,452	1,534	1,587	341	423	476	31	38	43
Hotel desk clerks	109	146	156	163	37	47	54	34	43	49
Interviewing clerks, except personnel and social welfare	104	143	150	158	39	46	54	37	45	52
New accounts clerks, banking	94	110	117	122	16	23	28	17	24	30

Table 3. Continued—Civilian employment in occupations with 25,000 workers or more, actual 1986 and projected to 2000
[Numbers in thousands]

Occupation	Total employment				1986–2000 employment change					
	1986	Projected, 2000			Number			Percent		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Receptionists and information clerks	682	913	964	997	232	282	315	34	41	46
Reservation and transportation ticket agents and travel clerks	122	139	146	147	18	24	26	15	20	21
Mail and message distribution workers	876	924	947	992	48	71	116	5	8	13
Mail clerks, except mail machine operators and postal service	136	138	145	150	1	9	14	1	6	10
Messengers	101	116	123	128	16	22	28	16	22	28
Postal mail carriers	269	288	291	306	18	22	37	7	8	14
Postal service clerks	370	383	388	408	12	18	37	3	5	10
Material recording, scheduling, dispatching, and distribution occupations	2,173	2,151	2,264	2,330	−22	91	157	−1	4	7
Dispatchers	185	206	215	221	21	30	36	11	16	20
Dispatchers, except police, fire, and ambulance	124	138	146	151	14	22	26	11	18	21
Dispatchers, police, fire, and ambulance	61	67	69	71	6	8	10	11	13	16
Meter readers, utilities	48	42	43	44	−6	−5	−4	−12	−10	−7
Order fillers, wholesale and retail sales	195	200	208	211	5	13	16	3	7	8
Procurement clerks	41	33	35	37	−7	−5	−4	−18	−13	−9
Production, planning, and expediting clerks	213	210	228	239	−3	15	26	−1	7	12
Stock clerks, stockroom, warehouse, or yard	726	668	703	721	−57	−23	−4	−8	−3	−1
Traffic, shipping, and receiving clerks	548	557	585	604	9	38	56	2	7	10
Weighers, measurers, checkers, and samplers, recordkeepers	40	37	39	41	−3	0	1	−7	−1	3
Records processing occupations, except financial	848	898	939	969	49	91	121	6	11	14
Brokerage clerks	58	73	75	77	15	16	19	25	28	32
File clerks	242	260	274	283	18	32	41	8	13	17
Library assistants and bookmobile drivers	102	111	114	117	9	12	16	9	12	15
Order clerks, materials, merchandise, and service	271	263	277	285	−8	6	13	−3	2	5
Personnel clerks, except payroll and timekeeping	119	119	126	130	0	7	11	0	6	9
Statement clerks	43	54	57	59	11	14	16	26	32	37
Secretaries, stenographers, and typists	4,414	4,413	4,648	4,813	−2	234	398	0	5	9
Secretaries	3,234	3,470	3,658	3,789	236	424	554	7	13	17
Stenographers	178	123	128	133	−55	−50	−46	−31	−28	−26
Typists and word processors	1,002	820	862	892	−182	−140	−110	−18	−14	−11
Other clerical and administrative support workers	3,732	4,009	4,206	4,358	277	475	627	7	13	17
Bank tellers	539	576	610	635	37	71	96	7	13	18
Court clerks	40	49	51	52	9	10	12	23	26	30
Credit checkers	41	42	45	47	1	4	6	3	10	15
Customer service representatives, utilities	102	93	99	104	−9	−3	2	−9	−3	2
Data entry keyers, except composing	400	315	334	347	−85	−66	−53	−21	−16	−13
Data entry keyers, composing	29	41	43	45	13	15	17	44	51	58
First-line supervisors and managers	956	1,106	1,161	1,200	150	205	244	16	21	25
Loan and credit clerks	159	191	207	217	32	47	57	20	30	36
Real estate clerks	26	35	36	37	9	10	11	33	39	42
Statistical clerks	71	49	52	54	−21	−19	−17	−30	−26	−24
Teacher aides and educational assistants	648	752	773	797	104	125	150	16	19	23
Service occupations	17,536	21,933	22,917	23,532	4,397	5,381	5,996	25	31	34
Cleaning and building service occupations, except private household	3,107	3,662	3,819	3,937	555	712	830	18	23	27
Housekeepers, institutional	123	157	165	170	34	42	47	28	34	38
Janitors and cleaners, including maids and housekeeping cleaners	2,676	3,144	3,280	3,382	468	604	706	17	23	26
Pest controllers and assistants	50	56	58	59	6	8	10	13	16	19
Food preparation and service occupations	7,104	9,337	9,705	9,908	2,233	2,601	2,804	31	37	39
Chefs, cooks, and other kitchen workers	2,563	3,299	3,427	3,501	736	864	938	29	34	37
Cooks, except short order	1,023	1,324	1,378	1,413	301	355	390	29	35	38
Bakers, bread and pastry	114	155	162	165	41	48	51	36	42	45
Cooks, institution or cafeteria	389	442	457	469	53	68	80	14	17	20
Cooks, restaurant	520	727	759	778	207	240	259	40	46	50
Cooks, short order and fast food	591	748	775	788	157	184	197	27	31	33
Food preparation workers	949	1,227	1,273	1,300	277	324	351	29	34	37
Food service occupations	4,204	5,611	5,832	5,948	1,407	1,628	1,744	33	39	41
Bartenders	396	530	553	566	134	157	170	34	40	43
Dining room and cafeteria attendants and barroom helpers	433	607	631	644	174	197	211	40	46	49
Food counter, fountain, and related workers	1,500	1,879	1,949	1,985	378	449	485	25	30	32
Hosts and hostesses, restaurant, lounge, and coffee shops	172	236	245	250	64	73	78	37	42	45
Waiters and waitresses	1,702	2,360	2,454	2,503	658	752	801	39	44	47
Health service occupations	1,819	2,437	2,549	2,608	618	730	788	34	40	43
Dental assistants	155	231	244	250	76	88	95	49	57	61
Medical assistants	132	239	251	258	107	119	126	81	90	96
Nursing aides and psychiatric aides	1,312	1,673	1,750	1,786	361	437	474	28	33	36
Nursing aides, orderlies, and attendants	1,224	1,584	1,658	1,691	359	433	467	29	35	38
Psychiatric aides	88	90	92	95	2	4	7	2	5	8
Pharmacy assistants	64	77	79	81	13	15	17	20	24	27
Physical and corrective therapy assistants and aides	36	62	65	67	26	29	31	74	82	87
Personal service occupations	1,799	2,135	2,259	2,341	336	460	542	19	26	30
Amusement and recreation attendants	184	228	239	246	43	55	62	24	30	34
Baggage porters and bellhops	31	39	41	43	8	10	12	24	32	37
Barbers	80	76	81	85	−4	1	4	−5	1	5
Child care workers	589	664	708	739	75	118	150	13	20	25
Cosmetologists and related workers	595	666	702	724	71	107	129	12	18	22
Hairdressers, hairstylists, and cosmetologists	562	627	662	683	65	99	121	12	18	22
Flight attendants	80	101	105	106	21	26	26	26	32	33
Social welfare service and home health aides	197	320	336	349	123	139	152	63	71	77
Home health aides	138	236	249	258	98	111	120	71	80	87

Table 3. Continued—Civilian employment in occupations with 25,000 workers or more, actual 1986 and projected to 2000
[Numbers in thousands]

Occupation	Total employment				1986–2000 employment change					
	1986	Projected, 2000			Number			Percent		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Social welfare service aides	59	84	88	91	25	29	32	43	49	54
Ushers, lobby attendants, and ticket takers	42	41	46	49	−1	4	7	−2	9	16
Private household workers	981	883	955	970	−98	−26	−11	−10	−3	−2
Housekeepers and butlers	34	32	35	35	−2	1	1	−6	2	4
Child care workers, private household	400	334	362	367	−66	−38	−33	−16	−10	−8
Cleaners and servants, private household	531	501	543	551	−30	12	20	−6	2	4
Protective service occupations	2,055	2,589	2,700	2,813	534	645	758	26	31	37
Correction officers and jailers	176	231	236	243	55	60	67	31	34	38
Firefighting occupations	279	318	325	335	39	47	57	14	17	20
Firefighters	223	255	260	268	32	37	45	14	17	20
Firefighting and prevention supervisors	45	51	52	54	6	8	9	14	17	20
Police and detectives	489	563	576	594	74	87	105	15	18	21
Police and detective supervisors	84	98	100	103	14	17	20	17	20	23
Police detectives and investigators	57	65	67	68	8	10	12	14	17	21
Police patrol officers	349	400	409	422	52	61	73	15	17	21
Crossing guards	52	55	56	58	3	4	6	5	8	11
Guards	794	1,104	1,177	1,241	311	383	447	39	48	56
Agriculture, forestry, fishing, and related occupations	3,556	3,229	3,393	3,497	−327	−163	−59	−9	−5	−2
Animal caretakers, except farm	80	100	104	108	20	24	28	25	30	35
Gardeners and groundskeepers, except farm	767	964	1,005	1,033	197	238	266	26	31	35
Supervisors, farming, forestry, and agricultural-related occupations	65	59	62	64	−6	−3	−1	−9	−4	−1
Farm occupations	986	759	806	837	−227	−180	−149	−23	−18	−15
Farm workers	940	705	750	779	−235	−190	−161	−25	−20	−17
Nursery workers	46	54	57	58	8	11	12	18	24	27
Farm operators and managers	1,336	1,001	1,051	1,078	−335	−285	−258	−25	−21	−19
Farmers	1,182	810	850	871	−372	−332	−311	−31	−28	−26
Farm managers	154	191	201	207	37	47	53	24	31	34
Fishers, hunters, and trappers	77	94	97	101	16	20	23	21	26	30
Forestry and logging occupations	139	128	138	143	−11	−2	4	−8	−1	3
Forest and conservation workers	36	40	42	43	4	5	7	10	15	18
Timber cutting and logging occupations	103	88	96	100	−15	−7	−3	−15	−7	−3
Fallers and buckers	36	29	32	33	−7	−4	−3	−18	−11	−8
Logging tractor operators	28	26	28	29	−2	−1	0	−8	−2	1
Blue-collar worker supervisors	1,823	1,854	1,967	2,051	31	144	228	2	8	13
Construction trades and extractive workers	4,006	4,500	4,710	4,940	495	704	934	12	18	23
Bricklayers and stone masons	161	180	187	196	19	26	36	12	16	22
Carpenters	1,010	1,134	1,192	1,252	124	182	242	12	18	24
Carpet installers	66	78	83	87	12	17	21	19	26	31
Concrete and terrazzo finishers	118	137	142	149	19	24	31	16	20	26
Drywall installers and finishers	154	183	191	200	29	37	46	19	24	30
Electricians	556	617	644	676	61	89	120	11	16	22
Glaziers	47	54	56	58	7	9	11	15	19	24
Hard tile setters	32	37	39	41	6	8	10	19	25	31
Highway maintenance workers	167	184	188	194	18	22	27	11	13	16
Insulation workers	62	73	75	79	11	13	17	18	22	27
Painters and paperhangers, construction and maintenance	412	475	502	526	63	90	114	15	22	28
Paving, surfacing, and tamping equipment operators	59	67	69	72	9	11	13	15	18	23
Pipelayers and pipelaying fitters	52	58	59	62	6	8	10	11	15	20
Plasterers	28	30	31	33	2	3	5	8	12	17
Plumbers, pipefitters, and steamfitters	402	452	471	493	49	69	91	12	17	23
Roofers	142	174	181	190	32	39	48	23	28	34
Structural and reinforcing metal workers	86	101	104	109	14	17	23	17	20	26
Oil and gas extraction occupations	108	103	110	122	−5	2	14	−5	2	13
Roustabouts	56	48	52	57	−8	−4	1	−14	−7	2
Mechanics, installers, and repairers	4,678	5,060	5,365	5,547	382	687	869	8	15	19
Communications equipment mechanics, installers, and repairers	109	79	87	92	−30	−23	−17	−27	−21	−16
Central office and PBX installers and repairers	74	52	57	60	−22	−17	−13	−29	−23	−18
Electrical and electronic equipment mechanics, installers, and repairers	533	576	614	637	43	81	105	8	15	20
Data processing equipment repairers	69	117	125	129	48	56	60	69	80	86
Electrical powerline installers and repairers	108	114	118	121	6	11	14	6	10	13
Electronic home entertainment equipment repairers	49	54	59	60	5	10	12	11	20	24
Electronics repairers, commercial and industrial equipment	81	97	104	107	17	23	26	21	28	33
Station installers and repairers, telephone	58	36	40	42	−22	−18	−16	−37	−32	−28
Television and cable TV line installers and repairers	119	102	108	115	−18	−11	−4	−15	−9	−4
Machinery and related mechanics, installers, and repairers	1,545	1,712	1,810	1,881	167	265	335	11	17	22
Industrial machinery mechanics	421	420	447	468	−1	26	48	0	6	11
Maintenance repairers, general utility	1,039	1,205	1,270	1,314	167	232	275	16	22	26
Millwrights	86	87	93	99	0	7	13	0	8	15
Vehicle and mobile equipment mechanics and repairers	1,559	1,654	1,759	1,806	94	200	247	6	13	16
Aircraft mechanics and engine specialists	107	122	129	130	15	22	23	14	20	21
Aircraft mechanics	91	104	109	110	13	19	20	14	20	22
Automotive body and related repairers	214	221	239	246	7	25	31	3	12	15
Automotive mechanics	748	758	808	830	10	60	82	1	8	11
Bus and truck mechanics and diesel engine specialists	263	308	325	334	45	63	72	17	24	27
Farm equipment mechanics	52	51	54	55	0	2	3	0	4	6
Mobile heavy equipment mechanics, except engines	102	121	127	131	19	25	29	19	24	29
Small engine specialists	38	45	48	49	6	9	11	16	24	28

Table 3. Continued—Civilian employment in occupations with 25,000 workers or more, actual 1986 and projected to 2000
(Numbers in thousands)

Occupation	Total employment				1986–2000 employment change					
	1986	Projected, 2000			Number			Percent		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Other mechanics, installers, and repairers	931	1,039	1,095	1,132	108	164	200	12	18	21
Coin and vending machine servicers and repairers	27	29	30	31	2	3	4	6	12	15
Heating, air conditioning and refrigeration mechanics and installers	222	260	272	283	38	50	61	17	22	27
Home appliance and power tool repairers	76	79	84	86	3	8	10	4	10	13
Office machine and cash register servicers	56	75	78	80	19	22	24	34	40	43
Precision instrument repairers	49	48	52	54	−1	3	5	−2	5	10
Tire repairers and changers	83	98	103	105	15	20	22	18	24	26
Precision production and plant systems occupations	3,066	2,993	3,200	3,329	−73	134	263	−2	4	9
Precision food workers	317	312	322	330	−6	5	13	−2	2	4
Bakers, manufacturing	38	34	35	37	−4	−3	−1	−10	−7	−3
Butchers and meatcutters	248	251	259	264	2	11	16	1	4	7
Precision metal workers	939	889	962	994	−51	22	55	−5	2	6
Boilermakers	30	30	32	33	0	2	3	−1	5	10
Jewelers and silversmiths	36	42	44	45	6	8	9	16	22	25
Machinists	378	345	373	385	−34	−5	6	−9	−1	2
Sheet metal workers	222	226	240	249	4	19	28	2	8	13
Tool and die makers	160	152	168	174	−8	8	14	−5	5	9
Precision printing workers	112	117	122	128	5	10	16	5	9	14
Compositors, typesetters, and arrangers, precision	30	24	25	26	−6	−5	−4	−21	−17	−13
Lithography and photoengraving workers, precision	48	57	59	62	9	11	14	18	22	29
Precision textile, apparel, and furnishing workers	285	287	306	320	1	21	34	0	7	12
Custom tailors and sewers	108	116	123	127	7	15	19	7	13	17
Shoe and leather workers and repairers, precision	35	28	29	30	−7	−6	−5	−20	−17	−14
Upholsterers	74	75	82	87	1	8	13	1	10	17
Precision woodworkers	204	214	234	250	10	30	46	5	15	23
Inspectors, testers, and graders	694	640	692	722	−55	−3	28	−8	0	4
Other precision workers	223	250	267	278	28	44	55	12	20	25
Dental lab technicians, precision	46	60	64	67	14	18	21	31	39	46
Chemical plant and system operators	33	23	23	25	−11	−10	−8	−32	−30	−25
Electric power generating plant operators, distributers, and dispatchers	45	48	50	51	3	5	6	7	11	14
Power generating and reactor plant operators	25	27	28	29	3	3	4	10	14	16
Gas and petroleum plant and system occupations	31	19	20	21	−11	−11	−9	−37	−34	−30
Stationary engineers	41	41	42	44	0	2	4	0	5	9
Water and liquid waste treatment plant and systems operators	74	83	85	88	9	11	14	13	15	19
Machine setters, set-up operators, operators, and tenders	4,964	4,470	4,770	5,012	−494	−194	47	−10	−4	1
Numerical control machine tool operators and tenders, metal and plastic	56	55	60	61	−2	4	5	−3	7	9
Combination machine tool setters, set-up operators, operators, and tenders	92	88	97	100	−3	5	8	−4	6	9
Machine tool cutting and forming set-up operators and tenders, metal and plastic	822	668	737	766	−155	−85	−56	−19	−10	−7
Drilling machine tool setters and set-up operators, metal and plastic	63	51	57	58	−11	−6	−4	−18	−10	−7
Grinding machine setters and set-up operators, metal and plastic	88	72	80	82	−16	−8	−6	−18	−9	−6
Lathe machine tool setters and set-up operators, metal and plastic	96	78	86	89	−18	−9	−7	−18	−10	−7
Machine forming operators and tenders, metal and plastic	170	141	156	163	−29	−15	−7	−17	−9	−4
Machine tool cutters operators and tenders, metal and plastic	167	134	148	153	−33	−19	−14	−20	−11	−8
Punching machine setters and set-up operators, metal and plastic	61	50	55	58	−11	−6	−4	−18	−9	−6
Metal fabrication machine setters, operators, and related workers	180	152	167	172	−28	−13	−8	−16	−7	−4
Metal fabricators, structural metal products	37	35	38	39	−2	1	3	−4	4	7
Welding machine setters, operators, and tenders	126	101	112	115	−25	−15	−11	−20	−12	−9
Metal and plastic process machine setters, operators, and related workers	300	296	320	338	−3	21	39	−1	7	13
Electric plating machine operators and tenders, setters and set-up operators, metal and plastic	47	41	45	46	−6	−1	0	−12	−3	0
Metal molding machine operators and tenders, setters and set-up operators	37	29	33	34	−8	−4	−3	−22	−12	−7
Plastic molding machine operators and tenders, setters and set-up operators	147	174	183	193	27	36	46	19	25	31
Printing, binding, and related workers	412	458	478	505	46	66	93	11	16	23
Bindery machine operators, setters, and set-up operators	72	86	90	95	14	17	22	19	24	31
Printing press operators	222	252	262	278	29	40	56	13	18	25
Offset lithographic press setters and set-up operators	73	92	96	101	19	23	28	27	32	39
Printing press machine setters, operators, and tenders	115	126	131	140	11	17	25	10	15	22
Photoengraving and lithographic machine operators and photographers	29	37	38	40	7	9	11	24	29	36
Typesetting and composing machine operators and tenders	37	35	36	37	−2	−1	1	−6	−3	2
Textile and related setters, operators, and related workers	1,165	959	995	1,048	−206	−170	−117	−18	−15	−10
Pressing machine operators and tenders, textile, garment, and related workers	89	83	88	90	−6	−1	2	−7	−2	2
Sewing machine operators, garment	633	526	541	567	−106	−92	−66	−17	−14	−10
Sewing machine operators, nongarment	135	119	125	131	−16	−10	−3	−12	−7	−2
Textile draw-out and winding machine operators and tenders	219	156	164	175	−62	−55	−43	−28	−25	−20
Textile machine setters and set-up operators	54	45	47	51	−9	−7	−3	−16	−13	−6
Woodworking machine setters, operators, and other related workers	147	140	159	173	−7	12	26	−5	8	18
Head sawyers and sawing machine operators and tenders, setters and set-up operators	74	68	78	85	−5	5	12	−7	7	16
Woodworking machine operators and tenders, setters and set-up operators	74	72	81	88	−2	7	14	−2	9	19
Other machine setters, set-up operators, operators, and tenders	1,700	1,575	1,668	1,754	−125	−32	54	−7	−2	3
Cementing and gluing machine operators and tenders	42	39	41	45	−3	−1	3	−8	−2	6
Chemical equipment controllers, operators and tenders	73	50	52	55	−24	−22	−18	−33	−30	−25
Cooking and roasting machine operators and tenders, food and tobacco	26	22	22	23	−4	−4	−3	−17	−14	−11
Crushing and mixing machine operators and tenders	132	117	123	129	−16	−9	−3	−12	−7	−2
Cutting and slicing machine setters, operators, and tenders	82	79	82	88	−3	0	6	−4	0	7
Electronic semiconductor processors	29	13	14	14	−15	−15	−15	−53	−51	−52

Table 3. Continued—Civilian employment in occupations with 25,000 workers or more, actual 1986 and projected to 2000
[Numbers in thousands]

Occupation	Total employment				1986–2000 employment change					
	1986	Projected, 2000			Number			Percent		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Extruding and forming machine setters, operators, and tenders	100	91	96	102	−9	−3	2	−9	−3	2
Furnace, kiln, or kettle operators and tenders	58	49	53	56	−9	−5	−2	−16	−8	−3
Laundry and drycleaning machine operators and tenders, except pressers	140	160	170	175	21	31	36	15	22	26
Packaging and filling machine operators and tenders	299	280	293	308	−19	−5	10	−6	−2	3
Painting and paint spraying machine operators	100	94	102	107	−7	1	6	−7	1	6
Painting machine operators, tenders, setters, and set-up operators	66	62	68	72	−3	2	6	−5	3	9
Painters, transportation equipment	35	31	34	35	−4	−1	0	−10	−2	1
Paper goods machine setters and set-up operators	60	58	60	66	−2	0	6	−4	0	10
Photographic processing machine operators and tenders	39	45	48	51	6	9	12	16	24	32
Separating and still machine operators and tenders	26	22	23	24	−4	−3	−2	−16	−12	−7
Shoe sewing machine operators and tenders	27	18	18	18	−8	−9	−8	−31	−32	−31
Assembler and other handwork occupations	2,701	2,389	2,589	2,695	−312	−113	−6	−12	−4	0
Precision assemblers	351	315	348	358	−36	−3	7	−10	−1	2
Electrical and electronic equipment assemblers, precision	170	155	171	177	−15	1	6	−9	1	4
Electromechanical equipment assemblers, precision	59	57	62	64	−2	4	5	−3	7	9
Machine builders and other precision machine assemblers	50	44	48	49	−6	−2	−1	−12	−4	−1
Other hand workers, including assemblers and fabricators	2,350	2,074	2,240	2,338	−277	−110	−13	−12	−5	−1
Cannery workers	78	69	72	76	−8	−5	−1	−11	−7	−2
Coil winders, tapers, and finishers	34	25	28	29	−9	−6	−5	−26	−19	−16
Cutters and trimmers, hand	50	48	50	53	−2	0	3	−4	1	6
Electrical and electronic assemblers	249	105	116	119	−145	−134	−131	−58	−54	−52
Grinders and polishers, hand	73	62	69	72	−11	−4	−2	−15	−6	−2
Machine assemblers	50	44	49	50	−6	−1	0	−12	−2	1
Meat, poultry, and fish cutters and trimmers, hand	101	105	106	108	3	4	7	3	4	7
Painting, coating, and decorating workers, hand	42	42	46	48	0	4	6	−1	9	14
Solderers and brazers	25	24	27	28	−1	2	3	−3	7	10
Welders and cutters	287	284	307	320	−4	19	32	−1	7	11
Transportation and material moving machine and vehicle operators	4,789	5,029	5,289	5,456	240	500	667	5	10	14
Aircraft pilots and flight engineers	76	94	98	99	17	22	23	23	29	30
Motor vehicle operators	3,089	3,520	3,693	3,798	431	604	709	14	20	23
Bus drivers	478	541	555	572	63	77	94	13	16	20
Bus drivers, except school	143	172	177	182	29	34	39	20	24	27
Bus drivers, school	334	369	378	390	34	44	56	10	13	17
Taxi drivers and chauffers	88	88	94	98	0	6	10	0	7	11
Truck drivers	2,463	2,821	2,968	3,050	358	505	587	15	21	24
Driver-salesworkers	252	222	232	239	−30	−20	−13	−12	−8	−5
Truck drivers, light and heavy	2,211	2,599	2,736	2,811	388	525	600	18	24	27
Rail transportation workers	117	66	74	79	−51	−43	−39	−44	−37	−33
Railroad brake, signal, and switch operators	42	22	25	27	−20	−17	−15	−47	−40	−36
Railroad conductors and yardmasters	29	15	17	18	−14	−12	−11	−48	−41	−37
Water transportation and related workers	50	43	46	49	−8	−4	−1	−15	−8	−3
Other transportation and related workers	416	401	421	430	−15	5	15	−4	1	4
Parking lot attendants	30	34	37	38	4	7	8	12	21	25
Service station attendants	299	272	285	291	−28	−14	−8	−9	−5	−3
Material moving equipment operators	998	857	905	947	−140	−93	−51	−14	−9	−5
Crane and tower operators	58	56	60	64	−2	3	7	−4	5	11
Excavation and loading machine operators	70	75	79	83	6	9	13	8	13	19
Grader, dozer, and scraper operators	92	100	104	109	8	11	17	8	12	18
Industrial truck and tractor operators	426	265	283	296	−161	−143	−131	−38	−34	−31
Operating engineers	150	167	172	180	17	23	30	11	15	20
Helpers, laborers, and material movers, hand	4,273	4,295	4,522	4,705	22	249	432	1	6	10
Freight, stock, and material movers, hand	831	768	811	838	−63	−19	8	−8	−2	1
Hand packers and packagers	566	606	639	662	40	73	96	7	13	17
Helpers, construction trades	519	570	587	616	51	68	97	10	13	19
Machine feeders and offbearers	278	242	262	280	−36	−16	2	−13	−6	1
Refuse collectors	113	130	135	138	17	22	25	15	19	22
Vehicle washers and equipment cleaners	189	190	203	208	1	14	19	0	7	10

of the rapid growth of the personnel supply services industry, which has many small establishments. Other managerial occupations projected to grow rapidly because of large employment gains in industries where the occupations are concentrated include insurance underwriters (34 percent), property and real estate managers (39 percent), and loan officers and counselors (34 percent). However, not all occupations in the managerial group will fare as well. Employment for purchasing managers; purchasing agents, except wholesale, retail, and farm products; and wholesale and retail buyers is expected to grow more slowly than total employment due to the computerization of purchasing tasks and more efficient purchasing methods. Other occupations with low projected growth rates are in Federal, State, and local governments, which are not expected to grow as fast as the overall economy; these occupations include postmasters and mail superintendents, public administrators, and construction and building inspectors.

Engineers, architects, and surveyors. The electrical engineers occupation is projected to have the largest employment gain (192,000 jobs) and the most rapid increase (48 percent) in this cluster. Most of the increase is expected to occur in industries such as communications equipment,

computers, and other electronics equipment manufacturing. The need to remain competitive will require an increasing number of these engineers to update product designs, explore more cost-efficient ways of producing goods, and develop new products.

The mechanical engineers occupation is projected to have the next largest employment gain (76,000 jobs) and the second most rapid increase (33 percent) among occupations in the engineers, architects, and surveyors group. Most of the employment increase is expected in manufacturing because of increasing product design requirements. Other sources of demand for mechanical engineers include services, such as engineering and architectural services, miscellaneous business services, and temporary help supply services. Construction and government industries are expected to employ an increasing number of mechanical engineers as well. The number of civil engineers, including traffic engineers is projected to increase by 50,000 jobs (25 percent), based on the need to improve the highway system and other large-scale construction projects in the economic infrastructure. Also, the number of industrial engineers, except safety engineers, is projected to increase by 35,000 workers (30 percent) as industry seeks to improve its efficiency through the introduction of new production techniques, such as integrated manufacturing systems. The architects, except landscape and marine, occupation is projected to gain 25,000 jobs (30 percent) because of increased demand for office buildings, apartment buildings, and residential housing. Computer-assisted design equipment will allow architects to provide more flexible services by producing variations in design more easily.

Natural, computer, and mathematical scientists. The computer systems analysts occupation is expected to have the largest employment gain (251,000 jobs) and the fastest growth (76 percent) of any occupation within this job cluster. Close to half the employment gain for computer systems analysts is projected to occur in the computer and data processing services industry. The remaining increase will be scattered throughout the economy as computers continue to be used more intensively by an ever-expanding number of industries and firms. New business and defense computer applications will continue to be prime sources of demand. The number of operations and systems researchers is projected to grow very rapidly (54 percent) due to the increased importance of quantitative analysis throughout industries.

The number of life scientists is expected to grow 21 percent, or by 30,000 jobs, from 1986 to 2000. The government and health services industries are expected to employ increasing numbers of life scientists as genetic research expands into such areas as new medicines, plant and animal variations, and diagnostic techniques for genetic defects. Employment of physical scientists is to increase moderately at 13 percent, with 24,000 jobs added due to military and private research and development. Employment opportunities are expected to open up in laser research, high-energy physics, and other areas of advanced science.

Teachers, librarians, and counselors. This group of occupations is projected to grow about as fast as the average for total employment and add about 772,000 jobs. However, not all detailed occupations within this cluster are expected to have the same growth rate due to differing trends in the cohorts that comprise school-age youth in different levels of education. Employment for preschool teachers, for example, is projected to increase faster than total employment, or by 36 percent, because of the increased demand by working parents for child daycare services. The number of kindergarten and elementary school teachers is expected to grow about as fast as the average for total employment; this growth is because of rising enrollments that reflect the increase in births beginning in the late 1970's from the "echo" effect of the post-World War II baby boom. Employment for secondary teachers, however, is expected to grow more slowly than the average for total employment due to the small projected increase in enrollments from 1986 to 2000. The number of college and university faculty is projected to decrease by 4 percent because of the decline in college enrollments projected through 2000. Employment in the professional librarians occupation is expected to grow just slightly less than total employment, or by 13 percent; while the duties of librarians have become heavily automated, their work still requires extensive judgment. The number of counselors in education is projected to grow by 21 percent, as their duties are expected to extend beyond academic counseling into such areas as family relations and substance abuse.

Health diagnosing and treating occupations. Employment for health professionals is expected to grow rapidly (42 percent), adding over 1 million jobs by 2000. Job growth in the health industries where these workers are employed is projected to be among the fastest in the economy, except for the hospital industry, which is projected to grow more slowly than total employment. A variety of health practitioner occupations in the health industries are projected to grow faster than the average for total employment, including physical therapists (87 percent), optometrists (49 percent), and speech pathologists and audiologists (34 percent).

The projections show 2 million registered nurses in 2000, an increase of more than 600,000 jobs. The demand for registered nurses is expected to be particularly strong in hospitals, where, in response to cost-containment pressures, nurses will assume some of the duties previously performed by other health personnel. The number of registered nurses is projected to grow rapidly in physicians' offices, due to the increasing size of physician practices and more sophisticated medical technology, and also in nursing and personal care facilities to care for patients who are expected to have shorter stays in hospitals.

Employment for physicians and surgeons is projected to grow rapidly (38 percent), adding 188,000 jobs. Employ-

ment for physician assistants, a relatively small occupation, is projected to grow much faster than that of physicians. In addition, health maintenance organizations and other group practices are expected to use physician assistants to a greater degree.

Other professional workers. Most other professional occupations are expected to have average or above-average growth rates by 2000. Employment for lawyers is expected to grow about twice as fast as total employment, or by 36 percent, because of projected strong demand for legal services by individuals and businesses. Employment of social workers is expected to rise 33 percent due to the increased demand for social workers as mental health counselors and therapists.

Technicians. Health services, computer applications, research and development, and legal services will be areas of the economy where technician occupations are projected to experience large employment gains. The increase in employment for health technicians and technologists is expected to account for about half of the increase for total technicians—663,000 of the 1,403,000 jobs. The health technicians and technologists group contains occupations with duties ranging from cleaning teeth to administering electrocardiographs. The licensed practical nurses occupation is expected to have the largest numerical increase (238,000 jobs) among the health technicians, with many of these employed in nursing and personal care facilities that are expected to grow in response to an aging population. The radiologic technologists and technicians occupation is expected to have the second largest increase (75,000 jobs), with gains mainly in offices of physicians and in hospitals. The number of medical and clinical laboratory technologists and technicians is expected to increase by 57,000 jobs throughout the health industries and the number of dental hygienists is projected to increase by 54,000 jobs.

Employment for computer programmers is expected to grow rapidly by 70 percent, adding 335,000 jobs. Despite more effective programming tools, demand for software is expected to spur the growth because of the ever-expanding range of new applications for computers. Close to one-half of the job increase for computer programmers is expected to occur in the computer and data processing services industry. The remaining job increases for programmers are expected to be found throughout the economy.

The engineering and science technicians and technologists group is expected to gain 285,000 jobs. These workers are expected to realize healthy job gains in trade, services, and manufacturing. They perform testing, diagnose complicated problems with equipment, and assist scientists and engineers in research and development.

The paralegal personnel occupation is projected to be the fastest growing technician occupation and the fastest growing occupation overall, increasing by 104 percent. (See table 4.) Nearly all of its employment gain is expected in legal services where the paralegal workers assist lawyers.

Marketing and salesworkers. A rapid projected growth rate for the real estate industry is expected to have a favorable impact on employment for brokers (increasing by 44 percent) and appraisers (increasing by 41 percent). Other sales occupations that are expected to grow rapidly are travel agents (46 percent) and securities and financial services salesworkers (42 percent). The largest detailed occupation in the group—salespersons, retail—is projected to grow 34 percent and add more jobs than any other detailed occupation (1.2 million jobs by 2000). (See table 5.)

Administrative support occupations, including clerical. Office automation and other technological changes are projected to result in employment declines in several clerical occupations, including typists and word processors (14 percent); stenographers (28 percent); payroll and timekeeping clerks (12 percent); telephone central office operators (18 percent); telephone directory assistance operators (18 percent); procurement clerks (13 percent); data entry keyers, except composing (16 percent); and statistical clerks (26 percent). Other clerical occupations, however, are expected to increase because of rapid growth rates in the industries employing them or because of the difficulty in automating their duties. The number of real estate clerks, for example, is expected to grow by 39 percent; hotel desk clerks by 43 percent; brokerage clerks by 28 percent; receptionists and

Table 4. Fastest growing occupations, 1986–2000, moderate alternative

[Numbers in thousands]

Occupation	Employment		Change in employment, 1986-2000		Percent of total job growth, 1986-2000
	1986	Projected, 2000	Number	Percent	
Paralegal personnel	61	125	64	103.7	.3
Medical assistants	132	251	119	90.4	.6
Physical therapists	61	115	53	87.5	.2
Physical and corrective therapy assistants and aides	36	65	29	81.6	.1
Data processing equipment repairers	69	125	56	80.4	.3
Home health aides	138	249	111	80.1	.5
Podiatrists	13	23	10	77.2	0
Computer systems analysts, electronic data processing	331	582	251	75.6	1.2
Medical records technicians	40	70	30	75.0	.1
Employment interviewers, private or public employment service	75	129	54	71.2	.3
Computer programmers	479	813	335	69.9	1.6
Radiologic technologists and technicians	115	190	75	64.7	.3
Dental hygienists	87	141	54	62.6	.3
Dental assistants	155	244	88	57.0	.4
Physician assistants	26	41	15	56.7	.1
Operations and systems researchers	38	59	21	54.1	.1
Occupational therapists	29	45	15	52.2	.1
Peripheral electronic data processing equipment operators	46	70	24	50.8	.1
Data entry keyers, composing	29	43	15	50.8	.1
Optometrists	37	55	18	49.2	.1

information clerks by 41 percent; and interviewing clerks, except personnel and social welfare, by 45 percent. Furthermore, certain clerical occupations are expected to grow as a result of being favorably affected by technological change. The rising use of computers throughout the economy is expected to spur the demand for computer operators and peripheral electronic data processing equipment operators; these occupations are projected to grow by 47 percent and 51 percent, respectively. Also, the data keyers, composing, occupation is projected to grow by 51 percent, a result of the increasing use of computerized typesetting technology.

Service workers. This group is projected to have several rapidly growing occupations and add large numbers of new jobs. Near the top of the list are several health service occupations. The medical assistant occupation, with a growth rate of 90 percent, is projected to be one of the fastest growing occupations from 1986 to 2000 because of the growing acceptance of those workers as a cost-effective way to provide both clinical and clerical support to physicians and other health professionals. The number of home health aides is projected to grow by 80 percent due to a number of factors, mainly the growing elderly population and the continuation of the trend to provide medical care outside of the traditional hospital setting.

Other health service occupations with rapid projected rates of growth over the 1986–2000 period include physical and corrective therapy assistants (82 percent) and dental assistants (57 percent). Employment for nursing aides, orderlies, and attendants is projected to grow by 35 percent, adding 433,000 jobs by 2000; much of the employment growth of these workers is expected in the rapidly expanding nursing and personal care industry. In the slower growing hospital industry, however, employment in this occupation is expected to decline by 62,000 jobs due to cost-cutting efforts.

Employment for food preparation and service occupations is projected to grow by 37 percent, increasing by 2.6 million jobs. These workers are concentrated in eating and drinking places. This industry is projected to have the largest numerical job growth of all the industries in the economy from 1986 to 2000—nearly 2.5 million additional jobs. Occupational employment growth ranges from 17 percent for institution or cafeteria cooks to 46 percent for restaurant cooks.

The protective service workers group is projected to grow by 31 percent, or by 645,000 jobs. Within this group, the largest and most rapidly growing occupation is guards, with a projected increase of 48 percent. Their growth is expected to occur mainly in the protective services industry as more and more firms choose to contract out for protective services.

Another large service occupation with a sizable employment increase is janitors and cleaners (604,000 jobs), although the growth rate for the occupation will be about the average for the economy. More and more firms also are expected to contract out for janitorial services, rather than using their own employees for this work.

Table 5. Occupations with the largest job growth, 1986–2000, moderate alternative
[Numbers in thousands]

Occupation	Employment		Change in employment, 1986-2000		Percent of total job growth, 1986-2000
	1986	Projected, 2000	Number	Percent	
Salespersons, retail	3,579	4,780	1,201	33.5	5.6
Waiters and waitresses	1,702	2,454	752	44.2	3.5
Registered nurses	1,406	2,018	612	43.6	2.9
Janitors and cleaners, including maids and housekeeping cleaners	2,676	3,280	604	22.6	2.8
General managers and top executives	2,383	2,965	582	24.4	2.7
Cashiers	2,165	2,740	575	26.5	2.7
Truck drivers, light and heavy	2,211	2,736	525	23.8	2.5
General office clerks	2,361	2,824	462	19.6	2.2
Food counter, fountain, and related workers	1,500	1,949	449	29.9	2.1
Nursing aides, orderlies, and attendants	1,224	1,658	433	35.4	2.0
Secretaries	3,234	3,658	424	13.1	2.0
Guards	794	1,177	383	48.3	1.8
Accountants and auditors	945	1,322	376	39.8	1.8
Computer programmers	479	813	335	69.9	1.6
Food preparation workers	949	1,273	324	34.2	1.5
Teachers, kindergarten and elementary	1,527	1,826	299	19.6	1.4
Receptionists and information clerks	682	964	282	41.4	1.3
Computer systems analysts, electronic data processing	331	582	251	75.6	1.2
Cooks, restaurant	520	759	240	46.2	1.1
Licensed practical nurses	631	869	238	37.7	1.1
Gardeners and groundskeepers, except farm	767	1,005	238	31.1	1.1
Maintenance repairers, general utility	1,039	1,270	232	22.3	1.1
Stock clerks, sales floor	1,087	1,312	225	20.7	1.0
First-line supervisors and managers	956	1,161	205	21.4	1.0
Dining room and cafeteria attendants and barroom helpers	433	631	197	45.6	.9
Electrical and electronics engineers	401	592	192	47.8	.9
Lawyers	527	718	191	36.3	.9

Agriculture, forestry, and fishing workers. Although this group as a whole is projected to have an employment decline of 163,000 jobs, several detailed occupations are projected to have significant employment increases. The most important of these increases is for the gardeners and groundskeepers, except farm, occupation that is projected to gain nearly 240,000 jobs largely because of growth in lawn services and landscaping services for both individuals and businesses.

Occupations in farming are projected to account for most of the employment decline in this group. Employment for farmers is expected to decline by 332,000 jobs as small farms continue to be consolidated into larger ones. However, the process of farm consolidation is projected to lead to an increase in the number of jobs (47,000) for farm managers. Employment for farm workers is expected to decrease by almost 200,000 jobs as farming methods and equipment improve.

Blue-collar worker supervisors. The blue-collar worker supervisors occupation is expected to gain 144,000 jobs, an increase of only 8 percent. This slow growth rate is due mainly to the projected employment decline in manufacturing. However, small employment gains are expected in some manufacturing industries, including plastics, electronics, and commercial printing. Most of the growth in the blue-collar worker supervisors occupation is expected to occur outside manufacturing, especially in construction and services.

Construction trades and extractive workers. Employment for carpenters is projected to grow by about 18 percent, or by 182,000 jobs—the largest numerical increase among occupations in this cluster. Close to one-third of the gain is expected to occur among self-employed carpenters. The residential building and nonresidential carpentering and flooring industries are expected to add the bulk of the remaining jobs.

Employment in the electricians occupation is projected to grow by 89,000 jobs. Most of the increase is expected to occur in construction, which will more than offset job losses projected for electricians in manufacturing.

Employment for painters and paperhangers (construction and maintenance) is projected to increase by 90,000 jobs. More than 40 percent of this increase is expected among self-employed painters and paperhangers. The wage and salary worker increase is projected to occur in the construction, real estate, and services sectors.

Employment in the plumbers, pipefitters, and steamfitters occupation is projected to have an increase of 69,000 jobs, mainly occurring in construction.

Mechanics, installers, and repairers. The general utility maintenance repairers occupation is projected to have the largest job gain (232,000 jobs) within this job cluster, although the growth of 22 percent will be the same as that for total employment. A large part of the increase is expected in real estate and services, such as business services, hotels, nursing care, and education. Employment for bus and truck mechanics and diesel engineers is projected to grow by 63,000 jobs due to employment gains in trucking, repair services, and trade. Employment in the data processing equipment repairers group is projected to increase by 56,000 jobs, or 80 percent, the largest percentage increase of any occupation in the mechanics, installers, and repairers group. Most of the increase is expected in the machinery and equipment wholesale trade industry and in the computer and data processing services industry.

The number of automotive mechanics is projected to grow by 60,000 jobs, an increase of only 8 percent. This modest rate of increase is due to a decline in repair work done in gasoline service stations and from better design and workmanship in automobiles.

Precision production and plant system operators. The precision production and plant systems operators group is projected to experience little growth through the year 2000. The precision woodworkers occupation is expected to add 30,000 of the 134,000 new jobs for the group; the dental laboratory technicians and sheet metal workers occupations are expected to add 18,000 jobs and 19,000 jobs, respectively. The number of machinists is projected to drop by 5,000 jobs. Shoe and leather workers and repairers are expected to be one of the most rapidly declining occupations (17 percent) due to the projected declines in the shoe and leather industries.

Machine setters, set-up operators, operators, and tenders. This occupational group is projected to have the largest job decline, down 194,000 jobs. Employment for garment sewing machine operators is expected to decline by 14 percent, or by 92,000 jobs, as a result of the impact of technology and foreign imports on employment in the apparel industry. Other occupations expected to decline include textile drawout and winding machine operators (55,000 jobs); chemical equipment controllers and operators (22,000 jobs); and machine tool cutters, operators, and tenders (19,000 jobs). However, several occupations in this group are in industries that are growing and are expected to make modest gains: plastic molding machine operators and tenders (36,000 jobs), laundry and dry cleaning machine operators and tenders (31,000 jobs), and offset lithographic press setters and operators (23,000 jobs).

Assemblers and other handwork occupations. Employment in this group as a whole is projected to decline by 113,000 jobs as many tasks of the workers are automated. The increasing use of industrial robots, for example, is expected to cause electrical and electronic assemblers to be the fastest declining occupation with a projected loss of 54 percent (table 6) and to cause a more modest 7-percent decline for welders and cutters. The impact of technological change is expected to be less severe on precision assemblers as a group because current robots, which are expected to be used on a large scale in the 1990's, are not capable of performing more complex assembly tasks. The employment of precision assemblers, therefore, is expected to remain virtually unchanged from 1986 to 2000.

Transportation and material moving occupations. Employment in many occupations in this group is expected to decrease between 1986 to 2000 due to declining industry employment and technological changes. The railroad industry, for example, is expected to lose about 190,000 jobs, causing the number of rail transportation workers to drop by 37 percent. The number of water transportation workers is expected to decline by 8 percent as a result of the projected employment losses in the water transportation industries.

The greater use of automated materials handling equipment in factories and warehouses is projected to cause employment in the industrial truck and tractor operators occupation to decrease by about 34 percent. Employment in the truck drivers occupation, however, is projected to grow by 21 percent, increasing by more than half a million jobs between 1986 and 2000. Other occupations expected to have average growth rates include bus drivers, parking lot attendants, excavation and loading machine operators, grading machine operators, and operating engineers. The aircraft pilots and flight engineers occupation is projected to increase faster than the average for total employment, or by 29 percent.

Helpers, laborers, and hand material movers. Occupations in this group are generally expected to grow more slowly than the average for total employment except for the refuse collectors occupation, which is projected to have an average rate of growth through the year 2000. Declines in the machine feeders and offbearers occupation (6 percent) and freight, stock, and material movers occupation (2 percent) are expected as a result of technological changes.

Low and high projections

The distribution of employment by broad occupational group varies little among the projected alternatives for 2000 because of offsetting changes within the broad occupational groups. (See table 7.) In specific occupations, however, some significant differences may exist between the moderate and either the low or high alternatives. The differences in occupational employment from one alternative to another are caused only by differences in projected industry employment levels, because the same set of occupational staffing patterns were used for all alternatives. Total employment in the moderate trend projections varies by only about 4 percent from the high alternative and about 6 percent from the low alternative. Therefore, the greatest numerical differences for specific occupations exist between the low alternative projected employment and the moderate trend employment; the following text tabulation shows these differences:

Occupation	*Employment difference*
Salespersons, retail	216,000
Secretaries	188,000
General managers and top executives	145,000
Truck drivers, light and heavy	138,000
Janitors and cleaners	136,000
General office clerks	136,000
Cashiers	125,000
Bookkeeping, accounting, and auditing clerks	123,000
Blue-collar worker supervisors	113,000
Waiters and waitresses	94,000

Table 6. Fastest declining occupations, 1986–2000, moderate alternative
[Numbers in thousands]

Occupation	Employment		Percent decline in employment
	1986	Projected, 2000	
Electrical and electronic assemblers	249	116	−53.7
Electronic semiconductor processors	29	14	−51.1
Railroad conductors and yardmasters	29	17	−40.9
Railroad brake, signal, and switch operators	42	25	−39.9
Gas and petroleum plant and system occupations	31	20	−34.3
Industrial truck and tractor operators	426	283	−33.6
Shoe sewing machine operators and tenders	27	18	−32.1
Station installers and repairers, telephone	58	40	−31.8
Chemical equipment controllers, operators and tenders	73	52	−29.7
Chemical plant and system operators	33	23	−29.6
Stenographers	178	128	−28.2
Farmers	1,182	850	−28.1
Statistical clerks	71	52	−26.4
Textile draw-out and winding machine operators and tenders	219	164	−25.2
Central office and PBX installers and repairers	74	57	−23.1
Farm workers	940	750	−20.3
Coil winders, tapers, and finishers	34	28	−18.5
Central office operators	42	34	−17.9
Directory assistance operators	32	27	−17.7
Compositors, typesetters, and arrangers, precision	30	25	−17.1

Table 7. Occupational employment distribution, 1986 and projected to 2000

Occupation	1986	Projected, 2000		
		Low	Moderate	High
Total, all occupations	100.0	100.0	100.0	100.0
Managerial and management-related workers	9.5	10.2	10.2	10.3
Engineers, architects, and surveyors	1.4	1.6	1.6	1.6
Natural scientists and computer specialists	0.7	0.8	0.8	0.8
Teachers, librarians, and counselors	4.4	4.4	4.3	4.3
Health-diagnosing and treating specialists	2.3	2.8	2.8	2.8
Other professional specialists	3.3	3.5	3.5	3.5
Technicians	3.3	3.8	3.8	3.8
Marketing and salesworkers	11.3	12.3	12.3	12.2
Administrative support, including clerical	17.8	16.6	16.6	16.6
Service workers	15.7	17.3	17.2	17.1
Agriculture, forestry, and fishing workers	3.2	2.6	2.6	2.5
Blue-collar worker supervisors	1.6	1.5	1.5	1.5
Construction trades and extractive workers	3.6	3.6	3.5	3.6
Mechanics and repairers	4.2	4.0	4.0	4.0
Precision production and plant systems occupations	2.7	2.4	2.4	2.4
Machine setters and operators	4.4	3.5	3.6	3.6
Assemblers and other hand workers	2.4	1.9	1.9	2.0
Transportation and material moving workers	4.3	4.0	4.0	4.0
Helpers and laborers	3.8	3.4	3.4	3.4

Uses and implications

BLS occupational projections are used extensively for career guidance and provide the background for analyses of future employment opportunities in the BLS *Occupational Outlook Handbook*. Job outlook discussions in the 1988–89 edition of the *Handbook*, scheduled for release in the spring of 1988, will use the projections presented in this article. These projections also provide information for analyzing a variety of issues, including the relation of education and training to job opportunities and labor market conditions for minority groups.

Educational attainment. Much has been written to indicate that the changing occupational structure of employment

implies the need for a more highly educated work force. To see if the 1986–2000 occupational projections substantiate this view, the occupational clusters discussed previously were divided into three groups. Group I includes the clusters in which at least two-thirds of the workers in 1986 had 1 or more years of college. Group II includes the clusters in which the median years of school completed was greater than 12 and the proportion of those workers with less than a high school education was relatively low. Group III includes occupational clusters where the proportion of workers having less than a high school education was relatively high—more than 30 percent. Given that workers in any occupational cluster have a broad range of educational background, these three groups can only be based on the educational level of the majority of workers. Obviously, workers are employed in each of the groups at each of the educational levels.

The distribution of total employment in 1986 and projected 2000 employment for these three groups of educational attainment is shown in table 8. These data indicate that employment in the occupations requiring the most education, group I, is projected to increase as a proportion of total employment, while employment in the other two groups in which workers had less education will decline as a proportion of total employment. The proportion of total employment is expected to decline the most in group III, the group which requires the least amount of education. It should be noted that the service workers group—the only occupational cluster in the educational attainment group III with median school years completed above 12 years—is increasing as a proportion of total employment. All other occupational clusters in this group are declining (some by very significant amounts). Conversely, in group I, all the clusters are increasing as a percent of total employment except for the teachers, librarians, and counselors occupation.

Table 8. Employment in broad occupational clusters by level of educational attainment, 1986 and projected to 2000, moderate alternative

[In percent]

Occupation	1986	2000
Total, all groups	100.0	100.0
Group I, total	25.1	27.3
Management and management-related occupations	9.5	10.2
Engineers, architects, and surveyors	1.4	1.5
Natural scientists and computer specialists	.7	.8
Teachers, librarians, and counselors	4.4	4.3
Health diagnosing and treating	2.3	2.8
Other professional specialists	3.5	3.7
Technicians	3.3	4.0
Group II, total	40.8	40.0
Salesworkers	11.3	12.3
Administrative support, including clerical	17.8	16.7
Blue-collar worker supervisors	1.6	1.5
Construction trades and extractive workers	3.4	3.3
Mechanics and repairers	4.2	4.0
Precision production and plant systems workers	2.5	2.2
Group III, total	34.0	32.7
Service workers	15.7	17.2
Agriculture, forestry, and fishing workers	3.3	2.6
Machine setters and operators	4.5	3.6
Hand workers	2.4	1.9
Transportation and material moving workers	4.3	4.0
Helpers and laborers	3.8	3.4

Table 9. Projected 1986–2000 growth rate and percent of total employment in 1986 accounted for by blacks, Hispanics, and women, moderate alternative[1]

Occupation	Projected percent change, 1986–2000	Percent of total employment in 1986		
		Black	Hispanic	Women
Total, all occupations	19	10	7	44
Natural scientists and computer specialists	46	6	3	31
Health diagnosing and treating occupations	42	6	3	67
Technicians	38	8	4	47
Engineers, architects, and surveyors	32	4	3	7
Service workers	31	17	9	61
Marketing and salesworkers	30	6	5	48
Managerial and management-related workers	29	6	4	43
Other professional workers	26	7	4	43
Construction trades and extractive workers	18	7	8	2
Teachers, librarians, and counselors	16	9	3	68
Mechanics and repairers	15	7	7	3
Administrative, support, including clerical	11	11	6	80
Transportation and material moving workers	10	14	8	9
Helpers and laborers	6	17	11	16
Precision production and plant systems occupations	4	9	9	23
Machine setters and operators	−4	16	13	42
Assemblers and other handwork occupations	−4	13	11	38
Agriculture, forestry, and fishing workers	−5	7	10	16

[1] Does not include supervisors in construction trades and extractive workers; mechanics and repairers; precision production and plant system occupations; or assemblers and other handwork occupations.

Minority groups. Job opportunities for individuals or groups of workers are determined by a multitude of factors relating to the job market and the characteristics of workers. Consequently, in developing projections of employment by industry and occupation, BLS does not develop projections of the demographic composition of those jobs. However, data on the current demographic composition of jobs can be used in conjunction with projected change in employment to determine the implications of the employment projections. For example, projections can be used to see if future job growth is consistent with the labor market pattern for jobs currently held by blacks and Hispanics.

Blacks and Hispanics accounted for about 10 percent and 7 percent of employment in 1986, respectively. Although members of these two groups were employed in virtually every occupation, they were more heavily concentrated in certain occupational clusters. These occupational clusters are listed in decreasing order by projected growth rate in table 9. In general, the data show that both blacks and Hispanics account for a greater proportion of persons employed in the occupations that are projected to decline or grow more slowly than in those occupations that are projected to increase rapidly. It should be pointed out that the occupational clusters projected to decline or grow slowly are generally those requiring the least amount of education and training and those projected to grow the fastest require the most education and training. The only exception is the service workers cluster, which, as discussed previously, is growing rapidly.

In general, occupations having the fastest growth rates can be assumed to have the better opportunities for employment. For blacks and Hispanics to improve their labor market situation, they must be able to take advantage of those opportunities. The labor force projections discussed in the article by Howard Fullerton, pp. 19–29, indicate that blacks and Hispanics will make up 17.4 percent and 28.7 percent of the total labor force growth, respectively. Because, as noted earlier, the fastest growing occupations are those in which a high percentage of workers currently have postsecondary education, the data imply that improvements in educational attainment are important if blacks and Hispanics are to take advantage of the favorable job opportunities associated with these rapidly growing occupations.

The proportion of women employed in certain occupational clusters varies among the clusters. In general, however, women account for relatively high proportions of employment in the faster growing occupations with two exceptions. For natural scientists and computer specialists, the women's share of employment currently is low and the proportion of women employed as engineers, architects, and surveyors is very low (7 percent). Women tend to account for smaller proportions in the occupations projected to decline or grow slowly, except for the proportion of women employed as machine setters and operators.

In summary, occupations requiring the most education and training are projected to grow more rapidly than total employment. Women currently represent larger proportions of employment in those occupations than blacks and Hispanics. Therefore, among the three minority groups, employment opportunities for women are expected to be the most favorable. □

FOOTNOTES

[1] Data from the 1983, 1984, and 1985 Occupational Employment Statistics (OES) surveys, the most current for each industry in the economy when the projections were developed, were used to develop 1986 occupational staffing patterns for industries covered by the matrix. Staffing patterns for other industries were derived from the 1986 Current Population Survey. For more information concerning the development of the National Industry-Occupation Matrix, see *Employment Projections for 1995: Data and Methods*, Bulletin 2253 (Bureau of Labor Statistics, 1986). For more information concerning the OES survey program, see *BLS Handbook of Methods*, Bulletin 2134–1 (Bureau of Labor Statistics, December 1982).

[2] The 1986 and projected 2000 occupational distributions in each of the 258 detailed matrix industries were multiplied by estimates of total wage and salary worker employment in each year. Estimates of self-employed and unpaid family workers by occupation for 1986 and projected 2000 were developed at the total (all industry) level based on data in the Current Population Survey. They were added to the sum of wage and salary worker employment to derive estimates of 1986 and projected 2000 total employment by occupation for the economy.

[3] In the National Industry-Occupation Matrix, State and local government workers in education and health service industries are included in the services industry division, not in government.

Part II. Methods

Overview

BLS develops and publishes 10- to 15-year projections of the U.S. economy on a 2-year cycle, with the initial results usually published in the fall of odd-numbered years. The projections cover the labor force, aggregate economy, final demand, output by industry, employment by industry, and employment by occupation. In recent years, alternative projections have been made based on differing assumptions with regard to basic economic activity—such as the level of business investment or the path of government spending.

The basic principles underlying the procedures used to develop the projections have remained constant over the years, but many changes in procedures have been made as new series of data become available and as statistical tools improve. The current methodology has been relatively unchanged since the late 1970's.

Projections are made from a base year to a target year. The base year is the latest year for which acceptable data are available at the time the projections are being developed. The base year for these projections was generally 1986 except for final demand, for which 1985 was used since 1986 data were not available. The projections, except for the labor force, do not attempt to measure year-to-year change; they only project levels of economic activity for the target year. The BLS projections are developed in a series of six steps or stages, each of which is based on a separate model: (1) labor force, (2) aggregate economy, (3) industry final demand, (4) input-output, (5) industry employment, and (6) occupational employment. While each of these steps is taken separately, they are closely interrelated, the results of one usually being needed for the next; the third and fourth steps, in particular, are very tightly interwoven. (See chart 1.) Details on the data used in each model and the methods used for each projection appear in later pages; however, some general comments follow with regard to assumptions, procedures, presentation, and limitations of the projections.

Assumptions and procedures

The development of projections requires analyzing large amounts of historical data, analyzing trends, and determining a likely course for those trends in the future. Users of BLS projections, like the users of any projections, need to be aware of the underlying assumptions and should consider the projections as likely outcomes in the light of those assumptions and current and expected trends.

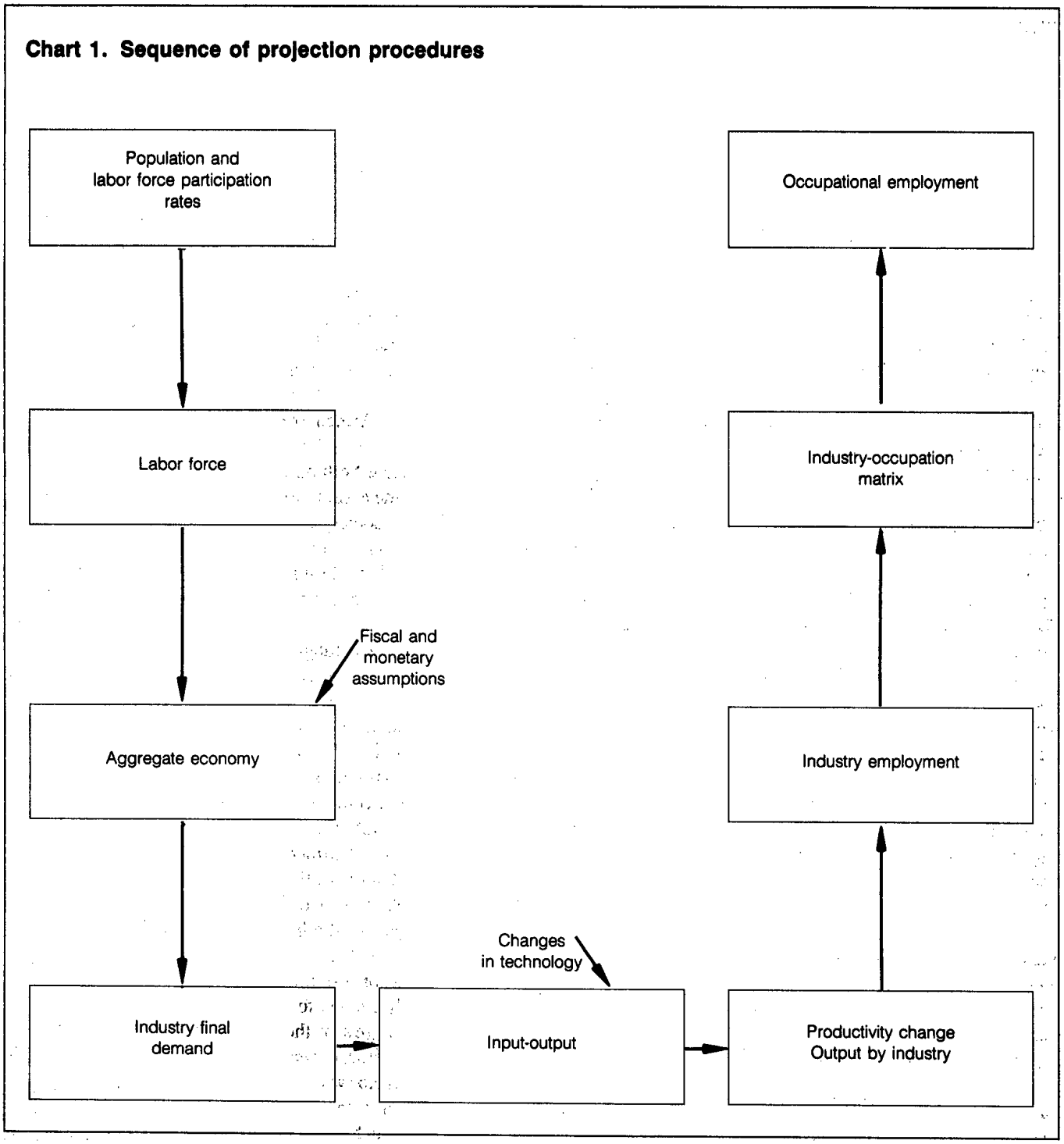
First, some assumptions are made concerning general economic or social conditions. For the projections for the year 2000, these included the following: (1) work patterns will not change significantly over the projection period; for example, the average workweek will not change markedly; (2) broad social and educational trends will continue; (3) there will be no major war; (4) there will be no significant change in the size of the Armed Forces; and (5) fluctuations in economic activity due to the business cycle will occur. These assumptions have both an overall and a particular impact. For example, the assumption that social trends will continue implies that our society will continue to provide for the education of the young in a way which is broadly similar to current practices. This, in turn, influences the projected level of local government expenditures and the demand for teachers.

Second, particular ranges in the target year are set for certain variables, such as unemployment—a factor that obviously affects the figure for total employment and, indirectly, the employment in each industry and occupation. The projections are particularly sensitive to target ranges of variables such as real gross national product (GNP), the GNP deflator, real disposable income, the civilian labor force, civilian employment, real output per person, and the unemployment rate. For this set of projections, BLS specified three alternatives rather than one, thus generating three scenarios, or projected levels of economic activity, for the target year.

Third, analysis of the historical data calls for judgments as to influences on the past rate of change that will become more important or less important in the future. During the 1970's and early 1980's, for example, employment of cashiers in retail stores grew at the expense of other sales occupations as these stores centralized their cashier services. However, this factor will no longer cause changes in the kinds of workers retail stores hire, in the judgment of BLS analysts, because most such stores now have centralized cashier operations.

To insure the consistency of the six models and the many assumptions and variables, the BLS projection procedure encompasses detailed review and analysis of the results at each stage for reasonableness and consistency. Preliminary projections made in each step are reviewed by both the analysts who work primarily on that projection and analysts who work primarily on other steps. As a result of detailed analyses, the models are rerun and reanalyzed several times until, in the judgment of the BLS staff, projections that are both reasonable and internally consistent are achieved for the en-

Chart 1. Sequence of projection procedures



tire system. In short, the final results reflect innumerable interactions among staff members who focus on particular variables in the models.

Presentation

The projections are first published in the *Monthly Labor Review*, usually in the fall of odd-numbered years, and subsequently appear in BLS bulletins and the *Occupational Outlook Quarterly*, which also prints articles on such topics as new and emerging occupations and changing job market conditions for existing occupations.

The projections described in this bulletin were first released in summary form in a news release in June 1987 and then described more fully in a series of articles in the September 1987 *Monthly Labor Review*, reprinted here in part I. The projections also are discussed in the *Occupational Outlook Handbook, 1988-89 Edition*, and *Occupational Projections*

and Training Data, 1988 Edition. The *Occupational Outlook Handbook* discusses more than 200 occupations; besides outlook data, it includes information on the nature of the work, training requirements, working conditions, and earnings. The *Handbook* is available in the vast majority of career information centers in the country's high schools, colleges, and libraries, where it is used as a primary source of information for people in the process of choosing a career. *Occupational Projections and Training Data* presents detailed statistics on employment, job openings, and education and training completions; most of the data are for the occupations included in the *Handbook.*

BLS also releases data in machine-readable form. Computer tapes are prepared containing historical and projected input-output data, historical and projected industry data, and occupational projections. Diskettes for use with Lotus 1-2-3 on an IBM-compatible personal computer contain industry data on output, total employment, wage and salary employment, and total hours. An order form for both tapes and diskettes appears at the back of this publication.

Limitations

Because of the nature of projections, misunderstandings may arise between users, who feel the need for exact numbers, and producers, who recognize their inability to predict with such precision. Such conflicts are all the more likely because the models used to develop the projections provide numerical answers to specific questions. Users are inevitably tempted to attribute to those numbers an exactness which they should not be accorded. The translation of analytical judgments, such as those concerning the impact of a specific technology on the need for workers with specific skills, into numerical estimates is especially subjective. For example, most analysts would agree that the use of robots and other computer-controlled machinery will affect employment in manufacturing industries. Yet numerical estimates of the reduction in the proportion of assemblers and welders in an industry affected by this equipment could vary significantly among analysts. The Bureau attempts to address this dilemma by making clear all of the important assumptions underlying its projections, by developing alternative versions that reflect some of the uncertainties and differing policy decisions about the future, and by making projections on a regular 2-year cycle in order to incorporate new data and assumptions.

The Bureau also seeks to improve the projections process and to make users aware of their limitations by reviewing previous projections.[1] Once the target year is reached, BLS evaluates the projections to determine the errors and to learn what changes in assumptions or models might have made them more accurate.

[1] See, for example, John Tschetter, "An Evaluation of BLS's Projections of 1980 Industry Employment," *Monthly Labor Review*,. August 1984.

Labor Force

The labor force projections, the first step in the BLS projections sequence, depend upon an analysis of the current population and projections of its future size and composition, and also on the trends in labor force participation rates for the different population groups. Projections are made for the labor force as a whole and for 96 separate age-sex-race groups and for 16 age-sex groups of people of Hispanic origin.

Data sources

Projections of the labor force require projections of the population and data on labor force participation. The Bureau of the Census prepares population projections by age, sex, race, and Hispanic origin based on trends in birth rates, death rates, and migration. BLS develops data on participation rates based on the Current Population Survey (CPS), conducted for BLS by the Bureau of the Census.

Methods

Various assumptions can be made for population growth and labor force participation. The size and composition of the population are affected by the interaction of three variables: Births, deaths, and net migration. The Bureau of the Census prepares 30 possible scenarios for these variables.[2] For this round of projections, BLS selected two population estimates—the middle and high migration scenarios—as the basis for its labor force projections.

Three separate projections of the labor force were prepared. The middle labor force scenario was based on the middle population projection and assumed labor force participation growth comparable to past years. The high growth labor force scenario assumed more rapid growth in net migration and thus a higher population than the middle but the same participation rates. The low growth scenario assumed the same population as the middle version but lower participation rates.

The labor force participation projection for each age-sex-race group and for each group of Hispanic origin was developed by analyzing past rates of growth for that group and extrapolating to the target year.

Cross-sectional and cohort analyses were also conducted for each group. In cases where these analyses showed inconsistencies, the participation rate extrapolated from the time-series data was modified. The modification was greatest for black women and smallest for white men.

At each stage, the results for specific groups were reviewed and modified if not consistent with those for other demographic groups. The projected participation rate for each age-

[2] See *Projections of the Population of the United States: 1983 to 2080,* Current Population Reports, series P-25, No. 932. (Bureau of the Census 1984).

sex-race group was then multiplied by the corresponding population projection to obtain the labor force projection for that group. The groups were then summed to obtain the total civilian labor force.

Aggregate Economy

Data sources

Projections of the aggregate economy—the second stage in the BLS projection procedures—are made through use of a macroeconomic model, referred to as the macro model. The labor force projections made in the first stage of the BLS procedure are used along with many other variables to develop projections of GNP and major categories of demand and income. Because the variables are so numerous, sources of data are manifold. They include BLS itself, the U.S. Departments of Commerce and Energy, the Federal Reserve Board, and Wharton Econometric Forecasting Associates, Inc.

Methods

For the past few cycles of projections, BLS has used models of the economy—which are basically sets of equations that correlate different aspects of the economy with each other—created by other organizations. The specific equations used in a model may differ, but they work in similar ways to provide a framework for the preparation of a consistent set of economywide projections for a given set of assumptions and goals. The 1986-2000 projections were based on a macro model created by Wharton Econometric Forecasting Associates, Inc. The macro model is a system of behavioral relationships and identities based on annual data and designed to allow an analyst to explore the determinants of growth in the U.S. economy. Made up of approximately 2,400 equations, the macro model is driven by a set of 900 exogenous variables—arithmetic values that can be manipulated by the equations in the macro model. BLS specifies the value of these variables.

The exogenous variables can be divided into three groups, according to the degree of certainty to which each can be determined. Reliable, generally accepted values are available for some variables, such as the future size of the population; Census population projections have proven to be highly accurate. Other variables involve policy decisions that, while subject to change, have remained fairly constant for many years; these include the amount of Federal transfer payments, the response of the monetary authority to economic growth, and the size of the Armed Forces. Finally, some exogenous variables do not follow predictable relationships; these include the inflation rates in the economies of the major trading partners of the United States, the exchange value of the U.S. dollar, and energy prices.

Besides being governed by general assumptions, the projections are generally approached with certain goals or targets in mind. Because the goals relate to variables that are, strictly speaking, results of the aggregate model rather than inputs to it, they are attained by changes to the structure of the model itself. Such goals or target variables include the unemployment rate, the rate of growth of labor productivity, inflation, and the sectoral distribution of employment.

Once the value of each variable has been determined, the macro model is run, that is, the equations are solved, producing projected values for numerous kinds of economic activity, such as GNP, purchases of consumer goods, and capital investment. BLS analysts review the aggregate results for soundness of logic and reasonableness. The review includes checks on internal consistency, evaluation of continuity with past trends, and comparisons with projections made by other organizations. Although the review tends to focus on such items as GNP, unemployment, and productivity, the macro model's framework ensures that other important measures of economic performance are not overlooked.

Industry Final Demand

Projections of final demand are made in the third stage of the BLS projection procedures. Final demand is one way to view GNP; it is GNP distributed among final users, broadly categorized into four groups: (1) personal consumption expenditures (PCE), (2) investment, (3) foreign trade, and (4) government purchases.

(1) PCE represents demand on the part of persons and certain nonprofit institutions. Rent and the imputed rental value of owner-occupied dwellings are included in this category, but the purchase of dwellings is classified as residential investment.

(2) Investment includes both fixed capital goods—the purchase of durable equipment and structures—and the value of the change in business inventories of raw materials, semifinished goods, and finished goods.

(3) Foreign trade includes both exports and imports. These are analyzed separately; imports are subtracted from exports at the final stage of the projections procedure to derive domestic production.

(4) Government demand is defined as the goods and services purchased by all government units—local, State, and Federal. It does not include transfer payments such as those made in the Social Security program, interest, grants, or subsidies, all of which are accounted for under personal consumption expenditures, government purchases, or capital investment.

Final demand is one of the determinants of output by industry, which in turn determines the distribution of employment. Because the purpose of production is the satisfaction of demand, variation in the demand for goods and in the means of producing these goods changes the level and distribution of employment over time.

Data sources

In general, projecting final demand entails the compilation of historical data in a form that helps determine the industry distribution of the economy for some future year. BLS uses "bridge" tables and bills of goods that show the industry composition of final demand components in order to perform this analysis.

Large amounts of data in various forms are available to analyze past trends in the industry composition of final demand. Much of it is provided by the Bureau of Economic Analysis (BEA) of the Department of Commerce. Although considerable data are collected annually, the creation of a bill of goods in its most complete industry detail requires data that are available only from the economic censuses, conducted every 5 years, and BEA only produces a bill of goods for those census years. The historical series depends heavily, therefore, on the census years; more recent economic trends are incorporated into the projections through supplementary data series.

Besides the economic censuses, BLS analysts use several series of data produced by the Department of Commerce in order to develop a historical data base. Personal consumption expenditures are compiled by BEA in the National Income and Product Accounts (NIPA); they are available annually from 1929, disaggregated into more than 80 components. BEA also produces a bridge table for each year in which an economic census is held; the bridge table distributes the more than 80 PCE categories among over 500 producing industries. The principal source of data for capital investment is also the NIPA's annual data, which yield information on both durable goods and structures. A capital flows matrix, also produced by BEA for the years in which there is an economic census, distributes investment by industry to the producing industry. For foreign trade, plentiful data on exports and imports are available in the detailed merchandise trade statistics published annually by the Bureau of the Census. Data from the Department of Commerce and from specialized surveys allow for the construction of bills of goods for government demand.

Methods

In order to project final demand, the same kinds of judgments and assumptions must be made as those that enter into the macro model. For some components, the data available permit reasonable certainty. For example, the demand for education, a significant factor in State and local government demand, reflects the projected age structure of the population. Similarly, demand for residential construction depends heavily on demographic and income forecasts. Judgments must also be made, however, with regard to the effect of technological developments—such as computers and robots—and other factors for which data are less reliable.

The initial projections of various categories of final demand generated by the early runs of the macro model provide a starting point for the analysts, who must study all aspects of demand to insure that the models remain balanced and consistent throughout the development of a new set of projections. Although the four categories of final demand—personal consumption expenditures, investment, foreign trade, and government—are subject to different procedures, each makes use of bridge tables that relate final demand categories to producing industries.

The latest bridge tables, developed by BEA for 1977, were used as an initial estimate of the projected bridge table. Projected bridge tables were then created by BLS for 226 industries; most are at the 3-digit SIC level. The projected bridge tables reflect such factors as expected changes in technology, consumer tastes or buying patterns, the industrial pattern of exports and imports, and the future composition of each industry's investment. Thus, the bridge tables allow the analyst to provide for shifts in the industrial makeup of a given demand category. Having the data at this level of allocation allows finer adjustment for technological and economic change.

Personal consumption expenditures are initially projected by the macro model for 17 major spending groups. For the latest set of projections, a regression model, which disaggregates the 17 major groups into a lower level of the NIPA's detail of 82 categories, was used as a submodel. Each of the 82 detailed product categories was then distributed to its component industries through a projected bridge table. For this current set of PCE projections, the focus was on the 17 major spending groups projected in the macro model. Each of the 17 groups was reviewed and then modified to reflect technological and economic assumptions as well as industry trends that are expected to continue over the projected time span.

Capital investment is initially projected by the macro model, which generates values for total investment in durable goods and new structures for the whole economy and then distributes these figures among aggregate industries. These investments by purchasing industries in durable goods and new structures are converted into the producing industries by use of the BEA capital flows tables. The results are then carefully reviewed and modified to reflect expected changes in technology or other factors. Changes that result from these reviews may necessitate complementary adjustments in other parts of the macro model. Adjustments to the macro model also have to reflect changes in inventories.

Foreign trade is initially projected by the macro model, which generates values for 12 subcategories of total exports and imports. These values are distributed across the 226 industries in the light of past trends, existing and expected shares of the domestic market, expected world conditions, and trade agreements. Once this distribution has been made, it is reviewed by the staff and adjustments made as necessary. Total imports are divided into two categories: those competitive with domestic products and those that have no domestic counterparts, such as coffee and diamonds. Competitive imports are subtracted from final demand in order

to derive domestic output. For example, the projected value of imported automobiles is subtracted from total demand for autos so that the demand-for-autos component of the macro model will reflect domestic products only. Noncompetitive imports are considered purchases of the industry that uses them; some noncompetitive imports that do not need any processing, such as bananas, are only included in the final user category.

Government demand is initially projected by the macro model for six categories: State and local education; State and local health, welfare, and sanitation; State and local safety; State and local other; Federal defense; and Federal nondefense. Projections of the size of the government labor force—State and local, Armed Forces, and Federal civilian—are also made at earlier stages of the BLS projection process. Consequently, the analyst is able to project at this stage the compensation that governments will provide their employees and to subtract this amount from the value of total government demand. The remainder is then distributed across other industries in the economy by means of a bridge table.

Input-Output

The creation of an input-output model is the fourth stage of the BLS projection procedure. Each industry within the economy relies on other industries to supply inputs—intermediate products or services—for further processing. The input-output model insures consistency between demand estimates and output estimates and permits analysis of technological change and product substitution.

The components and support services that enter into a product are frequently produced by industries other than the one that provides the final product. For example, an automobile is a final product and its value is part of the final demand model. However, the carmaker must purchase steel, glass, electricity, secretarial assistance, and financial services in order to produce the automobile; these intermediate products do not explicitly appear in the final demand model. The input-output model does show these purchases by the carmaker. Analysis of such interrelationships results in a more precise projection of each industry's production than is possible from the projection of final demand alone. This, in turn, allows for a better projection of employment by industry.

In addition to allowing the examination of technological change, the input-output model makes possible the analysis of changes in demand for secondary products of an industry. In the historical data, establishments are grouped into industries according to their primary product—those goods or services that produce the largest part of its revenue. Many establishments, however, produce more than one product. The input-output model enables analysts to look at changes in output for all the products of an industry and in all the industries that sell a product, allowing for projected changes in demand to be made proportionately across all relevant industries.

Data sources

Historical data prepared by BEA, projections of final demand developed in the third stage of the procedure, and studies of particular industries and commodities are all needed to produce the input-output model. BEA creates historical input-output tables based on data contained in the Census of Manufactures and other economic censuses. The latest official table available from BEA is for 1977. Because this table is somewhat outdated, BLS used data from more recent surveys and other sources in order to construct input-output tables for 1982 and 1985. These tables reflect changes which have occurred since 1977.

Methods

The BLS input-output model consists of five matrices, or tables. The "use" table shows the sales in dollars of each commodity to every consuming industry and to final demand; rows sum to commodity output and columns to industry output. The "make" table shows, in dollars, the production of commodities by each industry; rows sum to industry output and columns sum to commodity output. The direct requirements table presents the values from the "use" table as coefficients. The market shares matrix presents the values from the "make" table as coefficients. The total requirements table combines data from the direct requirements table and the market shares matrix; it shows total requirements—direct and indirect—to produce a dollar of final demand.

BLS uses the historical tables in coefficient form to project input-output relationships. Throughout the projection process, the coefficients used for the projected input-output matrices may be changed for several reasons, such as technological developments, changes in product mix or relative prices, and the availability of substitute inputs. The coefficients can be analyzed and adjusted to insure that they reflect the best information available and are consistent with other projections. As with the other steps, several reviews and interim projections are required before the final matrices are produced.

Industry Employment

The fifth stage of the projection procedure is the analysis of trends in industry output and employment. Fast-growing and declining industries are identified, and employment is projected for each of more than 200 industries. Industry employment is projected through the use of a labor model, developed by BLS, that correlates productivity with industry output. An equation is specified for each industry, relating the demand for labor in that industry to the output of the industry and to certain other economic variables.

Data sources

Historical data for the industry employment model are developed from a wide variety of sources. Time series on output (in constant dollars) for manufacturing industries are estimated from the Annual Survey of Manufactures conducted by the Department of Commerce and from BLS industry and producer price indexes. For nonmanufacturing industries, the sources for the output and price data are very diverse; they include NIPA, the *Service Annual Survey*, IRS data on business receipts, *Agricultural Statistics, Minerals Yearbook*, transportation statistics, and numerous others. Time series on employment and hours are derived from three BLS sources for different groups of workers: the Current Employment Statistics survey (or establishment survey) for nonagricultural wage and salary employment, production worker employment, and weekly hours; the Current Population Survey, (or household survey), for agricultural employment, self-employed and unpaid family worker jobs and hours, and private household workers; and unemployment insurance data for employment in industries not covered in the establishment survey.

Projected data for this model come from the macro, input-output, and final demand models. In particular, projections of capital, ratios of output to capital, capacity utilization, the average workweek, and total wage and salary employment in durable goods manufacturing, nondurable goods manufacturing, and nonmanufacturing come from the macro model. Projections of industry output come from the final demand and input-output models.

Methods

The BLS labor model contains, for each of more than 200 industries, a regression equation that estimates worker hours as a function of four factors: Industry output, aggregate capacity utilization (as approximated by the unemployment rate), the relative price of labor, and a technological variable as approximated by the ratio of output to capital. Worker hours are then divided by projected average annual hours, yielding the projected number of wage and salary jobs for each industry. Estimates are then made, based on analysis of individual industries and on time series regressions, for the self-employed and for unpaid family workers.

Many adjustments are made while the projections are being developed. Adjustments are usually required in situations such as the following: An industry does not operate near the conditions of maximum profit, historical and projected trends diverge widely, the output and employment time series data are inconsistent, new technology is expected, or the labor productivity trend implies negative employment. Besides the general assumptions that govern the macro model, specific assumptions may be made for selected industries in order to project employment. For example, productivity in a particular industry may be assumed to equal, exceed, or fall short of the value determined by the labor model. Other assumptions that affect many industries also have to be made; recently, for example, an assumption has been made that new capital spending would be devoted in large part to high-technology innovations. For a detailed review of the specific assumptions made for the projections for the year 2000, see part III.

Adjustments to the labor model's initial estimate of productivity change are based on detailed analysis of historical and recent trends, special industry studies conducted by the staff, and industry technology studies from the Bureau's Office of Productivity and Technology. In order to make all these adjustments and to balance total employment from the aggregate projections with the sum of the industry employment projections, a number of iterations of the process are necessary.

Occupational Employment

The final stage in the BLS projection procedure is the development of occupational projections. To generate these data for wage and salary workers, an industry-occupation matrix, or table, showing the distribution of occupational employment by industry is constructed for the base year and projected to the target year. Base-year data are also developed for self-employed workers and unpaid family workers. The projections for these workers, however, are made for the economy as a whole rather than by industry. The three classes of workers—wage and salary workers, self-employed, and unpaid family workers—are summed to derive the projections for each occupation. The 1986 matrix, which was projected to the year 2000, includes more than 400 occupations in 236 industries.

Data sources

In order to project occupational employment, data are needed on staffing patterns of wage and salary workers by industry, employment of wage and salary workers by industry, and on self-employment and the employment of unpaid family workers.

Information on industry staffing patterns of wage and salary workers is available from several surveys. The Occupational Employment Statistics (OES) surveys conducted periodically by State employment security agencies under a BLS-State cooperative program provide information for all but a few industries. Information on agriculture and private household industries is available from the CPS and the Decennial Census of the Population. Economywide data on self-employed and unpaid family workers are also derived from the CPS and the decennial census. Information on staffing patterns for the Federal Government is developed by BLS from data compiled by the Office of Personnel Management (OPM).

Methods

Disaggregation and aggregation. Occupations in the

industry-occupation matrix are classified according to the system used in the OES surveys, which is compatible with the *Standard Occupational Classification (SOC) Manual*. It is very similar to the system used for the census and the CPS. The OES survey, however, compiles data for broader groups of occupations in some industries. The development of economywide employment estimates for the detailed occupations in these industries requires disaggregation of the broader survey data. Data from the decennial census are used for these adjustments.

Adjustments also have to be made for the industries that are not included in the OES: Agriculture, private households, and Federal Government. For example, the occupational classifications used by OPM are more detailed than the SOC, necessitating the aggregation of many occupations to make them comparable to the classification used in the matrix. Similarly, estimates of employment for self-employed and unpaid family workers derived from the CPS and decennial census must be adjusted to make them comparable to the other data in the matrix.

Once all these data have been reviewed, they are arrayed in a matrix that shows occupational employment distributed in percentages by industry. These percentages, however, are derived from surveys conducted in different years on a 3-year cycle. The percentages are, therefore, applied to total industry employment estimates for the base year in order to develop occupational employment estimates for the base year.

To develop estimates for 1986, data from the following survey rounds were used: 1983 surveys of manufacturing industries and hospitals; 1984 surveys of mining, construction, finance, and services; and 1985 surveys of wholesale and retail trade, regulated industries, and State and local governments. The ratios of occupational employment to total employment in each detailed industry covered by the surveys were applied to 1986 total employment estimates derived from the Bureau's Current Employment Statistics program. Annual average employment estimates for agriculture and private households were obtained from the 1986 CPS. Employment by occupation in the Federal Government for 1985 was obtained from the Office of Personnel Management and benchmarked to 1986. To derive the 1986 estimates of total employment by occupation, the detailed cells of the industry-occupation matrix were agregated across all industries and added to estimates separately derived for self-employed and unpaid family workers by occupation.

Projections. When a matrix for the base year has been developed, a projected matrix for the target year can be made. Changes in staffing patterns must, of course, be allowed for in the projections. This is done in several ways. Historical data are reviewed to identify trends; factors underlying the trends are identified through analytical studies of specific industries and occupations, technological change, and a wide variety of economic data; and judgments are made as to how the pattern will change. Factors underlying change are numerous, including technological developments affecting production and products, innovations in the ways business is conducted, modifications of organizational patterns, responses to government policies, and decisions to add new products and services or stop offering old ones.

Some expected trends may not be evident in the historical data. For example, an analysis of the past would not point toward the future impact of robots on staffing because this technology has not been used much in most industries. However, robots are expected to have a significant impact on some occupations, especially in the automobile industry. Information of this nature is identified by studies conducted by the BLS Office of Productivity and Technology and other organizations.

The industry-occupation matrix can display either the number employed or coefficients that show the proportion of workers in an industry that work in each occupation. The matrix of coefficients is used to project the staffing pattern of an industry. The change projected for a specific occupation may be small, moderate, or significant; the precise percentage reflects the judgment of the staff members based on the analyses described above that relate to that occupation. Part III of this bulletin provides detail on the assumptions developed for each of the occupations for which changes to the initial coefficients were made.

The projected coefficients to the year 2000 are multiplied by projected estimates of total employment by detailed industry. The individual cells of the matrix are than summarized across all industries and added to estimates separately projected for self-employed and unpaid family workers by occupation to derive the projected 2000 estimates of total employment by occupation.

Several versions of the projected matrix are developed during the projection procedure. Each version is reviewed by members of the staff preparing the *Occupational Outlook Handbook* and economists working on other steps in the projection program; these reviews insure that all information available to the staff is brought to bear on the projections and that consistent assumptions are made for all the Bureau's projections. Knowledgeable people outside the Bureau are also asked to comment. The final matrix represents, therefore, a broad consensus on the part of all analysts working on the projections.

Part III. Assumptions for Specific Industries and Occupations

Industry Assumptions

Several overall assumptions were made to override the initial results of the final demand models, the input-output projections, and the labor model. One of the most important for employment was a general assumption of higher productivity growth than in the recent past. This assumption was based on projections of lower real interest rates and a stable, noninflationary economy, which lead to a projection of a strong increase in investment spending for capital equipment. This new capital equipment, in turn, leads to higher productivity growth, especially in manufacturing.

It was assumed that much of the new capital spending would be for high-technology innovations, such as the new, highly engineered, computer-controlled production systems already in use in some industries. These flexible production lines allow much greater automation for processes such as welding, fastening, materials handling, painting, assembly, and inspection, The "just-in-time" inventory method, assisted by computer control, was also assumed to become more widespread. The computer was assumed to play an increasing role in offices as will as in factories. Computerized recordkeeping and office automation were projected to become even more diffused than they are now.

It was also assumed that gradually improving exchange rates would result in more favorable foreign trade balances. Finally, it was assumed that a slowdown in defense purchases would affect to some extent the growth in private sector demand.

In addition to the general assumption about a major shift to these new technologies in all industries, specific industry assumptions were made to further adjust the initial results of the various model projections. There additional industry-specific assumptions are described in detail in table 1.

Table 1. Specific industry assumptions for 2000 projections

Industry	Assumptions
Agricultural products	Moderate growth is anticipated. Demand is largely from the food products industries. Personal consumption will increase slowly, and some growth in exports is anticipated.
Agricultural services, forestry, and fishing	Assumes substantial growth in consumption of fish, which will increasingly replace meat for health reasons. Demand for services will be strong.
Metal mining	Declines in domestic metal industries such as steel, copper, and aluminum will cause decline in metal mining.
Coal mining	Increased use of coal as a fuel for the generation of electricity. Production assumptions based on Department of Energy forecasts.
Crude petroleum, natural gas, and gas liquids	Efficiency in the use of energy as well as advances in the production and transmission of electricity will keep petroleum demand at moderate levels. Foreign sources are projected to supply an increasing amount of demand; domestic production is projected to decline. These assumptions are based on Department of Energy forecasts.
Oil and gas field services	Increases in the price of petroleum will encourage modest increases in the exploration of domestic sources.
Nonmetallic minerals, except fuels	Growth in the construction industries will translate into growth for the products of this industry.
New nonfarm housing	Single and multifamily housing construction will slow from rates of early 1980's because of the expected slowdown in new household formation.
New farm housing, alterations,	As family-owned farms continue to diminish, expenditures on farm housing also will drop.
New industrial buildings	Slow growth projected for new factory construction. Modernization of existing facilities will be more prevalent.
New commercial buildings	Office and other commercial buildings are expected to recover from recent oversupply, but future growth will be slower than during the building boom of 1983-85.
New educational buildings	After years of decline, new school construction will swing upwards at a modest pace, reflecting growth in the school-age population.
New hospitals and institutions	Increases expected in nursing home construction. All growth will occur in the private sector; cutbacks expected in public hospital construction.
New communications facilities	Competition in the communications industry will lead to increases in the construction of new facilities.
New electric utility facilities	Expenditures expected to move upward following 1979-84 cutbacks.
New water supply and sewer facilities	Some increased demand for sewage treatment plants and waste disposal facilities was assumed.
New gas utility and pipeline facilities	No growth assumed in new construction from the 1986 level.
New roads	Replacement of aging bridges and highways will lead to some growth in road construction.
New local transit facilities	No growth expected; assumed to remain at 1985 level.
New conservation and development facilities	Government and private spending to continue a slow decline.
New nonbuilding facilities, nec	Less government spending, especially for military facilities, outweighs higher private spending, particularly for airports; net result will be very slow growth.
Maintenance and repair construction	Increases in State and local spending for repair of infrastructure and a substantial increase in intermediate demand will result in sizable output growth.
Logging camps and logging contractors	Growth in the wood and paper products industries as well as increases in residential construction will lead to increased demand for logging.
Sawmills and planing mills	Growth in construction will lead to moderate growth in this industry.
Millwork and structural wood members, nec	Structure of industry does not permit extensive automation. Demand for this industry's products depends mainly on new residential construction and the repair/remodeling sector; new home construction projected to slow.

See note at end of table.

Table 1. Specific industry assumptions for 2000 projections—Continued

Industry	Assumptions
Veneer and plywood	Industry faces encroachment from imports and from lower priced panel substitutes.
Prefabricated wood buildings	Little movement is expected towards the prefabrication of wooden buildings and parts in factories, in part due to the problems involved in moving these parts to the building site.
Household furniture	A large increase in producer durable goods purchases by the trade and service industries. Personal consumption requirements will grow moderately.
Partitions and fixtures	Increase in demand caused by capital spending on the part of the commercial industries.
Office and miscellaneous furniture and fixtures	Increase in demand due to capital investment by the commercial, nonelectrical machinery, and transportation industries. Demand for new office furniture will be strong. No significant technological advances in production processes expected for this sector.
Glass and glass products	Continued decline in use of glass for packaging foods and beverages is expected.
Hydraulic cement	Growth due to growth of construction.
Concrete, gypsum, and plaster products	Growth due to growth of construction. Little technological change expected.
Stone, clay, and miscellaneous mineral products	Productivity improvements are likely to slow since operations have already been fairly well mechanized.
Blast furnaces and basic steel products	Increased imports and a general trend towards the use of plastics, composites, and lighter weight metals will result in a further decline for this industry. Decline will taper, however, because of restructuring that has already taken place. Minimills will take a larger share of U.S. steel business. Imports will be mainly of semifinished steel, to be processed in U.S. finishing mills.
Primary aluminum	Increased imports and development of composites will combine to cause slight decline in this industry. Inefficient mills closed during 1979-85 period; further productivity gains will be limited.
Primary nonferrous metals, except aluminum	Increased imports and flat demand, due to substitution of other materials, will lead to a slight decline in this industry.
Copper rolling and drawing	Increased imports, the substitution of other materials, and the growth of fiber optics and satellite communications will result in no growth for this industry.
Aluminum rolling and drawing	This industry is expected to grow less than historically since other materials will be substituted for aluminum.
Nonferrous rolling and drawing, nec	Manufacturers will continue to substitute lighter weight products where possible; little growth expected.
Metal cans and shipping containers	Continued relative decline in use of metal cans as a packaging material for many foods and beverages due to use of plastics and increase in microwave and frozen foods.
Plumbing and nonelectric heating equipment	Growth of construction will lead to growth of this industry.
Fabricated structural metal products	Growth in capital spending by the chemical and the public utilities industries. Growth of construction will lead to growth of this industry. Some gains in exports also expected.
Screw machine products, bolts, rivets, etc.	Despite decreasing dependence on these products by manufacturers, this industry will continue to grow due to increase in demand for capital equipment.
Forgings	Despite movement to lighter weight materials, output is expected to grow modestly.
Automotive stampings	Growth of motor vehicle and truck production will cause growth in this industry.
Stampings, except automotive	Substantial growth expected in consumption requirements and intermediate demand. Technological advances and diffusion are likely to come slowly since much of the industry consists of small job shops.
Metal coating, engraving, and allied services	Productivity growth limited by the large number of small firms in the industry and by product diversity.
Ordnance, except vehicles and missiles	Defense requirements assumed to be somewhat higher than in 1985.
Miscellaneous fabricated metal products	Productivity gains from past technological advances will not be repeated as technology has already spread to much of the industry. Much of the industry's output is custom made, which limits productivity gains from economies of scale.

See note at end of table.

Table 1. Specific industry assumptions for 2000 projections—Continued

Industry	Assumptions
Engines and turbines	Many of this industry's products are specially designed, particularly for ships and power generating units, limiting productivity advances. Imports are expected to increase their market share. Exports will recover somewhat.
Farm and garden machinery	Demand expected to increase as a result of capital spending by the real estate and farming industries. Imports are expected to increase their market share, while exports will increase slightly.
Construction machinery	Increased purchases due to investment by the construction and mining industries. Demand should be fairly strong because of increased maintenance of the Nation's infrastructure. Producing factories already heavily mechanized; productivity gains associated with plant closings not foreseen. Imports are expected to increase their market share.
Mining and oil field machinery	Expenditures are dependent on the capital needs of the construction and mining industries. Some increases in oil exploration stemming from higher oil prices should boost demand for oil field machinery. Productivity growth limited because of the custom-designed nature of the equipment in this sector. Export share of output will increase.
Material handling machinery and equipment	All industries purchase investment goods from this industry. Increased factory automation will stimulate this sector.
Metalworking machinery	All industries, but particularly fabricated metals, electrical machinery, and the motor vehicle industry, buy investment goods from this industry. Rising imports and low productivity assumed (many small job shops in this industry limit technological change). Exports will increase substantially.
Special industry machinery	The food, paper, printing, and rubber industries buy investment goods from this industry. Imports made permanent inroads in this industry's markets, and it is unlikely U.S. producers can fully recover these markets.
General industrial machinery	Increased purchases will result from capital spending by public utilities. Growth due to general growth of economy and exports. Imports are projected to claim a larger market share.
Electronic computing equipment	The personal computer market is expected to continue technological advances to make systems more capable and easier to use. All industries are projected to have healthy investment demand for computer equipment. Computer-aided design, flexible manufacturing systems, and computer-integrated manufacturing will affect all areas of manufacturing. Industry is maturing, however, and future gains will be incremental; no new advances on the order of the micro or mini are expected. Both exports and imports are expected to have strong gains; a favorable net trade balance for the United States is expected for this industry.
Office and accounting machines	Demand for investment goods from the trade, finance,and service industries will contribute to growth.
Refrigeration and service industry machinery	Substantial demand growth, but slower than in past.
Miscellaneous nonelectrical machinery	Low productivity expected because of numerous small firms and product diversity.
Electrical industrial apparatus	Most of the demand for the products of this industry are from mature markets—mainly appliances and industrial machinery and equipment. As a result, there is little potential for rapid growth.
Household appliances	No major new products comparable to the microwave are presently under development. Appliances will have more microprocessors, replacing electromechanical controls. Productivity improvements are likely; there are many hand assemblers, and many products can be standardized. The industry could use robots and other automation methods. Imports will grow, but will not dominate, and their share will decline.
Electric lighting and wiring equipment	Growth of the economy, including construction and motor vehicles, spurs growth of this industry.
Electronic home entertainment equipment	The consumer electronics market is projected to continue the trend of very high levels of demand. Consumers will upgrade their existing systems by purchasing such items as super VCR's, wider screen TV sets, and laser disc players. It is assumed that much of the production and assembly of this equipment will be done overseas; the domestic industry will be concentrated on management and research and development. Growth in high-priced stereo equipment in motor vehicles will also help to fuel growth of this industry, as will large increases in computer software and video tapes.
Telephone and telegraph apparatus	The communications, trade, and service industries will buy investment goods from this industry, which will continue to be very healthy because of the increasing need for telecommunications equipment. Imports will increase but will account for a smaller share of total output.
Radio and TV communication equiment equipment	Defense and civilian requirements will increase. Increased sophistication of other machinery and equipment requires higher purchases of communications equipment as an input, especially in the manufacture of aircraft, missiles, and space vehicles. Although defense needs account for a large share, more of the future growth in the industry will be attributed to the private sector. There will be more private purchases of satellites, fiber optics systems, and equipment related to telecommunications.

See note at end of table.

Table 1. Specific industry assumptions for 2000 projections—Continued

Industry	Assumptions
Electronic tubes	Little growth due to continued substitution of solid-state devices and semiconductors.
Semiconductors and related devices	More equipment and instruments will have electronic sensors. There are some limits to growth as the industry matures and imports rise, but domestic production will still expand rapidly. Despite increasing imports, the United States will still lead in the development of specialized chips (such as for defense).
Storage batteries and engine electrical parts	Much of the growth expected in this industry is due to the projected growth of the motor vehicle industry. However, it was assumed that electric cars, which would boost demand in this sector even further, will not become commonplace within the next decade.
X-ray and other electromedical apparatus	The health industries buy investment goods from this industry; demand is assumed to be especialy strong because of the aging of the population and advances in biotechnology.
Motor vehicles and parts	A slow growth in auto purchases reflects a projected slowdown in growth of the population of driving age. Also, a higher than usual consumption of autos in 1985 and 1986 will result in a much lower growth rate over the early part of the 1986-2000 period. Many foreign car manufacturers will open plants in the United States, leading to a decline in the import share of output. Some import growth is expected from the Third World.
Aircraft	Defense demand is expected to grow slowly; some of the slack will be made up by exports and business purchases.
Aircraft and missile engines and equipment	Continued improvements in technology will lead to increased defense and intermediate demand. Exports expected to show strong growth.
Guided missiles and space vehicles	Defense spending assumed to be at a level that maintains the posture attained during the 1980's buildup.
Ship and boat building and repairing	Defense spending assumed to be lower than in the 1980's.
Railroad equipment	Reduced demand due to decline in capital spending by the rail transportation industry.
Engineering and scientific instruments	Increased demand expected to result from investment by all industries, particularly transportation and services. Demand will be very high for research and development for more engineering of manufactured products.
Measuring and controlling devices	Demand will be dependent on investment by the public utilities, chemicals, electrical machinery, communications, and services industries. More instruments and equipment will incorporate automatic sensors.
Optical and ophthalmic products	Growth in demand caused by investment by the chemical and health services industries. Demand high, especially for spectrographs and electron microscopes.
Medical instruments and supplies	Increased demand because of high investment by health services.
Photographic equipment and supplies	Increased demand will result from the capital needs of the trade and service industries. Advances in technology will lead to continued purchases of new equipment.
Watches, clocks, and parts	Despite continued growth of imported goods, the domestic industry will experience some growth. Imports will still dominate.
Jewelry, silverware, and plated ware	Continued growth of imported goods will lead to little growth for the domestic industry.
Meat products	Slow growth of meat products due to slower population growth and less meat consumption. Poultry will increasingly replace pork and beef for health reasons.
Dairy products	Greater efficiencies in production are assumed; productivity will advance.
Canned, dried, and frozen foods	Demand will be very strong for frozen specialties but weak for canned goods.
Grain mill products and fats and oils	Productivity advances will continue in this industry.
Sugar and confectionery products	Health concerns will lead to a relative decrease in the use of sugar as an ingredient in prepared foods.
Alcoholic beverages	Consumers are expected to continue to drink less alcoholic beverages because of (1) a greater emphasis on appearance, health, and diet; (2) the shrinking college population, the age group with the highest beer consumption; and (3) critics of substance abuse.
Soft drinks and flavorings	The slower growth of the teenage population will limit demand for soft drinks. Some increase expected as consumers substitute soft drinks for alcoholic beverages. The industry is already widely mechanized; further productivity gains may come about because of mergers and consolidations.
Tobacco manufactures	Health concerns and antismoking campaigns will cause sales of tobacco to continue to decline.

See note at end of table.

Table 1. Specific industry assumptions for 2000 projections—Continued

Industry	Assumptions
Weaving, finishing, yarn, and thread mills	Already heavily mechanized, but automated production techologies will become more widespread. Industry assumed to grow due to growth of apparel and textile industries.
Knitting mills	Industry assumed to grow due to growth of apparel industry. Industry already heavily automated; domestic producers very competitive with importers.
Floor covering mills	Assumed continued slight increase in the use of carpeting as a flooring material in new construction and in the manufacture of cars and trucks. Industry already widely automated. Imports not a big threat—most carpets are made of manmade fibers, where the U.S. has an edge; also, shipping costs are very high for carpets.
Miscellaneous textile goods	Industry already heavily automated; further productivity gains will be slow.
Apparel	Consumer demand will be high, but more of it will be met by imports. Domestic production will increase moderately.
Miscellaneous fabricated textile products	Demand will be strong, but imports will increase their market share. Consolidation and mergers will increase labor productivity.
Pulp, paper, and paperboard mills	Continued growth of paper products and printing and publishing industries will lead to growth. Industry already heavily mechanized.
Newspapers	Newspapers will continue to grow, spurred in part by the growth of advertising. Automated composition will become more widespread.
Periodicals	Periodicals will continue to grow, spurred in part by the growth of advertising. The number of regional or special interest magazines is assumed to proliferate.
Books	Elementary and secondary school textbooks will spur this market as the population of school-age children grows.
Miscellaneous publishing	Production will be high because of growth in catalogs, directories, newsletters, technical manuals, and other types of miscellaneous publishing.
Commercial printing and business forms	Firms will continue to increase their relative purchases of commercial printing and business forms.
Industrial chemicals	Exports will increase less rapidly because many former consumer nations now have their own petrochemical plants.
Plastics materials and synthetics	Substantial output growth as plastics continue to substitute for metals (for example, carbon fiber resin in autos and airplanes). Growth somewhat dampened by slowdown in synthetic fibers.
Drugs	Strong long-term growth is projected due to a strong demand for established drugs, a vast array of new products, and an expanding elderly population. Biotechnology advances for both humans and animals are expected to contribute to the number of products available.
Soap, cleaners, and toilet goods	Healthy growth is projected, reflecting an increase in demand for convenience-oriented, multifunctional cleaning products and the increasing popularity of men's toiletries, in addition to gains in standard health and beauty aid products.
Paints and allied products	Growth in construction and motor vehicle industries will lead to growth of this industry.
Agricultural chemicals	Slower growth despite gains in farm output reflects continued decline in the relative input of agricultural chemicals, as consumers and growers alike become increasingly wary of the environmental and health problems associated with some of these products.
Petroleum refining	Industries will continue energy conservation measures in an attempt to control costs. Cars and trucks will become more energy efficient, lessening demand for gasoline. The fleet of aircraft will become more energy efficient. Use of coal for electric generation will increase, with petroleum-based generation's share declining. Production projections based on assumptions of Department of Energy.
Miscellaneous plastics products	Continued advances in molding of plastics will increase their use in all types of products as their increased strength with decreasing weight and cost allow them to be substituted for many parts previously made from metals.
Footwear except rubber and plastic	Output will decline as imports increase.
Luggage, handbags, and leather products, nec	Output will decline as imports increase.
Railroad transportation	Continued relative decline in railroads as means of transporting goods to consumers due, in part, to growth of population in areas not served by existing railway lines. Assumed more goods would be carried by truck.
Trucking and warehousing	Assumed greater efficiencies in scheduling, marketing, and cost control. Growth of the economy and a shift away from rail freight will lead to growth of this industry.

See note at end of table.

Table 1. Specific industry assumptions for 2000 projections—Continued

Industry	Assumptions
Water transportation	Continued relative decline in shipping as means of transporting goods to market.
Air transportation	Consolidation and takeovers will eliminate route duplication and limit price competition; saturation will occur because of the fixed number of airport takeoff and landing slots and because of safety concerns.
Pipelines, except natural gas	Energy conservation and higher imports of crude petroleum products will lead to continued slow growth for this industry.
Arrangement of passenger transportation	As a result of the deregulation of the airline industry and the growth in the number of fares for all modes of transportation, growth will continue in the use of travel agents as persons and businesses find it increasingly difficult to make their own travel arrangements.
Communications except broadcasting	Telephone services are expected to show a rapid growth with applications and extensions of current technology. Competition should boost productivity. Business will continue to use these services, although cost-containment measures will prevent the industry from growing even faster.
Radio and television broadcasting	The increasing popularity of cable television is expected to continue as the industry makes an effort to develop better programs. However, there are limits to growth in this sector as cable TV approaches market saturation. Advertising revenues will continue to spur growth of this industry. Another new growth area will be direct satellite-to-home transmission. Employment will expand in sales and service.
Electric utilities including combined services	The shift away from scarce and vulnerable oil and natural gas and towards electricity is expected to continue. In addition, due to an increasing use of electronics in the home, demand for electric utilities is expected to grow more rapidly than demand for other energy sources. Despite these trends, growth will be slower than in the past, based on the assumptions of the Department of Energy. Conservation of energy will continue as businesses switch to more energy-efficient machinery, plants, and offices, decreasing their relative expenditures for electricity.
Gas utilities including combined services	Continued energy conservation measures will decrease relative use of natural gas by all industries. This assumption is based on estimates by the Department of Energy.
Water and sanitation including combined services	This industry expected to grow due to general growth of economy and to increasing demand for refuse and waste disposal.
Wholesale trade	New information technologies (such as teleshopping) will result in some growth for wholesalers.
Retail trade except eating and drinking places	Retailers may have difficulty finding part-time workers; past declines in the retail workweek because of the increased use of part-timers will taper; industry may have to rely more on full-time workers. Grocery stores will be faced with increasing pressure to raise productivity, but at the same time they will offer more labor-intensive services (salad bars, prepared foods, delis, etc.), and more grocery stores will extend hours. Teleshopping is not assumed to have a major impact on retailers at least through 2000.
Eating and drinking places	Fast-food growth will slow—the market is reaching saturation, and the teenage population, the biggest consumers of fast food, is decreasing. The decline in the youth population will also affect fast-food establishments as employers—about half their workers are young people. May have to offer more full-time jobs and higher wages to attract older workers. The increasing popularity of using microwave ovens to cook and the availability of prepared meals from grocery and specialty stores are other reasons to explain the slowdown in food-away-from-home sales. Assumed full-service restaurants will grow, especially restaurant chains. Assumed more contracting for food service operations by hospitals, schools, and other institutions.
Banking	Assumed wider public acceptance of automatic banking and electronic funds transfer. Productivity will be high as office automation reduces the need for large numbers of clerical workers.
Security and commodity brokers and exchanges	Personal spending on brokerage charges and investment counseling has undergone tremendous growth recently. Growth is expected to continue, although the projected growth rate is not expected to match that of recent years. Consumers will increase their demand for financial planning advice.
Insurance services	Assumed greater efficiencies in computerized underwriting for standarized life insurance policies. Also assumed increasing demand for specialized insurance, such as accident and health or fire and casualty, which is not as easily standarized. Work force may have to increase because of the demand for new commercial coverage such as product liability, prepaid legal, or pollution liability. Noninsurance firms (such as banks and department stores) may take away some of the insurance industry's business, but this should be partially offset by expansion of insurance firms into other financial services.
Real estate	This industry assumed to grow due to general growth of economy.
Hotels and other lodging places	As businesses attempt to control costs, they will limit the number of business trips, decreasing the relative share of their expenditures for hotels.
Laundry, cleaning, and shoe repair	Assumed more contracting out for industrial laundry services.

See note at end of table.

Table 1. Specific industry assumptions for 2000 projections—Continued

Industry	Assumptions
Personal services, nec	Assumed an expanding array of new personal services; demand expected to be high due to two-earner families.
Advertising	Businesses will spend relatively more on advertising as they continue their attempt to extend markets in an increasingly competitive environment.
Services to dwellings and other building	Business will increase their expenditures on these services as building managers continue to contract out for many of these services, especially those performed on an irregular basis. Assumed higher government purchases of contract cleaning services. The slowdown in commercial and office construction will somewhat limit growth, however.
Personnel supply services	Businesses will increase expenditures, especially for temporary help services. They will continue their use of employment agencies in an attempt to find the best qualified jobseekers. The market for temporaries will expand even further beyond office clerical workers to include nursing, engineering, and industrial workers. Also assumed more contracts for facilities management on the part of government.
Computer and data processing services	Businesses will increase their expenditures as the computer becomes more important both in the office and on the plant floor. Expenditures will increase as firms attempt to find the right equipment and software to fill their needs, and as specialized software is designed and developed. Assumed government demand will be strong.
Research, management, and consulting services	Businesses will increase expenditures as they continue to contract out for specialized services, especially market research, personnel training, management, systems design, efficiency experts, lobbyists, and other business consultants. Past research expenditures classified in this industry were dominated by government. In the future, industrial R&D should grow faster than Federal. Government agencies, including the Department of Defense, are assumed to contract out for more managerial and consulting services.
Detective and protective services	Business and government will continue to increase their expenditures for these services. However, as the industry matures, the demand for guard services is not expected to grow as rapidly as in the past. Some additional growth will come from the sale and operation of security systems, and from polygraph testing.
Equipment rental and leasing	Businesses will continue to increase their expenditures for rental equipment; however, most of the financial advantages of leasing have already been explored. Growth will be slow as the industry matures.
Credit reporting and business services, nec	Business expenditures on miscellaneous services are expected to increase as the number of new kinds of specialized services burgeons.
Electrical repair shops	A continuing decline assumed in portion of business expenses spent for electrical repair.
Miscellaneous repair shops and related services	Growth of the economy will lead to some growth for this industry, but businesses will decrease the proportion of their expenses for these services.
Motion pictures	Growth in TV broadcasting, including cable, will lead to increased output. Output will grow faster for the production of motion pictures than for movie theaters.
Theatrical producers and entertainers	Output will be stimulated by the increased programming required by cable television.
Amusement and recreation services, nec	Consumer demand will be very high.
Offices of health practitioners	Assumed more and more health services will be performed in offices and group practice centers rather than in hospitals.
Nursing and personal care facilities	Fueling the demand for nursing homes and for skilled-care nursing facilities will be strong growth in the elderly population (especially those over age 85). Increased cost-consciousness by hospitals will shift many patients to nursing homes.
Hospitals, private	Growth will be slowed by cost-containment pressures which force a shift of services from hospitals to doctors' offices and outpatient facilities, but new technologies and an older population will keep demand high.
Outpatient facilities and health services, nec	The growing elderly population and the shorter lengths of stay in hospitals will result in more outpatient visits and increased demand for home care services.
Legal services	Increased litigation and the trend toward more specialized services will boost demand.
Educational services, private	Private educational expenditures are primarily for higher education. Since the college-age population will decline to 2000, spending for this sector is not expected to have rapid growth.
Individual and miscellaneous social services	Demand and employment are assumed to grow rapidly (although slower than during 1977-86), especially for counseling, senior services, and fundraising activities. Growth will be driven by insurance reimbursement for counseling services; lack of jail space, which will force other types of rehabilitative alternatives; and mandatory counseling for drivers convicted of driving while intoxicated.

See note at end of table.

Table 1. Specific industry assumptions for 2000 projections—Continued

Industry	Assumptions
Child day care services	Growth will occur as more mothers enter the work force and care shifts from home-based babysitting to the commercial sector.
Residential care	This sector will also be affected by the shift away from hospital care. Strong growth is expected for drug and alcohol rehabilitation centers and elderly residential care.
Business and professional associations	Businesses looking to control costs will decrease the relative share of their expenditures used for these organizations.
Private households	Demand for housekeeping and babysitting services will grow, but will be met more by contract firms than by private individuals.
Engineering and architectural services	As buildings become more complex, and zoning and building codes more demanding, the construction industry will increase its purchases of these services. Other industries, especially in manufacturing, will also increase their purchases of engineering services.
Accounting, auditing, and services, nec	The continued complexity of tax laws, accounting procedures, and reporting requirements will cause increased expenditures by business for these services.
U.S. Postal Service	Businesses will continue to use the mail for billing and correspondence. Innovations such as electronic mail will have only a moderate impact on employment.

nec=not elsewhere classified.

Occupational Assumptions

The occupational projections developed through the industry-occupation matrix rely heavily on the assumptions used to project the matrix coefficients. The following table presents brief descriptions of the assumptions used to project the coefficients from the 1986 to the 2000 matrix. Based on analyses conducted by Bureau staff, the assumptions consider the impact of such factors as technological change, changes in management practices, changes in the mix of products and services produced by industries, and changes in the size of business establishments within industries.

In projecting the staffing patterns from 1986 to 2000, the first step was to review historical employment data to identify trends. Analyses were then conducted to identify the factors underlying the trends. Judgments were made as to whether the factors identified as causing changes in occupational utilization in the past would have less, more, or the same effect in the future. In addition, the analyses also uncovered factors that are expected to affect the utilization of workers in specific occupations that did not affect them in the past.

An example will serve to identify the nature of the analytical judgments that were made to reflect technological change. While the historical data show that employment of payroll and timekeeping clerks grew considerably over the last several decades, analyses indicated that computerization had slowed the rate of growth. Furthermore, all the available evidence indicates that with the further spread of personal computers, especially to smaller businesses, significant decreases can be expected in the coefficients for this occupation in all industries.

To maintain consistency among the judgments of the analysts projecting occupational change, the following procedure was used to develop the initial projections of the coefficients for all occupations across industries. Based on the analyses described above, a determination was made as to whether the coefficient should be changed, and, if so, whether the increase or decrease would be small, moderate, or significant. Guidelines for changing coefficients across all industries were as follows: Small—5 percent to 9 percent; moderate—10 percent to 19 percent; and significant—20 percent or greater. The projected rates of change for occupational coefficients were usually the same in all industries. However, coefficients were also projected for specific industries that differed from the economywide analysis.

The table groups the increases and decreases separately by the size of the changes, that is, small, moderate, and significant, and each of the six groups is in alphabetical order by occupation. In cases where assumptions were made that differ among industries, the occupation is listed in the category judged to have the greatest impact on the employment projection.

Table 2. Occupations with projected changes to employment coefficients in the national industry-occupation matrix, 1986 to 2000

Occupation	Projected changes and reasons
Small increases	
Agricultural and food scientists	Small increases in all industries except miscellaneous business services due to the expected increase in research opportunities created by biotechnology. A moderate decrease in miscellaneous business services because the segment of the industry where these workers are concentrated is expected to grow more slowly than the rest of the industry.
Cashiers	Small increases in grocery and apparel stores to reflect the growing importance of discount operations that require more cashiers relative to other workers. A small decrease in gasoline service stations due to the growth of self-service stations and the expected spread of automated gas pumps.
General managers and top executives	Small increases in all industries due to the expected increasing complexity of business operations.
Geologists, geophysicists, and oceanographers	Small increases in all industries except miscellaneous business services and engineering, architectural, and surveying services due to expected increase in exploration for petroleum and minerals. Little or no change is expected in the industries listed as exceptions.
Marketing, advertising, and public relations managers	Small increases in all industries due to the expectation that an increasingly competitive economy will result in a greater demand for these workers.
Medical assistants	A small increase in offices of physicians due to the expectation that these workers will increasingly perform tasks previously performed by other employees.
Pharmacists	A small increase in drug stores to reflect the growing use of part-time workers and the trend toward offering pharmacy services on a 24-hour basis.
Physical and life science technicians and technologists	Small increases in all industries except miscellaneous business services and engineering, architectural, and surveying services due to expected increases in research and development expenditures. Little or no change is expected in the two industries listed above because the segments of the industries where these workers are concentrated are not expected to grow as fast as other parts of these industries.
Property and real estate managers	Small increases in all industries to reflect the increasing complexity of real estate operations.
Salespersons, retail	Small increases in all industries to reflect growing use of part-time workers and more attention to customer service.
Securities and financial services salesworkers	Small increases in banks and other financial institutions due to a wider range and growing complexity of financial services that are expected to be offered to the public.
Tax examiners, collectors, and revenue agents	Small increases in Federal, State, and local government due to the expected greater enforcement of tax laws.
Teacher aides and educational assistants	A small increase in educational services due to the expected rise in student enrollments. A moderate increase in religious organizations due to expected large increases in enrollments in religious schools.
Teachers and instructors, vocational education and training	A small increase in educational services to reflect the projected number of 18- to 22-year-olds and other adults who will need vocational training and retraining.
Teachers, kindergarten and elementary	A small increase in educational services as kindergarten and elementary school enrollments are expected to become a larger proportion of total school enrollments.
Moderate increases	
Accountants and auditors	Moderate increases in all industries except accounting, auditing, and bookkeeping services to reflect the greater use of financial data in day-to-day business decisionmaking. Only a small increase is expected in accounting, auditing, and bookkeeping services.
Actuaries	Moderate increases in all industries due to expected greater demand for these workers as consultants to analyze revisions to State insurance plans and to appraise the impact of tax law changes on the financial soundness of companies.

Table 2. Occupations with projected changes to employment coefficients in the national industry-occupation matrix, 1986 to 2000—Continued

Occupation	Projected changes and reasons
Aeronautical and astronautical engineers	Moderate increases in all industries except miscellaneous business services due to the expectation that aircraft and space vehicles will continue to become more technologically advanced and, therefore, require a higher level of design and research and development efforts. Little or no change is expected in miscellaneous business services because these workers are not concentrated in the fastest growing segment of that industry.
Bakers, bread and pastry	Moderate increases in grocery stores, eating and drinking places, and hotels and other lodging places to reflect a greater volume of baked goods prepared on the premises of establishments in these industries. A small decrease in hospitals to reflect the trend toward contracting out food service functions.
Bartenders	A moderate increase in hotels to reflect the trend toward larger hotels, which provide more lounges and full-service restaurants.
Biological scientists	Moderate increases in all industries except miscellaneous business services due to expected increase in research and development funds for biological and medical research. A significant decrease in miscellaneous business services due to projected slower growth in the segment of the industry where these workers are concentrated than in the rest of the industry.
Bus drivers	A moderate increase in local government and small increases in local and suburban transportation and intercity buses to reflect an increasing trend toward more part-time bus drivers.
Chemical engineers	Moderate increases in all industries except miscellaneous business services due to the expected growth in research and development expenditures. Little or no change is expected in miscellaneous business services because of projected slower growth in the segment of the industry where these workers are concentrated than in the rest of the industry.
Child care workers	A moderate increase in religious organizations to reflect expected enrollment increases in religiously affiliated day care centers and schools.
Combination machine tool setters, set-up operators, operators, and tenders	Moderate increases in all industries due to increased use of numerical control machine tools and flexible manufacturing systems.
Computer operators, except peripheral equipment	Moderate increases in all industries reflecting the rising use of computers throughout the economy.
Cooks, restaurant	A moderate increase in hotels and other lodging places to reflect the trend toward larger hotels, which are expected to provide more full-service dining.
Correction officers and jailers	Moderate increases in Federal, State, and local governments due to increasing public concern about crime and expected increases in expenditures for construction of new correctional facilities.
Court clerks	Moderate increases in Federal, State, and local governments due to increasing concern about law and order and the need to reduce the backlog of cases waiting to be heard.
Electroencephalograph technicians	A moderate increase in hospitals to reflect more sophisticated and specialized medical treatments. A significant increase in offices of physicians to reflect the trend toward large group practices that will require the services of specialized personnel.
Electronic repairers, commercial and industrial equipment	Moderate increases in all industries to reflect a greater volume of electronic industrial equipment in use by firms to automate offices and production processes.
Food service and lodging managers	A moderate increase in eating and drinking places due to expected growth of chain restaurants, which will require more salaried managers and fewer self-employed managers. A moderate increase in hotels and other lodging places due to the expected trend toward larger, chain-affiliated hotels, which will require more salaried managers. Small decreases in hospitals and educational services to reflect the trend toward contracting out food service functions in these industries to the eating and drinking places industry.

Table 2. Occupations with projected changes to employment coefficients in the national industry-occupation matrix, 1986 to 2000—Continued

Occupation	Projected changes and reasons
Gardeners and groundskeepers, except farm	A moderate increase in agricultural services due to expected faster growth in demand for landscaping services than in demand for other services in this industry. A moderate decrease in private households due to the expectation that individuals will increasingly use firms offering gardening and related services rather than directly employing gardeners.
Guards	A moderate increase in miscellaneous business services and moderate decreases in all other industries as more and more firms contract out for security services.
Industrial machinery mechanics	Moderate increases in all industries to reflect an expanding number of industrial machines in use.
Judges, magistrates, and other judicial workers	A moderate increase in State government to reflect concern about law and order and to reflect efforts to reduce the backlog of cases waiting to be heard.
Lawyers	Moderate increases in industries other than legal services as more legal work is expected to be done in-house.
Millwrights	Moderate increases in all industries to reflect an expanding number of industrial machines in use.
Occupational therapy assistants and aides	A moderate increase in hospitals due to an expected greater volume of therapy services that will be offered.
Offset lithographic press setters and setup operators	A moderate increase in commercial printing and business forms to reflect the continuing trend toward lithography as the dominant form of printing in this industry.
Operations and systems researchers and analysts	Moderate increases in all industries to reflect the growing importance of quantitative analysis.
Peripheral electronic data processing equipment operators	Moderate increases in virtually all industries to reflect the rising use of computers throughout the economy.
Physical and corrective therapy assistants and aides	A moderate increase in hospitals due to an expected greater volume of therapy services that will be offered.
Programmers, numerical, tool, and process control	Moderate increases in all industries due to the growing use of numerical control machine tools.
Public relations specialists	Moderate increases in all industries to reflect the growing importance of public relations activities throughout the economy.
Radiologic technologists and technicians	A moderate increase in hospitals due to expected advances in technology and increased use of radiologic diagnostic techniques. A significant increase in offices of physicians due to the increasing trend toward large group practices and more scans performed on an outpatient basis. A significant increase in outpatient care facilities, reflecting very rapid growth of Health Maintenance Organizations, specialty medical clinics, and diagnostic imaging centers that employ these workers.
Registered nurses	A moderate increase in hospitals due to the expectation that nurses will be given greater responsibilities. A moderate increase in offices of physicians because of the increasing size of physician practices and the greater use of sophisticated technology. A moderate increase in nursing and personal care facilities due to the expectation that more patients will be released from hospitals to nursing homes to convalesce. A moderate increase in outpatient care facilities due to the expected growth in rehabilitation centers which rely heavily on registered nurses.
Respiratory therapists	A moderate increase in hospitals due to an expected increase in the volume of surgery performed and more patients with cardiopulmonary illnesses who require respiratory care. A moderate increase in outpatient care facilities due to the expected growth of Health Maintenance Organization, surgicenters, and other medical facilities which employ these workers. A moderate increase in offices of physicians due to an expected increase in large group practices and an expected increase in outpatient surgery done in physicians' offices.

Table 2. Occupations with projected changes to employment coefficients in the national industry-occupation matrix, 1986 to 2000—Continued

Occupation	Projected changes and reasons
Shoe and leather workers and repairers, precision	A moderate increase in the leather footwear industry. These workers are concentrated in the manufacture of custom-made shoes, a sector which is not expected to be as adversely affected by imports as the rest of the footwear industry.
Surgical technicians	A moderate increase in hospitals due to expected increases in the volume of both inpatient and outpatient surgery.
Significant increases	
Computer programmers	Significant increases in virtually all industries due to the rising use of computers throughtout the economy. Only a moderate increase is expected in computer and data processing services. In the Federal Government, where there is an increasing trend toward contracting out computer services, little or no change in the occupational coefficient is expected.
Computer systems analysts, electronic data processing	Significant increases in all industries except Federal Government due to the expected rising use of computers throughout the economy. Improvements to hardware and software are expected to make computers more versatile, cheaper, and easier to use. No change is expected in Federal Government because of the trend toward contracting out computer services.
Data entry keyers, composing	Significant increases in newspapers and commercial printing and business forms due to expected increasing use of computerized typesetting technology.
Data processing equipment repairers	Significant increases in all industries to reflect the increasing use of computers throughout the economy as improvements to hardware and software make computers more versatile, cheaper, and easier to use.
Electrical and electronics engineers	Significant increases in all industries except miscellaneous business services due to the expectation that the pace of innovation in electronic devices will accelerate. A moderate increase is expected in miscellaneous business services.
Electrical and electronics technicians and techologists	Significant increases in all manufacturing industries due to the expectation that the pace of innovation in electronic devices will accelerate, and the period between new products will shorten. Moderate increases in all other industries except miscellaneous business services, which is expected to show little or no change in the occupational coefficient.
Farm managers	A significant increase in crops, livestock, and livestock products to reflect the increasing number of large farms and farms with absentee owners. A moderate decrease in agricultural services since farm managers are concentrated in the part of the industry that is not expected to grow as fast as other parts.
Industrial engineers, except safety engineers	Significant increases in all industries except miscellaneous business services due to the expected need to incorporate increasingly sophisticated production methods such as robots and computers into production systems. Little or no change in miscellaneous business services because industrial engineers are not concentrated in one of the faster growing segments of this rapidly growing industry.
Mechanical engineers	Significant increases in all industries except miscellaneous business services and engineering, architectural, and surveying services. Research and development expenditures are expected to increase significantly in virtually all other industries. Only a small increase is expected in engineering, architectural,and surveying services. No change is expected in miscellaneous business services because these workers are not concentrated in one of the fastest growing segments of this industry.
Medical records technicians	Significant increases in hospitals, outpatient care facilities, and offices of physicians due to continued emphasis on cost containment, which entails much greater documentation and recordkeeping for reimbursement, clinical, and management purposes.
Metallurgists and metallurgical, ceramic, and materials engineers	Significant increases in all industries except engineering, architectural, and surveying services and miscellaneous business services. Research and development expenditures for materials research are expected to increase more than expenditures for other research and development. Only a small increase is expected in engineering, architectural, and surveying services. No change is expected in miscellaneous business services because these workers are not concentrated in one of the faster growing segments of this industry.

Table 2. Occupations with projected changes to employment coefficients in the national industry-occupation matrix, 1986 to 2000—Continued

Occupation	Projected changes and reasons
Meteorologists	A significant increase in Federal Government due to the expected higher level of funding for meteorological activities. A significant decrease in miscellaneous business services, reflecting much slower expected growth in the segment of the industry where these workers are concentrated than in the rest of the industry.
Occupational therapists	A significant increase in hospitals, reflecting more outpatient therapy services.
Paralegal personnel	A significant increase in legal services due to the growing acceptance of these workers as cost-effective members of the legal service team. Moderate increases in Federal, State, and local governments due to the expected greater use of these workers in legal work.
Physical therapists	A significant increase in hospitals, reflecting more outpatient therapy services. A significant increase in offices of "other health practitioners" to reflect the trend by physical therapists to separate themselves from physicians and set up their own private and group practices. Consequently, a significant decrease in offices of physicians is expected. A moderate increase in outpatient care facilities due to the expected greater demand for physical therapy services on an outpatient basis.
Small decreases	
Animal caretakers, except farm	A small decrease in agricultural services due to expected slower growth in demand for animal and veterinary services than for other services provided by this industry.
Architects, except landscape and marine	A small decrease in engineering, architectural, and surveying services due to the expected slower rate of growth in the demand for architectural services than for the other services provided by this industry.
Artists and commercial artists	Small decreases in all detailed printing and publishing industries and in mailing, reproduction, and commercial art due to the expected negative impact that computer graphics will have on these workers.
Bookbinders	Small decreases in all industries due to expected continued automation of bookbinding activities.
Broadcast technicians	A small decrease in radio and television broadcasting due to expected advances in broadcasting technology.
Construction and building inspectors	Small decreases in State and local governments due to the expectation that some intermediate inspection functions will be done by maintenance supervisors and engineers.
Cooks, institution or cafeteria	A small decrease in educational services and moderate decreases in hospitals, residential care, nursing homes, and Federal, State, and local governments due to expected contracting out of food service functions. A significant increase in the eating and drinking places industry, which will provide food service functions on a contractual basis to the above industries.
Dental laboratory technicians, precision	A small decrease in medical and dental laboratories because the demand for dental services is not expected to grow as fast as the demand for medical services in this industry.
Dining room and cafeteria attendants and bartender helpers	Small decreases in nursing homes, hospitals, educational services, and residential care to reflect contracting out of food service functions to reduce costs. A small increase in eating and drinking places as other industries contract out food services. A small increase in hotels to reflect the trend toward larger hotels, which are expected to provide more lounges and full-service restaurants.
Electrocardiograph (EKG) technicians and technologists	A small decrease in hospitals due to the expectation that registered nurses and other technicians will do some of the work performed by EKG technicians. A moderate increase in offices of physicians due to the expected continuation of the trend toward large group practices, which will employ more of these workers.
Electronic home entertainment equipment repairers	Small decreases in all industries to reflect the lower maintenance requirements of equipment made with microelectronic circuitry.
Food counter, fountain, and related workers	A small decrease in eating and drinking places due to expected slower growth in fast-food restaurants, where these workers are concentrated, than in other types of eating establishments.
Foundry mold assembly and shakeout workers	Small decreases in blast furnaces and basic steel products and iron and steel foundries to reflect increased use of continuous casting and robots within the steel mill.

Table 2. Occupations with projected changes to employment coefficients in the national industry-occupation matrix, 1986 to 2000—Continued

Occupation	Projected changes and reasons
Frame wirers, central office	Small decreases in all industries due to increased use of microelectronics that permit more telephone circuits to be transmitted on one wire.
Grinding machine setters and set-up operators, metal and plastic	Small decreases in all industries due to greater use of computer controls and flexible manufacturing systems.
Housekeepers, institutional	Small decreases in all industries except hotels and other lodging places due to expected contracting out of housekeeping services.
Janitors and cleaners	Small decreases in all industries except services to buildings due to a continuation of contracting out of janitorial services. Little or no change is expected in services to buildings.
Jewelers and silversmiths	A small decrease in miscellaneous shopping goods stores due to the expectation that many retail outlets that sell jewelry will no longer repair what they sell, but rather will contract out for repair services.
Lathe machine tool setters and set-up operators, metal and plastic	Small decreases in all industries to reflect advances in technology such as computer-controlled machines and flexible manufacturing systems.
Librarians	A small decrease in local government to reflect anticipated reductions in expenditures for library services.
Library assistants and bookmobile drivers	A small decrease in local government due to expected reductions in expenditures for library services.
Machine forming operators and tenders, metal and plastic	Small decreases in all industries to reflect increased use of computer-controlled machine tools and flexible manufacturing systems.
Machinists	Small decreases in all industries due to advances in manufacturing processes such as flexible manufacturing systems, numerical control machine tools, and greater use of computers.
Motorcycle repairers	A small decrease in boat and miscellaneous vehicle dealers due to expected slow growth or even a possible decline in the number of motorcycles in operation.
Personnel clerks	Small decreases in all industries due to computerization of employment records and information concerning employee benefits and basic personnel practices.
Physicians and surgeons	A small decrease in offices of physicians to reflect the trend toward large medical group practices, which require more clerical and clinical support staff relative to the number of physicians. A small decrease in hospitals to reflect cost-containment efforts, which are expected to result in a greater utilization of physician assistants and nurse practitioners relative to physicians.
Pressing machine operators and tenders, textile, garment, and related workers	Small decreases in laundry, cleaning, and garment services and apparel manufacturing to reflect new pressing technologies that are expected to reduce the demand for these workers.
Purchasing agents, except wholesale, retail, and farm products	Small decreases in all industries due to the expectation that computerization of purchasing tasks and more efficient purchasing methods will result in less demand for these workers.
Purchasing managers	Small decreases in all industries except State and local governments due to the expected increasing computerization of purchasing tasks and more efficient purchasing methods. Moderate increases in State and local governments due to the expected growth of purchasing departments in these sectors.
Radio mechanics	Small decreases in all industries to reflect increased use of durable and easy-to-maintain microelectronic circuitry in radios.
Recreation workers	A small decrease in local government due expected reduction in expenditures for noncritical services. A moderate increase in civic, social, and fraternal organizations to reflect growing membership in recreation clubs, day camps, sports instruction schools, and health clubs.
Sewing machine operators, nongarment	Small decreases in household furniture, knitting mills, floor covering mills, apparel, miscellaneous textile goods, and miscellaneous fabricated textile products due to expected advances in the application of industrial robots to sewing functions.

Table 2. Occupations with projected changes to employment coefficients in the national industry-occupation matrix, 1986 to 2000—Continued

Occupation	Projected changes and reasons
Shipfitters	Small decreases in all industries to reflect declining demand for new vessels.
Signal or track switch maintainers	A small decrease in railroad transportation due to computerization of track switching operations.
Surveyors	A small decrease in engineering, architectural, and surveying services due to the expected slower growth in the demand for surveying services than for the other services provided by this industry.
Technical assistants, library	A small decrease in local government due to expected reduction in expenditures for library services.
Moderate decreases	
Automotive body and related repairers	A moderate decrease in automobile repair shops due to increased use of plastics in vehicle bodies, which results in fewer minor repairs.
Automotive mechanics	A moderate decrease in gasoline service stations due to the continuing trend toward self-service stations that do not provide vehicle repair and maintenance services.
Bank tellers	Moderate decreases in all industries due to expected increases in automatic teller machines and the assumption of some banking functions by other financial industries.
Barbers	A moderate decrease in beauty shops due to expected slower growth in the demand for the services of barbers than for other services provided by this industry.
Billing, posting, and calculating machine operators	Moderate decreases in all industries due to the widespread use of computers and other aspects of office automation.
Billing, rate, and cost clerks	Moderate decreases in all industries due to an expected greater use of computerized office equipment.
Bookkeeping, accounting, and auditing clerks	Moderate decreases in all industries except finance, insurance, and real estate due to the widespread use of computers in bookkeeping and accounting functions. Little or no change is expected in finance, insurance, and real estate because a fairly high level of computerization has already been achieved.
Child care workers, private household	A moderate decrease in private households due to a projected decline in the number of children under age 5 and the trend toward formal daycare services rather than in-home child care.
Coil winders, tapers, and finishers	Moderate decreases in all industries due to the expected effect of automation on these workers.
College and university faculty	A moderate decrease in educational services since college and university enrollments are expected to decline as a proportion of total enrollments in educational services.
Cooks, short order	A moderate decrease in eating and drinking places due to expected slower growth in fast-food restaurants relative to other types of restaurants.
Credit authorizers	Moderate decreases in all industries except department stores to reflect the growing use of computers to directly access credit files. A significant decrease in department stores due to the phasing out of chain store credit cards.
Credit checkers	Moderate decreases in all industries except department stores to reflect the computerization and centralization of financial data. A significant decrease in department stores to reflect the industry trend away from offering credit to customers.
Dietetic technicians	A moderate decrease in hospitals due to expected staffing cuts and increased use of food service contractors.
Drill machine tool setters and set-up operators, metal and plastic	Moderate decreases in all industries due to greater use of computers and flexible manufacturing systems.

Table 2. Occupations with projected changes to employment coefficients in the national industry-occupation matrix, 1986 to 2000—Continued

Occupation	Projected changes and reasons
Driver-salesworkers	Moderate decreases in all industries as employers are expected to continue to separate the sales and delivery functions of these jobs, employing salesworkers and delivery drivers instead.
Duplicating, mail, and other office machine operators	Moderate decreases in all industries due to expected advances in duplicating machine technology. In addition, other aspects of office automation, such as electronic mail, copiers, and facsimile transmission, are expected to reduce the demand for these workers.
Farm and home management advisers	Moderate decreases in all industries due to the projected decline in the number of farmers who rely on the services of these workers.
File clerks	Moderate decreases in all industries due to expected greater use of electronic filing systems.
Food preparation workers	Moderate decreases in nursing homes, hospitals, and residential care and a small decrease in educational services due to contracting out of food service functions to reduce costs. A moderate increase in grocery stores to reflect a greater range of products and services offered to customers. A moderate increase in hotels due to the trend toward larger hotels, which are expected to offer more full-service dining.
Freight, stock, and material movers, hand	Moderate decreases in all industries due to technological advances in material handling equipment.
Furnace operators and tenders	Moderate decreases in blast furnaces and basic steel products and iron and steel foundries due to expected investment expenditures in basic oxygen process and electric arc furnaces.
Heaters, metal and plastic	Moderate decreases in blast furnaces and basic steel products and iron and steel foundries to reflect the introduction of continuous casting and computers.
Insurance claims clerks	Moderate decreases in all industries due to the expected impact of computer technology on these workers.
Laundry and drycleaning machine operators and tenders	Moderate decreases in nursing and personal care facilities and hospitals due to expected contracting out of laundry services and greater use of disposable products. A small decrease in hotels and other lodging places for the same reasons.
Licensed practical nurses	A moderate decrease in hospitals to reflect cost-containment efforts, which are expected to result in greater use of registered nurses at the expense of these workers. A moderate increase in nursing homes as these facilities increasingly provide more medical care.
Mail clerks, except mailing machine operators and postal service	Moderate decreases in all industries due to the expected introduction of robotic devices into mail handling systems and the expected greater use of electronic mail.
Medical and clinical laboratory technologists and technicians	A moderate decrease in hospitals due to the expectation that hospitals will send medical tests to central laboratories in an effort to contain costs. A significant decrease in offices of physicians due to the expectation that medical assistants, registered nurses, and clerical staff in this industry may perform medical tests. A moderate increase in medical and dental laboratories due to the expected growth in the number and complexity of medical tests being performed in this sector. A significant increase in outpatient care facilities due to the expectation that clinics will choose to perform a greater volume of medical tests in-house.
Optometrists	A moderate decrease in offices of "other health practitioners" as the demand for vision care is not expected to keep pace with the demand for other services provided by this industry.
Order clerks, materials, merchandise, and services	Moderate decreases in all industries to reflect the increasing trend toward transmitting orders electronically.
Order fillers, wholesale and retail trade	Moderate decreases in all industries to reflect increasing use of electronic ordering systems.
Procurement clerks	Moderate decreases in all industries to reflect increasing use by purchasing departments of computerized data bases to obtain information about products, and also to reflect the increasing use of computers to write up routine purchase orders.

Table 2. Occupations with projected changes to employment coefficients in the national industry-occupation matrix, 1986 to 2000—Continued

Occupation	Projected changes and reasons
Psychiatric aides	A moderate decrease in hospitals because State mental hospitals, where these workers are concentrated, are not expected to grow as fast as other hospitals.
Roustabouts	Moderate decreases in crude petroleum, natural gas, and gas liquids, and in oil and gas field services due to continued mechanization and greater use of new equipment.
Secretaries	Moderate decreases in all industries except personnel supply services, offices of physicians, and legal services. Secretaries are expected to be negatively affected by office automation, but the effect is expected to be moderated by the fact that these workers have many tasks that cannot be completely automated or delegated to other people. Little or no change is expected in the industries listed as exceptions since secretaries are expected to grow about as fast as total employment in these sectors.
Station installers and repairers, telephone	Moderate decreases in all industries due to a proliferation of telephones that are cheaper to replace than to repair. Also, modular plugs allow consumers to install their own telephones.
Stock clerks, stockroom, warehouse, or yard	Moderate decreases in all industries due to computerized inventory control and automated materials handling equipment.
Switchboard operators	Moderate decreases in all industries reflecting the greater use of automatic telephone switching equipment.
Telephone and cable television line installers and repairers	Moderate decreases in telephone communication and in telegraph and communication services not elsewhere classified, to reflect the switch from traditional cable lines to microwave transmission and the greater efficiency obtained from using fiber optic cable.
Textile draw-out and winding machine operators and tenders	Moderate decreases in all detailed textile industries due to expected expenditures on laborsaving devices such as industrial robots, automated material handling systems, and computer-controlled machinery.
Tire building machine operators	A moderate decrease in tires and inner tubes due to the expected effect of automation.
Title examiners and searchers	A moderate decrease in pension funds and insurance not elsewhere classified due to the increasing use of computers in assessing title information.
Watchmakers	Moderate decreases in all industries reflecting a trend toward disposable watches and toward clocks that do not require repair work.
Welders and cutters	Moderate decreases in fabricated metal products, nonelectrical machinery, aircraft and parts, and miscellaneous transportation equipment due to expected automation of welding functions. A significant decrease in motor vehicles and parts manufacturing because this industry has been one of the leaders in introducing industrial robots.
Wholesale and retail buyers, except farm products	Moderate decreases in all industries due to the expectation that firms increasingly will order directly from manufacturers through electronic ordering systems.
Significant decreases	
Butchers and meatcutters	A significant decrease in grocery stores and a moderate increase in meat products manufacturing, reflecting the continued shift in the processing of beef from retail to manufacturing establishments.
Chemical equipment controllers, operators, and tenders	Significant decreases in all industries due to expected advances in computerized and automated control systems.
Chemical plant and system operators	Significant decreases in all industries due to expected advances in computerized and automated control systems.
Compositors, typesetters, and arrangers	Significant decreases in newspapers, commercial printing and business forms, and printing trade services to reflect the growing availability of low-cost computer technology.
Data entry keyers, except composing	Significant decreases in all industries due to expected advances in data entry technologies, such as on-line processing and optical character and voice recognition technologies.

Table 2. Occupations with projected changes to employment coefficients in the national industry-occupation matrix, 1986 to 2000—Continued

Occupation	Projected changes and reasons
Drafters	Significant decreases in all industries due to the expected widespread implementation of computer-aided design technology.
Electrical and electronic equipment assemblers	Significant decreases in all industries due to the expectation that most electronic assembly will be done by industrial robots or other automated processes.
Electronic semiconductor processors	Significant decreases in all industries due to expected automation of the duties of these workers and a shift towards having much of the work done abroad.
Farm equipment mechanics	A significant decrease in wholesale trade in machinery and equipment due to much slower expected growth in the farm equipment dealer segment than in the rest of the industry. A moderate increase in crops, livestock, and livestock products to reflect the trend toward larger farms and increasingly complex farm equipment.
Gas and petroleum plant and system occupations	Significant decreases in all industries due to expected advances in computerized and automated control systems.
Industrial truck and tractor operators	Significant decreases in all industries due to expected continuing implementation of automated material handling equipment in factories and warehouses.
Insurance policy processing clerks	Significant decreases in all industries due to the expected effect of the greater use of automated equipment.
Letterpress setters and setup operators	Significant decreases in commercial printing and business forms and newspapers to reflect the trend toward lithography as the dominant form of printing in these industries.
Meter readers, utilities	Significant decreases in all industries except local government due to expected advances in computerized meter reading. Little or no change expected in local government.
Nuclear engineers	Significant decreases are expected in heavy construction, except highway and street; fabricated structural metal products; miscellaneous business services; and engineering, architectural, and surveying services as a result of the expected slowdown in nuclear power plant construction and the expected slowdown in the rate of increase in defense expenditures.
Nursing aides, orderlies, and attendants	Significant decreases in hospitals and personnel supply services. Hospitals are expected to continue to eliminate many lesser skilled jobs that can be performed by more highly skilled personnel. The demand for nursing aides in personnel supply services is not expected to keep up with the demand for other services provided by this industry.
Opticians, dispensing and measuring	A significant decrease in offices of "other health practitioners" due to the expectation that optometrists' offices, where optician employment is concentrated, will grow more slowly than the rest of the industry.
Painters, transportation	Significant decreases in motor vehicle and equipment manufacturing and aircraft and parts due to increased use of robots to perform painting functions on assembly lines. Small decreases in motor vehicle dealers and automotive repair shops due to greater use of plastic body panels in automobiles, which are less likely to require repainting after minor damage.
Payroll and timekeeping clerks	Significant decreases in all industries due to increasing computerization of payroll and timekeeping functions.
Pest controllers and assistants	A significant decrease in services to buildings because the demand for the services of pest controllers is not expected to grow as fast as the demand for other services in this industry.
Photographic process workers, precision	A significant decrease in miscellaneous business services because these workers are concentrated in a slower growing segment of this industry.
Podiatrists	A significant decrease in offices of "other health practitioners" because the demand for the services of podiatrists is not expected to grow as fast as the demand for services provided by other practitioners in this industry.

Table 2. Occupations with projected changes to employment coefficients in the national industry-occupation matrix, 1986 to 2000—Continued

Occupation	Projected changes and reasons
Statistical clerks	Significant decreases in all industries due to the increasing use of computers, especially personal computers, in performing all types of statistical analyses.
Stenographers	Significant decreases in all industries except Federal, State, and local governments due to the widespread use of increasingly sophisticated dictation equipment. Little or no change is expected in the three levels of government because any negative effect of office automation is expected to be offset by an increased demand for stenographers who work as court reporters and stenotype operators.
Typesetting and composing machine operators and tenders	A significant decrease in newspapers due to expected advances in computerized typesetting. Moderate decreases in all other industries for this reason.
Typists and word processors	Significant decreases in all industries except personnel supply services due to the expectation that more and more of the work of typists will be performed by word processors. The demand for word processors is expected to increase but is not expected to offset the decreased demand for typists. Therefore, the coefficient for the combined occupation is expected to decrease. No change is expected in personnel supply services due to the expectation that typists and word processors will continue to account for a large proportion of temporary jobs.
Welding machine setters, operators, and tenders	A significant decrease in motor vehicle manufacturing and moderate decreases in metal forgings and stampings farm and garden machinery and equipment and construction and related machinery and equipment due to increased use of industrial robots to perform welding functions on assembly lines.

Appendix: Supplementary Data

A-1. Civilian noninstitutional population and labor force by age, sex, race, and Hispanic origin, 1986 and projected 1990-2000

(Population and labor force in thousands and labor force participation in percent)

Group	1986	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Population												
Total, 16 and over	180,589	187,987	189,537	190,984	192,566	194,155	195,801	197,572	199,357	201,168	202,973	204,699
Total, 16 to 24	34,066	31,445	31,008	30,606	30,425	30,209	30,027	29,898	30,116	30,560	31,096	31,488
Total, 25 to 54	97,015	105,442	107,082	108,588	109,930	111,300	112,679	114,057	114,970	115,341	115,787	116,344
Total, 55 and over	49,508	51,100	51,447	51,790	52,211	52,646	53,095	53,617	54,271	55,267	56,090	56,867
Men	85,799	89,553	90,333	91,061	91,855	92,655	93,481	94,374	95,272	96,185	97,094	97,962
16 to 24	16,773	15,449	15,233	15,033	14,946	14,841	14,752	14,687	14,801	15,024	15,295	15,489
25 to 54	47,343	51,663	52,497	53,260	53,939	54,635	55,337	56,043	56,510	56,713	56,952	57,250
55 and over	21,683	22,441	22,603	22,768	22,970	23,179	23,392	23,644	23,961	24,448	24,847	25,223
Women	94,790	98,434	99,204	99,923	100,711	101,500	102,320	103,198	104,085	104,983	105,879	106,737
16 to 24	17,293	15,996	15,775	15,573	15,479	15,368	15,275	15,211	15,315	15,536	15,801	15,999
25 to 54	49,672	53,779	54,585	55,328	55,991	56,665	57,342	58,014	58,460	58,628	58,835	59,094
55 and over	27,825	28,659	28,844	29,022	29,241	29,467	29,703	29,973	30,310	30,819	31,243	31,644
White	155,433	160,450	161,462	162,385	163,406	164,426	165,485	166,630	167,793	168,966	170,133	171,230
Men	74,392	77,045	77,573	78,056	78,588	79,122	79,673	80,271	80,872	81,482	82,091	82,660
Women	81,041	83,405	83,889	84,329	84,818	85,304	85,812	86,359	86,921	87,484	88,042	88,570
Black	19,989	21,333	21,640	21,941	22,268	22,593	22,941	23,306	23,669	24,036	24,400	24,750
Men	8,957	9,579	9,725	9,867	10,021	10,176	10,343	10,517	10,693	10,870	11,045	11,214
Women	11,032	11,754	11,915	12,074	12,247	12,417	12,598	12,789	12,976	13,166	13,355	13,536
Asian and other	5,164	6,204	6,435	6,658	6,892	7,136	7,375	7,636	7,895	8,166	8,440	8,719
Men	2,450	2,929	3,035	3,138	3,246	3,357	3,465	3,586	3,707	3,833	3,958	4,088
Women	2,714	3,275	3,400	3,520	3,646	3,779	3,910	4,050	4,188	4,333	4,482	4,631
Hispanic[1] origin	12,343	14,577	15,113	15,668	16,221	16,786	17,372	17,960	18,563	19,178	19,832	20,490
Men	6,105	7,262	7,536	7,827	8,113	8,406	8,711	9,015	9,325	9,643	9,981	10,322
Women	6,238	7,315	7,577	7,841	8,108	8,380	8,661	8,945	9,238	9,535	9,851	10,168
Labor force participation												
Total, 16 and over	65.3	66.2	66.4	66.7	66.8	67.0	67.2	67.3	67.5	67.6	67.7	67.8
Total, 16 to 24	68.6	69.9	70.3	70.6	70.7	70.8	70.8	70.7	70.9	71.1	71.4	71.9
Total, 25 to 54	82.0	83.6	84.0	84.4	84.7	85.1	85.4	85.7	85.9	86.2	86.4	86.6
Total, 55 and over	30.1	27.9	27.5	27.2	26.9	26.7	26.5	26.5	26.5	26.8	26.9	27.0
Men	76.3	75.8	75.8	75.7	75.5	75.4	75.3	75.2	75.0	74.9	74.7	74.7
16 to 24	73.0	73.7	74.0	74.1	74.1	73.9	73.8	73.5	73.5	73.7	73.9	74.3
25 to 54	93.8	93.4	93.3	93.2	93.2	93.1	93.0	92.9	92.9	92.8	92.7	92.6
55 and over	40.4	36.8	36.2	35.5	35.0	34.6	34.3	34.1	33.9	34.2	34.2	34.1
Women	55.3	57.4	58.0	58.5	58.9	59.4	59.8	60.2	60.6	60.9	61.2	61.5
16 to 24	64.3	66.2	66.7	67.2	67.5	67.7	67.9	68.0	68.3	68.7	69.1	69.5
25 to 54	70.8	74.3	75.1	75.9	76.6	77.4	78.1	78.7	79.2	79.8	80.3	80.8
55 and over	22.1	21.0	20.8	20.6	20.5	20.4	20.4	20.5	20.6	20.9	21.2	21.4
White	65.5	66.5	66.7	66.9	67.1	67.3	67.5	67.6	67.8	67.9	68.0	68.2
Men	76.9	76.5	76.4	76.2	76.1	76.0	75.9	75.8	75.6	75.5	75.4	75.3
Women	55.0	57.2	57.8	58.3	58.7	59.2	59.7	60.1	60.5	60.8	61.2	61.5
Black	63.5	64.6	65.0	65.2	65.4	65.5	65.6	65.7	65.8	65.9	65.9	66.0
Men	71.2	71.5	71.6	71.6	71.6	71.5	71.4	71.2	71.1	71.0	70.8	70.7
Women	57.2	59.1	59.5	60.0	60.3	60.6	60.9	61.2	61.4	61.7	61.9	62.1
Asian and other	64.9	64.8	65.1	65.3	65.5	65.7	65.8	65.8	65.9	65.8	65.8	65.8
Men	74.9	73.5	73.6	73.6	73.5	73.4	73.3	73.0	72.9	72.7	72.5	72.4
Women	55.9	57.0	57.6	58.0	58.4	58.9	59.2	59.4	59.6	59.8	59.9	60.1
Hispanic[1] origin	65.4	65.9	65.9	66.2	66.4	66.5	66.7	66.8	66.9	67.0	67.1	67.1
Men	81.0	80.5	80.2	80.2	80.0	79.9	79.8	79.5	79.4	79.2	79.0	78.8
Women	50.1	51.8	52.3	52.7	53.2	53.6	54.0	54.4	54.8	55.2	55.5	55.7

A-1. Civilian noninstitutional population and labor force by age, sex, race, and Hispanic origin, 1986 and projected 1990-2000—Continued

(Population and labor force in thousands and labor force participation in percent)

Group	1986	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Labor force												
Total, 16 and over	117,837	124,457	125,947	127,332	128,695	130,117	131,598	133,053	134,516	135,938	137,366	138,775
Total, 16 to 24	23,368	21,983	21,800	21,597	21,515	21,380	21,258	21,134	21,341	21,733	22,216	22,631
Total, 25 to 54	79,565	88,202	89,980	91,662	93,146	94,685	96,247	97,730	98,799	99,399	100,045	100,780
Total, 55 and over	14,904	14,272	14,167	14,073	14,034	14,052	14,093	14,189	14,376	14,806	15,105	15,364
Men	65,423	67,909	68,432	68,890	69,358	69,851	70,392	70,924	71,475	72,033	72,574	73,136
16 to 24	12,251	11,386	11,272	11,136	11,069	10,973	10,881	10,792	10,875	11,066	11,304	11,506
25 to 54	44,406	48,258	48,983	49,663	50,247	50,849	51,488	52,081	52,471	52,615	52,779	53,024
55 and over	8,766	8,265	8,177	8,091	8,042	8,029	8,023	8,051	8,129	8,352	8,491	8,606
Women	52,414	56,548	57,515	58,442	59,337	60,266	61,206	62,129	63,041	63,905	64,792	65,639
16 to 24	11,117	10,597	10,528	10,461	10,446	10,407	10,377	10,342	10,466	10,667	10,912	11,125
25 to 54	35,159	39,944	40,997	41,999	42,899	43,836	44,759	45,649	46,328	46,784	47,266	47,756
55 and over	6,138	6,007	5,990	5,982	5,992	6,023	6,070	6,138	6,247	6,454	6,614	6,758
White	101,801	106,648	107,700	108,675	109,619	110,627	111,686	112,711	113,737	114,729	115,727	116,701
Men	57,216	58,909	59,236	59,516	59,800	60,114	60,471	60,814	61,166	61,532	61,883	62,252
Women	44,585	47,739	48,464	49,159	49,819	50,513	51,215	51,897	52,571	53,197	53,844	54,449
Black	12,684	13,788	14,057	14,307	14,559	14,802	15,058	15,320	15,578	15,833	16,084	16,334
Men	6,373	6,846	6,963	7,066	7,172	7,274	7,380	7,492	7,606	7,716	7,821	7,926
Women	6,311	6,942	7,094	7,241	7,387	7,528	7,678	7,828	7,972	8,117	8,263	8,408
Asian and other	3,352	4,021	4,190	4,350	4,517	4,688	4,854	5,022	5,201	5,376	5,555	5,740
Men	1,834	2,154	2,233	2,308	2,386	2,463	2,541	2,618	2,703	2,785	2,870	2,958
Women	1,518	1,867	1,957	2,042	2,131	2,225	2,313	2,404	2,498	2,591	2,685	2,782
Hispanic[1] origin	8,076	9,718	10,118	10,524	10,930	11,353	11,787	12,219	12,665	13,128	13,602	14,086
Men	4,948	5,896	6,120	6,348	6,573	6,805	7,048	7,284	7,529	7,781	8,038	8,303
Women	3,128	3,822	3,998	4,176	4,357	4,548	4,739	4,935	5,136	5,347	5,564	5,783

[1] Hispanics may be of any race.

A-2. Civilian noninstitutional population and labor force by age, sex, race, and Hispanic origin, 1986 and projected 1995 and 2000

(Population and labor force in thousands and labor force participation in percent)

Group	Population			Labor force participation			Labor force		
	1986	1995	2000	1986	1995	2000	1986	1995	2000
White, 16 and over	155,433	165,485	171,230	65.5	67.5	68.2	101,801	111,686	116,701
Men	74,392	79,673	82,660	76.9	75.9	75.3	57,216	60,471	62,252
16 to 17	3,084	2,839	3,027	48.7	51.1	52.5	1,502	1,451	1,589
18 to 19	2,894	2,583	2,886	70.5	73.5	75.3	2,040	1,899	2,173
20 to 24	8,002	6,487	6,455	87.3	88.8	89.7	6,986	5,760	5,790
25 to 29	8,968	7,448	6,809	94.9	94.2	93.9	8,515	7,016	6,394
30 to 34	8,597	8,941	7,730	96.0	95.5	95.6	8,253	8,539	7,390
35 to 39	7,764	9,189	8,900	95.7	94.9	94.8	7,434	8,720	8,437
40 to 44	6,076	8,396	9,196	95.0	94.5	94.2	5,773	7,934	8,663
45 to 49	5,008	7,381	8,321	93.6	93.3	93.1	4,688	6,886	7,747
50 to 54	4,570	5,786	7,275	89.8	89.0	88.6	4,103	5,150	6,446
55 to 59	4,696	4,612	5,560	79.8	77.4	76.3	3,749	3,570	4,242
60 to 61	1,847	1,685	1,837	69.1	65.7	64.0	1,277	1,107	1,176
62 to 64	2,657	2,420	2,489	46.4	41.1	39.1	1,233	995	973
65 to 69	3,866	3,970	3,716	25.3	20.4	18.2	979	810	676
70 to 71	1,356	1,447	1,407	15.3	12.4	11.1	208	179	156
72 to 74	1,586	1,938	1,923	14.1	10.6	8.8	223	205	169
75 and over	3,421	4,551	5,129	7.4	5.5	4.5	253	250	231
Women	81,041	85,812	88,570	55.0	59.7	61.5	44,585	51,215	54,449
16 to 17	2,953	2,710	2,891	47.2	52.4	54.0	1,393	1,420	1,561
18 to 19	2,949	2,631	2,932	65.3	69.9	72.4	1,927	1,839	2,123
20 to 24	8,351	6,846	6,816	74.1	78.6	80.8	6,191	5,381	5,507
25 to 29	9,073	7,592	6,948	72.9	79.9	83.0	6,618	6,066	5,767
30 to 34	8,656	8,924	7,747	70.6	80.2	84.1	6,111	7,157	6,515
35 to 39	7,938	9,175	8,892	72.7	81.4	85.0	5,768	7,468	7,558
40 to 44	6,284	8,445	9,152	73.2	80.9	84.2	4,597	6,832	7,706
45 to 49	5,198	7,526	8,363	69.3	77.5	81.0	3,603	5,833	6,774
50 to 54	4,812	6,019	7,467	62.0	66.9	69.5	2,985	4,027	5,190
55 to 59	5,128	4,937	5,907	51.1	53.6	55.0	2,618	2,646	3,249
60 to 61	2,100	1,839	1,991	40.3	40.6	40.8	846	747	812
62 to 64	3,048	2,697	2,731	28.2	28.7	28.8	859	774	787
65 to 69	4,645	4,674	4,293	14.3	12.8	11.8	666	598	507
70 to 71	1,631	1,809	1,694	7.7	7.4	7.2	125	134	122
72 to 74	2,213	2,515	2,464	6.4	6.3	6.3	141	158	155
75 and over	6,062	7,473	8,282	2.3	1.8	1.4	137	135	116
Black, 16 and over	19,989	22,941	24,750	63.5	65.6	66.0	12,684	15,058	16,334
Men	8,957	10,343	11,214	71.2	71.4	70.7	6,373	7,380	7,926
16 to 17	548	572	612	30.1	34.3	36.6	165	196	224
18 to 19	503	495	562	58.4	60.2	61.2	294	298	344
20 to 24	1,195	1,090	1,134	80.1	81.4	81.9	957	887	929
25 to 29	1,204	1,106	1,094	89.3	87.9	87.0	1,075	972	952
30 to 34	1,060	1,261	1,159	90.0	90.6	90.6	954	1,142	1,050
35 to 39	881	1,217	1,253	89.9	91.0	91.3	792	1,107	1,144
40 to 44	636	1,021	1,200	89.2	89.9	90.1	567	918	1,081
45 to 49	565	806	1,014	86.4	86.4	86.4	488	696	876
50 to 54	507	629	807	81.5	80.4	80.5	413	506	650
55 to 59	495	549	631	70.7	68.7	64.2	350	377	405
60 to 61	192	203	230	54.2	44.8	39.1	104	91	90
62 to 64	247	269	291	39.3	31.2	27.5	97	84	80
65 to 69	362	435	449	21.0	15.9	14.5	76	69	65
70 to 71	106	141	151	11.3	8.5	6.6	12	12	10
72 to 74	147	171	190	11.6	7.6	6.8	17	13	13
75 and over	309	378	437	3.9	3.2	3.0	12	12	13

A-2. Civilian noninstitutional population and labor force by age, sex, race, and Hispanic origin, 1986 and projected 1995 and 2000—Continued

(Population and labor force in thousands and labor force participation in percent)

Group	Population			Labor force participation			Labor force		
	1986	1995	2000	1986	1995	2000	1986	1995	2000
Women	11,032	12,598	13,536	57.2	60.9	62.1	6,311	7,678	8,408
16 to 17	542	559	592	29.0	34.5	37.2	157	193	220
18 to 19	545	528	593	49.2	54.5	57.0	268	288	338
20 to 24	1,430	1,300	1,339	64.6	67.9	69.6	924	883	932
25 to 29	1,451	1,348	1,319	71.6	74.2	75.7	1,039	1,000	998
30 to 34	1,311	1,508	1,385	75.3	78.4	80.2	987	1,182	1,111
35 to 39	1,093	1,454	1,489	77.2	82.3	83.4	844	1,197	1,242
40 to 44	800	1,237	1,421	74.1	79.9	82.1	593	988	1,167
45 to 49	704	998	1,232	70.6	76.5	79.1	497	763	975
50 to 54	637	789	1,002	62.2	67.3	70.1	396	531	702
55 to 59	600	666	762	53.0	55.0	56.2	318	366	428
60 to 61	235	243	278	36.2	39.1	38.8	85	95	108
62 to 64	310	331	357	31.0	29.6	28.9	96	98	103
65 to 69	474	545	558	13.9	9.4	8.1	66	51	45
70 to 71	166	186	194	7.8	5.9	4.6	13	11	9
72 to 74	207	243	263	5.3	5.3	3.8	11	13	10
75 to 79	527	663	752	3.2	2.9	2.7	17	19	20
Asian and other, 16 and over	5,164	7,375	8,719	64.9	65.8	65.8	3,352	4,854	5,740
Men	2,450	3,465	4,088	74.9	73.3	72.4	1,834	2,541	2,958
16 to 17	136	158	199	29.4	29.1	29.1	40	46	58
18 to 19	110	151	195	55.5	57.6	57.9	61	87	113
20 to 24	301	377	419	68.4	68.2	68.3	206	257	286
25 to 29	317	388	436	89.9	86.6	86.2	285	336	376
30 to 34	353	444	462	85.3	85.8	85.9	301	381	397
35 to 39	278	413	456	93.2	90.8	90.6	259	375	413
40 to 44	224	375	437	91.1	90.7	90.4	204	340	395
45 to 49	193	304	388	92.7	89.1	88.9	179	271	345
50 to 54	142	232	313	86.6	85.8	85.6	123	199	268
55 to 59	117	179	231	82.1	80.4	79.2	96	144	183
60 to 61	38	59	78	68.4	54.2	52.6	26	32	41
62 to 64	46	77	101	47.8	49.4	47.5	22	38	48
65 to 69	85	111	134	28.2	24.3	21.6	24	27	29
70 to 71	21	39	44	9.5	7.7	4.5	2	3	2
72 to 74	28	52	59	10.7	5.8	3.4	3	3	2
75 and over	61	106	136	4.9	1.9	1.5	3	2	2
Women	2,714	3,910	4,631	55.9	59.2	60.1	1,518	2,313	2,782
16 to 17	124	153	194	24.2	26.8	24.7	30	41	48
18 to 19	109	150	194	45.0	45.3	45.9	49	68	89
20 to 24	290	398	448	61.4	66.3	68.5	178	264	307
25 to 29	370	414	469	59.5	69.6	72.5	220	288	340
30 to 34	373	453	481	62.7	72.4	76.3	234	328	367
35 to 39	336	438	472	68.5	77.4	80.9	230	339	382
40 to 44	240	413	467	71.7	78.7	82.0	172	325	383
45 to 49	217	344	423	71.0	74.1	76.1	154	255	322
50 to 54	176	265	365	63.1	67.9	70.4	111	180	257
55 to 59	131	208	275	55.0	58.2	59.6	72	121	164
60 to 61	46	76	93	45.7	43.4	43.0	21	33	40
62 to 64	77	105	124	32.5	33.3	33.1	25	35	41
65 to 69	90	163	191	15.6	14.1	13.1	14	23	25
70 to 71	25	52	65	12.0	9.6	9.2	3	5	6
72 to 74	31	68	86	6.5	5.9	7.0	2	4	6
75 and over	79	210	284	3.8	1.9	1.8	3	4	5

A-2. Civilian noninstitutional population and labor force by age, sex, race, and Hispanic origin, 1986 and projected 1995 and 2000—Continued

(Population and labor force in thousands and labor force participation in percent)

Group	Population			Labor force participation			Labor force		
	1986	1995	2000	1986	1995	2000	1986	1995	2000
Hispanic[1], 16 and over	12,343	17,372	20,490	65.4	66.7	67.1	8,076	11,787	14,086
Men	6,105	8,711	10,322	81.0	79.8	78.8	4,948	7,048	8,303
16 to 17	330	433	534	34.5	36.8	38.1	114	159	203
18 to 19	325	421	497	68.3	71.8	73.3	222	302	364
20 to 24	1,006	1,112	1,254	88.3	88.6	89.4	888	985	1,121
25 to 34	1,787	2,483	2,658	93.4	94.0	93.7	1,669	2,334	2,491
35 to 44	1,088	1,934	2,397	93.3	93.6	93.2	1,015	1,810	2,234
45 to 54	735	1,092	1,471	89.9	88.6	88.2	661	968	1,297
55 to 59	241	355	454	81.3	79.8	79.3	196	283	360
60 to 64	225	290	339	56.4	53.0	52.6	127	154	178
65 and over	368	591	718	15.2	8.9	7.7	56	53	55
Women	6,238	8,661	10,168	50.1	54.0	55.7	3,128	4,739	5,783
16 to 17	328	417	515	27.1	31.5	33.7	89	132	173
18 to 19	319	411	483	46.1	52.4	54.5	147	215	263
20 to 24	893	1,063	1,197	58.9	62.0	64.2	526	659	770
25 to 34	1,723	2,233	2,402	59.0	65.0	68.1	1,016	1	1,636
35 to 44	1,151	1,818	2,164	60.6	67.9	71.6	698	1,. 4	1,549
45 to 54	760	1,156	1,499	57.4	63.5	66.7	436	734	1,000
55 to 59	303	399	503	41.6	44.3	45.4	126	177	228
60 to 64	254	339	393	24.4	26.7	26.9	62	90	106
65 and over	507	825	1,012	5.5	5.7	5.7	28	47	58

[1] Hispanics may be of any race.

B-1. Gross national product by industry, 1977, 1982, 1985, and projected 2000

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
Total	2,958,614	3,165,946	3,585,085	4,617,484	5,161,421	5,552,438
1. Livestock and livestock products	1,814	2,463	3,868	3,990	4,918	5,185
2. Other agricultural products	36,107	37,558	38,855	42,496	52,200	66,092
3. Agricultural services, forestry, and fishing	-414	1,263	2,134	5,603	6,690	7,039
4. Metal mining	-1,457	33	521	388	170	142
5. Coal mining	3,805	5,821	4,517	5,721	6,159	6,307
6. Crude petroleum, natural gas, and gas liquids	-82,504	-42,040	-38,393	-77,192	-94,157	-104,814
7. Oil and gas field services	21,437	36,672	33,234	30,118	38,529	44,272
8. Nonmetallic minerals, except fuels	1,183	539	-266	-740	-653	-546
9. New nonfarm housing, single units	92,623	41,188	79,404	95,845	101,352	142,021
10. New nonfarm housing, nec	17,841	17,780	29,186	21,901	23,439	32,270
11. Nonfarm residential alterations and additions	25,238	21,302	29,660	34,751	36,822	51,392
12. New farm housing, alterations, and additions	2,369	1,498	1,042	568	600	841
13. New industrial buildings	12,556	17,177	14,358	10,454	15,005	19,177
14. New office buildings	10,704	25,476	30,989	32,166	40,643	42,262
15. New commercial buildings except offices	16,011	15,871	26,271	32,258	40,111	41,172
16. New educational buildings	10,118	7,498	7,673	7,130	10,484	11,183
17. New hospitals and institutions	7,762	8,298	7,074	6,706	8,003	8,197
18. New nonfarm buildings, nec	7,811	9,771	13,999	16,176	20,403	25,140
19. New communications facilities	6,158	6,952	6,860	5,407	8,185	10,893
20. New electric utility facilities	18,283	17,790	14,865	11,155	20,499	23,457
21. New water supply and sewer facilities	11,357	10,378	11,310	11,425	16,546	17,746
22. New gas utility and pipeline facilities	3,989	3,620	3,550	1,692	3,546	4,244
23. New roads	18,901	16,130	20,426	21,187	26,249	27,745
24. New local transit facilities	1,182	1,083	1,033	824	1,024	1,081
25. New conservation and development facilities	4,574	4,050	3,826	2,876	3,545	3,834
26. New nonbuilding facilities, nec	15,169	10,938	9,876	6,925	9,916	11,212
27. Maintenance and repair construction	33,248	33,499	47,785	46,261	57,066	65,963
28. Logging camps and logging contractors	1,048	943	1,038	2,152	2,489	2,653
29. Sawmills and planing mills	-2,545	-1,376	-3,121	-3,099	-3,442	-3,293
30. Millwork and structural wood members, nec	314	-40	33	116	473	648
31. Veneer and plywood	-508	-394	-768	-461	-255	-169
32. Wood containers and miscellaneous wood products	671	554	576	955	1,056	1,056
33. Mobile homes	4,363	3,576	4,137	3,180	3,804	4,703
34. Prefabricated wood buildings	211	38	55	64	152	197
35. Household furniture	12,917	11,887	13,813	17,998	19,355	21,136
36. Partitions and fixtures	2,945	2,969	3,529	5,735	6,809	7,317
37. Office and miscellaneous furniture and fixtures	5,405	6,722	8,386	13,497	15,920	16,733
38. Glass and glass products	2,108	1,157	857	919	1,205	1,093
39. Hydraulic cement	-99	-62	-535	-540	-592	-613
40. Concrete, gypsum, and plaster products	524	8	72	-53	236	363
41. Stone, clay, and miscellaneous mineral products	1,863	875	344	538	552	380
42. Blast furnaces and basic steel products	-7,303	-13,553	-11,687	-13,302	-17,293	-18,473
43. Iron and steel foundries	604	-193	1	-294	-468	-584
44. Primary aluminum	-1,392	-1,224	-693	-918	-1,145	-1,235
45. Primary nonferrous metals, except aluminum	-3,949	-2,562	-3,657	-3,879	-4,367	-4,590
46. Miscellaneous primary and secondary metals	7	-59	48	53	58	64
47. Copper rolling and drawing	-194	-237	-332	-403	-524	-536
48. Aluminum rolling and drawing	870	-347	-370	-283	-208	-135
49. Nonferrous rolling and drawing, nec	262	145	394	364	371	394
50. Nonferrous wire drawing and insulating	650	138	18	137	-18	-144

See footnotes at end of table.

B-1. Gross national product by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
51. Aluminum foundries	201	97	189	224	317	365
52. Nonferrous foundries, except aluminum	48	10	63	77	104	117
53. Metal cans and shipping containers	457	187	92	89	39	-58
54. Cutlery, hand tools, and hardware	3,182	1,787	1,837	2,350	2,657	2,255
55. Plumbing and nonelectric heating equipment	851	25	427	373	539	576
56. Fabricated structural metal products	8,259	5,978	5,732	6,704	8,807	10,173
57. Screw machine products, bolts, rivets, etc	-119	-425	-518	-575	-507	-478
58. Forgings	218	-63	134	147	180	199
59. Automotive stampings	1,228	926	1,215	1,305	2,082	2,145
60. Stampings, except automotive	1,356	1,094	1,341	1,485	1,668	1,835
61. Metal coating, engraving, and allied services	110	36	126	100	170	203
62. Ordnance, except vehicles and missiles	3,978	5,074	6,327	8,012	9,639	10,236
63. Miscellaneous fabricated metal products	4,211	2,338	1,328	1,810	2,053	1,833
64. Engines and turbines	7,768	4,963	4,421	4,534	5,321	4,314
65. Farm and garden machinery	15,393	10,007	8,633	10,337	9,512	8,524
66. Construction machinery	15,459	8,033	8,270	9,688	10,084	10,225
67. Mining and oil field machinery	7,302	9,363	5,472	6,137	7,160	8,218
68. Materials handling machinery and equipment	5,122	4,533	4,522	6,094	7,287	8,019
69. Metalworking machinery	14,237	11,486	11,715	13,144	15,644	16,214
70. Special industry machinery	11,408	9,228	9,394	8,672	9,382	9,221
71. General industrial machinery	11,494	9,335	7,928	10,173	10,878	10,355
72. Electronic computing equipment	4,553	24,651	59,756	148,042	172,656	192,272
73. Office and accounting machines	2,324	4,842	5,918	9,001	9,232	8,314
74. Refrigeration and service industry machinery	7,207	6,665	7,104	9,946	12,160	13,079
75. Miscellaneous nonelectrical machinery	716	992	1,254	1,678	2,467	2,923
76. Electric distributing equipment	4,206	3,303	3,146	2,796	4,883	6,130
77. Electrical industrial apparatus	4,682	3,937	3,332	3,834	4,042	3,869
78. Household appliances	11,404	9,593	11,727	18,055	19,029	20,345
79. Electric lighting and wiring equipment	3,550	2,282	2,126	2,477	2,641	2,441
80. Electronic home entertainment equipment	3,738	4,689	4,690	14,477	12,170	10,464
81. Telephone and telegraph apparatus	6,869	8,501	10,147	15,291	18,148	20,153
82. Radio and TV communication equipment	15,646	27,685	36,363	55,736	66,716	72,610
83. Electronic tubes	880	225	213	174	193	152
84. Semiconductors and related devices	38	11	-1,896	260	-3,492	-7,118
85. Miscellaneous electronic components	1,267	1,697	-1,883	-1,514	-6,749	-11,125
86. Storage batteries and engine electrical parts	2,610	1,742	2,145	2,684	3,114	2,468
87. X-ray and other electromedical apparatus	2,799	3,604	3,986	7,089	7,906	8,030
88. Electrical equipment and supplies, nec	1,012	1,285	1,796	2,663	2,838	2,941
89. Motor vehicles and car bodies	101,652	64,974	104,771	115,759	132,986	147,387
90. Motor vehicle parts and accessories	3,016	2,986	1,073	3,524	6,027	3,541
91. Truck and bus bodies, trailers, and motor homes	7,965	4,633	6,902	8,197	10,392	12,254
92. Aircraft	20,476	27,522	30,626	31,620	38,203	42,981
93. Aircraft and missile engines and equipment	12,687	17,635	22,568	28,192	32,546	33,428
94. Guided missiles and space vehicles	7,775	9,141	14,327	14,574	17,213	18,277
95. Ship and boat building and repairing	12,929	13,398	11,684	10,386	11,996	12,895
96. Railroad equipment	4,899	1,949	1,699	694	576	618
97. Miscellaneous transportation equipment	4,798	4,749	5,771	8,968	9,629	9,159
98. Engineering and scientific instruments	2,758	2,911	3,286	4,384	5,366	5,901
99. Measuring and controlling devices	8,067	9,967	11,447	15,297	19,852	21,520
100. Optical and ophthalmic products	2,240	4,402	5,334	10,317	11,909	12,359

See footnotes at end of table.

B-1. Gross national product by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
101. Medical instruments and supplies	4,649	6,147	7,054	12,722	15,086	15,915
102. Photographic equipment and supplies	7,877	9,365	10,416	13,286	15,285	16,452
103. Watches, clocks, and parts	941	427	200	146	43	-254
104. Jewelry, silverware, and plated ware	7,577	4,440	4,460	4,743	4,842	3,627
105. Toys and sporting goods	6,737	7,063	6,320	8,759	9,822	9,162
106. Manufactured products, nec	7,217	6,056	5,977	5,816	6,881	7,281
107. Meat products	41,235	40,707	44,691	48,577	53,017	58,838
108. Dairy products	26,962	25,918	28,588	30,682	33,206	36,400
109. Canned, dried, and frozen foods	24,551	22,620	23,592	28,444	31,291	34,791
110. Grain mill products and fats and oils	13,069	16,525	16,497	19,347	22,239	25,464
111. Bakery products	15,642	14,185	14,709	15,747	16,923	18,531
112. Sugar and confectionery products	8,823	8,193	8,503	8,545	9,317	10,391
113. Alcoholic beverages	14,494	14,962	14,618	15,524	16,450	18,188
114. Soft drinks and flavorings	12,604	13,831	14,598	17,372	18,577	20,437
115. Miscellaneous foods and kindred products	12,219	15,603	16,413	20,632	22,323	24,398
116. Tobacco manufactures	16,514	16,653	15,380	12,015	14,548	16,134
117. Weaving, finishing, yarn and thread mills	2,513	225	-187	-856	-646	-2,153
118. Knitting mills	2,078	2,598	3,295	4,284	4,826	5,283
119. Floor covering mills	3,683	3,709	4,612	7,367	8,323	9,055
120. Miscellaneous textile goods	219	186	125	107	182	313
121. Apparel	38,431	36,705	35,966	42,479	42,291	44,408
122. Miscellaneous fabricated textile products	6,224	6,029	6,389	7,692	9,125	9,327
123. Pulp, paper, and paperboard mills	-1,524	-1,004	-3,550	-3,845	-4,269	-4,474
124. Converted paper products except containers	9,534	10,077	11,314	15,808	18,934	20,775
125. Paperboard containers and boxes	1,047	516	698	846	1,305	1,511
126. Newspapers	5,974	6,235	5,588	5,693	6,663	7,245
127. Periodicals	3,793	4,845	4,198	5,021	5,984	6,547
128. Books	7,231	6,754	7,481	7,776	10,499	11,661
129. Miscellaneous publishing	1,023	913	1,123	1,493	1,960	2,170
130. Commercial printing and business forms	3,725	3,534	3,968	4,862	7,165	8,004
131. Greeting card publishing	893	1,321	1,642	2,376	2,869	3,158
132. Blankbooks and bookbinding	568	507	559	758	1,102	1,236
133. Printing trade services	29	12	16	19	40	51
134. Industrial chemicals	6,631	5,907	4,283	4,270	7,566	10,087
135. Plastics materials and synthetics	2,262	2,898	2,443	4,537	6,613	8,045
136. Drugs	12,392	13,213	14,352	21,363	27,029	29,978
137. Soap, cleaners, and toilet goods	18,742	18,971	19,712	25,748	30,676	33,515
138. Paints and allied products	860	787	878	1,188	1,612	1,839
139. Agricultural chemicals	1,832	1,754	2,754	2,538	3,606	4,224
140. Miscellaneous chemical products	2,195	2,203	2,973	3,369	4,878	5,601
141. Petroleum refining	91,177	80,283	86,185	91,982	103,702	109,504
142. Miscellaneous petroleum and coal products	2,012	1,528	1,544	1,692	2,058	2,253
143. Tires and inner tubes	5,852	3,329	3,731	2,899	3,607	3,152
144. Rubber products and plastic hose and footwear	2,115	2,195	2,461	2,650	3,229	3,525
145. Miscellaneous plastics products	2,817	2,602	2,455	3,809	5,269	6,456
146. Footwear except rubber and plastic	5,899	4,881	3,934	2,683	2,541	2,401
147. Luggage, handbags, and leather products, nec	2,182	1,829	1,627	929	1,132	1,282
148. Railroad transportation	9,505	10,245	10,554	10,776	12,635	14,035
149. Local and interurban passenger transit	12,195	9,592	9,775	8,162	10,379	11,038
150. Trucking and warehousing	21,796	19,831	24,227	31,352	37,091	40,404

See footnotes at end of table.

B-1. Gross national product by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
151. Water transportation	13,458	11,832	14,259	16,414	19,260	21,297
152. Air transportation	29,220	26,762	31,994	52,635	63,171	66,889
153. Pipe lines, except natural gas	2,201	1,511	1,679	1,934	2,300	2,486
154. Arrangement of passenger transportation	1,101	1,424	2,157	4,055	4,938	5,354
155. Miscellaneous transportation services	193	234	261	345	438	505
156. Communications except broadcasting	36,347	49,378	47,463	71,356	84,832	91,885
157. Radio and television broadcasting	452	728	842	1,963	2,280	2,358
158. Electric utilities including combined services	49,326	52,989	59,890	82,771	88,451	96,676
159. Gas utilities including combined services	24,405	25,189	26,080	28,708	29,843	29,991
160. Water and sanitation including combined services	8,491	9,366	10,231	12,021	13,984	14,415
161. Wholesale trade	138,833	149,132	182,126	244,998	288,971	321,294
162. Retail trade, except eating and drinking places	231,492	259,966	304,787	426,180	469,497	511,516
163. Eating and drinking places	98,725	109,375	120,841	147,865	154,135	168,205
164. Banking	40,987	49,343	56,351	79,874	93,772	98,265
165. Credit agencies and investment offices	6,905	7,216	9,728	14,095	16,385	16,969
166. Security and commodity brokers and exchanges	8,286	9,649	18,346	29,824	34,828	36,173
167. Insurance carriers	45,319	51,487	56,429	68,236	79,654	82,769
168. Insurance agents, brokers, and service	0	0	0	0	0	0
169. Real estate	103,385	102,202	116,812	147,136	170,358	185,432
170. Owner-occupied dwellings	194,189	228,458	241,087	320,602	364,711	377,805
171. Hotels and other lodging places	16,027	17,630	18,560	22,474	25,974	26,997
172. Laundry, cleaning, and shoe repair	8,911	7,546	8,317	7,458	8,777	9,096
173. Personal services, nec	8,264	10,350	10,747	14,684	17,054	17,642
174. Beauty and barber shops	10,581	9,945	11,393	11,239	13,052	13,502
175. Funeral service and crematories	4,540	3,652	3,452	3,457	4,015	4,154
176. Advertising	1,568	1,338	1,423	1,564	2,073	2,203
177. Services to dwellings and other buildings	1,616	1,594	2,043	3,131	3,815	3,997
178. Personnel supply services	2,535	3,040	4,186	5,792	6,732	7,075
179. Computer and data processing services	3,866	7,303	9,799	12,466	15,759	16,798
180. Research, management, and consulting services	7,453	9,565	10,998	13,250	16,336	17,679
181. Detective and protective services	-7	62	-27	213	67	62
182. Equipment rental and leasing	1,145	1,514	2,041	4,230	4,783	5,029
183. Photocopying, commercial art, photofinishing	2,586	3,061	3,662	6,896	8,006	8,293
184. Credit reporting and business services, nec	1,015	1,012	1,169	1,471	1,844	1,931
185. Automotive rentals, without drivers	1,266	1,035	1,321	1,340	1,837	1,963
186. Automobile parking, repair, and services	39,306	35,005	42,449	49,625	58,753	62,501
187. Electrical repair shops	4,940	4,549	4,598	4,295	5,014	5,196
188. Watch, clock, jewelry, and furniture repair	2,875	3,050	2,915	2,566	2,965	3,061
189. Miscellaneous repair shops and related services	1,894	2,291	2,517	2,470	2,904	2,939
190. Motion pictures	4,670	5,765	5,514	6,261	7,330	7,864
191. Theatrical producers and entertainers	1,487	2,197	2,553	5,067	5,884	6,093
192. Bowling alleys and billiard establishments	1,867	1,729	1,594	1,430	1,661	1,718
193. Commercial sports	2,930	3,329	3,263	3,389	3,925	4,070
194. Amusement and recreation services, nec	10,758	17,170	18,807	35,260	40,931	42,374
195. Offices of health practitioners	65,804	78,249	87,035	141,373	149,490	157,933
196. Nursing and personal care facilities	16,242	20,440	21,741	35,213	37,162	39,259
197. Hospitals, private	73,349	91,406	96,017	138,884	146,703	154,988
198. Outpatient facilities and health services,nec	12,723	17,385	22,608	41,372	43,937	46,347
199. Legal services	19,407	21,422	24,054	28,446	33,787	35,243
200. Educational services, private	29,813	31,578	35,639	40,998	47,087	48,835

See footnotes at end of table.

B-1. Gross national product by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
201. Individual and miscellaneous social services	7,259	10,746	12,774	17,582	20,419	21,123
202. Job training and related services	1,470	1,792	2,008	2,553	2,970	3,077
203. Child day care services	5,021	6,246	8,254	15,130	17,571	18,176
204. Residential care	3,774	4,978	6,480	11,646	13,525	13,991
205. Museums and noncommercial organizations, nec	5,403	7,658	8,866	12,320	14,306	14,802
206. Business and professional associations	1,428	1,616	1,764	2,090	2,471	2,563
207. Labor, civic, and social organizations	9,114	9,041	9,645	10,876	12,645	13,103
208. Religious organizations	15,292	15,709	15,824	16,304	18,934	19,587
209. Private households	8,646	7,659	9,284	8,671	9,925	10,193
210. Engineering and architectural services	2,453	3,470	1,996	4,261	5,415	6,308
211. Accounting, auditing, and services, nec	3,233	4,285	4,826	5,200	6,843	7,267
212. Post Office	4,835	5,887	7,112	9,574	11,107	11,500
213. Federal electric utilities	0	0	0	0	0	0
214. Commodity Credit Corporation	-80	-143	-171	-171	-187	-200
215. Federal government enterprises, nec	-52	35	-168	-376	-375	-376
216. Federal general government	109,516	116,880	122,600	132,701	135,266	137,827
217. Local government passenger transit	0	0	0	0	0	0
218. State and local electric utilities	0	0	0	0	0	0
219. State and local government enterprises, nec	5,485	6,509	7,152	8,551	9,963	10,355
220. State and local government hospitals	14,810	17,935	20,207	28,011	28,626	29,513
221. State and local government education	114,413	120,749	123,942	154,533	157,930	162,825
222. State and local general government, nec	72,984	88,193	90,525	115,372	117,933	121,592
223. Noncomparable imports	-15,819	-19,451	-21,068	-20,001	-26,860	-32,559
224. Scrap, used and secondhand goods	-4,636	-2,985	-7,130	-6,721	-12,287	-16,875
225. Rest of the world industry	37,861	46,452	40,141	80,175	71,332	70,744
226. Inventory valuation adjustment	-33,123	-11,229	-14,525	-6,347	-34,468	-47,670

nec = not elsewhere classified.

NOTE: Detail may not add to totals because of rounding.

B-2. Personal consumption expenditures by industry, 1977, 1982, 1985, and projected 2000

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
Total	1,883,755	2,050,666	2,324,521	3,101,166	3,429,450	3,659,668
1. Livestock and livestock products	3,594	3,285	3,831	4,567	4,966	5,317
2. Other agricultural products	11,582	10,722	12,336	14,905	16,149	17,600
3. Agricultural services, forestry, and fishing	1,547	3,008	4,340	8,994	10,105	10,699
4. Metal mining	0	0	0	0	0	0
5. Coal mining	343	190	175	163	161	158
6. Crude petroleum, natural gas, and gas liquids	0	0	0	0	0	0
7. Oil and gas field services	0	0	0	0	0	0
8. Nonmetallic minerals, except fuels	36	84	92	120	131	142
9. New nonfarm housing, single units	0	0	0	0	0	0
10. New nonfarm housing, nec	0	0	0	0	0	0
11. Nonfarm residential alterations and additions	0	0	0	0	0	0
12. New farm housing, alterations, and additions	0	0	0	0	0	0
13. New industrial buildings	0	0	0	0	0	0
14. New office buildings	0	0	0	0	0	0
15. New commercial buildings except offices	0	0	0	0	0	0
16. New educational buildings	0	0	0	0	0	0
17. New hospitals and institutions	0	0	0	0	0	0
18. New nonfarm buildings, nec	0	0	0	0	0	0
19. New communications facilities	0	0	0	0	0	0
20. New electric utility facilities	0	0	0	0	0	0
21. New water supply and sewer facilities	0	0	0	0	0	0
22. New gas utility and pipeline facilities	0	0	0	0	0	0
23. New roads	0	0	0	0	0	0
24. New local transit facilities	0	0	0	0	0	0
25. New conservation and development facilities	0	0	0	0	0	0
26. New nonbuilding facilities, nec	0	0	0	0	0	0
27. Maintenance and repair construction	0	0	0	0	0	0
28. Logging camps and logging contractors	0	0	0	0	0	0
29. Sawmills and planing mills	0	0	0	0	0	0
30. Millwork and structural wood members, nec	0	0	0	0	0	0
31. Veneer and plywood	0	0	0	0	0	0
32. Wood containers and miscellaneous wood products	749	840	1,010	1,281	1,358	1,515
33. Mobile homes	0	0	0	0	0	0
34. Prefabricated wood buildings	0	0	0	0	0	0
35. Household furniture	11,547	11,404	13,500	17,707	18,832	21,130
36. Partitions and fixtures	0	0	0	0	0	0
37. Office and miscellaneous furniture and fixtures	809	852	1,041	1,909	2,030	2,278
38. Glass and glass products	1,267	1,001	1,205	1,647	1,761	1,971
39. Hydraulic cement	0	0	0	0	0	0
40. Concrete, gypsum, and plaster products	2	4	4	6	6	7
41. Stone, clay, and miscellaneous mineral products	1,746	1,740	2,029	2,027	2,205	2,430
42. Blast furnaces and basic steel products	18	9	9	12	14	14
43. Iron and steel foundries	0	0	0	0	0	0
44. Primary aluminum	0	0	0	0	0	0
45. Primary nonferrous metals, except aluminum	0	0	0	0	0	0
46. Miscellaneous primary and secondary metals	0	0	0	0	0	1
47. Copper rolling and drawing	0	0	0	0	0	0
48. Aluminum rolling and drawing	0	0	0	0	0	0
49. Nonferrous rolling and drawing, nec	0	0	0	0	0	0
50. Nonferrous wire drawing and insulating	12	12	15	22	24	27

See footnotes at end of table.

B-2. Personal consumption expenditures by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
51. Aluminum foundries	51	26	32	43	46	52
52. Nonferrous foundries, except aluminum	0	0	0	0	0	0
53. Metal cans and shipping containers	0	0	0	0	0	0
54. Cutlery, hand tools, and hardware	2,331	1,936	2,357	2,503	2,783	3,066
55. Plumbing and nonelectric heating equipment	426	414	534	598	636	713
56. Fabricated structural metal products	83	92	113	154	164	184
57. Screw machine products, bolts, rivets, etc	97	75	80	101	118	129
58. Forgings	0	0	0	0	0	0
59. Automotive stampings	0	0	0	0	0	0
60. Stampings, except automotive	998	968	1,170	1,359	1,445	1,621
61. Metal coating, engraving, and allied services	0	0	0	0	0	0
62. Ordnance, except vehicles and missiles	853	1,028	1,287	2,193	2,548	2,798
63. Miscellaneous fabricated metal products	683	683	773	1,184	1,344	1,466
64. Engines and turbines	314	291	419	550	638	703
65. Farm and garden machinery	155	204	249	488	519	582
66. Construction machinery	0	0	0	0	0	0
67. Mining and oil field machinery	0	0	0	0	0	0
68. Materials handling machinery and equipment	0	0	0	0	0	0
69. Metalworking machinery	433	323	395	537	571	641
70. Special industry machinery	143	165	201	274	291	327
71. General industrial machinery	0	0	0	0	0	0
72. Electronic computing equipment	0	1,000	4,486	25,696	27,328	30,663
73. Office and accounting machines	448	641	783	1,524	1,621	1,818
74. Refrigeration and service industry machinery	561	551	709	1,060	1,147	1,258
75. Miscellaneous nonelectrical machinery	58	45	55	83	101	93
76. Electric distributing equipment	70	54	61	97	114	124
77. Electrical industrial apparatus	65	56	68	93	99	111
78. Household appliances	9,026	7,911	10,182	15,025	16,020	17,959
79. Electric lighting and wiring equipment	2,023	1,772	2,117	2,442	2,747	2,984
80. Electronic home entertainment equipment	8,384	9,377	16,231	28,548	30,605	33,973
81. Telephone and telegraph apparatus	35	47	251	847	901	1,011
82. Radio and TV communication equipment	765	829	1,131	2,221	2,363	2,651
83. Electronic tubes	90	17	15	14	15	17
84. Semiconductors and related devices	0	0	0	0	0	0
85. Miscellaneous electronic components	444	1,046	1,420	2,659	2,846	3,166
86. Storage batteries and engine electrical parts	1,821	1,596	1,973	2,453	2,984	2,798
87. X-ray and other electromedical apparatus	0	0	0	0	0	0
88. Electrical equipment and supplies, nec	880	1,205	1,477	2,094	2,341	2,585
89. Motor vehicles and car bodies	64,979	51,929	77,257	76,471	87,019	102,452
90. Motor vehicle parts and accessories	1,437	2,052	2,678	3,707	4,520	4,198
91. Truck and bus bodies, trailers, and motor homes	2,131	1,020	1,502	1,712	1,948	2,293
92. Aircraft	648	789	1,135	1,698	1,969	2,169
93. Aircraft and missile engines and equipment	0	0	0	0	0	0
94. Guided missiles and space vehicles	0	0	0	0	0	0
95. Ship and boat building and repairing	3,827	3,437	4,001	4,600	5,334	5,875
96. Railroad equipment	0	0	0	0	0	0
97. Miscellaneous transportation equipment	3,973	3,240	4,242	6,307	7,286	8,116
98. Engineering and scientific instruments	0	0	0	0	0	0
99. Measuring and controlling devices	75	61	69	112	126	138
100. Optical and ophthalmic products	1,159	1,223	1,490	2,936	3,404	3,750

See footnotes at end of table.

B-2. Personal consumption expenditures by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
101. Medical instruments and supplies	844	1,117	1,243	2,368	2,759	3,015
102. Photographic equipment and supplies	1,793	2,411	2,829	5,125	5,957	6,535
103. Watches, clocks, and parts	1,598	1,314	1,409	1,319	1,506	1,664
104. Jewelry, silverware, and plated ware	7,983	7,135	9,291	11,740	13,559	14,947
105. Toys and sporting goods	6,956	8,601	9,561	13,429	15,661	17,089
106. Manufactured products, nec	4,554	3,963	4,183	4,610	5,198	5,734
107. Meat products	39,487	40,144	43,770	47,480	49,869	54,397
108. Dairy products	24,685	23,997	26,418	28,906	30,360	33,116
109. Canned, dried, and frozen foods	23,323	22,640	24,322	29,139	30,605	33,383
110. Grain mill products and fats and oils	9,692	11,638	12,816	14,283	15,002	16,364
111. Bakery products	15,026	13,876	14,377	15,592	16,377	17,864
112. Sugar and confectionery products	10,762	9,463	9,922	10,289	10,806	11,787
113. Alcoholic beverages	15,936	17,765	17,568	19,979	20,984	22,889
114. Soft drinks and flavorings	12,153	13,548	14,455	17,104	17,964	19,595
115. Miscellaneous foods and kindred products	12,410	15,074	16,519	20,346	21,370	23,310
116. Tobacco manufactures	13,395	14,047	13,173	9,888	11,555	12,568
117. Weaving, finishing, yarn and thread mills	1,024	1,098	1,272	1,676	1,849	1,997
118. Knitting mills	1,930	2,750	3,293	4,301	4,685	5,053
119. Floor covering mills	2,348	2,282	3,014	4,326	4,601	5,162
120. Miscellaneous textile goods	238	220	258	368	410	453
121. Apparel	41,606	45,468	52,207	64,056	69,777	75,261
122. Miscellaneous fabricated textile products	5,507	5,834	6,744	8,110	9,370	10,215
123. Pulp, paper, and paperboard mills	251	304	364	407	476	517
124. Converted paper products except containers	7,413	8,797	9,998	14,522	16,704	18,134
125. Paperboard containers and boxes	300	280	300	470	549	597
126. Newspapers	5,929	6,229	5,569	5,734	6,700	7,287
127. Periodicals	3,386	4,451	3,796	4,573	5,344	5,812
128. Books	4,618	4,220	4,405	5,023	5,824	6,415
129. Miscellaneous publishing	567	496	610	917	1,048	1,141
130. Commercial printing and business forms	318	394	442	647	750	818
131. Greeting card publishing	956	1,309	1,566	2,357	2,754	2,995
132. Blankbooks and bookbinding	148	186	223	420	491	534
133. Printing trade services	0	0	0	0	0	0
134. Industrial chemicals	321	278	277	431	461	478
135. Plastics materials and synthetics	0	0	0	0	0	0
136. Drugs	9,586	10,312	10,891	17,074	19,953	21,701
137. Soap, cleaners, and toilet goods	17,381	17,671	18,398	24,643	28,806	31,303
138. Paints and allied products	245	477	511	842	984	1,071
139. Agricultural chemicals	460	515	552	638	745	811
140. Miscellaneous chemical products	939	1,327	1,603	2,111	2,474	2,530
141. Petroleum refining	90,709	78,478	81,994	93,099	93,513	94,933
142. Miscellaneous petroleum and coal products	953	917	988	1,082	1,090	1,112
143. Tires and inner tubes	5,755	4,063	5,310	4,736	5,771	5,372
144. Rubber products and plastic hose and footwear	1,886	2,032	2,206	2,838	3,186	3,406
145. Miscellaneous plastics products	1,354	1,753	2,066	3,309	3,594	4,004
146. Footwear except rubber and plastic	8,126	8,505	10,102	11,622	12,660	13,655
147. Luggage, handbags, and leather products, nec	2,781	2,986	3,540	3,520	3,861	4,183
148. Railroad transportation	4,797	5,337	5,800	6,119	6,771	7,345
149. Local and interurban passenger transit	9,568	7,443	7,218	6,069	7,163	7,605
150. Trucking and warehousing	12,970	11,800	14,980	19,677	21,747	23,204

See footnotes at end of table.

B-2. Personal consumption expenditures by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
151. Water transportation	2,968	2,865	3,737	4,892	5,547	5,784
152. Air transportation	25,436	22,994	29,362	49,069	57,530	60,523
153. Pipe lines, except natural gas	1,442	1,125	1,187	1,354	1,360	1,380
154. Arrangement of passenger transportation	861	1,014	1,576	2,831	3,347	3,561
155. Miscellaneous transportation services	0	0	0	0	0	0
156. Communications except broadcasting	27,510	37,548	35,671	56,116	65,507	70,725
157. Radio and television broadcasting	452	728	842	1,963	2,280	2,358
158. Electric utilities including combined services	42,374	47,066	52,972	76,453	79,748	87,390
159. Gas utilities including combined services	25,749	25,708	25,368	29,691	29,900	29,742
160. Water and sanitation including combined services	7,518	8,526	9,223	10,849	12,385	12,711
161. Wholesale trade	74,063	83,901	99,022	136,504	149,556	161,731
162. Retail trade, except eating and drinking places	221,753	250,823	290,377	408,252	448,524	488,510
163. Eating and drinking places	101,612	111,079	122,946	149,061	156,560	170,774
164. Banking	34,556	42,085	46,937	67,312	78,170	80,867
165. Credit agencies and investment offices	6,884	7,160	9,662	13,994	16,252	16,812
166. Security and commodity brokers and exchanges	6,664	8,426	16,576	27,658	32,121	33,228
167. Insurance carriers	45,400	51,670	56,042	67,986	79,105	82,142
168. Insurance agents, brokers, and service	0	0	0	0	0	0
169. Real estate	73,798	80,684	88,994	116,207	132,212	136,957
170. Owner-occupied dwellings	194,189	228,458	241,087	320,602	364,711	377,805
171. Hotels and other lodging places	15,191	15,988	17,045	20,665	23,694	24,568
172. Laundry, cleaning, and shoe repair	8,508	7,234	7,945	7,131	8,277	8,560
173. Personal services, nec	8,254	10,341	10,738	14,672	17,040	17,627
174. Beauty and barber shops	10,581	9,945	11,393	11,239	13,052	13,502
175. Funeral service and crematories	4,540	3,652	3,452	3,457	4,015	4,154
176. Advertising	32	39	42	57	66	69
177. Services to dwellings and other buildings	731	684	945	1,584	1,813	1,862
178. Personnel supply services	648	801	1,439	2,663	3,093	3,200
179. Computer and data processing services	0	0	0	0	0	0
180. Research, management, and consulting services	0	0	0	0	0	0
181. Detective and protective services	27	27	31	38	43	45
182. Equipment rental and leasing	627	1,010	1,423	3,709	4,047	4,238
183. Photocopying, commercial art, photofinishing	2,488	2,938	3,500	6,647	7,720	7,986
184. Credit reporting and business services, nec	677	726	816	1,049	1,210	1,252
185. Automotive rentals, without drivers	595	407	482	564	667	710
186. Automobile parking, repair, and services	38,863	34,633	42,011	49,187	58,139	61,854
187. Electrical repair shops	4,646	4,178	4,215	3,918	4,538	4,688
188. Watch, clock, jewelry, and furniture repair	2,852	3,022	2,883	2,533	2,925	3,017
189. Miscellaneous repair shops and related services	953	997	1,114	1,025	1,185	1,256
190. Motion pictures	3,651	4,425	4,274	4,738	5,330	5,606
191. Theatrical producers and entertainers	1,439	2,132	2,467	4,995	5,795	5,998
192. Bowling alleys and billiard establishments	1,867	1,729	1,594	1,430	1,661	1,718
193. Commercial sports	2,930	3,329	3,263	3,389	3,925	4,070
194. Amusement and recreation services, nec	10,614	17,003	18,599	35,081	40,697	42,124
195. Offices of health practitioners	64,859	76,901	85,562	139,745	147,217	155,514
196. Nursing and personal care facilities	16,125	20,313	21,589	34,928	36,795	38,869
197. Hospitals, private	71,435	89,987	94,309	137,248	144,587	152,735
198. Outpatient facilities and health services,nec	12,711	17,381	22,592	41,220	43,712	46,108
199. Legal services	16,173	18,764	21,282	24,697	28,682	29,671
200. Educational services, private	26,917	28,359	32,161	36,943	42,904	44,383

See footnotes at end of table.

B-2. Personal consumption expenditures by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
201. Individual and miscellaneous social services	7,259	10,746	12,774	17,582	20,419	21,123
202. Job training and related services	1,410	1,678	1,854	2,431	2,823	2,920
203. Child day care services	5,021	6,246	8,254	15,130	17,571	18,176
204. Residential care	3,774	4,978	6,480	11,646	13,525	13,991
205. Museums and noncommercial organizations, nec	5,346	7,575	8,754	12,232	14,205	14,695
206. Business and professional associations	1,313	1,489	1,612	1,958	2,274	2,353
207. Labor, civic, and social organizations	9,003	8,865	9,559	10,738	12,471	12,901
208. Religious organizations	15,292	15,709	15,824	16,304	18,934	19,587
209. Private households	8,646	7,659	9,284	8,671	9,925	10,193
210. Engineering and architectural services	0	0	0	0	0	0
211. Accounting, auditing, and services, nec	121	128	141	184	213	219
212. Post Office	3,585	4,373	5,355	7,703	8,822	9,063
213. Federal electric utilities	0	0	0	0	0	0
214. Commodity Credit Corporation	0	0	0	0	0	0
215. Federal government enterprises, nec	0	0	0	0	0	0
216. Federal general government	0	0	0	0	0	0
217. Local government passenger transit	0	0	0	0	0	0
218. State and local electric utilities	0	0	0	0	0	0
219. State and local government enterprises, nec	5,287	6,319	6,908	8,339	9,670	10,042
220. State and local government hospitals	0	0	0	0	0	0
221. State and local government education	0	0	0	0	0	0
222. State and local general government, nec	0	0	0	0	0	0
223. Noncomparable imports	10,796	14,752	21,435	36,212	41,921	43,733
224. Scrap, used and secondhand goods	8,530	11,200	16,783	17,251	19,526	23,548
225. Rest of the world industry	-11,478	-14,061	-12,133	-13,618	-15,819	-16,395
226. Inventory valuation adjustment	0	0	0	0	0	0

nec = not elsewhere classified.

NOTE: Detail may not add to totals because of rounding.

B-3. Gross private domestic investment by industry, 1977, 1982, 1985, and projected 2000

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
Total	521,281	447,281	647,668	767,833	932,124	1,103,161
1. Livestock and livestock products	-1,637	-690	506	129	669	934
2. Other agricultural products	2,629	-109	813	297	1,261	1,761
3. Agricultural services, forestry, and fishing	48	1	15	12	60	83
4. Metal mining	836	1,581	1,618	1,138	1,273	1,315
5. Coal mining	562	633	391	604	981	1,116
6. Crude petroleum, natural gas, and gas liquids	3,202	1,715	1,154	1,356	2,224	2,625
7. Oil and gas field services	21,437	36,672	33,234	30,118	38,529	44,272
8. Nonmetallic minerals, except fuels	1,197	1,204	855	1,275	1,817	1,971
9. New nonfarm housing, single units	92,527	41,100	79,271	95,742	101,224	141,886
10. New nonfarm housing, nec	16,440	16,491	27,840	20,452	21,624	30,346
11. Nonfarm residential alterations and additions	24,715	20,800	28,902	34,207	36,166	50,694
12. New farm housing, alterations, and additions	2,369	1,498	1,042	568	600	841
13. New industrial buildings	10,744	15,545	12,589	8,954	13,314	17,375
14. New office buildings	8,670	23,639	28,619	29,962	37,940	39,405
15. New commercial buildings except offices	15,742	15,624	26,097	31,968	39,754	40,795
16. New educational buildings	1,028	1,356	1,492	1,992	2,373	2,513
17. New hospitals and institutions	5,122	5,875	4,975	5,319	6,061	6,120
18. New nonfarm buildings, nec	4,958	7,259	10,972	13,182	16,358	20,825
19. New communications facilities	6,158	6,952	6,860	5,407	8,185	10,893
20. New electric utility facilities	15,035	14,700	12,487	7,972	16,809	19,541
21. New water supply and sewer facilities	475	306	603	861	1,815	2,110
22. New gas utility and pipeline facilities	3,936	3,570	3,500	1,631	3,471	4,165
23. New roads	172	111	219	248	341	380
24. New local transit facilities	0	0	0	0	0	0
25. New conservation and development facilities	585	378	744	302	635	740
26. New nonbuilding facilities, nec	11,039	7,100	6,455	4,813	7,349	8,489
27. Maintenance and repair construction	8,066	9,009	14,392	14,901	15,754	22,082
28. Logging camps and logging contractors	102	-244	-32	25	127	177
29. Sawmills and planing mills	460	-198	-142	110	570	796
30. Millwork and structural wood members, nec	352	-40	109	84	436	609
31. Veneer and plywood	411	-63	-127	99	510	712
32. Wood containers and miscellaneous wood products	176	-62	153	60	224	305
33. Mobile homes	4,307	3,548	4,130	3,144	3,753	4,642
34. Prefabricated wood buildings	83	-2	26	20	103	143
35. Household furniture	1,528	991	1,605	2,388	3,178	3,541
36. Partitions and fixtures	2,778	2,796	3,329	5,503	6,493	6,966
37. Office and miscellaneous furniture and fixtures	3,882	5,371	7,741	12,037	14,282	15,484
38. Glass and glass products	254	-98	78	61	315	440
39. Hydraulic cement	35	24	11	8	43	61
40. Concrete, gypsum, and plaster products	491	-23	152	79	409	571
41. Stone, clay, and miscellaneous mineral products	588	-157	182	64	329	459
42. Blast furnaces and basic steel products	1,490	-4,004	461	81	418	584
43. Iron and steel foundries	320	-259	99	19	97	135
44. Primary aluminum	206	-258	64	30	156	217
45. Primary nonferrous metals, except aluminum	203	-117	63	14	72	101
46. Miscellaneous primary and secondary metals	40	-78	16	8	31	42
47. Copper rolling and drawing	50	-106	16	4	23	31
48. Aluminum rolling and drawing	535	-367	165	70	364	509
49. Nonferrous rolling and drawing, nec	15	-146	5	4	19	26
50. Nonferrous wire drawing and insulating	374	-59	194	247	411	494

See footnotes at end of table.

B-3. Gross private domestic investment by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
51. Aluminum foundries	61	-37	19	15	75	105
52. Nonferrous foundries, except aluminum	18	-34	5	4	22	31
53. Metal cans and shipping containers	290	13	127	81	172	218
54. Cutlery, hand tools, and hardware	592	-3	251	172	484	656
55. Plumbing and nonelectric heating equipment	224	-38	-69	54	278	389
56. Fabricated structural metal products	5,815	3,875	4,675	5,151	7,170	8,449
57. Screw machine products, bolts, rivets, etc	178	-145	155	43	221	308
58. Forgings	87	-154	27	9	48	67
59. Automotive stampings	189	-75	58	45	235	328
60. Stampings, except automotive	140	-74	43	10	54	75
61. Metal coating, engraving, and allied services	52	-46	16	12	65	90
62. Ordnance, except vehicles and missiles	114	14	-15	27	141	197
63. Miscellaneous fabricated metal products	3,237	2,379	2,861	3,092	4,633	5,615
64. Engines and turbines	3,353	1,216	2,125	2,571	3,800	4,591
65. Farm and garden machinery	14,551	9,416	9,063	10,999	11,587	11,784
66. Construction machinery	10,877	4,702	7,633	9,064	10,574	11,886
67. Mining and oil field machinery	5,014	4,916	2,843	3,242	3,331	3,803
68. Materials handling machinery and equipment	4,586	3,977	4,735	5,985	7,635	8,802
69. Metalworking machinery	12,880	11,037	12,935	13,240	17,910	20,412
70. Special industry machinery	8,939	9,321	11,255	9,745	12,562	14,213
71. General industrial machinery	8,824	7,690	9,468	9,639	12,897	14,788
72. Electronic computing equipment	2,497	13,881	42,602	85,927	102,421	116,604
73. Office and accounting machines	2,704	4,640	8,212	10,321	12,376	13,463
74. Refrigeration and service industry machinery	4,707	4,350	5,477	7,409	9,041	9,836
75. Miscellaneous nonelectrical machinery	329	-113	123	172	470	615
76. Electric distributing equipment	3,789	2,587	2,812	2,146	4,292	5,645
77. Electrical industrial apparatus	3,361	2,632	3,788	3,728	5,009	5,790
78. Household appliances	2,540	1,832	3,252	4,794	5,266	5,497
79. Electric lighting and wiring equipment	732	20	359	373	602	713
80. Electronic home entertainment equipment	482	314	1,008	723	1,139	1,339
81. Telephone and telegraph apparatus	6,590	7,813	10,440	13,775	17,494	20,384
82. Radio and TV communication equipment	7,358	13,693	15,664	32,963	40,523	46,305
83. Electronic tubes	83	-23	26	10	53	74
84. Semiconductors and related devices	167	100	51	79	407	568
85. Miscellaneous electronic components	346	174	247	163	488	647
86. Storage batteries and engine electrical parts	584	97	439	377	680	844
87. X-ray and other electromedical apparatus	2,403	3,088	4,079	6,344	7,382	7,816
88. Electrical equipment and supplies, nec	64	-2	40	40	96	123
89. Motor vehicles and car bodies	46,942	29,915	59,141	58,365	71,057	80,346
90. Motor vehicle parts and accessories	1,002	-626	310	241	1,243	1,736
91. Truck and bus bodies, trailers, and motor homes	5,710	3,460	5,302	6,359	8,278	9,794
92. Aircraft	4,519	10,489	11,454	11,320	14,871	18,817
93. Aircraft and missile engines and equipment	400	713	865	751	1,203	1,564
94. Guided missiles and space vehicles	-59	436	9	468	571	626
95. Ship and boat building and repairing	3,734	3,286	1,377	1,366	1,394	1,542
96. Railroad equipment	4,369	1,525	1,479	717	885	1,132
97. Miscellaneous transportation equipment	698	673	863	984	1,758	2,132
98. Engineering and scientific instruments	1,717	1,693	1,933	2,671	3,290	3,699
99. Measuring and controlling devices	5,313	6,806	8,765	10,536	13,779	15,577
100. Optical and ophthalmic products	1,242	2,734	3,810	6,121	7,260	7,837

See footnotes at end of table.

B-3. Gross private domestic investment by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
101. Medical instruments and supplies	2,463	3,477	4,339	7,858	9,112	9,632
102. Photographic equipment and supplies	4,068	4,713	6,853	8,271	9,940	10,785
103. Watches, clocks, and parts	132	-20	-41	12	63	88
104. Jewelry, silverware, and plated ware	770	-16	100	49	255	356
105. Toys and sporting goods	450	409	447	723	965	1,075
106. Manufactured products, nec	2,298	2,168	2,539	2,980	3,858	4,255
107. Meat products	476	96	147	114	590	824
108. Dairy products	228	146	70	55	282	394
109. Canned, dried, and frozen foods	579	172	179	216	1,118	1,562
110. Grain mill products and fats and oils	-28	-163	-9	-7	-34	-48
111. Bakery products	159	4	49	38	197	276
112. Sugar and confectionery products	179	-6	55	43	222	310
113. Alcoholic beverages	203	-165	63	29	152	212
114. Soft drinks and flavorings	185	26	57	44	230	321
115. Miscellaneous foods and kindred products	269	140	83	64	333	466
116. Tobacco manufactures	638	136	197	56	292	408
117. Weaving, finishing, yarn and thread mills	1,448	-339	448	154	796	1,112
118. Knitting mills	171	-161	53	41	212	296
119. Floor covering mills	1,324	1,488	2,047	3,353	4,068	4,398
120. Miscellaneous textile goods	95	-15	53	54	135	175
121. Apparel	3,099	-221	-542	183	944	1,318
122. Miscellaneous fabricated textile products	293	-50	91	70	364	508
123. Pulp, paper, and paperboard mills	503	-13	155	63	324	452
124. Converted paper products except containers	576	-45	278	138	714	997
125. Paperboard containers and boxes	280	-179	86	67	347	485
126. Newspapers	10	4	3	2	12	17
127. Periodicals	23	0	7	5	28	39
128. Books	248	-43	327	118	608	849
129. Miscellaneous publishing	49	-3	15	31	161	225
130. Commercial printing and business forms	536	15	166	206	1,065	1,487
131. Greeting card publishing	-64	9	80	23	120	168
132. Blankbooks and bookbinding	60	11	18	34	174	243
133. Printing trade services	15	0	5	4	19	26
134. Industrial chemicals	1,909	152	1,122	766	2,440	3,360
135. Plastics materials and synthetics	386	-403	119	93	479	669
136. Drugs	574	26	677	196	1,012	1,413
137. Soap, cleaners, and toilet goods	327	-78	301	78	405	566
138. Paints and allied products	214	-62	66	32	165	231
139. Agricultural chemicals	356	-204	110	47	242	337
140. Miscellaneous chemical products	310	-93	596	190	984	1,374
141. Petroleum refining	6,908	-1,441	2,135	884	4,568	6,380
142. Miscellaneous petroleum and coal products	239	-96	74	57	297	414
143. Tires and inner tubes	835	-94	-42	46	238	333
144. Rubber products and plastic hose and footwear	275	-161	109	150	387	502
145. Miscellaneous plastics products	943	-162	326	292	1,205	1,653
146. Footwear except rubber and plastic	194	-17	-90	47	241	336
147. Luggage, handbags, and leather products, nec	150	-28	-46	26	136	190
148. Railroad transportation	1,176	578	714	1,073	1,505	1,788
149. Local and interurban passenger transit	0	0	0	0	0	0
150. Trucking and warehousing	2,445	1,271	2,203	3,345	4,789	5,584

See footnotes at end of table.

B-3. Gross private domestic investment by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
151. Water transportation	384	167	292	473	706	835
152. Air transportation	529	369	557	934	1,216	1,383
153. Pipe lines, except natural gas	199	-21	61	48	246	344
154. Arrangement of passenger transportation	0	0	0	0	0	0
155. Miscellaneous transportation services	0	0	0	0	0	0
156. Communications except broadcasting	4,274	5,325	5,146	6,831	8,341	9,147
157. Radio and television broadcasting	0	0	0	0	0	0
158. Electric utilities including combined services	0	0	0	0	0	0
159. Gas utilities including combined services	0	0	0	0	0	0
160. Water and sanitation including combined services	0	0	0	0	0	0
161. Wholesale trade	31,151	27,537	40,720	49,906	62,998	70,726
162. Retail trade, except eating and drinking places	9,343	8,653	13,948	17,366	20,192	22,163
163. Eating and drinking places	0	0	0	0	0	0
164. Banking	0	0	0	0	0	0
165. Credit agencies and investment offices	0	0	0	0	0	0
166. Security and commodity brokers and exchanges	0	0	0	0	0	0
167. Insurance carriers	1	0	0	0	1	1
168. Insurance agents, brokers, and service	0	0	0	0	0	0
169. Real estate	16,688	9,425	15,528	15,381	18,050	26,111
170. Owner-occupied dwellings	0	0	0	0	0	0
171. Hotels and other lodging places	0	0	0	0	0	0
172. Laundry, cleaning, and shoe repair	0	0	0	0	0	0
173. Personal services, nec	0	0	0	0	0	0
174. Beauty and barber shops	0	0	0	0	0	0
175. Funeral service and crematories	0	0	0	0	0	0
176. Advertising	0	0	0	0	0	0
177. Services to dwellings and other buildings	0	0	0	0	0	0
178. Personnel supply services	0	0	0	0	0	0
179. Computer and data processing services	0	0	0	0	0	0
180. Research, management, and consulting services	0	0	0	0	0	0
181. Detective and protective services	0	0	0	0	0	0
182. Equipment rental and leasing	0	0	0	0	0	0
183. Photocopying, commercial art, photofinishing	0	0	0	0	0	0
184. Credit reporting and business services, nec	0	0	0	0	0	0
185. Automotive rentals, without drivers	0	0	0	0	0	0
186. Automobile parking, repair, and services	11	0	3	3	13	18
187. Electrical repair shops	0	0	0	0	0	0
188. Watch, clock, jewelry, and furniture repair	0	0	0	0	0	0
189. Miscellaneous repair shops and related services	0	0	0	0	0	0
190. Motion pictures	195	-38	-100	47	242	338
191. Theatrical producers and entertainers	0	0	0	0	0	0
192. Bowling alleys and billiard establishments	0	0	0	0	0	0
193. Commercial sports	0	0	0	0	0	0
194. Amusement and recreation services, nec	0	0	0	0	0	0
195. Offices of health practitioners	0	0	0	0	0	0
196. Nursing and personal care facilities	0	0	0	0	0	0
197. Hospitals, private	0	0	0	0	0	0
198. Outpatient facilities and health services,nec	0	0	0	0	0	0
199. Legal services	0	0	0	0	0	0
200. Educational services, private	0	0	0	0	0	0

See footnotes at end of table.

B-3. Gross private domestic investment by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
201. Individual and miscellaneous social services	0	0	0	0	0	0
202. Job training and related services	0	0	0	0	0	0
203. Child day care services	0	0	0	0	0	0
204. Residential care	0	0	0	0	0	0
205. Museums and noncommercial organizations, nec	0	0	0	0	0	0
206. Business and professional associations	0	0	0	0	0	0
207. Labor, civic, and social organizations	0	0	0	0	0	0
208. Religious organizations	0	0	0	0	0	0
209. Private households	0	0	0	0	0	0
210. Engineering and architectural services	0	0	0	0	0	0
211. Accounting, auditing, and services, nec	0	0	0	0	0	0
212. Post Office	0	0	0	0	0	0
213. Federal electric utilities	0	0	0	0	0	0
214. Commodity Credit Corporation	0	0	0	0	0	0
215. Federal government enterprises, nec	0	0	0	0	0	0
216. Federal general government	0	0	0	0	0	0
217. Local government passenger transit	0	0	0	0	0	0
218. State and local electric utilities	0	0	0	0	0	0
219. State and local government enterprises, nec	0	0	0	0	0	0
220. State and local government hospitals	0	0	0	0	0	0
221. State and local government education	0	0	0	0	0	0
222. State and local general government, nec	0	0	0	0	0	0
223. Noncomparable imports	81	5	33	37	90	116
224. Scrap, used and secondhand goods	-16,513	-16,585	-26,869	-29,276	-38,430	-47,392
225. Rest of the world industry	0	0	0	0	0	0
226. Inventory valuation adjustment	-33,123	-11,229	-14,525	-6,347	-34,468	-47,670

nec = not elsewhere classified.

NOTE: Detail may not add to totals because of rounding.

B-4. Exports of goods and services by industry, 1977, 1982, 1985, and projected 2000

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
Total	277,042	354,548	352,216	516,790	634,467	711,954
1. Livestock and livestock products	272	364	520	604	744	855
2. Other agricultural products	17,801	20,436	19,558	23,302	30,351	41,974
3. Agricultural services, forestry, and fishing	335	385	321	438	573	671
4. Metal mining	728	684	687	1,109	1,236	1,300
5. Coal mining	2,837	4,829	3,816	4,802	4,803	4,804
6. Crude petroleum, natural gas, and gas liquids	649	454	265	384	384	384
7. Oil and gas field services	0	0	0	0	0	0
8. Nonmetallic minerals, except fuels	653	605	364	759	991	1,157
9. New nonfarm housing, single units	0	0	0	0	0	0
10. New nonfarm housing, nec	0	0	0	0	0	0
11. Nonfarm residential alterations and additions	0	0	0	0	0	0
12. New farm housing, alterations, and additions	0	0	0	0	0	0
13. New industrial buildings	0	0	0	0	0	0
14. New office buildings	1	1	1	2	2	2
15. New commercial buildings except offices	0	0	0	0	0	0
16. New educational buildings	0	0	0	0	0	0
17. New hospitals and institutions	0	0	0	0	0	0
18. New nonfarm buildings, nec	0	0	0	0	0	0
19. New communications facilities	0	0	0	0	0	0
20. New electric utility facilities	0	0	0	0	0	0
21. New water supply and sewer facilities	0	0	0	0	0	0
22. New gas utility and pipeline facilities	0	0	0	0	0	0
23. New roads	0	0	0	0	0	0
24. New local transit facilities	0	0	0	0	0	0
25. New conservation and development facilities	0	0	0	0	0	0
26. New nonbuilding facilities, nec	0	0	0	0	0	0
27. Maintenance and repair construction	40	53	62	69	87	100
28. Logging camps and logging contractors	1,018	1,234	1,117	2,182	2,432	2,557
29. Sawmills and planing mills	727	873	782	1,493	1,666	1,753
30. Millwork and structural wood members, nec	54	68	61	124	143	153
31. Veneer and plywood	117	173	130	307	342	359
32. Wood containers and miscellaneous wood products	141	192	169	320	373	401
33. Mobile homes	52	23	3	31	46	54
34. Prefabricated wood buildings	114	20	19	37	42	44
35. Household furniture	281	330	193	275	399	471
36. Partitions and fixtures	39	51	48	101	136	159
37. Office and miscellaneous furniture and fixtures	95	259	230	422	580	663
38. Glass and glass products	774	696	592	625	848	974
39. Hydraulic cement	31	32	27	31	40	47
40. Concrete, gypsum, and plaster products	46	50	34	40	53	62
41. Stone, clay, and miscellaneous mineral products	864	860	931	1,281	1,677	1,927
42. Blast furnaces and basic steel products	1,630	1,560	833	633	729	783
43. Iron and steel foundries	534	145	94	53	60	64
44. Primary aluminum	267	495	464	540	602	633
45. Primary nonferrous metals, except aluminum	395	739	633	634	707	743
46. Miscellaneous primary and secondary metals	62	60	103	163	182	191
47. Copper rolling and drawing	102	145	118	127	142	149
48. Aluminum rolling and drawing	469	416	432	689	768	807
49. Nonferrous rolling and drawing, nec	340	408	625	642	716	752
50. Nonferrous wire drawing and insulating	391	426	461	463	580	654

See footnotes at end of table.

B-4. Exports of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
51. Aluminum foundries	28	40	57	83	94	100
52. Nonferrous foundries, except aluminum	17	29	38	57	63	66
53. Metal cans and shipping containers	116	122	109	139	187	219
54. Cutlery, hand tools, and hardware	659	643	523	773	958	1,058
55. Plumbing and nonelectric heating equipment	255	190	123	125	155	173
56. Fabricated structural metal products	1,347	1,654	751	1,207	1,451	1,597
57. Screw machine products, bolts, rivets, etc	213	171	168	317	353	371
58. Forgings	134	102	113	142	158	166
59. Automotive stampings	1,096	1,095	1,386	1,552	2,217	2,301
60. Stampings, except automotive	151	133	94	95	126	143
61. Metal coating, engraving, and allied services	0	0	0	0	0	0
62. Ordnance, except vehicles and missiles	846	678	638	1,287	1,459	1,583
63. Miscellaneous fabricated metal products	1,549	1,773	1,292	1,593	1,913	2,104
64. Engines and turbines	3,258	3,496	2,876	3,032	4,127	4,748
65. Farm and garden machinery	1,859	1,551	1,065	950	1,287	1,507
66. Construction machinery	4,811	4,001	2,810	2,629	3,552	4,137
67. Mining and oil field machinery	2,322	4,522	2,728	2,985	4,027	4,705
68. Materials handling machinery and equipment	616	548	424	607	818	957
69. Metalworking machinery	1,705	1,922	1,520	2,360	3,185	3,721
70. Special industry machinery	3,709	1,975	1,421	1,929	2,599	3,042
71. General industrial machinery	3,417	4,949	4,513	5,862	7,893	9,226
72. Electronic computing equipment	1,615	9,046	20,289	43,383	58,491	68,437
73. Office and accounting machines	344	652	746	1,021	1,379	1,615
74. Refrigeration and service industry machinery	1,587	1,608	1,267	1,922	2,682	3,110
75. Miscellaneous nonelectrical machinery	238	979	981	1,367	1,843	2,157
76. Electric distributing equipment	745	566	388	539	727	850
77. Electrical industrial apparatus	1,536	1,683	1,175	1,410	1,878	2,186
78. Household appliances	895	984	792	783	1,124	1,324
79. Electric lighting and wiring equipment	725	968	869	1,029	1,381	1,593
80. Electronic home entertainment equipment	580	837	895	1,235	1,666	1,921
81. Telephone and telegraph apparatus	317	807	843	1,609	2,169	2,538
82. Radio and TV communication equipment	2,190	2,772	3,053	5,430	7,318	8,565
83. Electronic tubes	549	198	210	271	371	434
84. Semiconductors and related devices	1,389	3,617	3,675	7,518	10,134	11,861
85. Miscellaneous electronic components	927	2,399	2,273	4,545	6,135	7,181
86. Storage batteries and engine electrical parts	478	463	790	946	1,337	1,420
87. X-ray and other electromedical apparatus	409	797	874	1,410	1,901	2,224
88. Electrical equipment and supplies, nec	364	735	904	1,174	1,584	1,853
89. Motor vehicles and car bodies	9,140	4,983	8,140	8,113	10,528	11,108
90. Motor vehicle parts and accessories	7,561	6,267	8,209	7,905	11,254	11,684
91. Truck and bus bodies, trailers, and motor homes	110	127	64	100	142	148
92. Aircraft	6,500	6,567	6,898	8,783	10,291	11,352
93. Aircraft and missile engines and equipment	5,628	7,540	8,634	14,114	16,423	18,058
94. Guided missiles and space vehicles	867	791	404	918	1,034	1,120
95. Ship and boat building and repairing	791	1,384	417	418	495	549
96. Railroad equipment	388	337	375	243	275	352
97. Miscellaneous transportation equipment	828	1,487	1,608	2,937	3,324	3,602
98. Engineering and scientific instruments	320	404	449	624	841	985
99. Measuring and controlling devices	2,234	3,246	3,222	5,268	7,112	8,311
100. Optical and ophthalmic products	253	705	1,020	2,430	3,141	3,607

See footnotes at end of table.

B-4. Exports of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
101. Medical instruments and supplies	737	972	977	1,608	2,186	2,561
102. Photographic equipment and supplies	1,799	2,205	1,864	1,890	2,534	2,964
103. Watches, clocks, and parts	207	83	70	45	66	78
104. Jewelry, silverware, and plated ware	752	583	491	460	662	776
105. Toys and sporting goods	420	691	433	501	729	860
106. Manufactured products, nec	904	794	574	631	851	989
107. Meat products	2,090	1,979	2,305	3,345	4,539	5,703
108. Dairy products	379	538	446	435	604	790
109. Canned, dried, and frozen foods	878	853	636	858	1,191	1,562
110. Grain mill products and fats and oils	4,117	5,461	4,481	6,007	8,271	10,677
111. Bakery products	71	64	42	47	65	85
112. Sugar and confectionery products	246	319	285	318	442	578
113. Alcoholic beverages	178	174	145	179	249	326
114. Soft drinks and flavorings	232	295	214	355	489	633
115. Miscellaneous foods and kindred products	771	1,251	1,114	1,317	1,829	2,398
116. Tobacco manufactures	2,884	2,860	2,127	2,147	2,798	3,262
117. Weaving, finishing, yarn and thread mills	1,523	1,007	765	814	1,064	1,242
118. Knitting mills	101	109	74	76	99	116
119. Floor covering mills	128	263	143	321	471	557
120. Miscellaneous textile goods	306	434	406	543	711	830
121. Apparel	858	862	612	744	915	1,039
122. Miscellaneous fabricated textile products	434	434	369	580	761	888
123. Pulp, paper, and paperboard mills	2,504	2,814	2,632	3,395	3,788	3,985
124. Converted paper products except containers	565	684	647	915	1,059	1,145
125. Paperboard containers and boxes	273	264	153	203	226	238
126. Newspapers	29	19	34	36	46	54
127. Periodicals	257	299	298	407	528	614
128. Books	450	585	501	837	1,086	1,264
129. Miscellaneous publishing	2	26	22	40	52	60
130. Commercial printing and business forms	259	341	230	511	632	715
131. Greeting card publishing	8	13	11	17	22	26
132. Blankbooks and bookbinding	10	17	10	28	33	37
133. Printing trade services	7	9	7	13	17	20
134. Industrial chemicals	7,275	8,973	9,891	11,731	15,397	17,652
135. Plastics materials and synthetics	2,565	3,918	4,048	6,289	8,220	9,594
136. Drugs	1,827	2,135	2,058	3,413	4,428	5,155
137. Soap, cleaners, and toilet goods	696	803	597	708	922	1,074
138. Paints and allied products	232	248	217	315	411	480
139. Agricultural chemicals	1,573	1,889	3,052	2,939	3,540	4,482
140. Miscellaneous chemical products	765	829	845	1,317	1,723	2,015
141. Petroleum refining	5,197	9,533	10,531	10,273	12,006	13,262
142. Miscellaneous petroleum and coal products	815	700	543	612	681	729
143. Tires and inner tubes	473	350	390	337	465	505
144. Rubber products and plastic hose and footwear	501	334	409	528	696	805
145. Miscellaneous plastics products	1,178	1,860	1,863	2,329	3,120	3,648
146. Footwear except rubber and plastic	114	120	109	160	207	242
147. Luggage, handbags, and leather products, nec	354	380	317	332	434	506
148. Railroad transportation	2,884	3,723	3,168	2,875	3,496	3,992
149. Local and interurban passenger transit	0	0	0	0	0	0
150. Trucking and warehousing	2,638	2,727	2,472	3,682	4,634	5,309

See footnotes at end of table.

B-4. Exports of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
151. Water transportation	5,640	5,012	5,162	4,710	5,974	6,988
152. Air transportation	4,452	4,626	4,088	5,122	6,465	7,389
153. Pipe lines, except natural gas	305	188	186	286	347	392
154. Arrangement of passenger transportation	216	347	511	855	1,084	1,252
155. Miscellaneous transportation services	193	234	261	345	438	505
156. Communications except broadcasting	1,210	1,458	1,537	2,776	3,523	4,069
157. Radio and television broadcasting	0	0	0	0	0	0
158. Electric utilities including combined services	105	154	108	119	151	175
159. Gas utilities including combined services	461	466	346	465	511	544
160. Water and sanitation including combined services	11	18	15	18	23	27
161. Wholesale trade	17,848	21,250	19,442	33,062	42,556	48,984
162. Retail trade, except eating and drinking places	82	73	83	115	152	175
163. Eating and drinking places	122	192	215	313	397	458
164. Banking	2,461	3,086	4,814	7,240	9,188	10,611
165. Credit agencies and investment offices	43	77	92	127	162	187
166. Security and commodity brokers and exchanges	162	231	410	685	870	1,004
167. Insurance carriers	462	328	446	553	702	811
168. Insurance agents, brokers, and service	0	0	0	0	0	0
169. Real estate	5,580	6,445	6,066	8,626	10,947	12,643
170. Owner-occupied dwellings	0	0	0	0	0	0
171. Hotels and other lodging places	28	37	26	37	46	54
172. Laundry, cleaning, and shoe repair	7	10	10	11	14	17
173. Personal services, nec	0	0	0	0	0	0
174. Beauty and barber shops	0	0	0	0	0	0
175. Funeral service and crematories	0	0	0	0	0	0
176. Advertising	54	85	74	98	124	143
177. Services to dwellings and other buildings	23	36	38	39	50	58
178. Personnel supply services	0	0	0	0	0	0
179. Computer and data processing services	21	33	45	72	92	106
180. Research, management, and consulting services	1,417	1,617	1,279	2,589	3,285	3,794
181. Detective and protective services	38	60	54	65	83	96
182. Equipment rental and leasing	9	14	12	15	19	22
183. Photocopying, commercial art, photofinishing	28	43	56	151	170	184
184. Credit reporting and business services, nec	6	10	8	10	13	15
185. Automotive rentals, without drivers	0	0	0	0	0	0
186. Automobile parking, repair, and services	3	6	5	6	7	9
187. Electrical repair shops	6	9	10	11	14	17
188. Watch, clock, jewelry, and furniture repair	6	10	10	11	14	17
189. Miscellaneous repair shops and related services	365	560	588	748	844	914
190. Motion pictures	592	1,115	933	1,184	1,375	1,515
191. Theatrical producers and entertainers	0	0	0	0	0	0
192. Bowling alleys and billiard establishments	0	0	0	0	0	0
193. Commercial sports	0	0	0	0	0	0
194. Amusement and recreation services, nec	0	0	0	0	0	0
195. Offices of health practitioners	2	3	3	3	4	5
196. Nursing and personal care facilities	0	0	0	0	0	0
197. Hospitals, private	0	0	0	0	0	0
198. Outpatient facilities and health services,nec	0	0	0	0	0	0
199. Legal services	490	651	594	1,262	1,602	1,850
200. Educational services, private	0	0	0	0	0	0

See footnotes at end of table.

B-4. Exports of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
201. Individual and miscellaneous social services	0	0	0	0	0	0
202. Job training and related services	0	0	0	0	0	0
203. Child day care services	0	0	0	0	0	0
204. Residential care	0	0	0	0	0	0
205. Museums and noncommercial organizations, nec	0	0	0	0	0	0
206. Business and professional associations	0	0	0	0	0	0
207. Labor, civic, and social organizations	111	176	87	138	175	202
208. Religious organizations	0	0	0	0	0	0
209. Private households	0	0	0	0	0	0
210. Engineering and architectural services	2,858	3,735	2,232	4,665	5,926	6,846
211. Accounting, auditing, and services, nec	19	27	19	28	35	41
212. Post Office	51	95	75	71	90	104
213. Federal electric utilities	0	0	0	0	0	0
214. Commodity Credit Corporation	0	0	0	0	0	0
215. Federal government enterprises, nec	217	371	234	208	264	305
216. Federal general government	0	0	0	0	0	0
217. Local government passenger transit	0	0	0	0	0	0
218. State and local electric utilities	0	0	0	0	0	0
219. State and local government enterprises, nec	1	1	1	1	2	2
220. State and local government hospitals	0	0	0	0	0	0
221. State and local government education	0	0	0	0	0	0
222. State and local general government, nec	0	0	0	0	0	0
223. Noncomparable imports	0	0	0	0	0	0
224. Scrap, used and secondhand goods	2,283	1,898	2,907	5,331	6,456	7,104
225. Rest of the world industry	66,120	104,333	99,701	159,308	174,844	178,080
226. Inventory valuation adjustment	0	0	0	0	0	0

nec = not elsewhere classified.

NOTE: Detail may not add to totals because of rounding.

B-5. Imports of goods and services by industry, 1977, 1982, 1985, and projected 2000

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
Total	-312,542	-328,266	-460,416	-555,909	-733,025	-862,152
1. Livestock and livestock products	-491	-566	-1,072	-1,389	-1,578	-2,046
2. Other agricultural products	-1,394	-1,713	-3,679	-4,442	-4,980	-5,288
3. Agricultural services, forestry, and fishing	-1,717	-2,467	-2,923	-4,209	-4,610	-5,013
4. Metal mining	-2,926	-2,098	-1,603	-1,716	-2,166	-2,288
5. Coal mining	-132	-26	-100	-70	-88	-94
6. Crude petroleum, natural gas, and gas liquids	-86,675	-44,385	-40,022	-79,141	-96,994	-108,068
7. Oil and gas field services	0	0	0	0	0	0
8. Nonmetallic minerals, except fuels	-780	-1,414	-1,640	-2,973	-3,690	-3,921
9. New nonfarm housing, single units	0	0	0	0	0	0
10. New nonfarm housing, nec	0	0	0	0	0	0
11. Nonfarm residential alterations and additions	0	0	0	0	0	0
12. New farm housing, alterations, and additions	0	0	0	0	0	0
13. New industrial buildings	0	0	0	0	0	0
14. New office buildings	0	0	0	0	0	0
15. New commercial buildings except offices	0	0	0	0	0	0
16. New educational buildings	0	0	0	0	0	0
17. New hospitals and institutions	0	0	0	0	0	0
18. New nonfarm buildings, nec	0	0	0	0	0	0
19. New communications facilities	0	0	0	0	0	0
20. New electric utility facilities	0	0	0	0	0	0
21. New water supply and sewer facilities	0	0	0	0	0	0
22. New gas utility and pipeline facilities	0	0	0	0	0	0
23. New roads	0	0	0	0	0	0
24. New local transit facilities	0	0	0	0	0	0
25. New conservation and development facilities	0	0	0	0	0	0
26. New nonbuilding facilities, nec	0	0	0	0	0	0
27. Maintenance and repair construction	0	0	0	0	0	0
28. Logging camps and logging contractors	-72	-48	-47	-55	-70	-81
29. Sawmills and planing mills	-3,752	-2,075	-3,790	-4,726	-5,714	-5,880
30. Millwork and structural wood members, nec	-94	-71	-141	-96	-110	-118
31. Veneer and plywood	-1,037	-506	-772	-868	-1,108	-1,242
32. Wood containers and miscellaneous wood products	-491	-513	-873	-813	-1,047	-1,323
33. Mobile homes	0	0	0	0	0	0
34. Prefabricated wood buildings	0	0	-17	-15	-19	-18
35. Household furniture	-596	-1,004	-1,695	-2,561	-3,304	-4,272
36. Partitions and fixtures	0	0	0	0	0	0
37. Office and miscellaneous furniture and fixtures	-400	-726	-1,774	-2,240	-2,942	-3,794
38. Glass and glass products	-659	-821	-1,457	-1,855	-2,390	-3,008
39. Hydraulic cement	-165	-118	-572	-579	-676	-720
40. Concrete, gypsum, and plaster products	-45	-54	-155	-217	-277	-325
41. Stone, clay, and miscellaneous mineral products	-1,547	-1,778	-3,055	-3,072	-3,973	-4,771
42. Blast furnaces and basic steel products	-10,489	-11,167	-13,060	-14,084	-18,537	-19,944
43. Iron and steel foundries	-352	-149	-285	-442	-716	-880
44. Primary aluminum	-1,881	-1,482	-1,247	-1,511	-1,930	-2,114
45. Primary nonferrous metals, except aluminum	-4,563	-3,209	-4,386	-4,557	-5,180	-5,470
46. Miscellaneous primary and secondary metals	-152	-75	-115	-156	-200	-218
47. Copper rolling and drawing	-370	-312	-511	-576	-736	-767
48. Aluminum rolling and drawing	-192	-476	-1,072	-1,128	-1,442	-1,560
49. Nonferrous rolling and drawing, nec	-102	-158	-290	-326	-417	-442
50. Nonferrous wire drawing and insulating	-194	-339	-779	-706	-1,161	-1,455

See footnotes at end of table.

B-5. Imports of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
51. Aluminum foundries	0	0	0	0	0	0
52. Nonferrous foundries, except aluminum	0	0	0	0	0	0
53. Metal cans and shipping containers	-69	-90	-329	-279	-510	-698
54. Cutlery, hand tools, and hardware	-772	-1,116	-1,702	-1,467	-2,049	-3,039
55. Plumbing and nonelectric heating equipment	-89	-588	-225	-455	-591	-764
56. Fabricated structural metal products	-253	-333	-704	-573	-871	-1,008
57. Screw machine products, bolts, rivets, etc	-731	-633	-1,054	-1,154	-1,350	-1,446
58. Forgings	-62	-78	-91	-82	-114	-128
59. Automotive stampings	-134	-163	-313	-360	-474	-595
60. Stampings, except automotive	-107	-114	-190	-175	-225	-290
61. Metal coating, engraving, and allied services	0	0	0	0	0	0
62. Ordnance, except vehicles and missiles	-120	-226	-267	-362	-467	-692
63. Miscellaneous fabricated metal products	-1,725	-2,759	-3,926	-4,357	-6,210	-7,749
64. Engines and turbines	-618	-1,736	-3,233	-3,437	-5,432	-8,057
65. Farm and garden machinery	-1,324	-1,304	-1,916	-2,267	-4,105	-5,588
66. Construction machinery	-947	-1,240	-2,845	-2,696	-4,900	-6,708
67. Mining and oil field machinery	-79	-125	-166	-144	-262	-359
68. Materials handling machinery and equipment	-251	-357	-1,118	-898	-1,640	-2,246
69. Metalworking machinery	-1,194	-2,668	-4,272	-3,946	-7,172	-9,784
70. Special industry machinery	-1,564	-2,401	-3,699	-3,458	-6,298	-8,603
71. General industrial machinery	-1,271	-3,758	-6,632	-5,895	-10,582	-14,373
72. Electronic computing equipment	-65	-2,036	-12,326	-12,653	-22,709	-31,025
73. Office and accounting machines	-1,784	-1,938	-4,865	-4,839	-7,415	-9,935
74. Refrigeration and service industry machinery	-168	-363	-982	-1,027	-1,543	-2,016
75. Miscellaneous nonelectrical machinery	-118	-104	-129	-159	-203	-216
76. Electric distributing equipment	-699	-267	-571	-401	-733	-1,004
77. Electrical industrial apparatus	-875	-1,138	-2,605	-2,177	-3,882	-5,218
78. Household appliances	-1,213	-1,295	-2,704	-2,730	-3,638	-4,711
79. Electric lighting and wiring equipment	-318	-822	-1,646	-1,736	-2,602	-3,396
80. Electronic home entertainment equipment	-5,846	-6,012	-13,655	-16,248	-21,553	-27,103
81. Telephone and telegraph apparatus	-190	-694	-2,494	-2,176	-3,975	-5,442
82. Radio and TV communication equipment	-1,144	-3,182	-3,785	-3,381	-5,989	-8,881
83. Electronic tubes	-111	-164	-240	-297	-458	-599
84. Semiconductors and related devices	-1,895	-4,400	-6,526	-8,355	-15,237	-20,829
85. Miscellaneous electronic components	-784	-2,498	-6,564	-9,535	-16,999	-22,952
86. Storage batteries and engine electrical parts	-390	-553	-1,238	-1,255	-2,098	-2,819
87. X-ray and other electromedical apparatus	-268	-520	-1,246	-979	-1,788	-2,448
88. Electrical equipment and supplies, nec	-392	-762	-762	-771	-1,336	-1,784
89. Motor vehicles and car bodies	-23,661	-27,100	-47,441	-34,381	-45,240	-56,781
90. Motor vehicle parts and accessories	-7,230	-5,315	-10,932	-9,083	-11,970	-15,122
91. Truck and bus bodies, trailers, and motor homes	-20	-23	-26	-30	-39	-49
92. Aircraft	-404	-1,149	-1,764	-1,692	-2,746	-4,073
93. Aircraft and missile engines and equipment	-549	-2,150	-3,284	-3,332	-4,978	-7,382
94. Guided missiles and space vehicles	0	0	-139	-168	-216	-320
95. Ship and boat building and repairing	-194	-308	-467	-526	-677	-876
96. Railroad equipment	-76	-105	-363	-437	-799	-1,093
97. Miscellaneous transportation equipment	-1,375	-1,620	-2,164	-2,476	-4,251	-6,305
98. Engineering and scientific instruments	-115	-144	-240	-179	-327	-448
99. Measuring and controlling devices	-694	-1,409	-2,229	-2,218	-3,026	-4,488
100. Optical and ophthalmic products	-744	-1,007	-2,059	-2,472	-3,493	-4,537

See footnotes at end of table.

B-5. Imports of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
101. Medical instruments and supplies	-237	-321	-546	-576	-930	-1,379
102. Photographic equipment and supplies	-1,462	-2,244	-3,829	-4,554	-6,454	-7,358
103. Watches, clocks, and parts	-1,060	-1,026	-1,335	-1,316	-1,700	-2,199
104. Jewelry, silverware, and plated ware	-1,919	-3,235	-5,390	-7,469	-9,614	-12,431
105. Toys and sporting goods	-1,480	-2,999	-4,550	-6,290	-8,099	-10,465
106. Manufactured products, nec	-1,506	-1,735	-2,344	-3,358	-4,367	-5,126
107. Meat products	-2,074	-2,656	-2,963	-3,663	-4,024	-4,272
108. Dairy products	-298	-689	-669	-811	-897	-952
109. Canned, dried, and frozen foods	-884	-1,578	-2,202	-2,371	-2,579	-2,738
110. Grain mill products and fats and oils	-825	-524	-933	-1,063	-1,215	-1,758
111. Bakery products	-81	-154	-250	-342	-363	-385
112. Sugar and confectionery products	-2,485	-1,695	-1,900	-2,222	-2,330	-2,474
113. Alcoholic beverages	-1,807	-2,798	-3,143	-4,645	-4,910	-5,213
114. Soft drinks and flavorings	-58	-114	-228	-217	-238	-253
115. Miscellaneous foods and kindred products	-1,680	-1,385	-1,937	-1,679	-2,096	-2,724
116. Tobacco manufactures	-403	-390	-118	-77	-97	-103
117. Weaving, finishing, yarn and thread mills	-1,639	-1,726	-2,908	-3,704	-4,629	-6,796
118. Knitting mills	-124	-101	-126	-134	-171	-183
119. Floor covering mills	-129	-339	-609	-651	-838	-1,084
120. Miscellaneous textile goods	-455	-494	-641	-907	-1,138	-1,212
121. Apparel	-8,001	-10,820	-17,914	-23,974	-31,396	-35,407
122. Miscellaneous fabricated textile products	-358	-566	-1,270	-1,513	-1,975	-2,928
123. Pulp, paper, and paperboard mills	-5,391	-4,728	-7,439	-8,398	-9,827	-10,464
124. Converted paper products except containers	-352	-541	-998	-1,150	-1,456	-1,537
125. Paperboard containers and boxes	-19	-47	-89	-118	-131	-144
126. Newspapers	-46	-61	-68	-131	-172	-194
127. Periodicals	-39	-46	-70	-105	-138	-155
128. Books	-230	-311	-505	-666	-872	-983
129. Miscellaneous publishing	-15	-20	-16	-22	-28	-32
130. Commercial printing and business forms	-116	-214	-253	-299	-391	-441
131. Greeting card publishing	-6	-9	-15	-20	-27	-30
132. Blankbooks and bookbinding	-47	-51	-94	-100	-131	-148
133. Printing trade services	-1	-3	-3	-4	-5	-5
134. Industrial chemicals	-5,275	-5,095	-8,961	-10,452	-13,070	-13,892
135. Plastics materials and synthetics	-750	-695	-1,828	-1,929	-2,187	-2,325
136. Drugs	-1,503	-1,180	-1,717	-2,460	-2,993	-3,222
137. Soap, cleaners, and toilet goods	-386	-258	-590	-631	-810	-872
138. Paints and allied products	-12	-29	-109	-157	-198	-210
139. Agricultural chemicals	-916	-737	-1,291	-1,345	-1,280	-1,788
140. Miscellaneous chemical products	-469	-431	-788	-901	-1,122	-1,190
141. Petroleum refining	-27,561	-19,959	-23,470	-26,015	-26,015	-26,015
142. Miscellaneous petroleum and coal products	-148	-126	-231	-216	-221	-229
143. Tires and inner tubes	-1,455	-1,318	-2,227	-2,459	-3,187	-3,398
144. Rubber products and plastic hose and footwear	-1,214	-614	-923	-1,539	-2,006	-2,220
145. Miscellaneous plastics products	-1,039	-1,330	-2,359	-2,672	-3,423	-3,673
146. Footwear except rubber and plastic	-2,577	-3,765	-6,249	-9,193	-10,648	-11,920
147. Luggage, handbags, and leather products, nec	-1,142	-1,554	-2,246	-3,001	-3,365	-3,668
148. Railroad transportation	-138	-231	-114	-189	-251	-277
149. Local and interurban passenger transit	0	0	0	0	0	0
150. Trucking and warehousing	0	0	0	0	0	0

See footnotes at end of table.

B-5. Imports of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
151. Water transportation	3,355	2,408	3,243	4,838	5,213	5,751
152. Air transportation	-4,772	-3,950	-5,432	-5,660	-6,123	-6,755
153. Pipe lines, except natural gas	0	0	0	0	0	0
154. Arrangement of passenger transportation	0	0	0	0	0	0
155. Miscellaneous transportation services	0	0	0	0	0	0
156. Communications except broadcasting	0	0	0	0	0	0
157. Radio and television broadcasting	0	0	0	0	0	0
158. Electric utilities including combined services	-610	-703	-945	-1,347	-1,683	-1,791
159. Gas utilities including combined services	-4,261	-4,077	-2,532	-3,945	-3,997	-3,945
160. Water and sanitation including combined services	0	0	0	0	0	0
161. Wholesale trade	8,002	8,584	12,396	15,578	20,704	25,830
162. Retail trade, except eating and drinking places	0	0	0	0	0	0
163. Eating and drinking places	0	0	0	0	0	0
164. Banking	0	0	0	0	0	0
165. Credit agencies and investment offices	0	0	0	0	0	0
166. Security and commodity brokers and exchanges	0	0	0	0	0	0
167. Insurance carriers	-736	-799	-447	-621	-685	-756
168. Insurance agents, brokers, and service	0	0	0	0	0	0
169. Real estate	0	0	0	0	0	0
170. Owner-occupied dwellings	0	0	0	0	0	0
171. Hotels and other lodging places	0	0	0	0	0	0
172. Laundry, cleaning, and shoe repair	0	0	0	0	0	0
173. Personal services, nec	0	0	0	0	0	0
174. Beauty and barber shops	0	0	0	0	0	0
175. Funeral service and crematories	0	0	0	0	0	0
176. Advertising	-18	-23	-77	-78	-102	-114
177. Services to dwellings and other buildings	0	0	0	0	0	0
178. Personnel supply services	0	0	0	0	0	0
179. Computer and data processing services	0	0	0	0	0	0
180. Research, management, and consulting services	0	0	0	0	0	0
181. Detective and protective services	0	0	0	0	0	0
182. Equipment rental and leasing	0	0	0	0	0	0
183. Photocopying, commercial art, photofinishing	-1	-2	0	-1	-1	-1
184. Credit reporting and business services, nec	0	0	0	0	0	0
185. Automotive rentals, without drivers	0	0	0	0	0	0
186. Automobile parking, repair, and services	-18	-21	-54	-47	-62	-78
187. Electrical repair shops	0	0	0	0	0	0
188. Watch, clock, jewelry, and furniture repair	0	0	0	0	0	0
189. Miscellaneous repair shops and related services	-122	-169	-260	-307	-395	-586
190. Motion pictures	-51	-73	-23	-68	-90	-99
191. Theatrical producers and entertainers	0	0	0	0	0	0
192. Bowling alleys and billiard establishments	0	0	0	0	0	0
193. Commercial sports	0	0	0	0	0	0
194. Amusement and recreation services, nec	0	0	0	0	0	0
195. Offices of health practitioners	0	0	0	0	0	0
196. Nursing and personal care facilities	0	0	0	0	0	0
197. Hospitals, private	0	0	0	0	0	0
198. Outpatient facilities and health services,nec	0	0	0	0	0	0
199. Legal services	0	0	0	0	0	0
200. Educational services, private	0	0	0	0	0	0

See footnotes at end of table.

B-5. Imports of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
201. Individual and miscellaneous social services	0	0	0	0	0	0
202. Job training and related services	0	0	0	0	0	0
203. Child day care services	0	0	0	0	0	0
204. Residential care	0	0	0	0	0	0
205. Museums and noncommercial organizations, nec	0	0	0	0	0	0
206. Business and professional associations	0	0	0	0	0	0
207. Labor, civic, and social organizations	0	0	0	0	0	0
208. Religious organizations	0	0	0	0	0	0
209. Private households	0	0	0	0	0	0
210. Engineering and architectural services	-3	-4	-8	-11	-14	-16
211. Accounting, auditing, and services, nec	-1	-2	-4	-14	-18	-20
212. Post Office	0	0	0	0	0	0
213. Federal electric utilities	0	0	0	0	0	0
214. Commodity Credit Corporation	0	0	0	0	0	0
215. Federal government enterprises, nec	0	0	0	0	0	0
216. Federal general government	0	0	0	0	0	0
217. Local government passenger transit	0	0	0	0	0	0
218. State and local electric utilities	0	0	0	0	0	0
219. State and local government enterprises, nec	0	0	0	0	0	0
220. State and local government hospitals	0	0	0	0	0	0
221. State and local government education	0	0	0	0	0	0
222. State and local general government, nec	0	0	0	0	0	0
223. Noncomparable imports	-32,923	-43,130	-50,443	-65,666	-80,108	-88,374
224. Scrap, used and secondhand goods	-404	-349	-660	-562	-719	-1,066
225. Rest of the world industry	-16,283	-40,500	-43,447	-60,049	-81,704	-84,559
226. Inventory valuation adjustment	0	0	0	0	0	0

nec = not elsewhere classified.

NOTE: Detail may not add to totals because of rounding.

B-6. Federal Government purchases of goods and services by industry, 1977, 1982, 1985, and projected 2000

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
Total	231,900	272,704	323,500	319,803	354,403	371,203
1. Livestock and livestock products	8	11	13	13	14	15
2. Other agricultural products	4,955	7,766	9,300	8,097	8,878	9,464
3. Agricultural services, forestry, and fishing	-1,076	-49	-57	-59	-64	-68
4. Metal mining	-94	-134	-180	-144	-173	-184
5. Coal mining	43	61	79	67	79	84
6. Crude petroleum, natural gas, and gas liquids	319	175	210	209	230	245
7. Oil and gas field services	0	0	0	0	0	0
8. Nonmetallic minerals, except fuels	1	1	1	2	2	2
9. New nonfarm housing, single units	23	22	34	24	29	31
10. New nonfarm housing, nec	510	495	517	531	639	680
11. Nonfarm residential alterations and additions	480	464	700	498	599	638
12. New farm housing, alterations, and additions	0	0	0	0	0	0
13. New industrial buildings	1,811	1,633	1,769	1,500	1,691	1,801
14. New office buildings	292	265	415	306	345	368
15. New commercial buildings except offices	69	67	62	71	86	91
16. New educational buildings	169	163	163	176	210	224
17. New hospitals and institutions	738	672	717	774	876	933
18. New nonfarm buildings, nec	577	516	843	788	874	931
19. New communications facilities	0	0	0	0	0	0
20. New electric utility facilities	1,616	1,519	1,404	1,813	1,990	2,121
21. New water supply and sewer facilities	199	194	159	218	252	269
22. New gas utility and pipeline facilities	0	0	0	0	0	0
23. New roads	913	546	505	652	716	762
24. New local transit facilities	0	0	0	0	0	0
25. New conservation and development facilities	2,849	2,608	2,423	2,095	2,314	2,465
26. New nonbuilding facilities, nec	1,413	1,375	1,893	1,232	1,475	1,570
27. Maintenance and repair construction	5,302	6,565	10,027	6,943	8,169	8,699
28. Logging camps and logging contractors	0	0	0	0	0	0
29. Sawmills and planing mills	1	3	3	3	3	4
30. Millwork and structural wood members, nec	2	3	4	3	4	4
31. Veneer and plywood	1	1	2	2	2	2
32. Wood containers and miscellaneous wood products	20	29	37	32	37	40
33. Mobile homes	2	2	3	3	3	3
34. Prefabricated wood buildings	14	20	27	22	26	28
35. Household furniture	75	98	120	115	128	136
36. Partitions and fixtures	44	54	68	63	71	76
37. Office and miscellaneous furniture and fixtures	111	138	169	252	280	298
38. Glass and glass products	25	31	39	35	40	42
39. Hydraulic cement	0	0	0	0	0	0
40. Concrete, gypsum, and plaster products	19	22	27	27	29	31
41. Stone, clay, and miscellaneous mineral products	84	111	141	126	144	153
42. Blast furnaces and basic steel products	17	23	30	25	29	31
43. Iron and steel foundries	102	70	92	77	91	97
44. Primary aluminum	16	21	27	23	27	29
45. Primary nonferrous metals, except aluminum	16	26	33	30	34	36
46. Miscellaneous primary and secondary metals	57	34	44	38	44	47
47. Copper rolling and drawing	24	36	45	42	47	50
48. Aluminum rolling and drawing	58	79	105	86	102	109
49. Nonferrous rolling and drawing, nec	9	41	54	45	53	57
50. Nonferrous wire drawing and insulating	66	99	127	111	128	137

See footnotes at end of table.

B-6. Federal Government purchases of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
51. Aluminum foundries	36	46	56	55	61	64
52. Nonferrous foundries, except aluminum	14	15	20	16	19	20
53. Metal cans and shipping containers	83	111	149	119	143	152
54. Cutlery, hand tools, and hardware	200	190	238	218	248	264
55. Plumbing and nonelectric heating equipment	35	47	63	51	61	65
56. Fabricated structural metal products	1,267	690	897	765	894	952
57. Screw machine products, bolts, rivets, etc	80	67	87	75	87	93
58. Forgings	59	67	85	77	88	94
59. Automotive stampings	5	6	8	7	8	9
60. Stampings, except automotive	60	82	106	92	106	113
61. Metal coating, engraving, and allied services	58	82	110	88	106	112
62. Ordnance, except vehicles and missiles	2,214	3,525	4,579	4,704	5,649	6,015
63. Miscellaneous fabricated metal products	370	183	233	208	239	254
64. Engines and turbines	1,279	1,556	2,086	1,674	2,008	2,138
65. Farm and garden machinery	32	41	54	45	53	56
66. Construction machinery	210	261	345	286	338	360
67. Mining and oil field machinery	45	50	66	54	65	69
68. Materials handling machinery and equipment	167	362	478	396	469	499
69. Metalworking machinery	318	798	1,052	874	1,032	1,099
70. Special industry machinery	136	134	175	148	174	185
71. General industrial machinery	449	394	507	488	562	598
72. Electronic computing equipment	478	2,661	4,070	4,306	5,047	5,375
73. Office and accounting machines	258	453	589	545	637	679
74. Refrigeration and service industry machinery	126	177	229	197	229	244
75. Miscellaneous nonelectrical machinery	156	142	174	167	186	198
76. Electric distributing equipment	254	324	413	366	421	448
77. Electrical industrial apparatus	492	620	809	686	804	856
78. Household appliances	47	66	88	72	86	91
79. Electric lighting and wiring equipment	109	133	173	147	172	183
80. Electronic home entertainment equipment	35	60	77	68	78	83
81. Telephone and telegraph apparatus	117	528	1,106	842	981	1,045
82. Radio and TV communication equipment	6,237	13,351	19,856	17,814	21,337	22,719
83. Electronic tubes	248	187	187	163	192	204
84. Semiconductors and related devices	368	682	891	1,004	1,184	1,261
85. Miscellaneous electronic components	288	523	668	590	680	724
86. Storage batteries and engine electrical parts	51	85	110	94	110	117
87. X-ray and other electromedical apparatus	127	144	181	164	187	199
88. Electrical equipment and supplies, nec	71	86	111	97	112	119
89. Motor vehicles and car bodies	1,295	2,484	3,371	3,395	4,014	4,274
90. Motor vehicle parts and accessories	20	430	576	546	655	697
91. Truck and bus bodies, trailers, and motor homes	33	49	61	56	64	68
92. Aircraft	9,200	10,817	12,887	11,481	13,762	14,653
93. Aircraft and missile engines and equipment	7,209	11,533	16,353	16,659	19,898	21,188
94. Guided missiles and space vehicles	6,966	7,914	14,052	13,356	15,824	16,851
95. Ship and boat building and repairing	4,704	5,547	6,271	4,460	5,332	5,678
96. Railroad equipment	9	11	14	13	15	16
97. Miscellaneous transportation equipment	587	899	1,108	1,131	1,359	1,448
98. Engineering and scientific instruments	677	827	993	1,078	1,269	1,351
99. Measuring and controlling devices	1,075	1,207	1,554	1,534	1,766	1,881
100. Optical and ophthalmic products	252	672	989	1,155	1,368	1,457

See footnotes at end of table.

B-6. Federal Government purchases of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
101. Medical instruments and supplies	264	389	493	700	806	858
102. Photographic equipment and supplies	646	1,174	1,429	1,385	1,535	1,636
103. Watches, clocks, and parts	38	54	71	59	70	74
104. Jewelry, silverware, and plated ware	-83	-71	-85	-85	-93	-99
105. Toys and sporting goods	41	55	69	63	71	76
106. Manufactured products, nec	140	180	228	204	233	249
107. Meat products	87	124	165	134	160	171
108. Dairy products	670	837	1,008	997	1,096	1,168
109. Canned, dried, and frozen foods	19	25	33	28	33	35
110. Grain mill products and fats and oils	-27	-39	-41	-52	-52	-55
111. Bakery products	28	37	48	40	48	51
112. Sugar and confectionery products	20	28	38	30	36	39
113. Alcoholic beverages	0	1	1	1	1	1
114. Soft drinks and flavorings	13	17	22	18	21	23
115. Miscellaneous foods and kindred products	47	81	105	91	105	112
116. Tobacco manufactures	0	0	0	0	0	0
117. Weaving, finishing, yarn and thread mills	76	111	148	121	144	153
118. Knitting mills	0	0	0	0	0	0
119. Floor covering mills	7	9	11	11	12	13
120. Miscellaneous textile goods	14	19	24	23	25	27
121. Apparel	472	1,060	1,025	970	1,167	1,243
122. Miscellaneous fabricated textile products	99	145	190	160	187	200
123. Pulp, paper, and paperboard mills	33	129	169	143	167	178
124. Converted paper products except containers	156	210	263	242	274	292
125. Paperboard containers and boxes	68	84	109	94	109	116
126. Newspapers	5	6	8	7	8	9
127. Periodicals	2	3	3	3	3	4
128. Books	20	26	36	28	34	36
129. Miscellaneous publishing	88	136	168	159	178	190
130. Commercial printing and business forms	345	288	357	335	376	401
131. Greeting card publishing	0	0	0	0	0	0
132. Blankbooks and bookbinding	29	36	45	42	48	51
133. Printing trade services	0	0	0	0	0	0
134. Industrial chemicals	1,518	899	1,175	992	1,164	1,240
135. Plastics materials and synthetics	57	75	100	81	97	103
136. Drugs	322	224	274	264	293	312
137. Soap, cleaners, and toilet goods	181	214	281	235	277	295
138. Paints and allied products	5	6	8	7	8	9
139. Agricultural chemicals	34	39	50	45	51	54
140. Miscellaneous chemical products	446	399	521	442	518	551
141. Petroleum refining	6,479	3,914	4,358	3,784	4,636	4,935
142. Miscellaneous petroleum and coal products	63	68	83	79	88	94
143. Tires and inner tubes	63	184	168	118	138	147
144. Rubber products and plastic hose and footwear	287	153	191	176	199	212
145. Miscellaneous plastics products	93	128	166	142	166	177
146. Footwear except rubber and plastic	8	10	14	11	13	14
147. Luggage, handbags, and leather products, nec	30	38	49	42	49	52
148. Railroad transportation	477	668	784	728	863	919
149. Local and interurban passenger transit	86	110	144	123	143	153
150. Trucking and warehousing	2,135	2,745	3,146	3,163	3,747	3,990

See footnotes at end of table.

B-6. Federal Government purchases of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
151. Water transportation	932	1,297	1,728	1,404	1,675	1,784
152. Air transportation	1,904	1,751	2,283	2,030	2,369	2,523
153. Pipe lines, except natural gas	87	69	76	75	89	95
154. Arrangement of passenger transportation	0	0	0	91	100	107
155. Miscellaneous transportation services	0	0	0	0	0	0
156. Communications except broadcasting	1,299	2,019	2,069	2,288	2,625	2,796
157. Radio and television broadcasting	0	0	0	0	0	0
158. Electric utilities including combined services	1,990	2,423	3,112	2,767	3,196	3,404
159. Gas utilities including combined services	396	602	691	582	672	716
160. Water and sanitation including combined services	144	180	238	276	323	344
161. Wholesale trade	3,210	4,437	6,257	5,556	6,543	6,968
162. Retail trade, except eating and drinking places	34	47	62	67	80	85
163. Eating and drinking places	303	380	494	422	492	524
164. Banking	724	1,112	1,331	1,330	1,457	1,552
165. Credit agencies and investment offices	-23	-22	-26	-26	-28	-30
166. Security and commodity brokers and exchanges	5	4	5	5	6	6
167. Insurance carriers	-12	-14	-14	-18	-18	-20
168. Insurance agents, brokers, and service	0	0	0	0	0	0
169. Real estate	1,683	1,502	1,870	1,736	1,958	2,086
170. Owner-occupied dwellings	0	0	0	0	0	0
171. Hotels and other lodging places	529	765	894	850	992	1,056
172. Laundry, cleaning, and shoe repair	23	25	30	30	33	35
173. Personal services, nec	0	0	0	0	0	0
174. Beauty and barber shops	0	0	0	0	0	0
175. Funeral service and crematories	0	0	0	0	0	0
176. Advertising	80	96	121	110	125	134
177. Services to dwellings and other buildings	422	520	670	674	775	826
178. Personnel supply services	1,832	2,195	2,698	2,660	2,967	3,161
179. Computer and data processing services	2,144	4,123	5,527	7,091	7,889	8,404
180. Research, management, and consulting services	4,507	5,530	7,087	7,437	8,583	9,141
181. Detective and protective services	57	67	82	160	178	189
182. Equipment rental and leasing	207	261	313	312	342	365
183. Photocopying, commercial art, photofinishing	58	71	91	79	92	98
184. Credit reporting and business services, nec	13	17	24	34	42	45
185. Automotive rentals, without drivers	48	67	85	76	87	93
186. Automobile parking, repair, and services	72	90	118	99	117	124
187. Electrical repair shops	207	291	285	285	337	359
188. Watch, clock, jewelry, and furniture repair	9	11	15	13	15	16
189. Miscellaneous repair shops and related services	518	742	851	816	960	1,023
190. Motion pictures	150	215	283	237	279	297
191. Theatrical producers and entertainers	37	55	74	59	71	76
192. Bowling alleys and billiard establishments	0	0	0	0	0	0
193. Commercial sports	0	0	0	0	0	0
194. Amusement and recreation services, nec	70	100	126	113	130	138
195. Offices of health practitioners	315	396	499	453	516	549
196. Nursing and personal care facilities	117	127	152	152	166	177
197. Hospitals, private	1,200	919	1,197	1,017	1,191	1,268
198. Outpatient facilities and health services,nec	3	4	5	4	5	5
199. Legal services	0	0	0	0	0	0
200. Educational services, private	3,886	3,800	4,188	4,514	4,974	5,299

See footnotes at end of table.

B-6. Federal Government purchases of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
201. Individual and miscellaneous social services	0	0	0	0	0	0
202. Job training and related services	60	114	154	123	147	157
203. Child day care services	0	0	0	0	0	0
204. Residential care	0	0	0	0	0	0
205. Museums and noncommercial organizations, nec	83	105	136	117	136	145
206. Business and professional associations	13	14	17	17	18	20
207. Labor, civic, and social organizations	0	0	0	0	0	0
208. Religious organizations	0	0	0	0	0	0
209. Private households	0	0	0	0	0	0
210. Engineering and architectural services	142	182	244	195	234	249
211. Accounting, auditing, and services, nec	913	994	1,219	1,164	1,298	1,383
212. Post Office	578	827	1,033	1,022	1,158	1,234
213. Federal electric utilities	0	0	0	0	0	0
214. Commodity Credit Corporation	-80	-143	-171	-171	-187	-200
215. Federal government enterprises, nec	-269	-336	-402	-584	-640	-682
216. Federal general government	109,516	116,880	122,600	132,701	135,266	137,827
217. Local government passenger transit	0	0	0	0	0	0
218. State and local electric utilities	0	0	0	0	0	0
219. State and local government enterprises, nec	67	86	113	94	111	118
220. State and local government hospitals	0	0	0	0	0	0
221. State and local government education	0	0	0	0	0	0
222. State and local general government, nec	0	0	0	0	0	0
223. Noncomparable imports	6,201	8,902	7,882	9,395	11,204	11,930
224. Scrap, used and secondhand goods	-90	-104	-131	-639	-742	-790
225. Rest of the world industry	-498	-3,320	-3,980	-5,466	-5,990	-6,382
226. Inventory valuation adjustment	0	0	0	0	0	0

nec = not elsewhere classified.

NOTE: Detail may not add to totals because of rounding.

B-7. State and local government purchases of goods and services by industry, 1977, 1982, 1985, and projected 2000

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
Total	357,178	369,013	397,596	467,802	544,002	568,603
1. Livestock and livestock products	67	59	70	66	103	110
2. Other agricultural products	534	455	527	338	542	581
3. Agricultural services, forestry, and fishing	449	386	438	428	626	667
4. Metal mining	0	0	0	0	0	0
5. Coal mining	150	135	156	156	223	238
6. Crude petroleum, natural gas, and gas liquids	0	0	0	0	0	0
7. Oil and gas field services	0	0	0	0	0	0
8. Nonmetallic minerals, except fuels	75	59	63	78	97	102
9. New nonfarm housing, single units	73	66	99	80	99	104
10. New nonfarm housing, nec	891	794	829	918	1,176	1,244
11. Nonfarm residential alterations and additions	43	38	58	46	57	60
12. New farm housing, alterations, and additions	0	0	0	0	0	0
13. New industrial buildings	0	0	0	0	0	0
14. New office buildings	1,741	1,571	1,953	1,897	2,355	2,487
15. New commercial buildings except offices	200	181	112	218	271	286
16. New educational buildings	8,921	5,979	6,018	4,962	7,901	8,446
17. New hospitals and institutions	1,902	1,751	1,382	613	1,066	1,145
18. New nonfarm buildings, nec	2,276	1,996	2,184	2,206	3,171	3,384
19. New communications facilities	0	0	0	0	0	0
20. New electric utility facilities	1,632	1,571	974	1,369	1,700	1,795
21. New water supply and sewer facilities	10,683	9,877	10,548	10,346	14,478	15,367
22. New gas utility and pipeline facilities	53	50	50	60	75	79
23. New roads	17,815	15,473	19,703	20,288	25,193	26,603
24. New local transit facilities	1,182	1,083	1,033	824	1,024	1,081
25. New conservation and development facilities	1,140	1,064	660	479	595	628
26. New nonbuilding facilities, nec	2,717	2,463	1,527	879	1,092	1,153
27. Maintenance and repair construction	19,841	17,872	23,304	24,349	33,056	35,081
28. Logging camps and logging contractors	0	0	0	0	0	0
29. Sawmills and planing mills	20	21	26	20	33	35
30. Millwork and structural wood members, nec	0	0	0	0	0	0
31. Veneer and plywood	0	0	0	0	0	0
32. Wood containers and miscellaneous wood products	75	68	79	75	110	118
33. Mobile homes	2	2	2	2	3	3
34. Prefabricated wood buildings	0	0	0	0	0	0
35. Household furniture	81	69	91	74	122	131
36. Partitions and fixtures	85	68	84	68	109	116
37. Office and miscellaneous furniture and fixtures	910	829	978	1,117	1,690	1,803
38. Glass and glass products	446	349	400	406	631	674
39. Hydraulic cement	0	0	0	0	0	0
40. Concrete, gypsum, and plaster products	11	9	10	12	16	17
41. Stone, clay, and miscellaneous mineral products	128	99	116	113	170	181
42. Blast furnaces and basic steel products	31	25	39	32	55	59
43. Iron and steel foundries	0	0	0	0	0	0
44. Primary aluminum	0	0	0	0	0	0
45. Primary nonferrous metals, except aluminum	0	0	0	0	0	0
46. Miscellaneous primary and secondary metals	0	0	0	0	0	0
47. Copper rolling and drawing	0	0	0	0	0	0
48. Aluminum rolling and drawing	0	0	0	0	0	0
49. Nonferrous rolling and drawing, nec	0	0	0	0	0	0
50. Nonferrous wire drawing and insulating	0	0	0	0	0	0

See footnotes at end of table.

B-7. State and local government purchases of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
51. Aluminum foundries	25	22	26	28	41	44
52. Nonferrous foundries, except aluminum	0	0	0	0	0	0
53. Metal cans and shipping containers	38	31	37	30	48	51
54. Cutlery, hand tools, and hardware	172	137	169	151	234	250
55. Plumbing and nonelectric heating equipment	0	0	0	0	0	0
56. Fabricated structural metal products	0	0	0	0	0	0
57. Screw machine products, bolts, rivets, etc	44	40	46	44	64	68
58. Forgings	0	0	0	0	0	0
59. Automotive stampings	73	62	75	60	95	102
60. Stampings, except automotive	113	98	119	105	161	172
61. Metal coating, engraving, and allied services	0	0	0	0	0	0
62. Ordnance, except vehicles and missiles	70	55	105	162	308	335
63. Miscellaneous fabricated metal products	97	78	95	90	134	143
64. Engines and turbines	181	139	148	144	180	190
65. Farm and garden machinery	121	98	118	122	172	183
66. Construction machinery	508	308	327	405	520	550
67. Mining and oil field machinery	0	0	0	0	0	0
68. Materials handling machinery and equipment	4	3	4	4	6	6
69. Metalworking machinery	96	73	85	79	117	125
70. Special industry machinery	45	34	41	33	52	56
71. General industrial machinery	74	59	72	79	108	115
72. Electronic computing equipment	28	98	635	1,382	2,078	2,219
73. Office and accounting machines	354	394	453	430	633	674
74. Refrigeration and service industry machinery	394	342	405	385	605	646
75. Miscellaneous nonelectrical machinery	53	42	50	48	71	75
76. Electric distributing equipment	46	39	43	48	63	67
77. Electrical industrial apparatus	104	83	96	93	135	144
78. Household appliances	109	96	117	111	172	184
79. Electric lighting and wiring equipment	279	212	255	222	342	365
80. Electronic home entertainment equipment	103	113	134	151	235	251
81. Telephone and telegraph apparatus	0	0	0	392	578	617
82. Radio and TV communication equipment	240	221	445	690	1,165	1,252
83. Electronic tubes	21	9	15	12	21	22
84. Semiconductors and related devices	10	12	13	14	20	21
85. Miscellaneous electronic components	45	53	73	64	101	108
86. Storage batteries and engine electrical parts	67	56	70	68	100	107
87. X-ray and other electromedical apparatus	128	95	98	150	224	239
88. Electrical equipment and supplies, nec	25	24	26	30	42	44
89. Motor vehicles and car bodies	2,958	2,762	4,303	3,796	5,608	5,987
90. Motor vehicle parts and accessories	225	178	232	209	325	348
91. Truck and bus bodies, trailers, and motor homes	0	0	0	0	0	0
92. Aircraft	13	9	18	30	57	62
93. Aircraft and missile engines and equipment	0	0	0	0	0	0
94. Guided missiles and space vehicles	0	0	0	0	0	0
95. Ship and boat building and repairing	67	52	85	68	118	127
96. Railroad equipment	209	181	194	158	200	212
97. Miscellaneous transportation equipment	87	70	114	86	154	166
98. Engineering and scientific instruments	159	130	152	190	293	313
99. Measuring and controlling devices	64	56	66	66	95	101
100. Optical and ophthalmic products	78	76	84	147	229	245

See footnotes at end of table.

B-7. State and local government purchases of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
101. Medical instruments and supplies	579	514	547	765	1,153	1,228
102. Photographic equipment and supplies	1,033	1,106	1,271	1,169	1,772	1,889
103. Watches, clocks, and parts	25	22	25	26	38	41
104. Jewelry, silverware, and plated ware	74	43	53	48	73	78
105. Toys and sporting goods	350	306	359	334	494	526
106. Manufactured products, nec	828	686	798	751	1,108	1,181
107. Meat products	1,169	1,020	1,268	1,166	1,882	2,015
108. Dairy products	1,299	1,088	1,315	1,101	1,760	1,883
109. Canned, dried, and frozen foods	616	508	624	575	923	988
110. Grain mill products and fats and oils	140	152	182	178	267	285
111. Bakery products	439	357	443	371	600	642
112. Sugar and confectionery products	101	84	104	87	141	150
113. Alcoholic beverages	-17	-15	-16	-20	-25	-26
114. Soft drinks and flavorings	77	60	78	67	111	119
115. Miscellaneous foods and kindred products	402	442	529	493	782	836
116. Tobacco manufactures	0	0	0	0	0	0
117. Weaving, finishing, yarn and thread mills	81	73	88	83	130	139
118. Knitting mills	0	0	0	0	0	0
119. Floor covering mills	5	5	6	6	9	10
120. Miscellaneous textile goods	21	21	25	26	39	41
121. Apparel	397	357	577	500	884	955
122. Miscellaneous fabricated textile products	249	231	266	284	417	445
123. Pulp, paper, and paperboard mills	576	490	568	545	804	856
124. Converted paper products except containers	1,177	971	1,127	1,140	1,639	1,744
125. Paperboard containers and boxes	146	114	139	130	205	219
126. Newspapers	48	38	41	46	68	72
127. Periodicals	164	138	164	138	218	233
128. Books	2,125	2,277	2,717	2,436	3,819	4,080
129. Miscellaneous publishing	333	277	323	367	550	586
130. Commercial printing and business forms	2,382	2,710	3,027	3,462	4,734	5,025
131. Greeting card publishing	-1	-1	-1	-1	-1	-1
132. Blankbooks and bookbinding	368	307	357	334	487	519
133. Printing trade services	7	6	7	6	9	10
134. Industrial chemicals	883	700	778	802	1,173	1,249
135. Plastics materials and synthetics	4	3	3	3	4	5
136. Drugs	1,586	1,695	2,169	2,877	4,336	4,617
137. Soap, cleaners, and toilet goods	544	619	725	714	1,078	1,150
138. Paints and allied products	177	147	185	149	242	259
139. Agricultural chemicals	325	250	280	215	308	327
140. Miscellaneous chemical products	205	172	197	209	301	321
141. Petroleum refining	9,446	9,759	10,635	9,958	14,993	16,009
142. Miscellaneous petroleum and coal products	91	65	87	78	123	132
143. Tires and inner tubes	181	144	132	121	182	194
144. Rubber products and plastic hose and footwear	380	450	468	497	767	819
145. Miscellaneous plastics products	288	352	393	409	608	648
146. Footwear except rubber and plastic	35	28	48	37	68	74
147. Luggage, handbags, and leather products, nec	9	7	13	9	18	19
148. Railroad transportation	309	171	201	170	251	268
149. Local and interurban passenger transit	2,541	2,039	2,413	1,971	3,072	3,281
150. Trucking and warehousing	1,609	1,287	1,425	1,485	2,174	2,317

See footnotes at end of table.

B-7. State and local government purchases of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
151. Water transportation	179	83	97	97	145	154
152. Air transportation	1,671	972	1,136	1,139	1,713	1,827
153. Pipe lines, except natural gas	168	150	168	172	258	275
154. Arrangement of passenger transportation	25	63	71	278	407	434
155. Miscellaneous transportation services	0	0	0	0	0	0
156. Communications except broadcasting	2,054	3,027	3,039	3,345	4,836	5,148
157. Radio and television broadcasting	0	0	0	0	0	0
158. Electric utilities including combined services	5,467	4,049	4,642	4,778	7,037	7,497
159. Gas utilities including combined services	2,060	2,489	2,207	1,914	2,758	2,934
160. Water and sanitation including combined services	818	642	755	877	1,253	1,333
161. Wholesale trade	4,560	3,422	4,289	4,391	6,614	7,055
162. Retail trade, except eating and drinking places	279	370	318	380	549	584
163. Eating and drinking places	-3,312	-2,276	-2,814	-1,931	-3,314	-3,552
164. Banking	3,246	3,060	3,269	3,992	4,957	5,235
165. Credit agencies and investment offices	0	0	0	0	0	0
166. Security and commodity brokers and exchanges	1,455	987	1,354	1,475	1,831	1,934
167. Insurance carriers	204	302	402	336	551	591
168. Insurance agents, brokers, and service	0	0	0	0	0	0
169. Real estate	5,637	4,146	4,355	5,186	7,191	7,635
170. Owner-occupied dwellings	0	0	0	0	0	0
171. Hotels and other lodging places	278	840	596	924	1,242	1,319
172. Laundry, cleaning, and shoe repair	373	277	332	286	453	484
173. Personal services, nec	10	8	9	11	14	15
174. Beauty and barber shops	0	0	0	0	0	0
175. Funeral service and crematories	0	0	0	0	0	0
176. Advertising	1,421	1,140	1,263	1,376	1,860	1,972
177. Services to dwellings and other buildings	441	354	391	833	1,177	1,252
178. Personnel supply services	55	44	50	469	672	715
179. Computer and data processing services	1,701	3,147	4,227	5,303	7,778	8,288
180. Research, management, and consulting services	1,528	2,417	2,633	3,224	4,468	4,744
181. Detective and protective services	-129	-92	-195	-50	-238	-268
182. Equipment rental and leasing	302	229	292	194	375	404
183. Photocopying, commercial art, photofinishing	13	11	15	19	25	26
184. Credit reporting and business services, nec	319	260	321	378	579	619
185. Automotive rentals, without drivers	622	561	754	699	1,083	1,160
186. Automobile parking, repair, and services	375	298	366	378	539	574
187. Electrical repair shops	81	71	88	80	125	133
188. Watch, clock, jewelry, and furniture repair	7	7	7	9	11	12
189. Miscellaneous repair shops and related services	181	161	224	187	310	333
190. Motion pictures	134	119	147	123	194	208
191. Theatrical producers and entertainers	11	10	12	12	18	19
192. Bowling alleys and billiard establishments	0	0	0	0	0	0
193. Commercial sports	0	0	0	0	0	0
194. Amusement and recreation services, nec	74	68	82	65	105	112
195. Offices of health practitioners	628	949	971	1,172	1,752	1,865
196. Nursing and personal care facilities	0	0	0	134	200	213
197. Hospitals, private	714	500	511	619	925	985
198. Outpatient facilities and health services,nec	8	0	11	147	219	233
199. Legal services	2,744	2,007	2,178	2,487	3,503	3,723
200. Educational services, private	-990	-580	-710	-459	-792	-848

See footnotes at end of table.

B-7. State and local government purchases of goods and services by industry, 1977, 1982, 1985, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1977	1982	1985	2000 Low	2000 Moderate	2000 High
201. Individual and miscellaneous social services	0	0	0	0	0	0
202. Job training and related services	0	0	0	0	0	0
203. Child day care services	0	0	0	0	0	0
204. Residential care	0	0	0	0	0	0
205. Museums and noncommercial organizations, nec	-26	-22	-23	-29	-36	-38
206. Business and professional associations	102	113	135	115	179	191
207. Labor, civic, and social organizations	0	0	0	0	0	0
208. Religious organizations	0	0	0	0	0	0
209. Private households	0	0	0	0	0	0
210. Engineering and architectural services	-544	-442	-472	-588	-731	-772
211. Accounting, auditing, and services, nec	2,182	3,138	3,452	3,837	5,315	5,644
212. Post Office	620	593	649	777	1,037	1,099
213. Federal electric utilities	0	0	0	0	0	0
214. Commodity Credit Corporation	0	0	0	0	0	0
215. Federal government enterprises, nec	0	0	0	0	0	0
216. Federal general government	0	0	0	0	0	0
217. Local government passenger transit	0	0	0	0	0	0
218. State and local electric utilities	0	0	0	0	0	0
219. State and local government enterprises, nec	129	103	130	117	180	193
220. State and local government hospitals	14,810	17,935	20,207	28,011	28,626	29,513
221. State and local government education	114,413	120,749	123,942	154,533	157,930	162,825
222. State and local general government, nec	72,984	88,193	90,525	115,372	117,933	121,592
223. Noncomparable imports	26	21	26	21	33	36
224. Scrap, used and secondhand goods	1,557	955	842	1,173	1,621	1,722
225. Rest of the world industry	0	0	0	0	0	0
226. Inventory valuation adjustment	0	0	0	0	0	0

nec = not elsewhere classified.

NOTE: Detail may not add to totals because of rounding.

C-1. Gross duplicated output by industry, selected years, 1972-86, and projected 2000

(Millions of 1982 dollars)

Industry	1972	1979	1986	2000 Low	2000 Moderate	2000 High
1. Livestock and livestock products	73,103	74,924	88,061	96,990	106,602	117,183
2. Other agricultural products	81,314	103,141	94,480	123,064	142,061	165,405
3. Agricultural services, forestry, and fishing	24,157	22,986	38,553	51,890	58,528	64,978
4. Metal mining	9,300	9,777	6,875	5,581	6,159	6,711
5. Coal mining	19,856	26,307	30,300	37,096	40,980	44,276
6. Crude petroleum, natural gas, and gas liquids	182,555	163,820	150,826	106,996	114,391	119,485
7. Oil and gas field services	14,414	29,955	26,041	36,547	45,402	51,451
8. Nonmetallic minerals, except fuels	12,129	13,603	9,443	9,482	11,484	13,228
9. New nonfarm housing, single units	76,103	84,516	90,205	95,845	101,352	142,021
10. New nonfarm housing, nec	46,737	22,898	29,766	21,901	23,439	32,270
11. Nonfarm residential alterations and additions	18,177	27,744	31,874	34,751	36,822	51,392
12. New farm housing, alterations, and additions	1,750	1,478	947	568	600	841
13. New industrial buildings	10,702	19,017	12,065	10,454	15,005	19,177
14. New office buildings	15,771	14,849	27,775	32,166	40,643	42,262
15. New commercial buildings except offices	20,324	21,514	26,967	32,258	40,111	41,172
16. New educational buildings	16,265	10,322	9,507	7,130	10,484	11,183
17. New hospitals and institutions	9,488	6,787	6,870	6,706	8,003	8,197
18. New nonfarm buildings, nec	12,243	9,520	15,117	16,176	20,403	25,140
19. New communications facilities	6,959	7,762	6,714	5,407	8,185	10,893
20. New electric utility facilities	18,775	20,523	15,192	11,155	20,500	23,457
21. New water supply and sewer facilities	7,737	13,311	13,100	11,425	16,546	17,746
22. New gas utility and pipeline facilities	4,717	3,809	3,550	1,692	3,546	4,244
23. New roads	27,692	17,339	21,523	21,187	26,249	27,745
24. New local transit facilities	1,077	784	1,032	824	1,024	1,081
25. New conservation and development facilities	4,056	4,686	3,754	2,876	3,545	3,834
26. New nonbuilding facilities, nec	11,469	14,982	9,282	6,925	9,916	11,212
27. Maintenance and repair construction	84,197	120,885	136,423	148,979	174,100	191,674
28. Logging camps and logging contractors	7,097	9,552	11,775	14,876	17,004	20,493
29. Sawmills and planing mills	13,144	13,286	13,388	14,779	16,585	21,288
30. Millwork and structural wood members, nec	7,841	9,319	11,218	12,622	14,226	18,737
31. Veneer and plywood	5,019	5,043	6,057	7,496	8,644	11,037
32. Wood containers and miscellaneous wood products	6,079	6,975	8,324	9,554	11,133	12,472
33. Mobile homes	6,307	4,691	3,623	3,191	3,817	4,715
34. Prefabricated wood buildings	2,053	2,220	1,328	1,155	1,370	1,765
35. Household furniture	14,127	14,579	15,274	19,264	20,697	22,524
36. Partitions and fixtures	3,446	3,611	4,488	6,520	7,751	8,388
37. Office and miscellaneous furniture and fixtures	5,234	6,742	9,914	14,543	17,143	18,115
38. Glass and glass products	13,232	13,938	13,580	14,043	15,972	17,247
39. Hydraulic cement	4,568	4,806	4,115	3,985	4,844	5,796
40. Concrete, gypsum, and plaster products	17,885	19,288	19,066	19,442	23,442	27,990
41. Stone, clay, and miscellaneous mineral products	15,348	19,141	16,024	17,161	19,928	22,465
42. Blast furnaces and basic steel products	77,214	82,646	42,891	34,188	38,126	42,028
43. Iron and steel foundries	14,896	17,027	7,580	6,034	6,885	7,300
44. Primary aluminum	6,161	7,263	3,981	3,364	3,908	4,307
45. Primary nonferrous metals, except aluminum	6,915	7,044	5,073	4,326	5,030	5,395
46. Miscellaneous primary and secondary metals	6,200	6,397	7,336	6,621	7,664	8,261
47. Copper rolling and drawing	5,302	4,878	3,116	2,710	3,110	3,455
48. Aluminum rolling and drawing	10,713	14,399	12,592	12,547	14,717	16,260
49. Nonferrous rolling and drawing, nec	4,624	3,862	3,572	3,299	3,687	3,890
50. Nonferrous wire drawing and insulating	7,425	8,571	9,661	10,109	12,013	13,479

See footnotes at end of table.

C-1. Gross duplicated output by industry, selected years, 1972-86, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1972	1979	1986	2000 Low	2000 Moderate	2000 High
51. Aluminum foundries	3,329	3,960	4,205	4,367	5,109	5,469
52. Nonferrous foundries, except aluminum	2,282	1,935	1,986	2,156	2,509	2,688
53. Metal cans and shipping containers	11,851	13,010	12,455	13,501	14,840	16,251
54. Cutlery, hand tools, and hardware	11,220	13,047	11,420	12,883	14,823	15,983
55. Plumbing and nonelectric heating equipment	4,456	4,600	4,231	4,392	5,131	6,093
56. Fabricated structural metal products	32,864	36,987	34,628	35,642	43,999	50,194
57. Screw machine products, bolts, rivets, etc	6,170	7,819	7,471	7,918	9,307	10,160
58. Forgings	5,003	5,797	3,962	3,922	4,541	4,781
59. Automotive stampings	11,970	12,486	13,912	14,216	17,010	18,478
60. Stampings, except automotive	6,797	8,202	8,187	10,036	11,415	12,392
61. Metal coating, engraving, and allied services	3,480	5,811	6,229	8,059	9,283	9,945
62. Ordnance, except vehicles and missiles	5,535	4,632	6,602	7,966	9,555	10,148
63. Miscellaneous fabricated metal products	18,925	23,703	22,187	24,396	28,830	31,505
64. Engines and turbines	14,194	17,849	13,258	14,132	16,076	15,938
65. Farm and garden machinery	13,619	20,432	10,266	12,671	12,208	11,539
66. Construction machinery	16,337	20,882	11,122	13,499	14,359	14,793
67. Mining and oil field machinery	6,628	11,674	6,963	7,899	9,198	10,434
68. Materials handling machinery and equipment	6,524	8,476	6,598	8,466	10,151	11,163
69. Metalworking machinery	18,061	24,432	19,071	20,960	24,616	25,946
70. Special industry machinery	16,775	15,151	12,725	13,014	14,415	14,778
71. General industrial machinery	21,112	27,958	23,301	27,197	30,485	31,577
72. Electronic computing equipment	1,341	13,397	85,996	200,240	232,315	256,862
73. Office and accounting machines	2,119	4,685	6,478	10,121	10,770	10,339
74. Refrigeration and service industry machinery	15,801	18,656	18,265	23,086	27,410	30,407
75. Miscellaneous nonelectrical machinery	10,963	16,355	16,685	19,247	22,732	24,757
76. Electric distributing equipment	8,073	9,190	7,989	8,184	11,065	13,037
77. Electrical industrial apparatus	12,895	16,480	13,967	16,242	18,482	19,621
78. Household appliances	12,531	15,116	16,190	21,340	22,897	24,777
79. Electric lighting and wiring equipment	13,681	14,849	13,865	14,890	17,345	19,104
80. Electronic home entertainment equipment	4,503	7,402	11,783	24,525	23,027	21,830
81. Telephone and telegraph apparatus	8,704	12,627	16,009	23,852	28,149	31,013
82. Radio and TV communication equipment	15,391	25,760	42,884	64,128	76,279	82,850
83. Electronic tubes	4,103	4,264	2,165	2,220	2,367	2,362
84. Semiconductors and related devices	3,184	7,952	13,346	28,745	29,233	28,125
85. Miscellaneous electronic components	6,126	12,882	19,368	39,975	41,053	40,305
86. Storage batteries and engine electrical parts	6,687	8,255	8,688	10,374	11,985	12,178
87. X-ray and other electromedical apparatus	1,073	2,958	4,067	7,392	8,235	8,397
88. Electrical equipment and supplies, nec	1,587	2,265	2,884	3,981	4,384	4,647
89. Motor vehicles and car bodies	88,508	108,369	112,843	127,578	146,900	162,379
90. Motor vehicle parts and accessories	40,821	53,272	55,802	63,097	74,620	79,074
91. Truck and bus bodies, trailers, and motor homes	6,483	8,778	8,167	9,891	12,305	14,321
92. Aircraft	20,312	33,419	37,695	34,982	42,083	46,956
93. Aircraft and missile engines and equipment	21,914	26,653	39,061	44,051	51,204	53,502
94. Guided missiles and space vehicles	9,987	9,842	16,753	15,848	18,719	19,907
95. Ship and boat building and repairing	11,384	14,130	13,076	11,643	13,443	14,476
96. Railroad equipment	6,268	10,125	1,977	1,624	1,653	1,786
97. Miscellaneous transportation equipment	6,110	5,273	7,569	11,165	12,093	11,722
98. Engineering and scientific instruments	2,027	2,803	3,808	4,930	5,963	6,500
99. Measuring and controlling devices	7,093	12,472	15,646	19,975	25,103	27,352
100. Optical and ophthalmic products	1,665	3,512	6,616	11,537	13,357	13,934

See footnotes at end of table.

C-1. Gross duplicated output by industry, selected years, 1972-86, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1972	1979	1986	2000 Low	2000 Moderate	2000 High
101. Medical instruments and supplies	5,589	8,005	12,817	20,429	23,350	24,711
102. Photographic equipment and supplies	9,570	16,435	17,405	22,473	25,796	27,728
103. Watches, clocks, and parts	1,427	1,670	819	980	981	722
104. Jewelry, silverware, and plated ware	9,125	6,869	5,587	5,679	5,883	4,661
105. Toys and sporting goods	6,659	7,727	7,162	9,752	10,945	10,367
106. Manufactured products, nec	14,055	15,063	13,216	14,877	17,084	18,333
107. Meat products	55,619	60,138	68,125	77,845	84,850	93,545
108. Dairy products	30,528	32,533	38,076	41,561	45,028	49,244
109. Canned, dried, and frozen foods	25,563	29,551	29,312	36,068	39,555	43,767
110. Grain mill products and fats and oils	35,713	43,259	54,308	61,799	69,147	77,150
111. Bakery products	19,483	18,736	19,758	20,707	22,300	24,356
112. Sugar and confectionery products	14,388	14,864	16,023	15,685	17,129	18,992
113. Alcoholic beverages	18,541	23,481	23,473	25,232	27,002	29,687
114. Soft drinks and flavorings	14,537	18,997	20,582	23,664	25,378	27,850
115. Miscellaneous foods and kindred products	17,984	19,541	23,432	27,904	30,206	32,964
116. Tobacco manufactures	21,153	20,786	18,248	14,565	17,627	19,547
117. Weaving, finishing, yarn and thread mills	35,293	37,296	38,579	42,276	46,655	47,927
118. Knitting mills	11,870	11,937	11,934	13,704	14,451	15,424
119. Floor covering mills	5,217	7,204	8,236	11,075	12,532	14,143
120. Miscellaneous textile goods	4,749	5,624	5,833	6,428	7,402	8,024
121. Apparel	39,571	41,032	42,261	48,864	49,191	51,727
122. Miscellaneous fabricated textile products	9,264	10,263	13,217	15,292	17,595	18,592
123. Pulp, paper, and paperboard mills	27,707	34,476	38,384	46,964	54,834	59,907
124. Converted paper products except containers	21,052	25,615	30,595	38,137	44,224	48,373
125. Paperboard containers and boxes	18,245	20,423	21,693	24,438	27,964	30,595
126. Newspapers	20,113	21,478	22,975	25,157	28,936	31,417
127. Periodicals	7,011	10,609	12,875	16,972	19,720	21,452
128. Books	8,194	9,832	11,744	12,777	16,340	17,942
129. Miscellaneous publishing	2,452	2,697	4,321	6,020	7,115	7,736
130. Commercial printing and business forms	24,500	29,066	42,983	60,514	70,991	76,882
131. Greeting card publishing	1,260	1,529	2,483	3,216	3,861	4,238
132. Blankbooks and bookbinding	2,100	2,683	3,133	3,937	4,781	5,170
133. Printing trade services	1,964	2,621	3,233	4,463	5,214	5,664
134. Industrial chemicals	54,853	66,133	61,566	66,965	79,708	88,875
135. Plastics materials and synthetics	23,925	33,466	35,654	45,943	53,743	58,965
136. Drugs	15,278	21,814	26,300	38,396	45,798	50,183
137. Soap, cleaners, and toilet goods	20,103	24,581	27,660	32,802	38,718	42,293
138. Paints and allied products	8,067	9,567	10,300	11,079	12,918	14,867
139. Agricultural chemicals	10,749	14,802	13,342	13,949	16,749	19,166
140. Miscellaneous chemical products	10,379	14,066	15,608	19,451	23,380	25,863
141. Petroleum refining	174,628	236,870	209,775	199,734	227,968	246,003
142. Miscellaneous petroleum and coal products	8,557	10,609	11,651	12,145	14,294	16,031
143. Tires and inner tubes	14,123	11,936	10,402	10,796	12,648	13,088
144. Rubber products and plastic hose and footwear	9,019	9,345	10,440	11,903	13,788	14,955
145. Miscellaneous plastics products	23,575	35,022	49,516	71,439	82,138	90,006
146. Footwear except rubber and plastic	7,185	5,381	3,732	2,964	2,832	2,692
147. Luggage, handbags, and leather products, nec	5,003	4,625	3,230	2,507	2,807	3,010
148. Railroad transportation	27,932	33,035	30,074	28,759	33,147	36,819
149. Local and interurban passenger transit	13,053	14,961	12,407	12,200	14,814	15,895
150. Trucking and warehousing	61,948	80,331	87,038	101,280	117,706	129,148

See footnotes at end of table.

C-1. Gross duplicated output by industry, selected years, 1972-86, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1972	1979	1986	2000 Low	2000 Moderate	2000 High
151. Water transportation	22,530	28,294	23,370	25,370	29,607	32,738
152. Air transportation	38,278	54,470	51,794	72,412	85,858	91,509
153. Pipe lines, except natural gas	7,191	9,164	8,864	8,953	10,337	11,203
154. Arrangement of passenger transportation	1,794	3,596	7,618	14,326	17,056	18,360
155. Miscellaneous transportation services	3,287	5,709	6,627	8,502	9,972	10,901
156. Communications except broadcasting	43,116	81,510	85,464	124,096	145,360	157,551
157. Radio and television broadcasting	8,600	13,186	16,941	25,321	28,940	31,301
158. Electric utilities including combined services	75,738	105,577	128,336	160,994	177,843	193,747
159. Gas utilities including combined services	120,076	113,636	83,317	93,480	102,491	108,539
160. Water and sanitation including combined services	5,357	7,632	8,543	11,895	13,696	14,502
161. Wholesale trade	240,362	298,282	381,035	477,133	553,157	612,606
162. Retail trade, except eating and drinking places	224,539	276,946	348,501	455,220	502,843	551,418
163. Eating and drinking places	102,785	132,294	153,570	185,677	198,931	216,705
164. Banking	58,289	82,811	107,926	136,969	159,333	169,240
165. Credit agencies and investment offices	9,256	11,539	17,452	23,285	26,869	28,109
166. Security and commodity brokers and exchanges	18,302	19,598	47,294	54,898	63,779	66,983
167. Insurance carriers	50,201	66,355	71,877	85,472	99,347	104,105
168. Insurance agents, brokers, and service	17,237	27,409	31,009	36,874	42,859	44,912
169. Real estate	184,569	236,778	260,328	320,881	366,705	397,505
170. Owner-occupied dwellings	162,213	215,789	248,809	320,603	364,711	377,805
171. Hotels and other lodging places	31,273	39,034	42,418	48,750	55,358	58,976
172. Laundry, cleaning, and shoe repair	14,501	13,697	13,545	13,227	15,240	16,071
173. Personal services, nec	6,466	9,533	11,144	14,886	17,290	17,899
174. Beauty and barber shops	11,341	10,974	11,772	11,239	13,052	13,502
175. Funeral service and crematories	4,636	5,012	3,526	3,520	4,087	4,228
176. Advertising	10,158	12,211	16,380	23,124	26,393	28,652
177. Services to dwellings and other buildings	6,939	9,619	11,437	15,435	17,799	19,107
178. Personnel supply services	5,320	8,855	12,984	18,767	21,446	22,974
179. Computer and data processing services	15,673	30,161	55,679	94,022	109,538	118,047
180. Research, management, and consulting services	14,549	25,326	40,319	62,404	72,616	78,729
181. Detective and protective services	3,178	5,323	7,913	11,998	13,538	14,617
182. Equipment rental and leasing	10,408	18,054	28,529	43,350	49,941	54,345
183. Photocopying, commercial art, photofinishing	4,921	7,740	10,211	15,414	17,870	19,026
184. Credit reporting and business services, nec	10,618	17,303	24,490	37,187	42,422	45,780
185. Automotive rentals, without drivers	9,382	12,731	12,942	15,730	18,493	20,204
186. Automobile parking, repair, and services	43,787	61,635	72,200	83,486	97,758	105,030
187 Electrical repair shops	6,341	8,575	7,681	7,446	8,561	9,001
188. Watch, clock, jewelry, and furniture repair	2,762	3,130	3,051	2,566	2,965	3,061
189. Miscellaneous repair shops and related services	8,983	16,084	15,608	16,873	19,443	21,146
190. Motion pictures	9,540	13,765	14,314	16,307	18,894	20,352
191. Theatrical producers and entertainers	3,105	5,725	7,988	12,181	13,891	14,695
192. Bowling alleys and billiard establishments	1,446	1,872	1,538	1,430	1,661	1,718
193. Commercial sports	3,483	3,938	3,991	4,271	4,931	5,159
194. Amusement and recreation services, nec	6,591	12,635	19,153	35,090	40,725	42,217
195. Offices of health practitioners	54,993	73,524	95,739	149,837	158,660	167,616
196. Nursing and personal care facilities	12,117	17,951	22,524	35,213	37,162	39,259
197. Hospitals, private	53,655	78,166	98,998	138,884	146,703	154,988
198. Outpatient facilities and health services,nec	17,703	14,683	23,067	39,609	42,072	44,421
199. Legal services	37,067	37,943	48,504	58,698	68,226	72,423
200. Educational services, private	30,007	32,377	39,988	44,790	51,464	53,592

See footnotes at end of table.

C-1. Gross duplicated output by industry, selected years, 1972-86, and projected 2000—Continued

(Millions of 1982 dollars)

Industry	1972	1979	1986	2000 Low	2000 Moderate	2000 High
201. Individual and miscellaneous social services	2,027	9,147	13,660	17,582	20,419	21,123
202. Job training and related services	1,642	1,992	2,498	3,088	3,574	3,725
203. Child day care services	1,930	6,108	8,770	15,130	17,571	18,176
204. Residential care	1,776	4,147	6,939	11,646	13,525	13,991
205. Museums and noncommercial organizations, nec	4,238	5,466	8,324	11,471	13,299	13,799
206. Business and professional associations	5,536	6,827	7,906	9,234	10,659	11,412
207. Labor, civic, and social organizations	8,418	9,529	9,665	10,876	12,645	13,103
208. Religious organizations	14,898	15,390	16,014	16,304	18,934	19,587
209. Private households	10,203	7,849	9,650	8,671	9,925	10,193
210. Engineering and architectural services	26,782	32,685	48,008	56,798	71,327	81,982
211. Accounting, auditing, and services, nec	20,981	31,161	33,200	46,217	53,957	58,485
212. Post Office	15,994	18,803	28,271	37,324	42,877	45,714
213. Federal electric utilities	3,812	4,363	4,970	5,475	6,057	6,602
214. Commodity credit corporation	0	0	0	0	0	0
215. Federal government enterprises, nec	5,221	7,136	10,697	13,622	15,175	16,369
216. Federal general government	114,914	110,992	122,876	132,701	135,266	137,827
217. Local government passenger transit	2,033	2,982	3,173	2,981	3,624	3,886
218. State and local electric utilities	8,292	9,859	10,577	11,565	12,775	13,918
219. State and local government enterprises, nec	23,305	26,417	30,543	33,491	38,529	40,966
220. State and local government hospitals	13,645	16,304	20,035	28,011	28,626	29,513
221. State and local government education	102,514	115,541	127,075	154,533	157,930	162,825
222. State and local general government, nec	62,742	84,795	92,671	115,372	117,933	121,592

nec = not elsewhere classified.

D-1. Bureau of Labor Statistics input-output sectoring plan

Industry sector number and title	Standard Industrial Classification (SIC) 1977	Bureau of Economic Analysis Input-Output Sector
Agriculture, forestry, fisheries		
1 Livestock and livestock products	part 01, part 02	1.0100–1.0302
2 Other agricultural products	part 01, part 02	2.0100–2.0702
3 Agricultural services, forestry, and fishing	07,08,09	3.0001–4.0002
Mining		
4 Metal mining	10	5.0000–6.0200, part 11.0602, part 11.0603
5 Coal mining	11,12	7.0000, part 11.0602, part 11.0603
6 Crude petroleum, natural gas, and gas liquids	131,132	8.0000, part 11.0602
7 Oil and gas field services	138	11.0601,12.0215, part 11.0602
8 Nonmetallic minerals, except fuels	14	9.0001–10.0000, part 11.0602, part 11.0603
Construction		
9 New nonfarm housing, single units	part 15, part 17	11.0101
10 New nonfarm housing, nec	part 15, part 16, part 17	11.0102–11.0104,11.0107
11 Nonfarm residential alterations and additions	part 15, part 16, part 17	11.0105
12 New farm housing, alterations, and additions	part 15, part 17	11.0501
13 New industrial buildings	part 15, part 16, part 17	11.0201
14 New office buildings	part 15, part 16, part 17	11.0202
15 New commercial buildings except offices	part 15, part 16, part 17	11.0203–11.0205
16 New educational buildings	part 15, part 16, part 17	11.0207
17 New hospitals and institutions	part 15, part 16, part 17	11.0231–11.0232
18 New nonfarm buildings, nec	part 15, part 16, part 17	11.0106,11.0206,11.0241,11.0250
19 New communications facilities	part 16, part 17	11.0301
20 New electric utility facilities	part 16, part 17	11.0303
21 New water supply and sewer facilities	part 16, part 17	11.0306–11.0307
22 New gas utility and pipeline facilities	part 16, part 17	11.0304–11.0305
23 New roads	part 16, part 17	11.0400
24 New local transit facilities	part 16, part 17	11.0308
25 New conservation and development facilities	part 15, part 16, part 17	11.0702–11.0703
26 New nonbuilding facilities, nec	part 15, part 16, part 17	11.0302,11.0502,11.0701,11.0704
27 Maintenance and repair construction	part 15, part 16, part 17	12.0100–12.0214,12.0216
Manufacturing		
28 Logging camps and logging contractors	241	20.0100
29 Sawmills and planing mills	242	20.0200–20.0400
30 Millwork and structural wood members, nec	2431,2434,2439	20.0501–20.0502,20.0701
31 Veneer and plywood	2435,2436	20.0600
32 Wood containers and misc. wood products	244,249	20.0800–21.0000
33 Mobile homes	2451	61.0602
34 Prefabricated wood buildings	2452	20.0702
35 Household furniture	251	22.0101–22.0400
36 Partitions and fixtures	254	23.0400–23.0500
37 Office and misc. furniture and fixtures	252,253,259	23.0100–23.0300,23.0600–23.0700
38 Glass and glass products	321,322,323	35.0100–35.0200
39 Hydraulic cement	324	36.0100
40 Concrete, gypsum, and plaster products	327	36.1000–36.1400
41 Stone, clay, and misc. mineral products	325,326,328,329	36.0200–36.0900,36.1500–36.2200
42 Blast furnaces and basic steel products	331	37.0101–37.0105
43 Iron and steel foundries	332	37.0200
44 Primary aluminum	3334	38.0400
45 Primary nonferrous metals, except aluminum	3331–3333,3339	38.0100–38.0300,38.0500
46 Miscellaneous primary and secondary metals	334,339	38.0600,37.0401–37.0402
47 Copper rolling and drawing	3351	38.0700
48 Aluminum rolling and drawing	3353–3355	38.0800
49 Nonferrous rolling and drawing, nec	3356	38.0900
50 Nonferrous wire drawing and insulating	3357	38.1000
51 Aluminum foundries	3361	38.1100
52 Nonferrous foundries, except aluminum	3362,3369	38.1200–38.1300
53 Metal cans and shipping containers	341	39.0100–39.0200
54 Cutlery, hand tools, and hardware	342	42.0100–42.0300
55 Plumbing and nonelectric heating equipment	343	40.0100–40.0300
56 Fabricated structural metal products	344	40.0400–40.0902
57 Screw machine products, bolts, rivets, etc	345	41.0100
58 Forgings	3462–3463	37.0300,38.1400
59 Automotive stampings	3465	41.0201
60 Stampings, except automotive	3466,3469	41.0202–41.0203
61 Metal coating, engraving, and allied services	347	42.0401–42.0402
62 Ordnance, except vehicles and missiles	348	13.0200,13.0500–13.0700

See notes at end of table.

D-1. Bureau of Labor Statistics input-output sectoring plan—Continued

Industry sector number and title	Standard Industrial Classification (SIC) 1977	Bureau of Economic Analysis Input-Output Sector
Manufacturing—Continued		
63 Miscellaneous fabricated metal products	349	42.0500–42.1100
64 Engines and turbines	351	43.0100–43.0200
65 Farm and garden machinery	352	44.0001–44.0002
66 Construction machinery	3531	45.0100
67 Mining and oil field machinery	3532–3533	45.0200–45.0300
68 Materials handling machinery and equipment	3534–3537	46.0100–46.0400
69 Metalworking machinery	354	47.0100–47.0403
70 Special industry machinery	355	48.0100–48.0600
71 General industrial machinery	356	49.0100–49.0700
72 Electronic computing equipment	3573	51.0101
73 Office and accounting machines	3572,3574,3576,3579	51.0102–51.0400
74 Refrigeration and service industry machinery	358	52.0100–52.0500
75 Miscellaneous nonelectrical machinery	359	50.0001–50.0002
76 Electric distributing equipment	361	53.0200–53.0300
77 Electrical industrial apparatus	362	53.0400–53.0800
78 Household appliances	363	54.0100–54.0700
79 Electric lighting and wiring equipment	364	55.0100–55.0300
80 Electronic home entertainment equipment	365	56.0100–56.0200
81 Telephone and telegraph apparatus	3661	56.0300
82 Radio and TV communication equipment	3662	56.0400
83 Electronic tubes	3671–3673	57.0100
84 Semiconductors and related devices	3674	57.0200
85 Miscellaneous electronic components	3675–3679	57.0300
86 Storage batteries and engine electrical parts	3691,3694	58.0100,58.0400
87 X-ray and other electromedical apparatus	3693	58.0300
88 Electrical equipment and supplies, nec	3692,3699	58.0200,58.0500
89 Motor vehicles and car bodies	3711	59.0301
90 Motor vehicle parts and accessories	3714	59.0302
91 Truck & bus bodies, trailers, & motor homes	3713,3715,3716	59.0100–59.0200,61.0603
92 Aircraft	3721	60.0100
93 Aircraft and missile engines and equipment	3724,3728,3764,3769	60.0200–60.0400
94 Guided missiles and space vehicles	3761	13.0100
95 Ship and boat building and repairing	373	61.0100–61.0200
96 Railroad equipment	374	61.0300
97 Miscellaneous transportation equipment	375,379	61.0500–61.0601,61.0700,13.0300
98 Engineering and scientific instruments	381	62.0100
99 Measuring and controlling devices	382	62.0200–62.0300,53.0100
100 Optical and ophthalmic products	383,385	63.0100–63.0200
101 Medical instruments and supplies	384	62.0400–62.0600
102 Photographic equipment and supplies	386	63.0300
103 Watches, clocks, and parts	387	62.0700
104 Jewelry, silverware, and plated ware	391	64.0101–64.0104
105 Toys and sporting goods	394	64.0301–64.0400
106 Manufactured products, nec	393,395,396,399	64.0105–64.0200,64.0501–64.1200
107 Meat products	201	14.0101–14.0104
108 Dairy products	202	14.0200–14.0600
109 Canned, dried, and frozen foods	203	14.0800–14.1100,14.1301–14.1302
110 Grain mill products and fats and oils	204,207	14.1401–14.1700,14.2400–14.2700,14.2900
111 Bakery products	205	14.1801–14.1802
112 Sugar and confectionery products	206	14.1900–14.2003
113 Alcoholic beverages	2082–2085	14.2101–14.2104
114 Soft drinks and flavorings	2086–2087	14.2200–14.2300
115 Miscellaneous foods and kindred products	209	14.0700,14.1200,14.2800,14.3000–14.3200
116 Tobacco manufactures	21	15.0101–15.0200
117 Weaving, finishing, yarn and thread mills	221–224,226,228	16.0100–16.0400
118 Knitting mills	225	18.0101–18.0300
119 Floor covering mills	227	17.0100
120 Miscellaneous textile goods	229	17.0200–17.1002
121 Apparel	231–238	18.0400
122 Miscellaneous fabricated textile products	239	19.0100–19.0306
123 Pulp, paper, and paperboard mills	261–263,266	24.0100–24.0300,24.0602
124 Converted paper products except containers	264	24.0400–24.0500,24.0701–24.0706
125 Paperboard containers and boxes	265	25.0000
126 Newspapers	271	26.0100
127 Periodicals	272	26.0200
128 Books	273	26.0301–26.0302

See notes at end of table

D-1. Bureau of Labor Statistics input-output sectoring plan—Continued

Industry sector number and title	Standard Industrial Classification (SIC) 1977	Bureau of Economic Analysis Input-Output Sector
Manufacturing—Continued		
129 Miscellaneous publishing	274	26.0400
130 Commercial printing and business forms	275,276	26.0501,26.0601,26.0801
131 Greeting card publishing	277	26.0700
132 Blankbooks and bookbinding	278	26.0602,26.0802
133 Printing trade services	279	26.0502,26.0803–26.0805
134 Industrial chemicals	281,286	27.0100,27.0401
135 Plastics materials and synthetics	282	28.0100–28.0400
136 Drugs	283	29.0100
137 Soap, cleaners, and toilet goods	284	29.0201–29.0300
138 Paints and allied products	285	30.0000
139 Agricultural chemicals	287	27.0201–27.0300
140 Miscellaneous chemical products	289	27.0402–27.0406
141 Petroleum refining	291	31.0101
142 Miscellaneous petroleum and coal products	295,299	31.0102–31.0300
143 Tires and inner tubes	301	32.0100
144 Rubber products and plastic hose and footwear	302–304,306	32.0200–32.0302,32.0500
145 Miscellaneous plastics products	307	32.0400
146 Footwear except rubber and plastic	313,314	34.0100–34.0202
147 Luggage, handbags, and leather products, nec.	311,315–317,319	33.0001,34.0301–34.0305
Transportation		
148 Railroad transportation	40	65.0100
149 Local and interurban passenger transit	41	65.0200
150 Trucking and warehousing	42	65.0300
151 Water transportation	44	65.0400
152 Air transportation	45	65.0500
153 Pipe lines, except natural gas	46	65.0600
154 Arrangement of passenger transportation	4722	65.0702
155 Miscellaneous transportation services	471,4723,474,478	65.0701
Communications		
156 Communications except broadcasting	481,482,489	66.0000
157 Radio and television broadcasting	483	67.0000
Utilities		
158 Electric utilities incl. combined services	491, part 493	68.0100
159 Gas utilities including combined services	492, part 493	68.0200
160 Water and sanitation incl. combined services	494–497, part 493	68.0301–68.0302
Trade		
161 Wholesale trade	50,51	69.0100
162 Retail trade, exc. eating and drinking places	52–57,59	69.0200
163 Eating and drinking places	58	74.0000
Finance, insurance, and real estate		
164 Banking	60	70.0100
165 Credit agencies and investment offices	61,67	70.0200
166 Security and commodity brokers and exchanges	62	70.0300
167 Insurance carriers	63	70.0400
168 Insurance agents, brokers, and service	64	70.0500
169 Real estate	65,66	71.0200
170 Owner-occupied dwellings	na	71.0100
Services		
171 Hotels and other lodging places	70	72.0100
172 Laundry, cleaning, and shoe repair	721,725	72.0201
173 Personal services, nec	722,729	72.0203
174 Beauty and barber shops	723,724	72.0300
175 Funeral service and crematories	726	72.0202
176 Advertising	731	73.0200
177 Services to dwellings and other buildings	734	73.0102
178 Personnel supply services	736	73.0103
179 Computer and data processing services	737	73.0104
180 Research, management, and consulting services	7391,7392,7397	73.0105
181 Detective and protective services	7393	73.0106

See notes at end of table.

D-1. Bureau of Labor Statistics input-output sectoring plan—Continued

	Industry sector number and title	Standard Industrial Classification (SIC) 1977	Bureau of Economic Analysis Input-Output Sector
	Services—Continued		
182	Equipment rental and leasing	7394	73.0107
183	Photocopying, commercial art, photofinishing	7332,7333,7395	73.0108
184	Credit reporting and business services, nec	732,735,7331,7339,7396,7399	73.0109
185	Automotive rentals, without drivers	751	75.0001
186	Automobile parking, repair, and services	752–754	75.0002–75.0003
187	Electrical repair shops	762	72.0204
188	Watch, clock, jewelry, and furniture repair	763–764	72.0205
189	Misc. repair shops and related services	769	73.0101
190	Motion pictures	78	76.0100
191	Theatrical producers and entertainers	792	76.0201
192	Bowling alleys and billiard establishments	793	76.0202
193	Commercial sports	794	76.0203–76.0204
194	Amusement and recreation services, nec	791,799	76.0205–76.0206
195	Offices of health practitioners	801–804	77.0100
196	Nursing and personal care facilities	805	77.0301
197	Hospitals, private	806	77.0200
198	Outpatient facilities and health services,nec	807–809	77.0302
199	Legal services	81	78.0301
200	Educational services, private	82	77.0401–77.0403
201	Individual and miscellaneous social services	832,839	77.0900
202	Job training and related services	833	77.0600
203	Child day care services	835	77.0700
204	Residential care	836	77.0800
205	Museums and noncommerical organizations, nec.	84,865,869,892	77.0504
206	Business and professional associations	861–862	77.0501
207	Labor, civic, and social organizations	863–864	77.0502
208	Religious organizations	866	77.0503
209	Private households	88	84.0000
210	Engineering and architectural services	891	73.0302
211	Accounting, auditing, and services, nec	893,899	73.0303
	Government		
212	U.S. Postal Service	43	78.0100
213	Federal electric utilities	na	78.0200
214	Commodity credit corporation	na	78.0300
215	Federal government enterprises, nec	na	78.0400
216	Federal general government	na	part 82.0000
217	Local government passenger transit	na	79.0100
218	State and local electric utilities	na	79.0200
219	State and local government enterprises, nec.	na	79.0300
220	State and local government hospitals	na	part 82.0000
221	State and local government education	na	part 82.0000
222	State and local general government, nec	na	part 82.0000
	Special industries		
223	Noncomparable imports	na	80.0000
224	Scrap, used and secondhand goods	na	81.0001–81.0002
225	Rest of the world industry	na	83.0000
226	Inventory valuation adjustment	na	85.0000

nec = not elsewhere classified.
na = not applicable.

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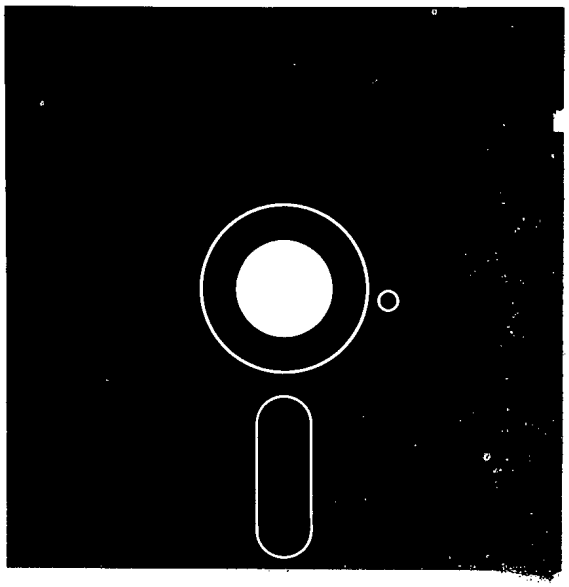

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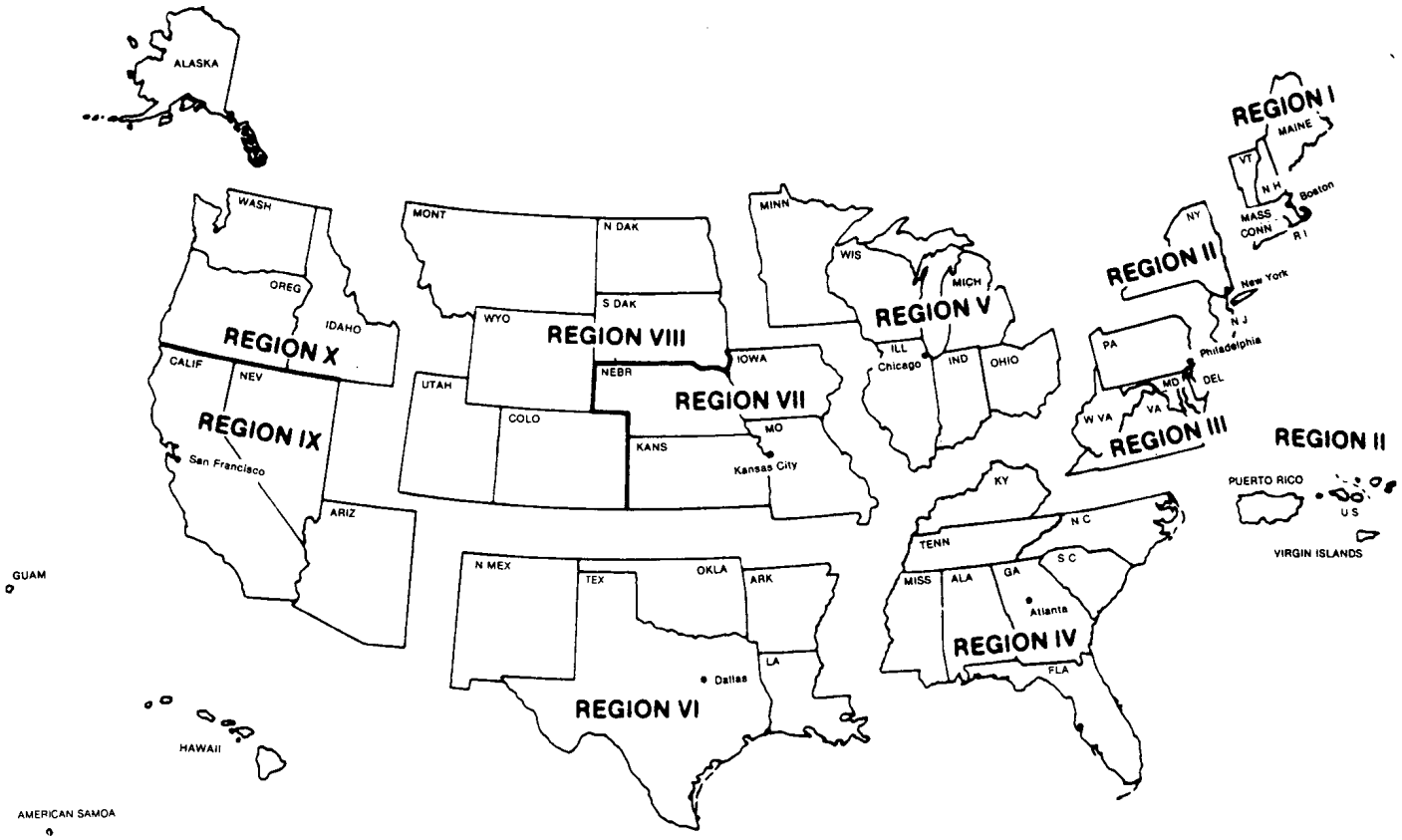

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