Employment Projections for 1995: Data and Methods

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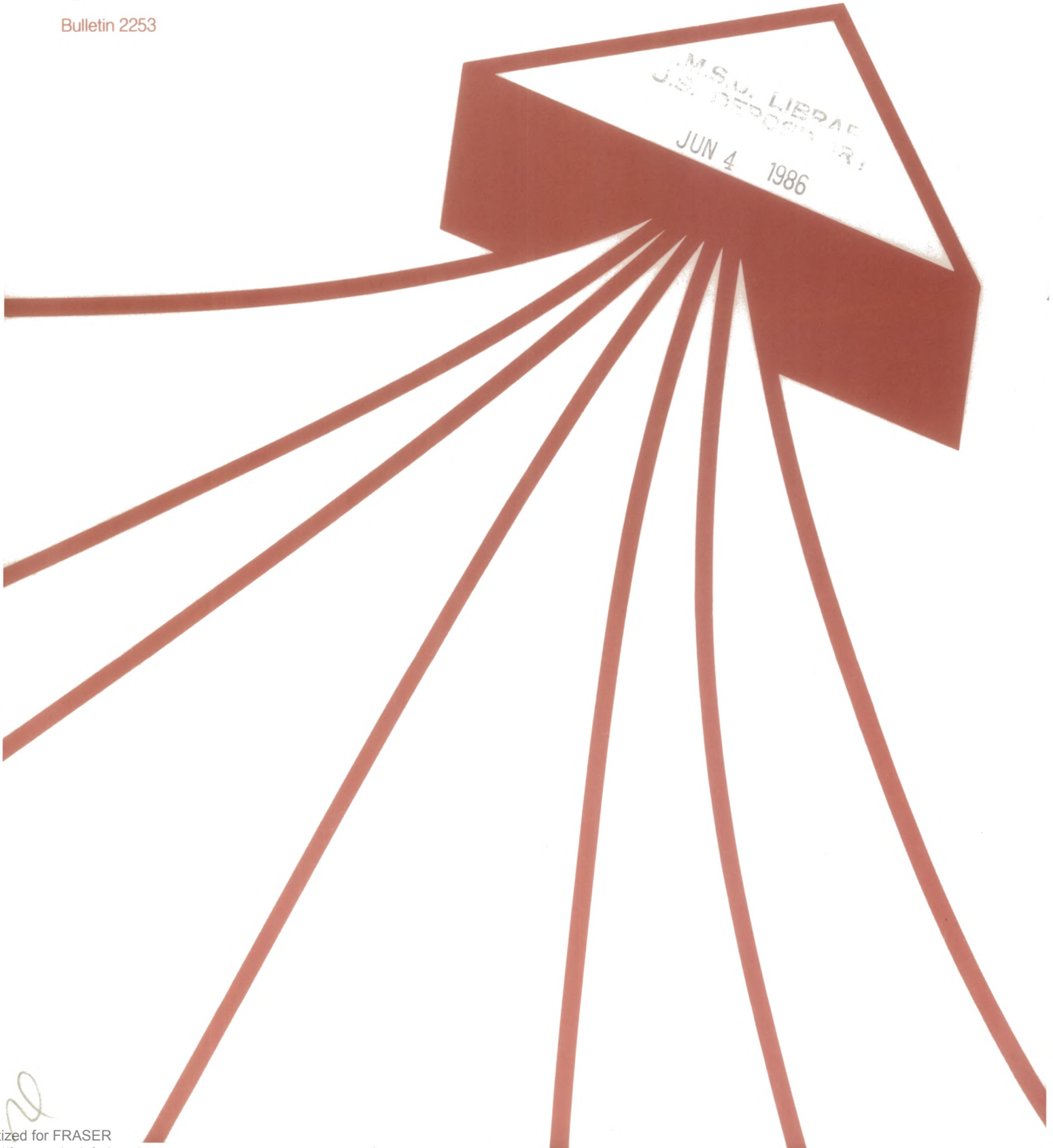

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U.S. Department of Labor
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Preface

This bulletin provides the latest Bureau of Labor Statistics employment projections for the year 1995. The bulletin contains three parts: The projections, the methodology, and supplementary data. The projections are contained in four articles reprinted from the November 1985 issue of the *Monthly Labor Review.* Part II provides a discussion of projection methodology, covering each stage of the projection process. The tables in part III add the more detailed data that are most often requested by users.

These projections are part of a program initiated 25 years ago to study alternative patterns of growth and their effects on employment in various industries and occupations. Previous economic and industry employment projections in this series were for the years 1970, 1975, 1980, 1985, 1990, and an earlier version for 1995. Labor force and occupational projections have been done for a somewhat longer period.

While the coverage in this bulletin is extensive, further detailed information, including data in machine-readable form, is available from the BLS Office of Economic Growth and Employment Projections and from the National Technical Information Service.

The authors of the *Review* articles are cited at the beginning of each article. The articles on methodology in part II were prepared by various members of the staff of the Office of Economic Growth and Employment Projections. The tables in part III were compiled and prepared for publication by David Frank. Vivian Minor assisted in the preparation of the output and employment series. Manuscripts were prepared by Marilyn Queen.

Contents

Part I. Economic and Employment Projections to 1995

The economic outlook to 1995: new assumptions and projections

With a base year of 1984 instead of 1982, the real GNP annual growth rate remains at 2.9 percent in the middle scenario; productivity growth, however, is assumed to accelerate under the revised projections

BETTY W. SU

The Bureau of Labor Statistics has revised its projections of the U.S. economy to 1995.[1] The new projections, with 1984 as the base year, approximate or parallel the previous projections, which were based in 1982.

Once again, the focus is on the moderate-growth projection, characterized by strong productivity and investment growth, a declining unemployment rate, and a real annual rate of growth in gross national product (GNP) of 2.9 percent between 1984 and 1995. Two alternatives to the moderate-growth projection have also been developed: (1) higher productivity-lower unemployment (high-growth), and (2) lower productivity-higher unemployment (low-growth). (For presentation simplicity these are labeled, particularly in the tables, as high, moderate, and low.) The two alternatives, discussed later in the article, are designed to provide a range of economic responses to a given policy mix for those measures of economic performance which most affect the industrial and occupational employment projections. Projected GNP growth for 1984–95 ranges between 2.2 percent for the low-growth alternative to 3.8 percent for the high. Other alternatives, designed to examine the sensitivity of the projections to selected policy variations, are currently being explored.

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By 1995, under the assumptions used by the Bureau of Labor Statistics, GNP is projected to range between $3.0 and $3.6 trillion (in 1977 dollars), with disposable personal income between $2.0 and $2.1 trillion, while civilian employment is projected to range between 116 and 126 million jobs. In all scenarios, annual rates of growth in GNP and employment slow in the latter half of the projection period. This reflects a slowdown in population and labor force growth after 1990.[2] The unemployment rate is assumed to drop for all three versions, from 7.5 percent in 1984 to 7.0 percent in 1995 for the low-growth alternative, to 6.0 percent for the moderate-growth version, and to 5.0 percent for the high. The following tabulation shows the rates of growth for selected key economic variables, historically and projected:[3]

	Rate of change (in percent): actual		
	1968–73	*1973–77*	*1977–84*
Real GNP	3.4	2.0	2.6
GNP deflator	5.1	7.3	6.9
Real disposable income	4.3	2.2	3.1
Real disposable income, per capita	3.2	1.2	2.1
Civilian labor force	2.6	2.6	2.0
Civilian employment	2.3	2.0	1.9
Real output per person (productivity), all industries	1.1	0.2	0.5

	Average levels: actual			
	1968	1973	1977	1984
Unemployment rate	3.6	4.9	7.1	7.5

	Rate of change (in percent): projected					
	1984–90			1990–95		
	High	Moderate	Low	High	Moderate	Low
Real GNP	4.0	3.0	2.2	3.5	2.8	2.2
GNP deflator	5.4	5.3	5.0	5.3	5.1	5.1
Real disposable income	2.7	2.5	2.1	2.1	2.3	2.2
Real disposable income, per capita	1.8	1.6	1.2	1.4	1.5	1.4
Civilian labor force	1.5	1.3	0.9	1.4	1.0	0.8
Civilian employment	1.8	1.5	0.9	1.5	1.1	0.9
Real output per person (productivity), all industries	2.4	1.7	1.5	1.9	1.7	1.3

	Average levels: projected					
	1990			1995		
	High	Moderate	Low	High	Moderate	Low
Unemployment rate	5.9	6.3	7.5	5.0	6.0	7.0

The first section of the article describes the major assumptions underlying BLS' demand projections. The second and third sections discuss the projected aggregate and industrial demand trends for the moderate-growth scenario. The fourth section describes the results of the high- and low-growth alternatives. Finally, the last section compares the current projections with the previous 1995 projections.

Detailed explanations of the methodology for the projections are given in part II of this bulletin. Part III presents supplementary data.

Major assumptions

An important focus of the BLS projection program is the structure of industrial and occupational employment. Influencing that structure is the demand for the goods and services of individual industries. The Bureau uses two steps to project industrial demand: (1) projections of aggregate economic trends, and (2) the disaggregation of these aggregate trends into purchases from specific industries.

The aggregate economic projections—projections of GNP and its major components—are based on assumptions developed by BLS used in conjunction with the Wharton long-term macroeconomic model.[4] Trends in GNP and its major components are determined in the model by the interaction of a range of factors: income elasticity, money supply, inflation, interest rates, Federal policies, and so forth.

In addition, numerous assumptions are required for fiscal and monetary policies, demographics, foreign economic activity, and energy. Values for selected assumptions are shown in tables 1 and A-1. The assumptions for the moderate-growth scenario are briefly described here.

Fiscal policy. Real defense purchases of goods and services are assumed to increase at an annual rate of 5.3 percent between 1984 and 1990. After 1990, growth in defense expenditures is expected to taper sharply to the 1.0 to 1.5 percent annual real growth range.

Real nondefense purchases of goods and services are assumed to increase much less sharply during the rest of the 1980's—up at an average annual rate of 1.2 percent to 1990. After 1990, this category of expenditures is expected to increase at the modest rate of 0.9 percent each year.

A modest growth path for other Federal expenditure categories has generally been assumed. No real growth is assumed for food stamp benefits, military retirement and veterans' benefits, medicare payments, and Social Security payments during 1984–90. Growth in these categories is a combination of inflation adjustment and client population shifts. After 1990, some resumption of growth in all of the expenditure categories mentioned above is assumed—about 1 to 2 percent annually.

Federal grants-in-aid to State and local governments and Federal subsidy programs are assumed to decline in real terms over the entire projection horizon.

On the revenue side, effective personal tax rates are expected to remain virtually unchanged over the entire projection period at 10.7 percent of personal income. The recent trend toward lower effective tax rates on corporate profits is assumed to continue through 1995.

Social insurance contributions will continue to raise their effective share of income—from 12.2 percent in 1984 to 14 percent in 1995—as currently mandated wage base changes and rate increases take effect over the next decade.

The net effect of these assumptions is a level of Federal expenditures which drops from 24.4 percent of GNP in 1984 to 23 percent by 1995, and a level of receipts that increases from 19.4 percent of GNP in 1984 to 20.2 percent by 1995. The deficit remains high throughout the projection period, but it declines as a proportion of GNP, from 5 percent in 1984 to 3 percent in 1995.

Monetary policy. Monetary policy is best described as accommodative. Money supply growth has been set to parallel projected growth in nominal GNP. Thus, monetary policy does not interrupt growth by being too restrictive nor is it required to combat a resurgence of inflation.

The money supply, which largely determines the level of interest rates, coupled with the decline in the Federal deficit as a percent of GNP, brings both short- and long-term interest rates down, dropping about 3 to 4 percentage points over the 10-year horizon of the projections.

Demographic changes. The population projections underlying the aggregate projections are the middle range pub-

lished by the U.S. Bureau of the Census in 1983. The labor force projections, middle scenario, described in the article by Howard N Fullerton, are also incorporated in the moderate growth aggregate projections.

Foreign activity. Estimates of imports and exports are affected in the projections by both domestic and foreign economic activity. It is assumed that real economic growth for the major trading partners of the United States would more or less parallel real U.S. GNP growth. World gross domestic product (less that of the United States and centrally planned economies) is assumed to increase at an average annual rate of 3.5 percent between 1984 and 1990, and at a rate of 2.7 percent during 1990–95. The average gross domestic product deflator for the same economic grouping is assumed to increase at 5.6 percent annually during 1984–90 and 5.1 percent annually for 1990–95.

Since 1980, the weighted average exchange rate for the U.S. dollar has been declining at a very robust rate, dropping from a high of 115.0 in 1980 to 71.5 in 1984. The decline is assumed to continue in 1985, but at a much lower rate. After 1985, the exchange rate is projected to turn around. This implies a smooth decrease in the value of the dollar vis-a-vis other currencies, back to approximately the 1980 level by 1995.

Energy. The barrel price (in 1984 dollars) of imported crude (freight on board) is assumed to decline from $28 per barrel in 1984 to $23 in 1995.

Unemployment. A target path for the civilian unemployment rate was also selected. A smooth decline is assumed, from 7.5 percent in 1984 to 6.3 percent in 1990 and 6.0 percent in 1995.

General assumptions. The further assumptions of smooth growth with no business cycle fluctuations, and lack of major economic upheavals, such as major wars and price shocks, are also included.

The sensitivity of projections to assumptions

Users of the Bureau of Labor Statistics projections should keep in mind that BLS (or others preparing similar projections) must make many judgments regarding the probable behavior of those factors which affect the future course of the U.S. economy. In addition, BLS must make judgments about the response of the various models to the primary assumptions. In short, while projections preparation and the use of models in preparing these projections may sound precise and scientific when described, developing economic projections is still very much an art filled with uncertainty.

The assumptions made by BLS cover a broad range, from those about which we may be reasonably certain, to those which are not at all predictable. The role of BLS in preparing these projections is to exercise judgment with regard to reasonable expectations for the assumptions, tempered by a knowledge of the sensitivity of the various models to those assumptions. That is, if a particular assumption is highly uncertain, yet has little impact on the outcome of the projections, it is important that the analyst be aware of this and also make that known to the users of the projections.

A few examples may help to clarify this point. The future course of the youth labor force can have major effects on various occupational categories. Those who will be in this segment of the labor force in 1995 have all already been born. Unless some major shifts in the factors underlying the decision to participate in the labor force take place or unless immigration for this age group swells, we can know with a great degree of certainty how large the youth labor force will be in 1995.

Another demographic example is the share of the population accounted for by those aged 85 and over. This too can be predicted with a high degree of certainty. Unlike the prior example, however, even a substantial error in projecting this category of the population would have very little impact on the projection results because only a few of the group are in the labor force.

A third example would be the manner in which the monetary authority is assumed to respond to economic developments. The responses of the Federal Reserve Board to various situations are quite uncertain in the future, and the distribution of demand GNP is also sensitive to those responses through their impact on the level of interest rates in the economy.

A final example is the assumption regarding the statistical discrepancy in the National Income and Product Accounts. The measure of the difference between the income and product sides of the GNP accounts fluctuates widely from year to year and is subject to many near-term factors which are very difficult to predict or even to quantify. Nonetheless, a serious error in this assumption will have little noticeable impact on the projection results owing to the very small share of the GNP accounted for by this assumption.

The BLS has long been aware of these issues. It is one of the reasons alternative projections are prepared. However, we feel that further work is necessary. Currently, we are preparing several studies aimed at exploring further those assumptions to which the occupational employment projections are the most sensitive. The studies involve aggregate sensitivity analyses. In addition, several industry-level studies examining the sensitivity of occupational demand to alternative technological and institutional assumptions are under way. These studies are scheduled for completion and release by mid-1986.

The disaggregation of the aggregate trends into purchases from specific industries is based on final demand "bridge tables"—that is, a set of percentage distributions of aggregate final demand among industries. These tables transform demand estimates from the macro model to an input-output format. The projected changes in the bridge tables are based on reviews of studies of technological change, the relative output trends among industries, and the judgments of BLS analysts.

Aggregate demand

Gross national product consists of personal consumption expenditures (PCE), gross private domestic investment, foreign trade, and government purchases of goods and services. Since late 1982, when the recovery began, the growth of real GNP has accelerated to an annual rate of 5.2 percent in the 1982–84 period, while real consumer spending, despite high real interest rates, has surged at a 4.9-percent annual pace and gross investment at a 23-percent annual rate, paced by growth in equipment outlays. Under the moderate-growth assumptions, real GNP is projected to increase at an average annual rate of 3.0 percent during 1984–90. The rate of growth is projected to moderate after 1990, averaging 2.8 percent per year between 1990 and 1995, primarily in response to slowing population and labor force growth. Total GNP and its various components are presented in table 2 in constant 1977 prices for selected years from 1973 to 1995.[5]

Consumption expenditures have traditionally accounted for the largest share of GNP and have shown the least variation among the four major final demand sectors over time. However, because of the projected impact of higher income, new technology, changes in relative prices, and shifting population mix, consumers' behavior is expected to show

Table 1. Values of selected aggregate economic assumptions, 1976, 1984, and assumed values for 1990 and 1995

	1976	1984	1990			1995		
			Low	Moderate	High	Low	Moderate	High
Federal (numbers in billions):								
Defense purchases, 1972 dollars	64.4	92.4	122.0	122.0	122.0	129.5	129.5	129.5
Nondefense purchases, 1972 dollars	32.4	31.1	35.4	35.4	35.4	37.1	37.1	37.1
Food stamp benefits, 1972 dollars	3.3	4.9	5.0	5.0	5.0	5.5	5.5	5.5
Military retirement, 1972 dollars	16.0	14.9	15.5	15.5	15.5	15.9	15.9	15.9
Medicare payments, 1972 dollars	13.8	26.6	31.8	31.8	31.8	38.1	38.1	38.1
Social Security benefits, 1972 dollars	56.6	79.1	88.0	88.0	88.0	93.7	93.7	93.7
Other transfers, 1972 dollars	18.5	23.4	25.2	25.2	25.2	27.9	27.9	27.9
Old-age and survivors insurance taxable income, current dollars	15,300	36,600	56,100	56,100	56,100	78,600	78,600	78,600
Old-age and survivors insurance combined tax rate	11.7	14.0	15.3	15.3	15.3	15.3	15.3	15.3
Grants-in-aid, current dollars	61.1	92.5	126.6	126.6	126.6	167.2	167.2	167.2
Subsidies, current dollars	5.8	24.2	20.4	20.4	20.4	27.1	27.1	27.1
Transfers to foreigners, current dollars	3.2	8.0	9.1	9.1	9.1	11.0	11.0	11.0
Interest paid to foreigners, current dollars	4.5	19.4	26.3	26.3	26.3	29.0	29.0	29.0
State and local (numbers in billions):								
Education purchases, 1972 dollars	71.3	71.4	78.1	80.6	82.3	84.1	88.3	90.0
Health and welfare purchases, 1972 dollars	28.2	33.1	36.6	39.0	40.9	39.7	43.9	46.1
Safety purchases, 1972 dollars	13.4	14.6	16.4	17.3	18.2	17.6	19.6	20.6
Other purchases, 1972 dollars	55.4	56.7	63.8	68.5	71.3	70.1	78.4	81.5
Transfers, 1972 dollars	20.9	24.1	29.2	29.2	29.2	32.9	32.9	32.9
Dividend income, current dollars	0.8	3.2	4.2	4.2	4.2	4.7	4.7	4.7
Net interest, current dollars	−3.6	−26.0	−71.1	−70.5	−78.5	−102.7	−99.5	−131.0
Monetary (numbers in billions of current-dollars):								
Reserve requirement, demand deposits, (in percent)	10.2	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Reserve requirement, time deposits, (in percent)	3.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Free reserves	0.1	0.1	0.5	0.5	0.5	0.5	0.5	0.5
Money market mutual funds	3.0	184.2	271.0	271.0	271.0	417.4	417.4	417.4
Other checkable deposits	1.8	137.8	216.5	216.5	216.5	293.5	293.5	293.5
Overnight repurchase agreements	8.5	50.5	82.7	82.7	82.7	110.2	110.2	110.2
Term repurchase agreements, commercial banks	10.2	29.9	47.4	47.4	47.4	65.1	65.1	65.1
Term repurchase agreements, thrifts	1.4	26.3	47.2	47.2	47.2	66.5	66.5	66.5
Overnight Eurodollars	0.0	10.0	24.2	24.2	24.2	37.3	37.3	37.3
Traveler's checks	2.6	5.1	6.5	6.5	6.5	8.2	8.2	8.2
Demographic (numbers in millions):								
Male population, age 16 and over	76.846	85.940	91.926	91.926	91.926	95.478	95.478	95.478
Female population, age 16 and over	83.474	93.430	99.885	99.885	99.885	103.704	103.704	103.704
Number of families	56.827	61.996	68.183	68.183	68.183	72.250	72.250	72.250
Number of households	73.846	84.985	95.598	95.598	95.598	102.446	102.446	102.446
Number of unrelated individuals	20.543	31.905	34.287	34.287	34.287	36.747	36.747	36.747
Male labor force, age 16 and over	57.174	63.835	65.841	67.146	68.144	67.258	69.282	71.452
Female labor force, age 16 and over	38.983	49.709	54.259	55.507	56.156	57.842	59.886	61.448
Armed forces	2.141	2.239	2.322	2.322	2.322	2.322	2.322	2.322
Self-employed	5.783	7.785	7.974	8.191	8.363	8.175	8.632	8.921
Unpaid family workers	.464	.335	.310	.354	.374	.202	.235	.336
Conceptual difference	−.208	−.899	−.859	−1.081	−1.146	−.241	−.636	−.685
Foreign:								
World gross domestic product, billions of 1972 dollars	3,693.0	4,529.5	5,283.7	5,567.9	5,764.4	5,948.9	6,361.3	6,617.9
World gross domestic product deflator (1972 = 100)	153.3	297.1	433.5	412.0	391.4	610.9	528.3	480.8
Exchange rate (1972 = 100)	98.31	71.48	82.90	89.21	93.62	92.42	105.74	120.06

somewhat different patterns in the next 10 years. For example, consumer electronics products are projected to become increasingly popular and important. In 1977, PCE accounted for 63.1 percent of real GNP. During 1982–84, the PCE share was higher than usual because of the aftermath of the deep recessions and because of the relatively low prices of imported consumer goods, caused in part by the high value of the dollar. By 1995, the PCE share is estimated to decline because of the impact of a projected slowdown in population growth, as well as the larger share of GNP accounted for by investment expenditures. The decline in PCE's GNP share represents a return to the consumption patterns experienced during the 1970's, when PCE averaged about 63 to 64 percent of GNP.

Over the coming decade, consumption expenditures are projected to shift more toward durable goods and services and away from nondurable goods. The slow growth in consumer nondurables is in line with the slowdown in population growth. More important, because income elasticities for durables and services exceed those for nondurables, it is estimated that consumers will demand relatively more durable goods and services as real family incomes rise. As a result, the share of nondurable goods is projected to account for 34.2 percent of total PCE in 1995, down from 37.6 percent in 1984.

Since 1967, expenditures by consumers on services have exceeded expenditures on nondurables. Spending on services is projected to continue to increase relatively from a 46.8-percent share of total PCE in 1984 to 50.2 percent in 1995. **Spending on financial, legal, and business services** is expected to expand rapidly. Health care and other related services are estimated to become the fastest-growing part of services consumption.

By 1995, the share of durables is projected to remain close to 15.6 percent of total PCE. As noted earlier, durable goods have a high income elasticity, which implies that higher real incomes have a favorable effect on purchases of high-priced durable goods. This is projected to foster durable consumption growth despite a projected slowdown in household growth. The steady demand for durables is also stimulated by a growing demand for household electronic goods. On net balance, however, the rate of growth of consumer durables in the projection period is slower than for past trends.

Gross private domestic investment consists of (1) purchases of producers' durable equipment; (2) investment in nonresidential structures; (3) purchases of residential structures; and (4) changes in inventories of business. Historically, gross domestic investment is one of the most volatile elements of final output. Accounting for 17.9 percent of GNP in 1972 and 18.8 percent in 1973, gross investment accounted for only 14.1 percent in 1982 and 15.5 percent in 1983, primarily because of the effects of high interest rates, high inflation, and the recessions of the 1970's and early 1980's on housing construction.

Since the end of the latest recession in late 1982, investment spending has climbed to its historically high levels. The strength of the recovery in spending on purchases of producers' durable equipment has been particularly dramatic, an increase of 33 percent on average from the fourth quarter of 1982—the recession trough—to the second quarter of 1984, which is almost twice as large as the increase in any comparable recovery period. A major contributor to this increase was the category of office machinery which includes computers. Investment in nonresidential structures, especially for commercial buildings, recovered so sharply during the last 2 years that it was well ahead of the average for the previous postwar recoveries. Investment in residential structures, that is, housing construction, also rebounded strongly. Private housing starts for 1984 were about 1.8 million units versus 1.06 million for 1982.

The extent to which changes in tax laws in 1981 and 1982 contributed to the current recovery of business investment is unclear.[6] Nevertheless, the future mix of monetary and fiscal policies assumed by BLS in this set of projections, which determines the level of real interest rates, is estimated to be more favorable toward investment than in the recent past. Although Federal deficits in nominal terms are projected to remain high through 1995, as a percent of GNP they are projected, using the assumptions stated earlier, to decline from 5.0 percent of GNP in 1984 to 3.0 percent in 1995. As a result, interest rates (measured by the 3-month Treasury bill rate) are projected to fall from their 1984 level of 9.52 percent to 7.55 percent in 1995. This decline contributes to the projected increase in the share of GNP accounted for by investment expenditures, which attain a 19.0-percent level in 1995. Business investment is estimated to be a great contributor to real growth during the projection period.

Real exports and imports are projected to continue to account for a larger share of GNP. Exports are estimated to rise to 13.4 percent of GNP in 1995 and imports to a 13.8-percent share. For merchandise imports, the major growth area is expected in capital goods. For merchandise exports, the demand for "high-tech" goods is estimated to increase rapidly during the projection period.

In 1984, the Nation experienced a large trade deficit as net exports fell to an unprecedented −$64.2 billion (in nominal terms), from −$8.3 billion in 1983. The worsening of the trade deficit was largely in merchandise trade. Merchandise imports were up 26 percent from 1983 to 1984, while merchandise exports increased only 10 percent. The weakness in merchandise exports and the strength in merchandise imports continue to reflect the effects of cumulative dollar appreciation. The current account trade balance, under the assumptions used in the BLS projections, is expected to remain in deficit into the 1990's, but the net exports share of GNP is projected to decline over the study period.

Because of differential price results, the real trade balance under the same assumptions is assumed to show improve-

ments after 1985. Real net exports would still be negative by 1995, but with a relatively narrow gap, as a result of a stable rate of inflation and the assumption of a slow but steady increase in the exchange rate.

Government purchases of goods and services[7] are assumed to rise at a slightly faster rate than GNP throughout the 1980's, then begin to slow after 1990, relative to overall GNP growth. This pattern reflects that defense spending, especially in the areas of computers and communication equipment, is anticipated to grow very strongly—by about 5.3 percent per year between 1984 and 1990—but then is assumed to slow sharply (to 1.2-percent growth per year) in the 1990-95 period. The real nondefense portion of Federal purchases is estimated to show only minimal growth in the next 10 years; an annual growth rate of 1.1 percent is projected for 1984-95.

State and local spending on goods and services is projected to increase more slowly than GNP in the 1990's, averaging 2.3 percent per year for both the 1984–90 and the 1990–95 periods. It should be noted that the projected growth rate of State and local purchases is somewhat faster than the recent trend. The slower growth during 1977–84 was the result of strict, recession-induced expenditure controls by State and local government. Between 1980 and 1983, total real State and local government purchases dropped about $2 billion, although purchases began a turnaround in 1984.

Industry final demand

Each demand sector mentioned above accounts for purchases from a different set of industries. Households consume a different variety of industrial products than businesses. Clearly, the products of food-related industries, such as meat products or soft drinks, are heavily consumed by households, while the products of machinery-related industries, such as engines and office machines, are heavily consumed by business as investment goods. Industry demand is affected by shifts both in the relative importance among the various final demand sectors and in each sector's distribution of purchases from each of the producing industries in the economy.[8]

Consumption expenditures

Motor vehicles. After the dismal sales experienced by the automobile industry from 1980 to 1982, new car sales boomed to 10.4 million units in 1984 from a cyclical low of 8.0 million units in 1982. The increase in motor vehicle sales was mostly accounted for by domestic cars; sales of imported cars were constrained, at least somewhat, by "voluntary" import quotas during 1982–84. The recovery of the new car market reflects the improvement in economic conditions—higher personal income, stable gasoline prices, a reduced inflation rate, and improved consumer confidence.

Demand for motor vehicles probably will remain strong in the near future because of a backlog of demand. However, a slowdown in long-term growth of automobile demand is anticipated, caused by the decline in the number of new auto registrants because of a long-term demographic swing. In addition, the continued rise in automobile costs may lead ultimately to lower replacement demand. Purchases of cars, vans, and light trucks as a whole, are estimated to rise at the moderate rate of 2.0 percent per year during 1984–95. This represents an increase in new car sales to 10.9 million units in 1995. Purchases of imported cars, because of the assumption that imports will continue to improve their competitive position in this country, are projected to account for a larger proportion of the industry's output—28.2 percent in 1995, compared with 13.5 percent in 1977 and 23.4 percent in 1984.

Demand for auto parts is expected to echo the slowing growth in demand for automobiles. Purchases of tires and inner tubes, accounting for about one-half of total sales of auto parts, are projected to show a very slow growth during the projection period, partly because of the increased use of smaller-size tires and the decreased replacement for longer-lasting tires.

Personal computers. Among the consumer-related industries, personal computers and computer peripheral equipment, such as disk drives and printers, are projected to be the most rapidly growing demand category. The substantial demand for personal computers that began in the late 1970's continued in 1984. The projections concerning the personal computer market in the longer term are still optimistic despite short-run problems, as rapid technological change is expected to sustain improvements in computer system capabilities, thus attracting new buyers, as well as repeat customers. In addition, improved software will likely propel demand for personal computers. Furthermore, the educational market is considered important. Many children are exposed to the use of computers at school, and for many it will become another standard appliance. Purchases of personal computers are projected to grow at a robust rate of 20.9 percent per year in 1984–95. This means that real spending on home computers should reach $8.1 billion in 1995, eight times that of 1984.

Telephone equipment. The consumer market for telephone sets over the next 10 years is expected to be positive. Because of the AT&T divestiture and changes in regulation, more people are replacing leased telephones with their own. Moreover, telephone sets have become much more available to consumers; the new products, such as cordless telephones and telephone clock-radios, have also been widely introduced. Purchases of telephone equipment are expected to increase at a rapid rate of 20 percent annually between 1984 and 1995, following the strong growth of 11.5 percent annually between 1977 and 1984.

Consumer electronics. A great deal of technological innovation has brought many unique electronic products to

the market in the past 5 years. Demand for consumer electronic products, with no recent evidence of cyclicality, has been increasing dramatically in recent years. These products include television sets, video disc players, automobile radios, video cassette recorders, and audio tape recorders. The new popular interest in video entertainment, which is aroused by an increasing variety of cable TV programs and pre-recorded video cassettes, is stimulating the demand for modular color television sets. Also, televisions will likely be used more and more as monitor-receivers to serve as a display screen for home computers and video games. As a result, demand for radio and television receiving sets as a group is estimated to increase strongly; from the already high level of 1984, an annual rate of 3.9 percent is projected for the 1984–95 period, reaching $22 billion in 1995.

Consumer nondurables. Expenditures for nondurables tend to be more closely tied to population growth than other categories of consumer expenditures. The projection of slow growth in population and household formation in the next decade is reflected in a moderate growth rate for all nondurables except for drugs and pharmaceutical products. For example, spending on dairy products is estimated to grow 2.4 percent per year between 1984 and 1995, while spending on apparel products is projected to grow even more slowly, 1.7 percent. Spending on gasoline is expected to decline below its 1977 level, as the stock of automobiles grows less rapidly and average fuel efficiency continues at a moderate rate of increase. Conversely, drugs are the only nondurable consumer product projected to show strong long-term growth: 7.4 percent per year for the 1984–95 period, as compared with 2.6 percent for 1977–84. The estimate for high growth is linked to the continuation of new product development, increases in prices of prescription drugs (such as cardiovascular drugs), further expansion in the use of generic drugs, and the rising number of elderly in the population who proportionately consume more drugs.

Banking and financial services. Personal banking and financial services have been expanding rapidly in recent years, as more persons enjoy banking and credit union services, such as the new and convenient automatic teller machine and the spread of investment counseling. Both banking and financial services are projected to expand even more in the future, with credit cards, debit cards, and in-home banking programs. However, because banking services are facing more intense competition from financial services, the latter are providing a wider array of financial products, such as retirement accounts, competitive deposit accounts, mutual funds, and insurance. Spending for personal banking services is projected to grow at a rate of 3.6 percent per year between 1984 and 1995, while spending for financial services is projected to increase at a rate of 5.6 percent.

Medical care services. Since the mid-1960's, medical care expenditures have grown rapidly. Reasons for the rapid increase include relatively inelastic demand for health care services; a generally more rapid rate of increase in prices; a rising proportion of the elderly in the total population; costly surgical and in-hospital treatment; technological development which allows the use of sophisticated and expensive medical equipment; new and costly medical procedures; and government and private insurance systems.

It is estimated that medical care spending will continue its upward trend in the coming decade. By 1995, such spending is projected to account for 8 percent of total PCE, but spending patterns will change considerably over the next 10 years. Mirroring the projected growth in the aging population, nursing home services will increase. Moreover, the rapid expansion of health maintenance organizations, spurred by the provision of more affordable and comprehensive medical services, should attract members of other health plans. Also, the continuing Federal restriction on payments to hospitals will be a strong motivation to curb hospital care in favor of other kinds of health care services, which are usually less expensive. Expenditures for physicians' services are projected to grow at an annual rate of 3.9 percent in the 1984–95 period, accounting for 3.9 percent of total PCE in 1995 versus 3.4 percent in 1984. Expenditures for hospitals are estimated to show a much slower growth of 1.7 percent per year between 1984 and 1995, down from 3.6 percent during 1977–84; while expenditures for other medical services are projected to grow faster, at an annual rate of 5.7 percent between 1984 and 1995, up from 3.4 percent for 1977–84.

The following tabulation highlights those PCE-related industrial categories with the best projected performance:

The 10 largest PCE-related industrial categories in 1995:	*1977 dollars (in billions)*
Owner-occupied real estate	$261.4
Real estate	100.8
Eating and drinking places	97.6
Doctors' and dentists' services	79.2
Motor vehicles	64.0
Hospitals	58.1
Communications services	56.6
Apparel	49.1
Banking services	48.1
Electric utilities	47.3

The 10 fastest growing PCE-related industrial categories during 1984–95:	*Annual percent growth rate*
Computers and computer-related equipment	20.9
Telephone and telegraph apparatus	20.0
Drugs	7.4
Electronic components and accessories	6.9
Professional services	5.8
Medical services	5.7
Communications services	5.7
Credit agencies and financial brokers	5.6
Real estate	4.7
Amusement and recreation services	4.5

Business investment

As mentioned earlier, business investment (nonresidential investment) is expected, under the assumptions used by BLS in this set of projections, to remain strong throughout the projection period, boosting the business investment share of GNP. From 1984 to 1995, investment in equipment, the largest portion of investment, is estimated to grow by 3.8 percent per year, outpacing growth in GNP. Equipment investment's GNP share is projected to rise to 10.3 percent by 1995, from 7.6 percent in 1977 and 9.4 percent in 1984.

During the 1970's, investment in equipment was directed more toward energy-efficient and environmentally safe equipment. Over the next decade, investment in equipment is likely to be highly concentrated in technologically advanced equipment, as businesses invest to increase productivity, cut costs, and respond to the availability and capabilities of new technologies. This equipment includes not only computers and advanced communication equipment, but manufacturing machinery incorporating programmable controls and robotics.

Computers. Investment spending on computers and computer-related equipment is projected to continue to boom through the 1990's. All major industries are projected to have made heavy commitments to computers during the next 10 years. In addition, intense competition and continued technological change are estimated to combine to sustain increases in capabilities and decreases in prices. Thus, business investment in computers is expected to show a sharp growth, averaging 8.5 percent per year between 1984 and 1995. This will bring spending on computers to 18.6 percent of total equipment spending, ranking it the largest item of total purchases of producers' durable equipment.

Metalworking machinery. The increase in demand for metalworking machinery in recent years reflects the interest in flexible manufacturing and automation, which incorporate robots and highly automated metal cutting tools, as well as lasers and fluid cutting techniques. Business spending for metalworking machinery is expected to continue its rapid advance through the next decade, reaching about $14 billion by 1995, almost double that in 1977.

Communication equipment and services. Continued growth in the demand for industrial electronic equipment (ranging from radio and television broadcast equipment to mobile radio equipment and cable television equipment), as well as the introduction of new high-technology products and services (such as fiber-optic cable, cellular mobile radio telephone, and video-conferencing) promise to widen the applicability of communication technologies. Investment demand for communication equipment and services is projected, therefore, to increase two- to threefold over 1984–95.

Other fast-growing investment demand is projected for optical equipment, scientific and controlling instruments, and medical instruments. These products are all characterized by rapid changes, partly because of changes in technology.

In contrast, equipment products for which investment demand is projected to grow slowly include farm and garden machinery, mining and oilfield machinery, and railroad equipment.

The following tabulation shows the highlights for those industrial categories related to purchases of producers' durable equipment (PDE) with the best expected performance:

The five largest PDE-related industrial categories in 1995:	*1977 dollars (in billions)*
Computers and computer-related equipment	$62.4
Motor vehicles	41.8
Radio and communication equipment	21.6
Communication services	19.0
Telephone and telegraph apparatus	18.0

The five fastest growing PDE-related industrial categories during 1984–95:	*Annual percent growth rate*
Computers and computer-related equipment	8.5
Communication services	8.1
Medical and dental instruments	5.7
Telephone and telegraph apparatus	5.2
Radio and communication equipment	4.5

Business investment in nonresidential structures is a small but very cyclical part of GNP. During the 1983–84 recovery, nonresidential structures did not turn up until late 1983. After that, investment expenditures recovered sharply in the mature stages of the business cycle, increasing by 16 percent between 1983 and 1984. The largest percent increase was for commercial buildings.

Because more of future economic growth is projected to come from high-technology industries, which invest heavily in research and development but are not generally structure-intensive, investment in nonresidential structures is estimated to grow principally to modernize the existing capital stock: factories, offices, transmission lines, and other structures. As a consequence, an average growth rate of only 2.0 percent per year is projected for 1984–95.

Housing

From the end of the 1960's until the beginning of this decade, demand for new housing (residential investment) increased at a steady rate, although usually interrupted by business cycles. Similarly, housing construction was severely depressed in the 1980–82 recessions. New housing starts plummeted from a high of 2.0 million units in 1977 to 1.1 million units in 1982, while residential investment expenditures (in real terms) declined from $99 billion in 1977 to $60.4 billion in 1982. Even though the downswing reversed sharply during the 1983–84 recovery period, new housing starts have averaged only about 1.7 million units for the last 2 years. During each economic recovery in the

1970's, housing starts bounced back to more than 2 million units and stayed there for a few years. Record-high mortgage rates are among the key reasons that housing has not rebounded as fast as in the past, but the demographic factors also play an important role. In the 1970's, baby boomers formed households in record numbers and this was reflected in housing demand. Now this age group is growing out of the typical age for forming new households.

Long-term housing demand is mainly determined by demographic factors and geographic movements, although higher housing prices and higher real interest rates could retard demand. Primarily because of projected slowdowns in population growth and changes in the age structure of the population, the number of households is projected to show a slower growth of 1.7 percent per year between 1984 and 1995, below the rate of 1.9 percent during 1973–84. The decline in household formation is projected to reduce the number of housing starts to a level of 1.6 million units in 1995 in spite of the assumption of steadily improving real interest rates.

Between 1973 and 1983, the stock of multiple units grew more rapidly than the stock of single units, averaging 2.4 percent growth, compared with 2.0 percent for single units. This pattern is projected to continue over the next 10 years, but a narrowing of the differential is also likely. The improved picture in the future for single-family units relative to multiple units stems from the shift of population structure. The 25- to 44-year-old group, used as proxy for the home buying market, is projected to maintain a consistently high proportion of the adult population in 1995; individuals in this group have traditionally favored single-family homes.

The stock of mobile homes, which was at the level of 3.4 million units in 1984, is projected to stabilize at about 3.2 million units over the study period.

Foreign trade

The trade picture is expected to show improvements in the coming decade under the assumptions used in this set of projections. With gradual depreciation of the U.S. dollar assumed, along with the stronger world economic growth, the GNP share of real net exports is projected to recover from −2.2 percent in 1984 to −0.4 percent in 1995.

Real exports are expected to increase much faster than total GNP in the 1990's. An annual growth rate of 5.6 percent for exports is projected in the 1984–95 period, while a rate of 2.9 percent for GNP is projected. By 1995, merchandise exports are estimated to be even more highly concentrated in "high tech" goods, such as computers, electronic components, communication equipment, and drugs, because technology has risen to become a worldwide concern. The U.S. technological lead in computers is universally acknowledged. Thus, by 1995, the computer industry is projected to become the largest export industry, accounting for 7.4 percent of total exports. Also, exports of electronic components, the basic building blocks of all electronic equipment, are expected to increase sharply because of strong demand from their end users. A rapid growth of 10 percent per year is projected between 1984 and 1995. It is important to note that the expansion of exports for electronic components, however, will be significantly tempered by the parallel expansion of imports.

Over the past 20 years, the U.S. trade balance always has benefited from strong exports of agricultural products. While agricultural surpluses are still expected to continue over the projection period, the share of the agricultural industry with respect to total exports is estimated to be smaller, 6.9 percent in 1995 versus 8.3 percent in 1984. Other traditional export industries, such as aircraft and motor vehicles, are projected to continue to exhibit their sizable share of total exports.

Among services exports, the most rapidly growing industry is communication services, averaging 10.5-percent growth per year in the 1984–95 period; a strong demand for U.S.-built communication equipment, as well as telephone and telegraph apparatus, implies a strong demand for communication services. The following tabulation highlights those industries with the best expected performance:

The five largest merchandise export industrial categories in 1995:	*1977 dollars (in billions)*
Computers	$31.5
Electronic components	19.5
Motor vehicles	16.5
Food and feed grains	14.6
Aircraft	13.8

The five fastest growing export industrial categories during 1984–95:	*Annual percent growth rate*
Computers	10.5
Communication services	10.5
Radio and television receiving sets	10.1
Electronic components	10.1
Telephone and telegraph apparatus	9.1

It is assumed that as the U.S. dollar falls, import price increases will gradually reflect the drop in the dollar's value. In turn, the growth of real imports is expected to show a slower pace. Average growth of 4.0 percent per year for total imports is projected in the 1984–95 period, as compared with 6.5 percent for 1977–84 and 15.9 percent during 1982–84.

In 1980, nearly one-fourth of merchandise imports was accounted for by crude oil and petroleum products. However, in 1984, petroleum imports were less than 15 percent of total merchandise imports. The lagged impacts of the 1979–80 oil price increases are still inducing conservation and substitution away from oil and reducing the growth of oil demand: petroleum dropped to 3.4 million barrels per day in 1983 from a high level of 6.5 million barrels per day in 1979. Despite the recent fall in oil demand, in the long-term, demand for imports is projected to increase because of falling domestic production. Domestic oil production, is projected to continue to decline over the projection period, from 8.6 million barrels per day in 1984 to 7.9 million

barrels by 1990 and 7.6 million barrels by 1995. In contrast, petroleum imports are expected to increase steadily from 3.9 million barrels per day in 1984 to 5.7 million in 1990 and 6.9 million in 1995. With no real oil price increases assumed during the projection period, demand for petroleum imports is projected to increase at a rate of 2.6 percent per year during 1984–95.

Instead of imported oil, Americans are buying more foreign-made steel, textiles, apparel, automobiles, and business equipment. During the 1980–82 recessions, the market penetration of imported cars was record breaking. As a result of a recovery of the U.S. car market and a limit on Japanese imports, the import share declined from 28.8 percent in 1982 to 23.6 percent in 1984. But the restraint program ended on April 1, 1985. Despite a new set of self-imposed restraints, Japanese automobiles are expected to expand their share of U.S. markets in the near future. As noted earlier, the long-term automobile import share is expected to resume its increase because of the assumption that imports will continue to improve their competitive position in this country. Auto imports are projected to grow at a rate of 4.0 percent per year between 1984 and 1995.

Capital goods are increasingly being bought from foreign producers. Imports of electronic components, which have made major inroads in recent years, are projected to exceed exports by 1995, capturing 23.8 percent of the industry's output. Imports of office machines have already dominated the U.S. market since the 1970's. Their projected values reach $3.1 billion in 1995, representing 41.9 percent of the industry's output. Imports of machine tools accounted for about 40 percent of domestic machine tool sales in 1984. This industry is expected to become even more international by 1995.

Also, lured by lower prices, foreign steel took a record 26 percent of the domestic market in 1984, or an increase from a 20.5-percent of market share in 1983 and 18.5 percent in 1979. Even with import curbs for the next 5 years, foreign competition is anticipated to remain strong through 1995.

Imports of the products of some labor-intensive industries, such as apparel products and textiles, are also projected to continue to increase, as developing countries seek larger shares of the U.S. market. The traditional imported goods, such as motorcycles, jewelry, and watches, also continue to dominate the U.S. market for these products in the next decade in the BLS projections.[9] The following tabulation highlights those industries with the best expected performance:

The five largest merchandise import industrial categories in 1995:	*1977 dollars (in billions)*
Motor vehicles	$50.6
Computers	28.6
Crude petroleum and natural gas	27.9
Electronic components	26.6
Apparel products	23.5

The five highest import penetration industrial categories in 1995:	*Imports outputs ratio*
Watches and clocks	74.6
Leather products	60.2
Radio and television receiving sets	58.3
Motorcycles and bicycles	56.7
Jewelry and silverware	55.2

Government

Total real government purchases of goods and services are projected to grow more slowly than total GNP over the 1984–95 period, as reflected by the fact that government purchases, as a percent of GNP, fall from 18.8 percent in 1984 to 18.0 percent in 1995. However, when the various parts of government are viewed separately, a more complex picture emerges.

Federal Government defense spending is projected to increase to 5.7 percent of GNP by 1995, from a level of 5.4 percent held in 1984. This is a result of an average annual growth rate of 5.3 percent projected from 1984 to 1990, and 1.2 percent from 1990 to 1995. For the whole period, from 1984 to 1995, GNP is projected to grow 2.9 percent while defense grows 3.4 percent. However, the growth of Federal nondefense purchases is less than GNP over the whole period, resulting in a drop from 2.0 percent of GNP in 1984 to 1.7 percent in 1995. This pattern is duplicated by State and local government purchases of goods and services, which are projected to drop from 11.4 percent to 10.7 percent of GNP. All four of the major components of State and local government purchases—education, health and welfare, safety, and other purchases including highway construction—are assumed to have growth rates slower than GNP over the projection period. Spending on education, the largest State and local government component, is projected to increase at an average annual rate of 1.8 percent during 1984–95, reflecting that the population of 5- to 17-year-olds is projected to grow only at a rate of 0.8 percent per year. Spending per student is estimated to increase at a rate of 1.0 percent per year.

Government spending is further divided between compensation of employees and spending on purchases of goods and other services. In the defense sector, there is little expectation that the level of armed forces and civilian defense employment will increase dramatically over that of 1984, so the increases in spending will be for material. Compensation, as a percent of total real defense purchases, is projected to continue to drop from its 46-percent level in 1977 and 35 percent in 1984 to 26 percent in 1995. After compensation, the major recipient of defense spending is the manufacturing sector of the economy which is projected to hold its historical share of noncompensation purchases at 67 percent. Within the manufacturing sector, relatively more spending on computers and communication equipment causes the share of these industries to increase at the expense of such purchases as food and clothing which are devoted to

a stable armed force level. In the nonmanufacturing areas, communications, along with specialized professional services such as computer and data processing, will grow much faster than total defense purchases and thus take a larger share.

Slower projected growth for the remaining functions of government, than projected growth for total GNP, reflects the demographic landscape of the projection period. A maturing population will require relatively less real education expenditures but more health expenditures than were necessitated by the baby boom, while a completed highway program will call only for expenditures on upkeep.

Alternative growth paths

Two alternative projections of growth have been prepared with variations in those responses to economic policy which have the greatest impact on the industrial employment and occupational projections. It should be noted that the alternatives are not policy alternatives. In fact, both fiscal and monetary policies, with the exception of Federal spending programs which respond to economic stimuli, such as unemployment benefits, remain the same in all three scenarios. The purpose of the alternatives is to provide a reasonable range of outcomes around the probable responses of the economy to a given set of policy assumptions.

The assumptions underlying the high-growth alternative are that the civilian labor force is estimated to grow more rapidly, reaching almost 133 million by 1995, approximately 4 million more than in the BLS middle-growth labor force projection; and the unemployment rate is estimated to drop more rapidly over the projection horizon, reaching 5.9 percent in 1990 and 5.0 percent in 1995. Productivity growth is even higher than in the moderate-growth version. In contrast, the assumptions underlying the low-growth alternative are that the labor force will expand less rapidly and the unemployment rate will not improve very much over the projection period. In addition, a sluggish rate of productivity growth is also assumed. Each of the alternatives is summarized below and estimates from these scenarios are presented along with the moderate-growth projection in tables 1 and 2.

High growth. This alternative differs from the moderate-growth version primarily in the 1984–90 period. Real GNP is projected to increase at an average annual rate of 4.0 percent during 1984–90, a full percentage point higher than in the moderate-growth projection. Between 1990 and 1995, GNP is projected to grow at a rate of 3.5 percent annually. The GNP in 1995 is $310 billion higher than in the moderate-growth case.

Within GNP, the component of demand most sensitive to the alternative assumptions is business investment, especially investment in equipment. With more GNP and lower interest rates in this version, higher real investment is expected. In addition, investment is estimated to be more robust because of a decline in the user cost of capital relative to labor. Investment equipment is projected to grow at an average rate of 4.9 percent in the 1984–95 period, 1.1 percentage point over the moderate-growth case.

The higher incomes growth in this alternative is particularly beneficial to spending on consumer durables because consumer durables are more responsive to income changes than some other categories. Auto sales increase rapidly in the high-growth version, exceeding 12 million units by 1995, compared with 10.9 million units in the moderate-growth projection.

Demand for U.S. exports increases as a result of the stronger world growth and stable rate of inflation. Demand for imports is also expected to rise as a result of higher economic growth. Real exports in the high-growth version are $48 billion higher in 1995 than in the moderate-growth case, while real imports are only $11 billion above the moderate-growth projection, resulting in a trade surplus of about $25 billion in 1995, compared with a trade deficit of $12 billion in the moderate-growth scenario.

Real Federal purchases of goods and services at the total level show no change in the high-growth projection, while State and local purchases of goods and services show a slight increase, higher by $12 billion in 1995 than in the moderate alternative. Finally, higher income growth rates lead to higher Federal Government revenue collections, which in turn, lead to a projection of a balanced Federal budget in 1995.

Low growth. In this alternative, as noted above, a relatively more consumer-oriented growth path is assumed with less relative investment growth and much lower productivity growth.

Real GNP is $234 billion lower in 1995 than in the moderate-growth case, and durable items are particularly affected by the slower growth. Lower levels of disposable income dampen purchases of automobiles, furniture, and other durable goods. Thus, consumption of durable goods is 6.5 percent below the moderate-growth projection by 1995, while total consumption spending is 6.1 percent below the moderate-growth version.

With lower economic growth, business investment in this scenario shows a relatively poorer performance. By 1995, total investment is 7.6 percent below the moderate-growth version, especially investment in producers' durable equipment which ends up about 10 percent below moderate growth. Dampened capital goods spending leads to lower productivity over the entire period.

The demand for imports is assumed to be reduced by lower economic activity. However, the lower economic growth is projected to hamper export growth even more. Real exports are lower by $47 billion in 1995, compared with the moderate-growth levels, while real imports are off by only $12 billion. As a result, real net exports are projected to reach a $47 billion deficit by 1995 in the low-growth

Table 2. Gross national product, 1973, 1977, 1984, and projected to 1990 and 1995

[Billions of 1977 dollars]

Item	1973	1977	1984	1990			1995		
				Low	Moderate	High	Low	Moderate	High
Gross national product	$1,825.3	$1,976.6	$2,367.3	$2,691.4	$2,821.4	$2,986.7	$3,006.4	$3,240.5	$3,550.9
Personal consumption	1,111.9	1,246.5	1,522.2	1,744.3	1,808.4	1,930.4	1,929.2	2,053.5	2,257.9
Durables	162.1	184.4	237.2	275.5	284.4	307.9	299.9	320.6	363.7
Nondurables	455.1	490.5	572.2	617.9	641.7	680.6	659.7	702.5	763.0
Services	494.8	571.6	712.8	851.0	882.4	942.0	969.6	1,030.4	1,131.2
Gross private domestic investment	343.5	336.6	452.4	497.8	524.5	557.9	569.1	615.6	672.5
Equipment	136.3	149.9	221.7	256.7	270.3	290.5	302.5	335.0	375.0
Nonresidential structures	77.3	66.0	92.9	97.9	102.2	106.7	111.4	116.0	125.9
Residential structures	101.8	99.0	97.3	111.5	112.3	112.6	120.4	122.5	120.7
Inventory change	28.1	21.7	40.5	31.7	39.7	48.2	34.8	42.0	50.9
Net exports	−2.6	−2.1	−52.3	−68.0	−44.7	−45.9	−47.1	−11.8	25.2
Exports	161.4	185.3	238.2	314.2	340.2	355.3	388.6	435.6	483.4
Imports	−164.0	−187.4	−290.4	−382.2	−384.9	−401.2	−435.7	−447.3	−458.2
Government	372.5	395.6	445.0	517.3	533.2	544.2	555.2	583.2	595.3
Federal	136.8	143.4	174.8	224.3	224.3	224.3	237.4	237.4	237.4
Defense	97.0	92.8	127.2	173.1	173.1	173.1	183.8	183.8	183.8
Nondefense	39.9	50.5	47.6	51.2	51.2	51.2	53.6	53.6	53.6
State and local	235.7	252.2	270.2	293.0	308.9	319.9	317.8	345.9	357.9
Percent distribution									
Gross national product	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Personal consumption	60.9	63.1	64.3	64.8	64.1	64.6	64.2	63.4	63.6
Durables	8.9	9.3	10.0	10.2	10.1	10.3	10.0	9.9	10.2
Nondurables	24.9	24.8	24.2	23.0	22.7	22.8	21.9	21.7	21.5
Services	27.1	28.9	30.1	31.6	31.3	31.5	32.3	31.8	31.9
Gross private domestic investment	18.8	17.0	19.1	18.5	18.6	18.7	18.9	19.0	18.9
Equipment	7.5	7.6	9.4	9.5	9.6	9.7	10.1	10.3	10.6
Nonresidential structures	4.2	3.3	3.9	3.6	3.6	3.6	3.7	3.6	3.5
Residential structures	5.6	5.0	4.1	4.1	4.0	3.8	4.0	3.8	3.4
Investment change	1.5	1.1	1.7	1.2	1.4	1.6	1.2	1.3	1.4
Net exports	−0.1	−0.1	−2.2	−2.5	−1.6	−1.5	−1.6	−0.4	0.7
Exports	8.8	9.4	10.1	11.7	12.1	11.9	12.9	13.4	13.6
Imports	−9.0	−9.5	−12.3	−14.2	−13.6	−13.4	−14.5	−13.8	−12.9
Government	20.4	20.0	18.8	19.2	18.9	18.2	18.5	18.0	16.8
Federal	7.5	7.3	7.4	8.3	8.0	7.5	7.9	7.3	6.7
Defense	5.3	4.7	5.4	6.4	6.1	5.8	6.1	5.7	5.2
Nondefense	2.2	2.6	2.0	1.9	1.8	1.7	1.8	1.7	1.5
State and local	12.9	12.8	11.4	10.9	10.9	10.7	10.6	10.7	10.1

Average annual rate of change

	1973–77	1977–84	1984–90			1990–95			1984–95		
			Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Gross national product	2.0	2.6	2.2	3.0	4.0	2.2	2.8	3.5	2.2	2.9	3.8
Personal consumption	2.9	2.9	2.3	2.9	4.0	2.0	2.6	3.2	2.2	2.8	3.6
Durables	3.3	3.7	2.5	3.1	4.4	1.7	2.4	3.4	2.2	2.8	4.0
Nondurables	1.9	2.2	1.3	1.9	2.9	1.3	1.8	2.3	1.3	1.9	2.7
Services	3.7	3.2	3.0	3.6	4.8	2.6	3.1	3.7	2.8	3.4	4.3
Gross private domestic investment	−0.5	4.3	1.6	2.5	3.6	2.7	3.3	3.8	2.1	2.8	3.7
Equipment	2.4	5.8	2.5	3.4	4.6	3.3	4.4	5.2	2.9	3.8	4.9
Nonresidential structures	−3.9	5.0	0.9	1.6	2.3	2.6	2.6	3.4	1.7	2.0	2.8
Residential structures	−0.7	−0.2	2.3	2.4	2.5	1.6	1.8	1.4	2.0	2.1	2.0
Inventory change	−6.2	9.3	−4.0	−0.3	3.0	1.9	1.1	1.1	−1.4	0.3	2.1
Exports	3.5	3.7	4.7	6.1	6.9	4.3	5.1	6.4	4.6	5.6	6.7
Imports	3.4	6.5	4.6	4.8	5.5	2.7	3.1	2.7	3.8	4.0	4.2
Government	1.5	1.7	2.5	3.1	3.4	1.4	1.8	1.8	2.0	2.5	2.7
Federal	1.2	2.9	4.3	4.3	4.3	1.1	1.1	1.1	2.8	2.8	2.8
Defense	−1.1	4.6	5.3	5.3	5.3	1.2	1.2	1.2	3.4	3.4	3.4
Nondefense	6.1	−0.9	1.2	1.2	1.2	0.9	0.9	0.9	1.1	1.1	1.1
State and local	1.7	1.0	1.4	2.3	2.9	1.6	2.3	2.3	1.5	2.3	2.6

NOTE: Historical data in 1977 dollars were reestimated from the National Income and Product Accounts' estimates in 1972 dollars; projected data in 1977 dollars were reestimated from the BLS macro model's estimates in 1972 dollars. These data reflect the benchmark revisions released in May 1984 by the Bureau of Economic Analysis.

alternative, which is significantly below the $12 billion deficit of the moderate-growth case.

Real Federal Government spending on goods and services is assumed to follow the same path as in the moderate-growth projection. With lower receipts forthcoming from a sluggish economy, the Federal deficit, in nominal terms in this BLS alternative, is projected to reach nearly $500 billion by 1995, versus $267.9 billion in the moderate-growth case.

State and local spending is very sensitive to changes in the availability of receipts and hence to the poorer prospect for the economy. Total spending by State and local government in the low-growth alternative is thus below the moderate-growth projection by $28 billion in 1995.

Comparisons with previous projections

In November 1983, BLS published its initial projections of the 1995 economy[10] in the same format, including a moderate-growth scenario and a high- and a low-growth alternative. Starting from a cyclical low point in 1982, projected GNP growth to 1995 ranged from 2.8 percent for the low-growth alternative to 3.3 percent for the high. In the revised projections, GNP growth from 1984 to 1995 ranges from 2.2 percent to 3.8 percent per year.

By 1995, under the previous projections, civilian employment was projected to range between 122 million and 130 million jobs. By comparison, the current projected employment levels are lower for all three scenarios. The downward revision in projected employment results primarily from a lower growth in the labor force, in turn reflecting the slowdown in the rate of growth in female labor force participation that began in 1978 and continued into 1984.

Another major difference between this set of projections and the last projections is in productivity. As stated earlier, a strong rate of productivity growth is assumed and emphasized in the current moderate- and high-growth versions.

The projected 1995 unemployment rate is unchanged in the current moderate-growth projection from that previously assumed, while the differences in both the high- and low-growth alternatives are very modest. The following tabulation shows the projected annual growth rates, 1984–95, for selected economic variables for the two projections. It is important to note that the year of 1984 is the last historical reference year in the current projections, while 1984 was a projected year in the previous projections:

	Growth rate, 1984–95		
	Previous projections		
	High	*Moderate*	*Low*
Real GNP	3.5	2.9	2.9
Civilian labor force	1.6	1.2	1.1
Civilian employment	1.6	1.2	1.1
Real output per person, all industries	1.4	1.3	1.3
Unemployment rate, 1995	5.2	6.0	6.8
	Current projections		
	High	*Moderate*	*Low*
Real GNP	3.8	2.9	2.2
Civilian labor force	1.5	1.2	0.9
Civilian employment	1.7	1.3	0.9
Real output per person, all industries	2.2	1.7	1.4
Unemployment rate, 1995	5.0	6.0	7.0

Because real GNP and its components are measured in constant 1977 prices for this set of projections, while constant 1972 prices were used for the past projections, final demand components can only be compared in terms of percentage distribution or growth rates. Expenditures for equipment investment and defense purchases of goods and services are now projected to grow much faster than the initial estimates; both the export and import shares of GNP are higher in the current projections. However, personal consumption expenditures are expected to claim a relatively smaller share of GNP than previously estimated.

Lastly, the previous projections of final demand by industry used a Bureau of Economic Analysis input-output table for 1972 and a BLS-estimated table for 1977. For the current projections, the Bureau of Economic Analysis'1977 input-output table and a BLS' preliminary table for 1984 are used. The utilization of these tables in the current projections resulted in many historical data revisions and provided more current information on technological trends, and, presumably, contributed to many of the differences between the earlier and current projections, particularly at the industry level. □

FOOTNOTES

[1] For previous articles see Howard N Fullerton, Jr. and John Tschetter, "The 1995 labor force: a second look," *Monthly Labor Review*, November 1983, pp. 3–10; Arthur J. Andreassen, Norman C. Saunders, and Betty W. Su, "Economic outlook for the 1990's: three scenarios for economic growth," *Monthly Labor Review*, November 1983, pp. 11–23; Valerie A. Personick, "The job outlook through 1995: industry output and employment projections," *Monthly Labor Review*, November 1983, pp. 24–36; George T. Silvestri, John M. Lukasiewicz, and Marcus E. Einstein, "Occupational employment projections through 1995," *Monthly Labor Review*, November 1983, pp. 37–49; and Richard W. Riche, Daniel E. Hecker, and John U. Burgan, "High technology today and tomorrow: a small slice of the employment pie," *Monthly Labor Review*, November 1983, pp. 50–58; also *Employment Projections for 1995*, Bulletin 2197 (Bureau of Labor Statistics, 1984).

[2] See Howard N Fullerton, Jr., "The 1995 labor force: BLS' latest projections," *Monthly Labor Review*, November 1985, pp. 17–25.

[3] In this tabulation, real output per person, as measured by real GNP/civilian employment, is derived from the Wharton macroeconomic model—a model which is selected by BLS to develop the Bureau's aggregate economic projection. (See footnote 4.) It is important to note that productivity measures presented in this article are not comparable to the published BLS data series, which are developed by the BLS Office of Productivity and Technology. For the definitions of labor productivity, multifactor produc-

tivity, and other related measures, and their historical data series, see the Current Labor Statistics section of the *Monthly Labor Review*.

[4] The BLS aggregate projections have been developed in the context of the long-term model of the U.S. economy provided by Wharton Econometric Forecasting Associates, Inc. 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.

[5] The Bureau of Economic Analysis' latest 1977 input-output tables were used in their present benchmark revision. However, during this projection, the revised estimates of the National Income and Product Accounts were only available for 1977. The rates of change between the revised final demand sectors underlying the National Income and Product Accounts and the previously published demand sectors for 1977 were weighted by each of the major category levels, and these weights were carried over in the projection period.

[6] See Barry P. Bosworth, "Taxes and the investment recovery," *Brookings Papers on Economic Activity* (Washington, DC, The Brookings Institution, 1985), pp. 1–38.

[7] Federal Government purchases of goods and services are a major part of total Federal Government expenditures, which also include transfer payments to persons and to foreigners, grants-in-aid, and net interest. On the demand side of the National Income and Product Accounts, the Federal sector is divided into defense and nondefense, and then each of these categories is further split into purchases of goods and services and compensation of military and civilian employees. State and local government purchases of goods and services are also a major part of total State and local government expenditures, which also include transfer payments to persons and net interest. State and local government purchases are separated by type of function. Major categories used are education, health and welfare, safety, and all other.

[8] Demand by industry is only part of the picture, because an industry's output is dependent not only on the final demand categories, such as personal consumption, but also upon intermediate use by other industries: for example, final demand by consumers for cars leads to intermediate demand by auto producers for steel, glass, plastic, computer and accounting services, and all of the other goods and services necessary for the production of motor vehicles. Total output by industry, the sum of final demand and intermediate demand, is derived by use of the input-output model. For a fuller description of the model, see pages 58–59. It should be noted that the input-output estimates of final demand for 1984 are estimated by BLS based on the Bureau of Economic Analysis' 1977 input-output tables and the demand estimates of the National Income and Product Accounts for 1984. These estimates are preliminary. Also, developments related to output, employment, and labor productivity are discussed by Valerie Personick elsewhere in this bulletin.

[9] Imports in the BLS projections are valued at domestic port value. Imports are assigned to the relevant or most nearly comparable domestic industry based on the nature of the product, except for those noncomparable imports, such as stamps and coins.

[10] See several articles listed in footnote 1.

The 1995 labor force: BLS' latest projections

A third look shows that the 1995 labor force will have about 129 million persons, 2 million fewer than projected earlier; the proportion of blacks will increase, but women are still expected to have the fastest growth

HOWARD N FULLERTON, JR.

The labor force is projected to reach 129 million persons in 1995, up from 114 million in 1984, according to new Bureau of Labor Statistics projections. The new middle growth projections show the labor force growing at a slower rate over the 1984–95 period than over the 1975–84 period, with the slowest growth occurring during the early 1990's.

Blacks are expected to account for a larger share (20 percent) of the future labor force growth, the consequence of higher birth rates during the past several decades. Women also are expected to account for a larger share of growth (60 percent), the consequence of continued increased participation rates. Because of the aging of the baby-boom generation and the projected continued declines in participation among older persons, nearly three-fourths of the 1995 labor force is projected to be in the prime working ages (25 to 54 years), compared with two-thirds of the 1984 labor force. The prime working age component of the labor force is projected to increase by 21 million, while the overall labor force is projected to increase by only 15 million inasmuch as the numbers of those in both the older and younger labor force are projected to drop.

Participation among women ages 25 to 44 is expected to exceed 80 percent in 1995, up from 70 percent in 1984 and 50 percent in 1970. The continuing increases reflect changes in marital status, educational attainment, fertility, and rising career aspirations. Participation among persons ages 55 and over is expected to be only 25 percent in 1995, down from 30 percent in 1984 and 39 percent in 1970. These persistent declines reflect increasing percentages of workers who are eligible for pensions and who select early retirement.

This article presents BLS' third look at the 1995 labor force.[1] Each look has resulted in lower 1995 labor force participation. The revisions reflect the more modest increases in female participation over the last several years, compared with the substantial increases during the 1970's. The change in historical trends occurred mostly among 20- to 34-year-old women and reflects the movement of the baby-boom generation through these ages.

The projections are presented by age, sex, and race for 1990 and 1995. They are based on the Bureau of Census middle population projection as well as BLS assumptions concerning future trends in labor force participation.[2]

The projection for each component of the middle growth scenario is based on past trends of labor force activity extended forward to 1995. These extrapolated trends, modified when necessary, are then applied to Census Bureau population levels for different groups.[3] (The methods for projecting the labor force and other components of BLS' economic growth model are described in part II.) Also discussed briefly are two scenarios (low and high growth) which illustrate the sensitivity of labor force trends to demographic assumptions such as male and female and

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black and white labor force participation rates converging over time. These alternative scenarios provide some insights into the range of uncertainty concerning the future size of the U.S. labor force. Finally, this article compares current projections with projections of the 1995 labor force published by BLS in 1980 and 1983.

Middle growth scenario

The labor force is projected to continue the slowdown in growth that began in the late 1970's. The largest growth, 3.3 percent or 3.2 million additional persons, occurred over the 1977–78 period. Over the 1980–84 period, the labor force grew by only 1.7 million persons per year. Over the 1984–85 period, the average increase is expected to be only 1.4 million persons per year—1.5 million during the 1984–90 period and 1.3 million during 1990–95.[4]

The change in labor force growth between the late 1970's and early 1980's reflected sharply lower population and participation growth rates during the early 1980's. The labor force trends over the last and next decade are dominated by the movement of the baby-boom generation from the ages of labor force entry into the prime working ages. The participation trends are affected by the aging of the baby-boom generation and by an increasing propensity of older workers to retire early.

Labor force trends are projected to continue to vary by age, sex, and race. (See table 1.) During the last 15 years, the prime age female labor force has consistently been the fastest growing group. While the growth for this group is expected to slow, it would still be one of the fastest growing elements in this latest projection. The 1970–80 trends reflected large increases in both population and participation; the 1980–84 trends reflect modest increases. In absolute numbers, the 1975–84 and projected 1984–95 increases in the prime age female labor force are nearly equal.

The youth labor force (ages 16 to 24) also grew rapidly during the 1970's; during the late 1980's and early 1990's, it is projected to decline in absolute numbers. This change reflects the movement of the baby-boom generation into and through this age group. The projected population declines will more than offset projected modest increases in participation for this age group.

The older labor force (those 55 years and over) expanded during the 1970's, began to contract in the 1980's, and is expected to continue declining. The decline reflects a slowing of the growth of the older population that began about 1980. In the 1970's, population growth more than offset participation decreases for this group; in the 1980's and 1990's, this is not expected to hold.

The prime age male labor force has grown steadily; it is

Table 1. Civilian labor force, by sex, age, and race, actual 1975–84 and middle growth projections to 1995

Group	Actual			Projected	
	1975	1980	1984	1990	1995
Total, 16 years and over (thousands)	93,775	106,940	113,544	122,653	129,168
Men	56,299	61,453	63,835	67,146	69,282
16 to 24	12,371	13,606	12,727	11,163	10,540
25 to 54	34,991	38,712	42,302	48,079	51,200
55 and over	8,938	9,135	8,805	7,904	7,542
Women	37,475	45,487	49,704	55,507	59,886
16 to 24	10,250	11,696	11,260	10,089	9,623
25 to 54	21,860	27,888	32,360	39,632	44,519
55 and over	5,365	5,904	6,084	5,786	5,744
White	82,831	93,600	98,492	105,467	110,086
Black	9,263	10,865	12,033	13,602	14,796
Total, 16 years and over (percent)	100.0	100.0	100.0	100.0	100.0
Men	60.0	57.5	56.2	54.7	53.6
16 to 24	13.2	12.7	11.2	9.1	8.2
25 to 54	37.3	36.2	37.3	39.2	39.6
55 and over	9.5	8.5	7.8	6.4	5.8
Women	40.0	42.5	43.8	45.3	46.4
16 to 24	10.9	10.9	9.9	8.2	7.4
25 to 54	23.3	26.1	28.5	32.3	34.5
55 and over	5.7	5.5	5.4	4.7	4.4
White	88.3	87.5	86.7	86.0	85.2
Black	9.9	10.2	10.6	11.1	11.5
	Average annual rate of change				
	1970–75	1975–80	1980–84	1984–90	1990–95
Total, 16 years and over	2.5	2.7	1.5	1.3	1.0
Men	1.9	1.8	1.0	.8	.6
16 to 24	4.9	1.9	−1.7	−2.2	−1.1
25 to 54	1.7	2.0	2.2	2.2	1.3
55 and over	− .8	.4	− .9	−1.8	− .9
Women	3.5	4.0	2.2	1.9	1.5
16 to 24	4.8	2.7	− .9	−1.8	− .9
25 to 54	3.7	5.0	3.8	3.4	2.4
55 and over	.6	1.9	.8	− .8	− .1
White	2.4	2.5	1.3	1.1	.9
Black	—	3.2	2.6	2.1	1.7

NOTE: Dash indicates data not available.

Table 2. Civilian noninstitutional population, by sex, age, and race, actual 1975–84 and projected to 1995

[Numbers in thousands]

Group	Actual			Projected	
	1975	1980	1984	1990	1995
Total, 16 years and over	153,153	167,745	176,383	186,655	193,817
Men	72,291	79,398	83,605	88,568	92,065
16 to 24	17,084	18,282	17,494	15,162	14,254
25 to 54	37,071	41,095	45,039	51,407	55,054
55 and over	18,138	20,021	21,073	21,999	22,757
Women	80,860	88,348	92,778	98,087	101,752
16 to 24	17,929	18,895	17,928	15,653	14,746
25 to 54	39,700	43,603	47,436	53,544	56,994
55 and over	23,231	25,850	27,413	28,890	30,012
White	134,790	146,122	152,347	105,467	164,860
Black	15,751	17,824	19,348	21,204	22,658
	Average annual rate of change				
	1970–75	1975–80	1980–84	1984–90	1990–95
Total, 16 years and over	2.2	1.8	1.3	0.9	0.8
Men	2.4	1.9	1.3	1.3	0.8
16 to 24	4.1	1.4	−1.1	−2.4	−1.2
25 to 54	2.0	2.1	2.3	2.2	1.4
55 and over	1.7	2.0	1.3	0.7	0.7
Women	2.1	1.8	1.2	1.0	0.7
16 to 24	2.5	1.1	−1.3	−2.2	−1.2
25 to 54	1.8	1.9	2.1	2.0	1.3
55 and over	2.5	2.2	1.5	0.9	0.8
White	2.0	1.6	1.0	0.8	0.6
Black	—	2.5	2.1	1.5	1.3

NOTE: Dash indicates data not available.

SOURCE: Data are based on Census Bureau "middle" projections of the population.

expected to continue doing so. Like the prime age female labor force, the increases for men over the next decade are projected to be the same size as the last decade's. Prime working age women are expected to account for more than one-third of the labor force in 1995. Because of the differing trends in participation by age, the prime age labor force share of the total labor force has been steadily increasing since 1975 and is expected to reach nearly 75 percent in 1995.

The black labor force has grown faster than the white labor force for the last two decades; this is expected to continue. Even so, blacks would still account for a modest share (about 12 percent) of the 1995 labor force. The black share of the additions to the labor force over the 1984–95 period paints a more dramatic picture; they are projected to account for almost 20 percent of the additions to the labor force.

The projected growth in the labor force reflects two important underlying factors—population and labor force participation. An examination of these factors reveals their contribution to future labor force growth.

Population projections

Past and future trends in the labor force are determined by the composition of population and by the proportion of the population working or seeking work (participation or activity rates) within each of the age, sex, and race groups. The labor force changes as the composition of the population changes because each group differs as to levels and trends of participation.

The population projections reflect trends in births, mortality, and net migration. Of the three, births have the greatest and most direct impact on the labor force, life expectancy the least. Past trends in births have a direct impact on the 1995 labor force; future births are important only as they affect women's and men's labor force participation.

Births have fluctuated in long cycles over the past century, reflecting different combinations of fertility rates and numbers of women in their childbearing years. There was a sharp increase in births with the end of World War II, but the highest level occurred in the 1950's. From 1954 through 1964, annual births exceeded 4 million. Between the late 1960's and the mid-1970's, births dropped, numbering only 3.2 million in 1975. Since then, births have been rising and are expected to peak in 1988 at 3.9 million. After that, the number of births is projected to drop, as the baby-boom generation moves past its peak childbearing years, even as the total fertility rate is assumed to continue increasing slightly. Following is the total fertility rate (births per woman), 1955–95:[5]

	Actual				*Projected*
	1955	*1965*	*1975*	*1982*	*1995*
White	3.4	2.8	1.7	1.8	1.9
Black	4.1	3.6	2.2	2.3	2.0

Because of the swings in births during the 1940–80 period, the 25- to 54-year-old population group will be the fastest growing component during the next decade; the 16- to 24-year-old population will decline. (See table 2.) Those born in 1957, the peak year for births, will be 38 years in 1995; those born in 1973, the trough year for births, will be 22 years.

Black birth rates are higher than those of whites. Thus, the black population is growing faster and has a younger median age than the white population. The younger population of blacks would have proportionately more labor force entrants.

Life expectancy changes affect mainly the number and sex composition of the older population. This, however, has only a modest effect on the labor force projections, given that older persons have relatively low levels of labor force participation. Following is the life expectancy at birth (in years) for men and women, 1955–95:[5]

	Actual				*Projected*
	1955	*1965*	*1975*	*1982*	*1995*
Men	66.7	66.8	68.8	70.6	72.3
Women	72.8	73.7	76.6	78.1	79.8

Migration will have an increasingly important impact on labor force growth during the next decade. The Census Bureau assumed that the yearly level of net migration during the next decade would be about the same as it has been recently. Following is the net migration (in thousands), 1955–95:[5]

	Actual				*Projected*
	1955	*1965*	*1975*	*1982*	*1995*
Total migration	373	449	480	450	387

However, net migration will account for about 25 percent of the additions to the total population, compared with about 20 percent during the 1970's and 13 percent during the 1960's. According to Vernon M. Briggs, Jr., "In the 1970's and early 1980's, the United States legally admitted twice as many immigrants in absolute numbers as did all of the remaining nations of the world combined."[6] Further, since World War II, more immigrants are women and most are in the prime working ages.[7]

Labor force participation

The second element in labor force projections is BLS' projections of labor force participation rates. Trends in participation are projected for 82 age, sex, and race or ethnic groups. These projections involve two steps. First, past trends in participation are extrapolated to 1995. Second, these extrapolated trends are modified when cross-sectional and cohort analysis show an inconsistency with the time-series analysis. The second step has a major impact on most projected trends.

Patterns of participation differ by age and sex. (See chart 1.) Male rates are higher than women's at all ages. Participation increases rapidly during the teens and early twenties. Participation for women peaks in their late twenties; for men, in their early thirties. While the gap between male and female participation has been diminishing, it is projected to continue at least through 1995. The past declines in male participation are expected to continue through 1995; past

Chart 1. Labor force participation rates of men and women aged 16 and over, 1975-95

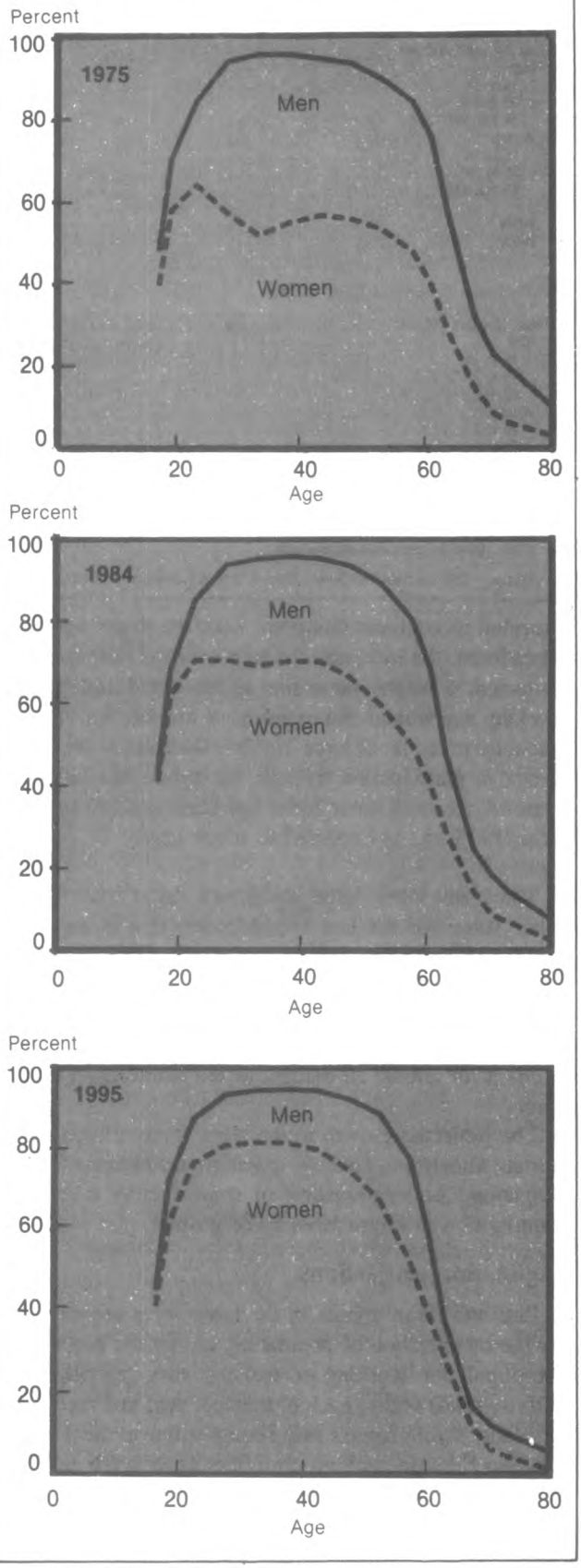

Table 3. Civilian labor force participation, by sex, age, and race, actual 1975–84 and middle growth projection to 1995

Group	Actual			Projected	
	1975	1980	1984	1990	1995
Total, 16 years and over	61.2	63.8	64.4	65.7	66.6
Men	77.9	77.4	76.4	75.8	75.3
16 to 24	72.4	74.4	72.8	73.6	73.9
25 to 54	94.4	94.2	93.9	93.5	93 0
55 and over	49.3	45.6	41.8	35.9	33.1
Women	46.3	51.5	53.6	56.6	58.9
16 to 24	57.2	61.9	62.8	64.5	65.3
25 to 54	55.1	64.0	68.2	74.0	78.1
55 and over	23.1	22.8	22.2	20.0	19.1
White	61.5	64.1	64.6	65.9	66.8
Black	58.8	61.0	62.2	64.1	65.3
	Average annual rate of change				
	1970–75	1975–80	1980–84	1984–90	1990–95
Total, 16 years	0.3	0.8	0.2	0.4	0.3
Men	−.5	−.1	−.4	.0	−.1
16 to 24	.8	.5	−.6	.2	.1
25 to 54	−.3	.0	−.1	−.1	−.1
55 and over	−2.4	−1.5	−2.2	−2.5	−1.6
Women	1.3	2.2	1.0	.9	.8
16 to 24	2.2	1.6	−.4	.4	.2
25 to 54	1.9	3.0	1.6	1.4	1.1
55 and over	−1.8	−.3	−.7	−1.7	−.9
White	.4	.8	.2	.3	.3
Black	—	.7	.5	.5	.4

NOTE: Dash indicates data not available.

increases in female participation are expected to continue, albeit at slower rates. (See table 3.)

White women. Participation of white women ages 20 to 29 increased rapidly during the early 1970's, but moderately during the late 1970's and early 1980's. (See table 4.) Moderate increases are projected to continue through 1995, as career aspirations and other factors, such as the use of child care facilities, continue to influence participation decisions of women.

The change from rapid to moderate participation reflects, in part, the passage of the baby-boom generation through their twenties. Those born in the late 1940's and early 1950's (the initial phase of the baby-boom generation) experienced a "marriage squeeze," a shortage of men 2 to 3 years older than themselves. Along with other factors, this squeeze increased the average age of women at marriage.[8] Because participation is much higher for single than for married women, the overall participation of women increased. (The squeeze had little effect on male rates because their participation varies little by marital status.) The marriage squeeze during the 1960's and early 1970's paralleled (and was a likely factor in) the declining fertility rates and increasing educational attainment among 20- to 29-year-old women. Since the mid-1970's, the marriage squeeze has lessened and should remain stable for at least the next decade. The population projections assume that fertility rates will increase slightly over the next decade.

Participation among white women ages 30 to 45 is expected to continue increasing rapidly during the next decade. These women, and their spouses, will have reached a point in their working lives when earnings no longer increase rapidly.[9] Thus, to maintain their living standard, they will have to increase their time in the labor force.[10] Some economists argue that because of the size of the baby-boom generation, its lifetime earnings will be depressed. If true, this would further encourage these women to contribute to family income through increased labor force activity.[11]

Data for the labor force participation rates of white women look very different, depending on whether one analyzes cohorts (generations) or cross-sectional patterns (the rate in a given calendar year for all labor force groups by age). For the entire post-World War II period, successive generations of white women have had greater labor force participation at the age of labor force entry. Furthermore, J. Gregory Robinson and Claudia Goldin report that rates for cohorts rise along with age until the participants reach their fifties.[12] A chart of the participation rate of several cohorts therefore would show an upward curve which levels off in the fifties and then declines; each successive cohort would have a higher curve (except for the 1940–44 and 1945–49 birth cohorts). Charts of the cross-sectional pattern, however, do not show this constant rise. Instead, they show a relative decline, or "valley," because participation rates appear to rise sharply through ages 25 to 29, then drop for ages 30 to 39, then rise again. The "valley" in the cross-sectional chart appears because the participation rate of women age 35 in 1975 was lower than the rate of women age 25 in that year. Note, however, that while the rate for women age 35 in 1975 is lower than the rate for 25-year-olds in 1975, it is not lower than the 1974 rate for the 25 year-old women who were born in 1949. (See chart 1.) It might also be noted that although this "valley" may be of interest, it has been disappearing in the cross-sectional data and this projection has it disappearing completely. Again, this reflects the interaction of two changes, lower growth in participation at the age of entry into the labor force and higher growth in participation in the prime working ages.

Black versus white women. In the 1960's and early 1970's, the participation of prime working age black women exceeded that of white women by as much as 15 percentage points for a few age groups. By 1984, white rates equaled or exceeded those of blacks in most age groups. To make this projection, it was necessary to consider whether participation of white women was likely to equal or exceed that of black women in the prime working age groups. Participation rates for black women have been projected to remain above those of whites at ages 30 to 64, but below those for whites at ages 25 to 29. A further assumption in the projections is that changes in family status would not result in labor force for black women being below those of white women.

The labor force participation rates of a few age groups of women are projected to increase by more than 1 percent

a year. The following tabulation shows the eight groups with the fastest participation growth projected for 1984–95:

Race	Age group	Projected growth per year
White women	25-34	1.4
White women	35-44	1.3
White women	45-54	1.1
Black women	35-44	1.0
Black women	45-54	.9
Black women	25-34	.9
Black women	20-24	.8
White women	18-19	.8

As noted earlier, the activity rates of men are expected to continue their slow descent. The rates of black men have been (and are projected to continue) declining most rapidly. Those of white men are expected to drop at a moderate pace.

Teenagers. Participation among most teenage groups declined over the past decade, but are expected to increase over the next decade. Teenage participation has been more cyclically responsive than other age groups. Teens have also faced considerable competition for jobs in the recent past; now that their numbers are falling, there should be relatively less competition. However, a greater proportion of the youth population is projected to be minority. To the extent that minorities live where there are fewer jobs, their participation or at least their chances of employment could be lower than one would expect, even if openings for youths exist elsewhere.

The absolute decline in the numbers of younger workers during the next decade may imply a labor shortage for some employers. Some employers of younger workers, particularly teenagers, are responding to this shortage either by hiring a different age mix of employees or by offering higher wages to continue attracting teenage employees.

Older persons. The participation rate of older workers is projected to drop substantially through 1995. Several factors lead to this projection. For those 65 and over, rates have dropped for the entire century. The drop for those 55 to 64 is a post-World War II phenomenon; there is no indication that this drop will end soon. A recent National Bureau of Economic Research study concludes that the largest expected gain from most pension plans is obtained by retiring as soon as a person is eligible.[13] As more people are covered by pension plans, labor force participation of older workers can be expected to drop.[14] They may start withdrawing funds

Table 4. Civilian labor force and participation rates by sex, age, and race, actual 1975–84 and middle growth projection for 1995

Group	Participation rate			Labor force (thousands)		
	Actual		Projected	Actual		Projected
	1975	1984	1995	1975	1984	1995
Total, 16 years and over	61.2	64.4	66.6	93,775	113,544	129,168
Men	77.9	76.4	75.3	56,299	63,835	69,282
16 to 19	59.1	56.0	57.9	4,805	4,134	3,750
20 to 24	84.5	85.0	87.3	7,565	8,594	6,790
25 to 34	95.3	94.4	93.7	14,192	18,488	18,247
35 to 44	95.6	95.4	94.3	10,398	14,037	19,232
45 to 54	92.1	91.2	90.4	10,401	9,776	13,721
55 to 64	75.6	68.5	62.6	7,023	7,050	6,119
65 and over	21.6	16.3	11.0	1,914	1,755	1,423
Women	46.3	53.6	58.9	37,475	49,704	59,886
16 to 19	49.1	51.8	51.2	4,065	3,809	3,307
20 to 24	64.1	70.4	76.3	6,185	7,451	6,316
25 to 34	54.9	69.8	81.1	8,673	14,234	16,168
35 to 44	55.8	70.1	80.5	6,505	10,896	16,943
45 to 54	54.6	62.9	71.3	6,683	7,230	11,408
55 to 64	40.9	41.7	42.7	4,323	4,911	4,695
65 and over	8.2	7.5	5.5	1.042	1,173	1,049
White	61.5	64.6	66.8	82,831	98,492	110,086
Men	78.7	77.1	75.8	50,324	56,062	59,894
16 to 24	74.4	75.0	77.0	10,931	10,977	9,051
25 to 54	95.1	94.8	94.0	31,225	37,067	44,062
55 and over	49.7	42.2	33.3	8,167	8,016	6,781
Women	45.9	53.3	58.4	32,508	42,431	50,192
16 to 24	59.0	65.5	68.3	8,988	9,706	8,175
25 to 54	54.3	68.0	78.0	18,732	27,378	37,090
55 and over	22.7	21.8	18.7	4,788	5,346	4,927
Black	58.8	62.2	65.8	9,263	12,033	14,796
Men	71.0	70.8	69.5	5,016	6,126	7,215
16 to 24	60.3	62.3	53.4	1,237	1,462	1,146
25 to 24	88.6	88.1	86.2	3,109	4,041	5,528
55 and over	44.7	36.2	29.5	670	623	541
Women	48.9	55.2	62.7	4,247	5,907	7,581
16 to 24	45.5	49.7	50.9	1,078	1,291	1,140
25 to 54	60.9	70.6	82.2	2,651	3,994	5,791
55 and over	26.2	25.4	23.4	517	621	650

from Individual Retirement Accounts (IRA's) at age 59½, which may also contribute to the trend in lower participation. Older people dominate the groups with rapidly declining labor force participation. Following are the eight groups with the most rapidly declining participation rates projected for 1984–95:

Race	*Age group*	*Projected decline per year*
Black men	65 and older	−5.4
White men	65 and over	−3.5
Black women	65 and over	−2.9
White women	65 and over	−2.6
Black men	60–64	−1.8
White men	60–64	−1.1
Black men	18–19	− .7
Black men	16–17	− .7

Implications of underlying assumptions

Prime working age workers (those 25 to 54) are projected to account for 74 percent of the 1995 labor force, compared with 66 percent in 1984 and 61 percent in 1970. Women would make up nearly 60 percent of the increase. Because of the drop in the numbers of younger and older workers, prime working age men would also be an increasing proportion of the labor force in the 1990's. This development should have a positive effect on labor productivity. The increase in relative size of the prime age male labor force comes about because of the more rapid drop in participation or population of other age groups, not because of a rise in prime age male participation. The rise in women's share results from the drop in younger and older workers, as well as from a rise in participation of women.

To pursue the age structure of the labor force further, the median age of the labor force peaked around 1960, affected by the rapid entry of the baby-boom generation into the labor force in the 1970's. By 1975, it had dropped sharply; the drop over the next 9 years has been more modest. Under the assumptions of the middle growth projection, the median age of the labor force would increase from 1984 through 1995. The 1995 labor force would be older than the 1975 labor force (have a greater median age). For the population as a whole, women are older than men; however, for the labor force, men have a greater median age. The difference in the median age of women and men in the labor force was 1½ years in 1955. This difference narrowed over the 1960's, but remains and is projected to continue. The white labor force was less than a year older than the black labor force in the mid-1970's, a difference that is projected to continue. Following is the median age of the labor force by sex and race, 1955–95:

	1955	*1965*	*1975*	*1984*	*1995*
Total	40.0	40.2	35.8	35.2	37.6
Men	40.5	40.3	36.5	35.4	37.9
Women	38.7	40.1	34.8	34.5	37.3
White	40.3	40.5	34.8	35.3	37.8
Black	—	—	34.1	33.5	36.3

By 1995, more of the total U.S. population, including children, is projected to be in the labor force than not in the labor force, as the economic dependency ratio shows. (The economic dependency ratio is defined as the number of persons not in the labor force, including those under age 16, per hundred persons in the labor force.) The numerator of the economic dependency ratio can be decomposed by age: those under 16, those 16 to 64, and those 65 and over. The following tabulation shows the economic dependency ratio, 1955–95:

	1955	*1965*	*1975*	*1984*	*1995*
Total	142.8	151.8	125.0	104.5	98.4
Under 16 years	74.9	81.3	61.1	47.9	46.1
16–64 years	51.4	50.6	43.4	34.9	28.2
65 years and over	16.4	19.9	20.5	21.7	24.0

The drop in the economic dependency ratio over the 1955–95 period in the 16–64 age group (from 51 persons per hundred workers to 28 per hundred) reflects the steady entry of women into the work force. The ratio for this age group has dropped by a third over the last 30 years. The ratio attributed to youth has also dropped by more than a third. In 1955, the youth ratio was high because of the baby-boom births; then it dropped with the entry of the baby-boom generation into the work force.

The dependency ratio attributed to older people has grown over the period, reflecting both the aging of the population and lower participation of older workers. By 1995, this group would account for a quarter of the ratio, up from a tenth in 1955. Although older people account for the smallest segment of the "dependent" population, their costs per person are three times that of the other groups.[15] Thus, a cost-weighted dependency ratio for older people would rise, and older persons would account for a larger portion of the overall ratio.

Women. The proportion of the labor force that is female increased from 40 percent in 1975 and 44 percent in 1984 and is projected to reach 46 percent by 1995. Although women are more than half the population 16 and older, they will not account for half of the labor force as long as their participation rates remain 10 percentage points lower than men of the same age.

Women do account for slightly more than half of the increment to the population 16 and older; during the early 1970's, when the baby-boom group was entering the labor force, each sex contributed to the labor force growth in proportion to their population growth. During the late 1970's as the entry of the baby-boom generation ended, women provided a greater share of the increment to the labor force. During the early 1980's, their share of labor force growth was more than 10 percentage points more than their addition to the population. In the late 1980's, as their participation growth slows, the percent of the increment should fall slightly, and continue falling in the early 1990's. The following

tabulation shows the percent of population and labor force growth attributed to women, 1970–95:

	1970–75	1975–80	1980–84	1984–90	1990–95
Labor force	53.9	60.9	63.9	63.7	61.3
Population	53.2	52.5	51.7	52.1	51.8
Difference	.5	8.4	12.2	11.5	9.5

Blacks. Blacks should account for a growing proportion of both the population and of the labor force between now and 1995. Their proportion of the population is expected to increase more than their proportion of the labor force. The population growth reflects higher fertility and, thus a younger population. This in itself partially explains why the proportion of blacks is higher in the population than in the labor force—more blacks than whites are too young to work. In addition, younger blacks of working age have substantially lower participation than other population groups. The combination of these two factors explains blacks' modest share of the labor force increment in the mid-1970's, a time when many youth were entering the labor force. While the proportion of growth attributed to women levels out after 1990, blacks should account for a growing proportion of the labor force after 1990, indicating their great importance in labor force developments as the century ends. The following tabulation shows the percent of population and labor force growth attributed to blacks, 1972–95:

	1972–75	1975–80	1980–84	1984–90	1990–95
Labor force	8.2	12.2	17.7	17.2	18.3
Population	13.6	14.2	17.8	18.6	20.1
Difference	− 5.4	− 2.0	− .1	− 1.4	− 1.8

Alternative scenarios

The projections reflect underlying assumptions; the results are significantly altered by changes in those assumptions. Different assumptions yield a 1995 labor force ranging from 124.4 million participants (low scenario) to 134.1 million (high scenario).[16] (See table 5.)

In the middle scenario, participation rates of women ages 20 to 29 are assumed to continue their 1977–84 trends over the 1984–95 period. During the late 1960's and 1970's, the participation for 20- to 29-year-old women steadily accelerated. Growth slowed in the mid-1970's, in part, because of the lessening of the marriage squeeze which also could cause the participation rates for these women to slow even more over the next decade. If this occurs, the 1995 labor force would be sharply lower than the middle scenario portrays (low scenario). Should the 1970's phenomena of accelerating growth recur during the next decade, the 1995 labor force would be sharply higher than the middle scenario (high scenario).

The high scenario presents a labor force with male and female rates nearly converging. This might be attained with a greater proportion of families with two wage earners and either a greater demand for child care facilities or the presence of fewer children than are implicit in the middle scenario. Or it might be achieved with a greater proportion of single heads of household and higher divorce rates, compared with the middle scenario. Either way, the high scenario implies substantially greater changes in the traditional family. Further, it assumes the activity rates of black men will increase, converging with those of whites, a sharp change in trends from the past.

The low scenario reflects both a sharp deceleration in the trends of the 1970's and a modest deceleration of the 1980–84 trend. This scenario represents a return to the growth pattern of the 1950's and early 1960's. While not a reversal of the growth in women's participation rates and related shifts in marital status, this scenario implies only modest growth.

A second assumption for the middle scenario concerns the relative trends in black-white participation. Over the last two decades, the rates for black and white women have been converging (toward the higher black rates), while the rates for black and white men have been diverging. The middle (and low) scenario assumes these respective trends will continue. The high scenario assumes that the rates for black men converges to the higher white male rates.

Previous BLS projections

The 1995 labor force projections described above are lower than those published in 1983, but higher than those published in 1980. (See table 6.)

The current projections are lower than the 1983 projections because they reflect the slowdown in the rate of growth

Table 5. Three scenarios of the civilian labor force and participation rates, by sex, age, and race, projections for 1995

Group	Participation rate			Labor force (thousands)		
	High	Middle	Low	High	Middle	Low
Total	69.2	66.6	64.2	134,085	129,168	124,411
Men	77.8	75.3	71.9	71,621	69,282	66,219
16 to 24 years	77.5	73.9	66.7	11,050	10,540	9,514
25 to 54 years	94.4	93.0	90.7	51,959	51,200	49,955
55 years and over	37.8	33.1	29.7	8,612	7,542	6,750
Women	61.4	58.9	57.2	62,464	59,886	58,192
16 to 24 years	68.6	65.3	64.4	10,112	9,623	9,495
25 to 54 years	81.2	78.1	75.7	46,292	44,519	43,132
55 years and over	20.2	19.1	18.5	6,060	5,744	5,565
White	69.0	66.8	64.5	113,761	110,086	106,327
Black	70.3	65.8	60.4	15,932	14,796	13,686

Table 6. Comparison of current and previous labor force middle growth projections for 1995

[Numbers in thousands]

Item	Projections made in			Difference between 1985 and previous projections			
				Number		Percent	
	1985	1983	1980	1983	1980	1983	1980
Labor force:							
Total	129,168	131,387	127,542	−2,219	1,626	−1.7	1.3
Men	69,282	69,970	67,611	−688	1,671	−1.0	2.5
Women	59,886	61,417	59,931	−1,531	−45	−2.5	− .1
Participation rate:							
Total	66.6	67.8	68.6	−1.2	−2.0	−1.8	−2.9
Men	75.3	76.1	76.8	−.8	−1.5	−1.1	−2.0
Women	58.6	60.3	61.2	−1.7	−2.6	−2.8	−4.2
Population:							
Total	193,817	193,833	186,034	−16	7,783	(1)	4.2
Men	92,065	91,947	88,031	118	4,034	.1	4.6
Women	101,752	101,886	98,003	−134	3,749	−.1	3.8

[1]Between −.1 and 0.0.

in women's participation which started in 1978 and continued through 1984. Much of the decrease in men's labor force participation occurred among older men whose participation is projected to continue to decrease. There were modest changes in the projected size of the population, reflecting the revision in mortality at the older ages. However, the revised population projections accounted for less than 1 percent of the overall change.

One reason the current and 1980 projections differ is because of revisions in the population projections, the result of the introduction of the population controls from the 1980 Census. Also, the difference between the current and the 1980 projected labor force reflects changes in labor force activity.

How accurate are these new projections? This question obviously cannot be answered until after 1995, but the accuracy of past BLS projections has been reviewed. Between 1965 and 1976, BLS published four projections of the 1980 labor force. Each underestimated the 1980 labor force by 1.7 to 2.9 percent. Most of the discrepancy was attributed to an underestimation of participation rates of women.[17]

THE LABOR FORCE WILL CONTINUE TO GROW, according to the middle growth scenario, although more slowly than in the recent past. Women's labor force participation would continue to grow slowly. Blacks would be a greater proportion of the labor force. By 1995, about three-quarters of the labor force would be in the 25- to 54-year-old age group, reflecting the aging of the baby-boom generation and the drop in participation by older workers. □

FOOTNOTES

[1]These projections replace those described by Howard N Fullerton, Jr. and John Tschetter in "The 1995 labor force: a second look," *Monthly Labor Review*, November 1983, pp. 3–10; and Howard N Fullerton, Jr., The 1995 labor force: a first look," *Monthly Labor Review*, December 1980, pp. 11–21.

[2]*Projections of the Population of the United States: 1983 to 2080, Current Population Reports*, Series P-25, No. 952 (Bureau of the Census, 1984).

[3]For a short description of the BLS demographic labor force projection methodology, see part II of this bulletin.

[4]The labor force (civilian labor force and resident Armed Forces) is projected to be 124,450,000 in 1990 and 130,965,000 in 1995. Of these, 55,698,000 in 1990 will be women and 60,462,000 in 1995 will be women. Because there is no age or race detail in the resident Armed Forces measure of the labor force, this article is based on the civilian labor force.

[5]Data are from the Census Bureau.

[6]Vernon M. Briggs, Jr., *Immigration Policy and the American Labor Force* (Baltimore, MD, The Johns Hopkins University Press, 1984), p. 1.

[7]Marion F. Houstoun, "Aliens in irregular status in the United States: a review of their numbers, characteristics, and role in the U.S. labor market," *International Migration*, 1983, pp. 372–414.

[8]Robert Schoen, "Measuring the Tightness of a Marriage Squeeze," *Demography*, February 1983, pp. 61–78. According to Schoen, "The marriage squeeze is shown to be capable of producing significant changes in both the level and distribution of marriage" (p. 61). Also see Kingsley Davis, "Wives and work: Consequences of the sex role revolution," *Population and Development Review*, September 1984, pp. 397–417; and Kingsley Davis and Peitronella van den Oever, "Demographic foundations of new sex roles," *Population and Development Review*, September 1982, pp. 495–511; Willard L. Rodgers and Arland Thornton, "Changing Patterns of First Marriage in the United States," *Demography*, May 1985, pp. 265–79; and Thomas J. Espenshade, "Marriage trends in America: Estimates, implications, and causes," *Population and Development Review*, June 1985, pp. 193–245.

[9]Valarie Kincade Oppenheimer, "The life-cycle squeeze: The interaction of men's occupational and family cycles," *Demography*, May 1974, pp. 227–45.

[10]Valarie Kincade Oppenheimer, "The Easterlin hypothesis: another aspect of the echo," *Population and Development Review*, September-December 1976, pp. 433–57.

[11]Richard Easterlin, "Relative economic status and the American fertility swing," in Eleanor Sheldon, ed., *Family Economic Behavior* (Philadelphia, PA, Lippincott, 1973); Richard Easterlin, *Birth and Fortune: The Impact of Numbers on Personal Welfare* (New York, Basic Books, 1980). Also, see Finis Welch, "Effects of Cohort Size on Earnings," *Journal of Political Economy*, October 1979, pp. 565–98; and Richard B. Freeman, "The Effect of Demographic Factors on Age-Earnings Profiles," *The Journal of Human Resources*, summer 1979, pp. 289–318.

[12]See J. Gregory Robinson, "Labor Force Participation Rates of Cohorts of Women in the United States: 1890–1979," presented at the 1980 Annual Meeting of the Population Association of America; and Claudia Goldin, "The Changing Economic Role of Women: A Quantitative Approach," *Journal of Interdisciplinary History*, spring 1983, pp. 707–33.

[13]David A. Wise, "Labor Aspects of Pension Plans," *NBER Reporter*, Winter 1984–85, pp. 23–25.

[14]Robert L. Clark, "Aging and labor force participation," in Pauline K. Robinson, Judy Livingston, and James E. Birren, eds., *Aging and Technological Advances* (New York, Plenum, 1985), pp. 39–54.

[15]Robert Clark and Joseph Spengler, "Dependency ratios: Their use in economic analysis," in Julian Simon and Julie Devanzo, eds., *Research in Population Economics, Vol. 2* (Greenwich, CT, JAI Press, 1980), pp. 63–67.

[16]BLS' alternative scenarios of gross national product, industry output, and employment trends and occupational requirements use the macro labor force model's projections of total labor force. This was done because the macro labor force is part of the macroeconometric model of the economic projections.

[17]See Howard N Fullerton, Jr., "How accurate were the 1980 labor force projections," *Monthly Labor Review*, July 1982, pp. 15–21.

A second look at industry output and employment trends through 1995

In new BLS projections, the shift of employment from manufacturing to services in coming years is more pronounced, but manufacturing output continues to be an important factor in GNP growth

VALERIE A. PERSONICK

New projections prepared by the Bureau of Labor Statistics show that, under a certain set of macroeconomic assumptions, total employment will reach almost 123 million in 1995, a gain of nearly 16 million jobs from 1984. Almost 9 out of every 10 of these new jobs will be added in a service-producing industry (transportation, communications, public utilities, trade, finance, insurance, real estate, miscellaneous services, and government). The remainder are projected to be goods-producing jobs (manufacturing, construction, mining, and agriculture).

One component of the broadly defined service-producing sector, the miscellaneous services sector (which includes business, personal, and medical services), will account for almost half of the 16 million new jobs. Growth in miscellaneous services between 1984 and 1995 is projected to be almost double the average rate of 1.3 percent for the economy as a whole. By 1995, this sector is expected to account for more than 1 out of every 4 jobs in the U.S. economy.

The Bureau has developed three alternative sets of economic and employment projections for the year 1995. The macroeconomic assumptions underlying these projections, which consist of a high-growth, moderate-growth, and low-growth scenario, are described by Bureau economist Betty Su on pp. 2—15. This article focuses on the employment and output of the middle projection, with the two alternatives described later.

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Overview

The business services industry is projected to have the most new jobs and the second-fastest rate of growth among the 149 industries studied.[1] The continued shift toward contracting out some firm operations and growth in demand for computer software and other types of modern business services are factors underlying this development.

Jobs in durable manufacturing industries are projected to rise by 1.5 million, but this gain will be partly offset by a 0.1 million decline in nondurable goods jobs. Employment in manufacturing is projected to just top 21 million by 1995, slightly below its 1979 peak.

Although manufacturing employment shows only modest growth between 1984 and 1995, the value of output in manufacturing is projected to rise rapidly. Under the assumptions of the moderate-growth scenario, the capital spending boom of 1984 will continue; exports of manufactured goods will grow rapidly after the current imbalances in international exchange rates equilibrate; and defense demand will continue strong at least through 1990. These factors spur production in manufacturing to a 3.0-percent yearly increase, compared to 2.9 percent for real GNP as a whole. The rise in manufacturing output without corresponding increases in employment occurs because of the projected faster rate of advance in productivity in this sector.

The projection of total employment of 122.8 million in 1995 represents growth averaging 1.5 percent a year from 1984 to 1990 and 1.0 percent during 1990–95. In the earlier years, there is still some residual recovery from the 1980–

82 recessionary period, but this is followed by a long-term slowdown in employment growth related to a decline in labor force growth. The deceleration of the labor force actually began in 1979, as the first members of the smaller birth cohort from the "baby bust" of the late 1960's reached working age. (Howard N Fullerton provides a complete discussion of this point in his article on pp. 16-24 of this bulletin.)

Of the 122.8 million employment level projected for 1995, 8.9 million workers are expected to be nonagricultural self-employed and unpaid family workers. The number of self-employed persons has been rising in recent years, especially during the cyclical downswing. When new hiring is tight, some people go into business for themselves or supplement their salaried jobs with side businesses. Most self-employed jobs are concentrated in trade or service industries. Despite the shrinking importance of the cyclical factor, the projected continued shift to service sector employment will contribute to the growth of self-employment—by increasing the demand for business and professional consultants, for example.

Overall, GNP is projected to expand by 3.0 percent a year to 1990, slowing to 2.8 percent between 1990 and 1995. A steady economy is assumed, with no business cycle fluctuations or major economic upheavals. The civilian unemployment rate is projected to drop from 7.5 percent in 1984 to 6.3 percent in 1990 and 6.0 percent in 1995.

Where will the new jobs be?

From 1959 to 1984, the U.S. economy added nearly 40 million jobs, one-half of them during the 1969–79 period. As has been well documented, service-producing industries, especially the other services sector, have absorbed ever increasing proportions of this rapidly expanding work force. Goods-producing industries, on the other hand, have declined in importance as employment sources, although they still contribute a sizable share to GNP. Manufacturing jobs were 25.1 percent of all jobs in 1959, but only 18.5 percent by 1984. (See table 1.) Other services, in contrast, accounted for 14.1 percent of total employment in 1959 and 22.4 percent in 1984. While manufacturing gained almost 3 million jobs over the 1959–84 period, this growth was dwarfed by the 14 million added in the other services sector.

However, simply looking at jobs somewhat overemphasizes the restructuring of the U.S. economy. In terms of output, the restructuring has been far more modest. (See table 2.) Manufacturing production represented 26.6 percent of private GNP in 1959, rose to a high of 29.7 percent during the peak of the Vietnam war buildup, and then tapered slowly to 25.7 percent by 1984. Overall, the manufacturing share of output dropped less than 1 percentage point over the 25-year span 1959–84, compared with a 6.6-percentage-point decline in its share of total jobs.

Other important employment shifts over the 25-year period included the shrinkage of the agricultural sector, with an absolute decline of 2.3 million jobs and a drop in share of total employment from 8.2 percent to 3.1 percent. Government jobs (Federal, State, and local) increased from less than 12 percent of total employment in 1959 to 15.7 percent in 1979. However, since then the public sector share of the total has fallen, although employment levels have not changed much.

Many of the shifts seen over the last 25 years are projected to continue to 1995. The employment shift to services is one of these, with jobs in industries such as business services, health care, professional services, and others accounting for 25.4 percent of all jobs by 1995. Similarly, government employment is projected to grow modestly in absolute levels but to decline as a share of total employment, continuing the trend started in the late 1970's. Chart 1 illustrates the relative employment growth of some of the major sectors.

Business services. The business services industry is projected to lead all others in numbers of new jobs and to rank second in terms of rate of employment growth. (See table 3.) This is the case despite the relatively small size of the industry compared to some others, such as retail trade, eating and drinking places, wholesale trade, and new construction. Each of these other industries had more employment than business services in 1984—in fact, retail trade was almost three times as large—but they will add smaller numbers of new jobs through 1995 than business services. More than 2.6 million new business service jobs are projected to be added to 1984's level of 4.6 million, an annual growth rate of 4.2 percent. Table 4 shows employment projections for detailed business service industries.

The expansion of the business services industry has been tremendous over the past few decades, with real output increasing fivefold over the past 20 years and employment quadrupling. Growth has been spurred by a combination of factors. First, many new types of services have now become integral parts of modern business operations. The computer and other technological advances have led to demand for programming and software services and for a whole range of consulting and management services. Security services have become widespread as organizations attempt to curb high insurance premiums and uninsured losses. Requirements for temporary help have expanded beyond clerical jobs to include technical and professional occupations. These and other new types of services have been introduced or have expanded in recent years and are now necessary in the operations of many firms.

Second, firms have found it more efficient to contract out many of these services rather than rely on in-house staff. An outside contractor can maintain a large specialized staff and enjoy economies of scale not possible for each individual firm. For permanent operations, such as security or janitorial services, overhead and management expenses are reduced by contracting out,[2] and for one-time or infrequent

Table 1. Employment by major sector, 1959–95

Economic sector	Employment (in thousands)[1]									
	Actual				Projected					
					1990			1995		
	1959	1969	1979	1984	Low	Moderate	High	Low	Moderate	High
Total	67,784	81,508	101,471	106,841	112,797	116,865	119,020	117,268	122,760	127,719
Agriculture	5,583	3,622	3,340	3,293	3,125	3,164	3,201	2,971	3,059	3,128
Nonagriculture	62,201	77,886	98,131	103,548	109,672	113,701	115,819	114,297	119,700	124,591
Government (including enterprises)	8,083	12,195	15,947	15,984	16,465	16,596	16,795	16,820	17,144	17,592
Federal	2,233	2,758	2,773	2,807	2,790	2,790	2,790	2,800	2,800	2,800
State and local	5,850	9,437	13,174	13,177	13,675	13,806	14,005	14,020	14,344	14,792
Private	54,118	65,691	82,184	87,564	93,207	97,105	99,024	97,477	102,556	106,999
Mining	614	501	704	651	633	659	676	600	631	661
Construction	3,910	4,374	5,879	5,920	5,910	6,189	6,276	6,331	6,636	6,856
Manufacturing	17,018	20,467	21,401	19,779	20,063	20,913	21,320	20,089	21,124	22,037
Durable	9,582	12,080	12,985	11,744	12,349	12,872	13,122	12,568	13,216	13,788
Nondurable	7,436	8,387	8,416	8,035	7,714	8,041	8,198	7,521	7,908	8,249
Transportation, communications, and public utilities[2]	4,255	4,637	5,414	5,500	5,726	5,957	6,065	5,996	6,304	6,586
Trade	13,492	16,671	22,311	24,290	25,991	27,106	27,706	26,848	28,272	29,545
Finance, insurance, and real estate	2,959	3,859	5,514	6,296	6,699	6,991	7,146	7,024	7,397	7,716
Services	9,591	13,326	19,635	23,886	27,080	28,142	28,662	29,607	31,170	32,537
Private households	2,279	1,856	1,326	1,242	1,106	1,148	1,174	982	1,023	1,060
	Percent distribution									
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture	8.2	4.4	3.3	3.1	2.8	2.7	2.7	2.5	2.5	2.4
Nonagriculture	91.8	95.6	96.7	96.9	97.2	97.3	97.3	97.5	97.5	97.6
Government (including enterprises)	11.9	15.0	15.7	15.0	14.6	14.2	14.1	14.3	14.0	13.8
Federal	3.3	3.4	2.7	2.6	2.5	2.4	2.3	2.4	2.3	2.2
State and local	8.6	11.6	13.0	12.3	12.1	11.8	11.8	12.0	11.7	11.6
Private	79.8	80.6	81.0	82.0	82.6	83.1	83.2	83.1	83.5	83.8
Mining	.9	.6	.7	.6	.6	.6	.6	.5	.5	.5
Construction	5.8	5.4	5.8	5.5	5.2	5.3	5.3	5.4	5.4	5.4
Manufacturing	25.1	25.1	21.1	18.5	17.8	17.9	17.9	17.1	17.2	17.3
Durable	14.1	14.8	12.8	11.0	10.9	11.0	11.0	10.7	10.8	10.8
Nondurable	11.0	10.3	8.3	7.5	6.8	6.9	6.9	6.4	6.4	6.5
Transportation, communications, and public utilities[2]	6.3	5.7	5.3	5.1	5.1	5.1	5.1	5.1	5.1	5.2
Trade	19.9	20.5	22.0	22.7	23.0	23.2	23.3	22.9	23.0	23.1
Finance, insurance, and real estate	4.4	4.7	5.4	5.9	5.9	6.0	6.0	6.0	6.0	6.0
Services	14.1	16.3	19.4	22.4	24.0	24.1	24.1	25.2	25.4	25.5
Private households	3.4	2.3	1.3	1.2	1.0	1.0	1.0	.8	.8	.8
	Average annual rate of change									
	1959–69	1969–79	1979–84	1984–90			1990–95			1984–95		
				Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Total	1.9	2.2	1.0	0.9	1.5	1.8	0.8	1.0	1.4	0.9	1.3	1.6
Agriculture	−4.2	− .8	− .3	− .9	− .7	− .5	−1.0	− .7	− .5	− .9	− .7	− .5
Nonagriculture	2.3	2.3	1.1	1.0	1.6	1.9	.8	1.0	1.5	.9	1.3	1.7
Government (including enterprises)	4.2	2.7	.0	.5	.6	.8	.4	.7	.9	.5	.6	.9
Federal	2.1	.1	.2	− .1	− .1	.1	.1	.1	.1	.0	.0	.0
State and local	4.9	3.4	.0	.6	.8	1.0	.5	.8	1.1	.6	.8	1.1
Private	2.0	2.3	1.3	1.0	1.7	2.1	.9	1.1	1.6	1.0	1.4	1.8
Mining	−2.0	3.5	−1.6	− .5	.2	.6	−1.0	− .9	− .4	− .7	− .3	.1
Construction	1.1	3.0	.1	.0	.7	1.0	1.4	1.4	1.8	.6	1.0	1.3
Manufacturing	1.9	.4	−1.6	.2	.9	1.3	.0	.2	.7	.1	.6	1.0
Durable	2.3	.7	−2.0	.8	1.5	1.9	.4	.5	1.0	.6	1.1	1.5
Nondurable	1.2	.0	− .9	− .7	.0	.3	− .5	− .3	.1	− .6	− .1	.2
Transportation, communications, and public utilities[2]	.9	1.6	.3	.7	1.3	1.6	.9	1.1	1.7	.8	1.2	1.7
Trade	2.1	3.0	1.7	1.1	1.8	2.2	.7	.8	1.3	.9	1.4	1.8
Finance, insurance, and real estate	2.7	3.6	2.7	1.0	1.8	2.1	1.0	1.1	1.5	1.0	1.5	1.9
Services	3.3	4.0	4.0	2.1	2.8	3.1	1.8	2.1	2.6	2.0	2.4	2.8
Private households	−2.0	−3.3	−1.3	−1.9	−1.3	− .9	−2.4	−2.3	−2.0	−2.1	−1.7	−1.4

[1]Includes wage and salary jobs, the self-employed, and unpaid family workers.

[2]Does not match detail in table 7 because these estimates exclude public electric utilities.

operations, it is often quicker and cheaper to hire outside expertise than to develop it in-house. Contracting out for the proliferating new services required in today's economy has strongly spurred employment growth in the business services industry.

The future of the industry depends on the same types of trends: new operations coming into importance and being performed by specialized firms. However, demand for some types of contract business services may be approaching saturation, and growth for these is, as a consequence, projected to be more modest than for the industry as a whole. Examples include detective and protective services and services to buildings. Employment will continue to expand faster in these areas than in most other sectors of the econ-

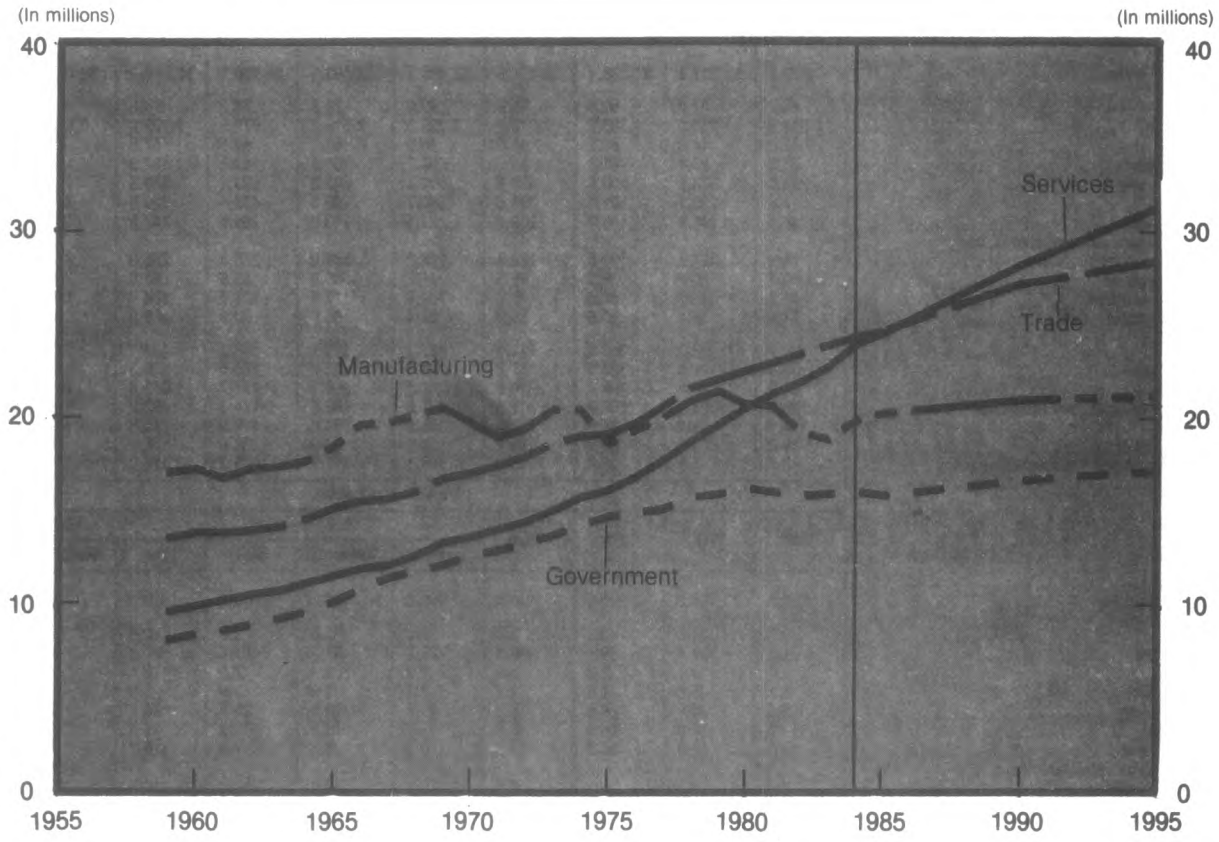
Table 2. Gross product originating by major sector, 1959–95

Economic sector	Billions of 1977 dollars									
	Actual				Projected					
					1990			1995		
	1959	1969	1979	1984	Low	Moderate	High	Low	Moderate	High
Total private	$879.3	$1,333.8	$1,860.4	$2,077.9	$2,465.3	$2,593.5	$2,756.1	$2,776.4	$3,005.1	$3,312.4
Agriculture	44.7	47.8	56.8	65.9	70.0	73.8	78.2	73.5	80.7	88.5
Nonagriculture	834.6	1,286.0	1,803.6	2,012.0	2,395.3	2,519.7	2,677.9	2,702.9	2,924.4	3,223.9
Mining	32.7	44.8	51.2	55.0	56.3	60.1	64.5	57.5	64.8	72.6
Construction	71.3	87.4	91.3	85.7	97.7	100.6	103.5	107.3	113.3	118.2
Manufacturing	233.7	378.2	500.8	533.9	608.3	643.5	693.3	669.3	738.6	827.4
Durable	137.6	232.1	304.5	324.5	380.7	403.5	437.4	426.5	472.3	532.2
Nondurable	96.1	146.1	196.3	209.4	227.6	240.0	255.9	242.8	266.3	295.2
Transportation, communications, and public utilities	76.9	127.9	190.0	202.8	248.2	260.0	278.4	286.3	310.5	341.0
Transportation	41.7	60.5	78.5	69.8	77.2	80.9	85.8	83.6	90.6	99.0
Communications	13.6	28.3	58.0	75.0	107.6	112.6	121.7	134.7	145.8	160.6
Public utilities	21.6	39.1	53.5	58.0	63.4	66.5	70.9	68.0	74.1	81.4
Trade	160.7	242.3	350.2	411.6	457.2	476.1	506.2	494.1	532.3	584.0
Wholesale	60.6	101.8	153.5	187.0	205.7	215.6	228.5	220.5	240.4	263.6
Retail	100.1	140.5	196.7	224.6	251.5	260.5	277.7	273.6	291.9	320.4
Finance, insurance, and real estate	129.3	200.5	300.9	347.8	427.5	442.6	474.1	493.2	523.1	576.8
Services[1]	116.7	179.0	264.0	315.5	378.9	394.6	418.0	430.8	461.9	503.7
Government enterprises	16.0	22.9	28.8	29.4	33.1	34.5	36.6	36.2	38.8	42.6
Rest of world and statistical discrepancy	−2.7	3.0	26.4	30.3	88.1	107.7	103.3	128.2	141.1	157.6
	Percent distribution									
	1959	1969	1979	1984	1990			1995		
					Low	Moderate	High	Low	Moderate	High
Total private	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture	5.1	3.6	3.1	3.2	2.8	2.8	2.8	2.6	2.6	2.7
Nonagriculture	94.9	96.4	96.9	96.8	97.2	97.2	97.2	97.4	97.4	97.3
Mining	3.7	3.4	2.8	2.6	2.3	2.3	2.3	2.1	2.2	2.2
Construction	8.1	6.6	4.9	4.1	4.0	3.9	3.8	3.9	3.8	3.6
Manufacturing	26.6	28.4	26.9	25.7	24.7	24.8	25.2	24.1	24.6	25.0
Durable	15.6	17.4	16.4	15.6	15.4	15.6	15.9	15.4	15.7	16.1
Nondurable	10.9	11.0	10.6	10.1	9.2	9.3	9.3	8.7	8.9	8.9
Transportation, communications, and public utilities	8.7	9.6	10.2	9.8	10.1	10.0	10.1	10.3	10.3	10.3
Transportation	4.7	4.5	4.2	3.4	3.1	3.1	3.1	3.0	3.0	3.0
Communications	1.5	2.1	3.1	3.6	4.4	4.3	4.4	4.9	4.8	4.8
Public utilities	2.5	2.9	2.9	2.8	2.6	2.6	2.6	2.4	2.5	2.5
Trade	18.3	18.2	18.8	19.8	18.5	18.4	18.4	17.8	17.7	17.6
Wholesale	6.9	7.6	8.3	9.0	8.3	8.3	8.3	7.9	8.0	8.0
Retail	11.4	10.5	10.6	10.8	10.2	10.0	10.1	9.9	9.7	9.7
Finance, insurance, and real estate	14.7	15.0	16.2	16.7	17.3	17.1	17.2	17.8	17.4	17.4
Services[1]	13.3	13.4	14.2	15.2	15.4	15.2	15.2	15.5	15.4	15.2
Government enterprises	1.8	1.7	1.5	1.4	1.3	1.3	1.3	1.3	1.3	1.3
Rest of world and statistical discrepancy	−.3	.2	1.4	1.5	3.6	4.2	3.7	4.6	4.7	4.8
	Average annual rate of change									
	1959–69	1969–79	1979–84	1984–90			1990–95			1984–95		
				Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Total private	4.3	3.4	2.2	2.9	3.8	4.8	2.4	3.0	3.7	2.7	3.4	4.3
Agriculture	.7	1.7	3.0	1.0	1.9	2.9	1.0	1.8	2.5	1.1	1.8	2.7
Nonagriculture	4.4	3.4	2.2	2.9	3.8	4.9	2.4	3.0	3.8	2.7	3.5	4.4
Mining	3.2	1.3	1.4	.4	1.5	2.7	.4	1.5	2.4	.4	1.5	2.6
Construction	2.1	.4	−1.3	2.2	2.7	3.2	1.9	2.4	2.7	2.1	2.6	3.0
Manufacturing	4.9	2.8	1.3	2.2	3.2	4.5	1.9	2.8	3.6	2.1	3.0	4.1
Durable	5.4	2.8	1.3	2.7	3.7	5.1	2.3	3.2	4.0	2.5	3.5	4.6
Nondurable	4.3	3.0	1.3	1.4	2.3	3.4	1.3	2.1	2.9	1.4	2.2	3.2
Transportation, communications, and public utilities	5.2	4.0	1.3	3.4	4.2	5.4	2.9	3.6	4.1	3.2	3.9	4.8
Transportation	3.8	2.6	−2.3	1.7	2.5	3.5	1.6	2.3	2.9	1.6	2.4	3.2
Communications	7.6	7.4	5.3	6.2	7.0	8.4	4.6	5.3	5.7	5.5	6.2	7.1
Public utilities	6.1	3.2	1.6	1.5	2.3	3.4	1.4	2.2	2.8	1.5	2.3	3.1
Trade	4.2	3.8	3.3	1.8	2.5	3.5	1.6	2.3	2.9	1.7	2.4	3.2
Wholesale	5.3	4.2	4.0	1.6	2.4	3.4	1.4	2.2	2.9	1.5	2.3	3.2
Retail	3.4	3.4	2.7	1.9	2.5	3.6	1.7	2.3	2.9	1.8	2.4	3.3
Finance, insurance, and real estate	4.5	4.1	2.9	3.5	4.1	5.3	2.9	3.4	4.0	3.2	3.8	4.7
Services[1]	4.4	4.0	3.6	3.1	3.8	4.8	2.6	3.2	3.8	2.9	3.5	4.3
Government enterprises	3.7	2.3	.4	2.0	2.7	3.7	1.8	2.4	3.1	1.9	2.6	3.4
Rest of world and statistical discrepancy	([2])	24.3	2.8	19.5	23.5	22.7	7.8	5.6	8.8	14.0	15.0	16.2

[1]Includes private households.

[2]Estimate cannot be calculated.

Chart 1. Total employment in selected major economic sectors, 1959-84, and projected, 1985-95



omy, but because of saturation and the slowdown in new nonresidential construction, growth is expected to be slower than during the 1970's and early 1980's.

A component of business services that appears to be far from saturation is computer and data processing services. According to many industry experts, all signs point to continued explosive employment growth for this industry. At 8.4 percent a year, it is projected to be the fastest growing of all 378 3-digit[3] industries in the economy.

Most of the growth within the computer and data processing industry will likely be in programming and software services. The investment boom in high technology products such as computer-assisted manufacturing and robotic production techniques projected to occur over the next decade will require significant increases in new software development, especially in high-level programming languages. Availability of new and cheaper computer hardware will also stimulate demand from small businesses and private consumers for new software, including "packaged" software. As a result, demand for programming services is projected to be very high through the next decade.

Employment in the data processing portion of the computer services industry will also increase, but much less rapidly than jobs in programming and software services. Hardware developments have allowed more on-site processing, and repetitive data processing tasks generally require less highly specialized skills than programming and software services. These developments in new hardware and software now permit a firm's own nontechnical personnel to perform routine processing.

The temporary help industry is another business service with potential for rapid growth. Firms have become more successful in using temporary help to meet peak workloads and to weather business cycle swings without having to hire or fire permanent employees. Also, more workers may be willing to work as temporaries in coming years because of the opportunities for flexible scheduling and for part-time employment. Between 1978 and 1983, employment in temporary help agencies grew a rapid 6.6 percent a year, and in 1984 alone, the job level increased another third. The use of temporaries is expected to increase 5.0 percent a year between 1984 and 1995, faster than the 4.2-percent rate projected for business services as a whole.

The management and public relations industry is another

category that is projected to grow faster than the average for all business services. Included in this area are firms that manage all the business and financial operations for other organizations (such as doctors' offices). Also included are consulting services (except engineering, computer, or laboratory research), public relations services, lobbying, and sales promotion. Consulting services have been increasingly contracted for as rapidly changing technology requires the use of highly skilled specialists.

Professional services. A closely related area, the professional services industry, also ranks among the top six in terms of rate of employment growth and number of new jobs added between 1984 and 1995. (See table 3.) Included in this industry are legal services, engineering services, and accounting, auditing, and bookkeeping services. (See table 4.) Growth has occurred in this industry for many of the same reasons cited earlier for business services. Increased demand (such as from increased litigation), and contracting out for specialized professional services has led to 4.4-percent annual growth in employment and 4.9-percent increase in output over the 1959–84 period. Growth is projected to continue strong through the 1990's, averaging 3.5 percent for employment and 4.1 percent for output. More than 1 million new jobs are projected to be added by 1995, bringing employment in the professional services sector to 3.3 million.

Trade. The three trade industries fill out the list of the top four industries in terms of numbers of new jobs to be added between 1984 and 1995. Employment in wholesale and retail trade and in eating and drinking establishments is projected to grow by 4 million, to more than 28 million, by 1995. However, the rate of job growth, at 1.4 percent a year, is just slightly faster than that for the economy as a whole.

The real output of eating and drinking places rose rapidly over the past decade as more women entered the labor force and as the large population of young people boosted the popularity of fast-food establishments. Employment increases in eating and drinking places represented more than 10 percent of all jobs created in the economy between 1969 and 1979, and more than 16 percent of new jobs between 1979 and 1984. Demand for meals away from home is expected to taper in the next decade as the rate of growth of total disposable income slows, although there will still be opportunities for employment gains as an older population shifts its demand toward more labor-intensive "sit-down" restaurants. Employment in eating and drinking places is projected to rise by 1.2 million, to 6.9 million, by 1995, accounting for only about 7.6 percent of all new jobs.

Other retail establishments showing projected large job gains include grocery stores and department stores, with each group growing faster than total retail trade employment as a whole. Table 5 shows employment in some of the key types of wholesale and retail establishments. Miscellaneous shopping goods stores (such as those selling jewelry, books, cameras, and sporting goods) are projected to grow quite a bit faster than the average for all retail stores. Gasoline service stations, on the other hand, are expected to have virtually no increase in jobs. Retail trade components projected to show absolute employment declines include variety stores, miscellaneous general merchandise stores, motorcycle dealers, fuel and ice dealers, household appliance stores, and furriers and fur shops. Many of the items formerly carried exclusively by these establishments now are being sold in department stores or in other types of retail stores.

Part of the anticipated rise in retail employment can be attributed to an increasing number of part-time jobs. In 1984, the workweek averaged 32.8 hours in retail stores and only 27.1 hours in eating and drinking places, compared to an average of more than 40 hours in manufacturing. The projections show the trend toward more part-time employment continuing: weekly hours in 1995 average 31.7 in retail trade stores and 26.2 in eating and drinking establishments.

In wholesale trade, which is projected to add more than

Table 3. Projected changes in employment[1] for selected industries, 1984–95

Most new jobs	Employment gain (in thousands)
Business services	2,633
Retail trade, except eating and drinking places	1,691
Eating and drinking places	1,203
Wholesale trade	1,088
Medical services, n.e.c.	1,065
Professional services, n.e.c.	1,040
New construction	558
Doctors' and dentists' services	540
Hotels and lodging places	385
Credit agencies and financial brokers	382
Fastest growing	**Average annual rate of change (percent)**
Medical services, n.e.c.	4.3
Business services	4.2
Computers and peripheral equipment	3.7
Materials handling equipment	3.7
Transportation services	3.5
Professional services, n.e.c.	3.5
Scientific and controlling instruments	2.9
Medical instruments and supplies	2.8
Doctors' and dentists' services	2.6
Plastics products	2.5
Most rapidly declining	**Average annual rate of change (percent)**
Cotton	−4.2
Wooden containers	−3.6
Leather products including footwear	−2.8
Iron and ferroalloy ores mining	−2.7
Sugar	−2.7
Leather tanning and finishing	−2.6
Railroad transportation	−2.6
Nonferrous metal ores mining, except copper	−2.6
Dairy products	−2.3
Blast furnaces and basic steel products	−2.2

[1]Includes wage and salary jobs, the self-employed, and unpaid family workers.
n.e.c. = not elsewhere classified.

1 million jobs, a large part of the gain will be among machinery and equipment wholesalers. This reflects both the initial large size of this industry and increased sales of durable investment goods related to new capital spending. Other wholesalers projected to enjoy rapid employment growth are suppliers of sporting goods, paper and paper products, metals and minerals, and motor vehicles and auto equipment.

Health care. Medical care industries have been very important in contributing to employment growth in the past. Jobs in doctors' and dentists' offices rose by more than 1 million between 1959 and 1984. Hospitals added more than 2 million new jobs, while other medical services (such as nursing homes, outpatient facilities, and rehabilitation centers) increased employment by 1.5 million. In terms of rates of job growth, other medical services was first among the three health care industries, and, in fact, led all other industries in the economy between 1959 and 1984. While total private employment over this period was increasing at an annual pace of 1.7 percent, other medical services posted a 7.3-percent growth rate, hospitals, 4.6 percent, and doctors' and dentists' offices, 3.8 percent. Employment in all health care sectors combined accounted for almost 1 out of every 9 new jobs added to the economy between 1959 and 1984, and almost 1 out of every 5 over the 1979–84 period.

The value of output in health care has also risen dramatically. Despite price increases that have been much higher than the average for the economy as a whole, the real value of output of hospitals averaged a 6.4-percent annual gain for the 1959–84 period, compared to 3.0 for GNP. The real value of other medical services expanded by 6.6 percent a year, and output in doctors' and dentists' offices posted a 4.6-percent annual gain. By 1984, health care expenditures in real terms were about 6 percent of GNP (10 percent in current dollar terms).

In the last few years, however, new cost-containment measures, especially for hospitals, have altered this expansionary trend. The Federal Government has imposed strict limits on hospital reimbursements made under medicare, and private insurers are following the lead with other cost-saving restrictions. According to the American Hospital Association, the average length of stay in a community hospital dropped from 7.2 days in 1980 to a record low of 6.7 days in 1984. Hospital employment actually decreased in 1984, the only such occurrence since BLS estimates for the industry were first published in 1958.

Part of the cutback in hospital care is being taken up by doctors' offices and other medical facilities, such as nursing homes, emergency treatment centers, and home health services. This is possible, in part, because some procedures that used to require a hospital stay can now be performed in alternative settings. The shift has been encouraged by public and private health insurers because hospitals are generally more capital-intensive and have higher overhead costs than some other types of health care establishments.

Cost-containment measures are expected to restrict the expansion of the health care industries over the next decade, despite increased demand generated by an aging population and by advances in medical technology. Hospital employment is projected to grow only 0.7 percent a year through 1995; doctors' and dentists' services, by 2.6 percent; and other medical services, by 4.3 percent. All rates are considerably slower than historical trends, although other medical services still ranks number one among all the industries in the economy in terms of projected growth. New health care jobs number 1.9 million over the next 11 years in the BLS projections, about 1 out of every 9 new jobs.

Outlook for other service-producing industries

Noncommercial sector. Another large employment industry is the noncommercial (or nonprofit) sector. Included in this industry are social services (such as nonprofit counseling centers, disaster relief, or the Salvation Army), community action agencies, fund-raising organizations, senior citizens' associations, museums, and membership organizations (such as labor unions or business, political, or religious groups). Employment in these noncommercial and membership organizations—2.2 million in 1984—is projected to grow to 2.5 million by 1995, or at a pace just about in line with the average for the economy as a whole.

Amusements. A field projected to grow almost twice as fast as the economy as a whole is amusement and recreation services. This industry is expected to continue to enjoy the effects of increased spending on leisure-time activities and the current popularity of health and fitness clubs. Personal consumption expenditures on amusement and recreation services are projected to grow by 4.5 percent a year between 1984 and 1995, compared to 2.8 percent for all consumer spending. Employment is projected to rise from 869,000 in 1984 to more than 1.1 million by 1995.

Financial services. The demand for banking and credit services is expected to be very high over the next 10 years. Deregulation in the industry, the projected capital spending boom, and the introduction of many new services will spur demand. It is also assumed that problems related to the recent uneven performance of several large U.S. banks due to heavy debt losses and to the uncertainty surrounding the huge loan balances of developing countries will be resolved. Industry losses in 1984 were linked primarily to those bank customers whose asset values fell because of the slower inflation rate, such as energy investors, real estate developers, home buyers, and farmers.

Despite high demand for financial services, employment in banking and credit agencies is projected to rise at a much slower pace than in the past. Jobs in banking and credit agencies combined expanded by more than 4 percent a year over the 1959–84 period, and for credit agencies alone, that

rate accelerated to 6.6 percent during the most recent 4-year span. Future job gains will be limited by consolidation of financial services and by advances in automatic banking. A total of 569,000 jobs are projected to be added in the two financial industries.

Employment in the insurance industry is also not expected to keep up with historical rates of growth. This industry, too, is becoming more concentrated and more automated. Functions once performed only by underwriters can now be computerized, cutting paperflow and allowing clerical personnel to prepare rate quotes. Industry job gains are projected to average 1.5 percent a year between 1984 and 1995, compared with 2.0 percent between 1959 and 1984.

Distribution services. Deregulation has also had, and will continue to have, a big impact in some of the transportation industries, in particular trucking and airlines. The output of the trucking industry is expected to grow along with the expanding economy. Employment will also increase in line with past trends, but more of it will consist of self-employed truckers rather than wage and salary workers. Air transportation employment is projected to have a much slower rate of growth than in the past, as a shakeout in the industry continues. On the other hand, the transportation services industry (mostly travel agencies) will be one of the top 10 employment growth sectors. The business of making travel arrangements is increasingly being shifted from the airlines to independent travel agents, in response to the complexity of the new rates and conditions of purchase arising from increased airline competition.

Table 4. Employment growth in selected business and professional services, 1978–95

Industry	1984 employment (in thousands)	Average annual rate of growth		
		1978–83	1983–84	Projected, 1984–95
Total, all industries[1]	106,841	0.8	4.2	1.3
Business services[1]	4,612	7.1	13.5	4.2
Wage and salary jobs	4,059	6.2	13.5	4.3
Credit reporting and collection	80	−.8	6.0	1.6
Mailing, reproduction, and stenographic	166	6.9	13.4	4.1
Services to buildings	609	4.0	8.9	4.0
Personnel supply services	828	6.8	30.5	4.7
Employment agencies	160	6.2	22.2	3.8
Temporary help	631	6.6	33.7	5.0
Personnel supply, n.e.c.	37	12.2	17.8	4.3
Computer and data processing services	474	12.7	13.9	8.4
Programming and software	163	20.3	18.5	10.6
Data processing	232	7.8	8.4	5.5
Computer-related services, n.e.c.	78	20.3	22.3	10.6
Miscellaneous business services	1,728	5.4	11.3	3.3
Research and development labs	193	3.9	9.8	2.0
Management and public relations	458	8.0	13.6	4.8
Detective and protective services	394	5.0	8.8	2.8
Equipment rental and leasing	158	6.5	15.6	3.0
Photofinishing labs	78	3.8	.9	1.5
Miscellaneous business services, n.e.c.	447	4.9	12.3	3.3
Professional services[1]	2,295	4.8	7.1	3.5
Wage and salary jobs	1,697	5.3	8.4	4.1
Legal services	650	7.1	7.9	4.4
Engineering and architectural services	635	3.8	10.4	3.8
Accounting, auditing, and bookkeeping	389	5.8	6.4	3.9

[1]Includes wage and salary jobs, the self-employed, and unpaid family workers.

n.e.c. = not elsewhere classified.

SOURCE: Historical wage and salary data are based on BLS establishment survey; for industries for which establishment survey data were not published before 1982, the 1978–83 rates are based on unemployment insurance data.

Table 5. Employment in selected trade industries, 1979–95

[In thousands]

Industry	1979	1984	Projected, 1995	Increase, 1984–95
Total, all industries[1]	101,471	106,841	122,760	15,919
Wholesale trade[1]	5,501	5,897	6,985	1,088
Wage and salary jobs	1,204	5,550	6,578	1,028
Machinery, equipment, and supplies	1,261	1,393	1,803	410
Groceries and related products	648	710	806	96
Electrical goods	405	477	570	93
Motor vehicles and auto equipment	439	424	509	85
Retail trade except eating and drinking places[1]	11,953	12,660	14,351	1,691
Wage and salary jobs	10,517	11,236	12,890	1,654
Grocery stores	2,002	2,318	2,817	499
Department stores	1,878	1,925	2,366	441
New and used car dealers	881	844	904	60
Miscellaneous shopping goods stores	569	690	871	181
Gasoline service stations	577	581	582	1
Drug and proprietary stores	489	530	592	62
Eating and drinking places[1]	4,857	5,733	6,936	1,203

[1]Includes wage and salary jobs, the self-employed, and unpaid family workers.

Communications services. Under the assumptions used in the BLS projections, the communications sector will enjoy the highest rates of growth in output of all the major sectors in the economy. (See table 2.) The demand for telecommunications services for data transmittal or other functions is expected to continue to show tremendous growth. The breakup of AT&T is also anticipated to lead to output growth by stimulating competition. The value of communications services is projected to expand by 6.2 percent a year, 1984–95.

As in past years, most of the increases in new telecommunications services will not require much additional employment. After remaining relatively constant at about 1 million to 1.2 million jobs for many years, employment in communications (except broadcasting) is projected to rise a bit to 1.3 million by 1995. Most of the increase will be limited to local cable television service operations, which are expected to grow as cable TV expands to new markets. The number of telephone workers is not projected to increase.

Manufacturing: strong demand but little job gain

As mentioned earlier, a capital spending boom, continued strong growth in real defense expenditures, and a rise in

exports of capital goods are expected to take place during the projection period, and this spending will provide a large boost to the manufacturing sector. Manufacturing output is projected to grow 3.0 percent a year from 1984 to 1995, compared to 2.9 percent for total GNP.

An investment boom is projected because of expected lower real interest rates; the prospect of a stable, noninflationary economy; and the desire on the part of manufacturers to take advantage of new technologies, purchases of which were postponed during the low-investment recession years 1980–82. Expenditures for producers' durable equipment under these assumptions are projected to rise much faster than total GNP through 1995—3.8 percent compared to 2.9 percent.

Augmenting the demand for capital investment goods will be greater expenditures for defense and for exports. Real defense purchases of goods and services are projected to show 5.3-percent annual growth between 1984 and 1990, and then taper off. This spending will have a large impact on the aircraft and guided missiles, ordnance, shipbuilding and repair, and communications equipment industries. Exports are also expected to increase much faster than GNP, and will be highly concentrated on high technology goods such as computers, electronic components, and communications equipment.

Somewhat offsetting this high demand for capital goods, however, is a parallel rise in imports. Durable goods imports have made sizable inroads in the domestic market in recent years, especially in electronic components, office equipment, machine tools, and other types of machinery and electrical equipment. The strength of the dollar against foreign currencies and slower economic growth in foreign markets made the United States an especially attractive magnet for imports in 1984, during which the Nation's merchandise trade deficit hit a record $123 billion (in current dollars).

Market shares accounted for by imports are projected to continue to rise for almost all durable manufacturing industries, but overall demand for capital goods is expected to be high enough for domestic production to expand as well. The U.S. dollar is expected to weaken after 1985, tending to curb the import merchandise boom. Total imports in real terms are projected to grow 4.0 percent a year between 1984 and 1995, while exports are expected to enjoy a 5.6-percent yearly gain.

The increased investment in capital equipment leads to the projection of a reversal in a long-term trend for productivity. As has been well documented, growth in output per worker hour slowed dramatically in this country during the 1970's. From the 2.1-percent annual increase posted between 1968 and 1973, productivity gains fell to 0.8 percent a year from 1973 to 1979, and then to 0.5 percent a year between 1979 and 1982. Although many of the reasons for the slowdown are still unknown, several causes have been cited, such as the influx of new, inexperienced workers to the labor force; a slowing in capital accumulation per worker; emphasis on nonproductive types of investment, such as for pollution control; and the oil price shocks, which diverted investment funds from production to energy conservation. Over the coming decade, many of these problems are expected to abate.

Productivity began a turnaround in 1983 and 1984 primarily as a result of the upswing in the business cycle, but this upturn is expected to be the start of a long-range advance in output per worker hour. Projections of large growth in investment expenditures on productive equipment, a more experienced labor force, and stable prices (including oil prices), contribute to the optimistic outlook for productivity. Gains are projected to average 1.7 percent annually through 1995.

Much of the productivity improvement will be centered in manufacturing. Manufacturing establishments are expected to take advantage of many new technologies as they expand facilities or replace aging capital stock. The new technologies include computer-assisted design, engineering, and manufacture; numeric control and computer-process control; industrial robots for many types of production operations, such as material handling, welding, spray painting, and parts assembly; lasers for printing, communications, metal fastening or cutting, and other functions; and numerous other changes specific to particular industries.[4] Many of these new technologies are available now, but their use will be considerably more widespread in the next decade. The rate of technology diffusion within a particular manufacturing industry will depend on a number of factors: the size of firms, the industry concentration ratio, the cost structure of the industry, and the potential market for its product.

New technologies improve product quality and are often labor-saving, permitting output to grow without a corresponding increase in employment. Thus, while the value of output of the manufacturing sector is projected to grow by 3.0 percent a year from 1984 to 1995, employment is projected to rise only 0.6 percent annually. Because this rate of job increase is slower than that for the total economy, manufacturing employment is projected to decline as a proportion of all jobs from 18.5 percent in 1984 to 17.2 percent in 1995.

The decline in the manufacturing share of employment is most severe in nondurable goods industries, which for the most part do not supply any of the capital equipment or defense goods that will account for much of the growth in demand for manufacturing output. In fact, the projected slight drop in the all-manufacturing share of private GNP between 1984 and 1995 results from a decrease in the nondurable share. Nondurable goods are more heavily dependent on consumer purchases, which are expected to grow only modestly. Expenditures for food and clothing are expected to increase only in line with population growth, about 1.8 percent a year. Employment in nondurable manufacturing is actually projected to show an absolute decline, from 8.0 million jobs in 1984 to 7.9 million in 1995. Of

36 nondurable goods industries covered in these projections, 27 are projected to lose jobs.

Durable goods manufacturing industries have a somewhat better job outlook, with total employment rising from 11.7 million in 1984 to 13.2 million in 1995. Production of durable goods remains unchanged at 15.6 percent of private GNP over the projections period. Those durable goods industries that produce the new, advanced capital equipment expected to be in great demand will be especially favored, and several of the machinery, electrical equipment, and instruments industries are projected to show strong output and employment growth.

Computers and electronic components. Among the expanding durable goods industries, computer manufacturing ranks first. As in the last few decades, the domestic computer industry is projected to show phenomenal output gains despite rising competition from imports. This industry and the electronic components industry were the output growth leaders over the 1959–84 period, and their position will remain unchallenged through the projections span. In the BLS projections, computer production grows 8.4 percent a year, and electronic components, 7.5 percent, compared to only 2.9 percent annually for GNP. These rates of output growth occur despite rising competition from foreign manufacturers. Demand for these products is expected to be so high that it will absorb increases in both imports and domestic production.

Imports of computers are projected to grow almost 12 percent annually from 1984 to 1995, raising their share of total output (domestic production plus imports) from 15.5 percent to 20.4 percent. Foreign producers will also be competing with U.S. firms for overseas markets, but U.S. exports of computer equipment are still projected to rise by 10.5 percent a year, 1984–95. As a result, the industry will continue to have a positive net trade balance.

For electronic components, the picture is somewhat different in that imports are projected to exceed exports by 1995. Domestic production will remain strong, however, due to the increasing ubiquity of the computer chip, soon to be found in even the most mundane of machines and consumer products.

The computer and electronic components industries have typically enjoyed very high rates of productivity growth. Quality advances have occurred even as unit costs declined, and this trend is projected to hold through the nineties.

Employment is projected to expand from 479,000 in 1984 to 713,000 in 1995 in computer production and for electronic components, from 673,000 to 846,000. Thus, despite very rapid expansion of output, only 234,000 new jobs will be added in the manufacture of computer hardware and only 173,000 in electronic components manufacture; together, these increases are equivalent to less than two-thirds of the gains projected for computer and data processing services.

Communications equipment. Production of communications equipment is projected to get a big boost from several key demand areas. One is the market for telecommunications linkups to transmit computer data, which is far from sated. Another is defense expenditures, a large part of which go for communications equipment. The expansion of the cable television industry will also contribute to demand for communications equipment. In addition, export gains are expected as world demand for sophisticated U.S. equipment grows.

Output of telephone and telegraph apparatus (including cellular phones and carrier equipment) is projected to grow 6.0 percent a year between 1984 and 1995, and that of radio and communication equipment (such as broadcasting equipment, satellites, radar, traffic control systems, and sonar and laser systems), by 5.0 percent. Job gains will be considerably smaller owing to productivity growth, but at 2.0 percent and 2.3 percent, respectively, they are greater than the all-industries average of 1.3 percent and considerably above the 0.6 percent projected for manufacturing industries as a whole.

Autos. The introduction of new technologies is expected to have a significant impact in the auto industry. New plants are expected to incorporate the most up-to-date processing techniques available, turning out more cars with fewer workers. Plans have already been announced for several new operations, including GM's Saturn Project, which will rely heavily on computer-assisted design and manufacturing and on robotic production methods. Thus, while domestic output in the auto industry is expected to grow, employment in 1995 is projected to be lower than at present.

The industry was hit especially hard by the 1980 and 1981–82 recessions. As high interest rates, unemployment, and prices kept many buyers away from dealer showrooms, production fell an average of 13.8 percent annually between 1979 and 1982. Employment dropped 10.9 percent a year; from a high of 1 million jobs in 1978, the number of jobs fell by 300,000, to a 20-year low of 701,000 in 1982. In contrast, 184,000 jobs were cut back during the 1974–75 recession. The industry's recovery began in 1983 and picked up momentum in 1984. The 1984 value of production of cars, trucks, and vans was 50 percent higher than 1982's trough, and employment was back up to 863,000.

After recovery from the cyclical downturn, however, long-term secular trends are projected to dampen the industry's expansion. Demographic changes curbing the numbers of first-time buyers have reduced the potential market for new cars, and high sticker prices discourage frequent replacement. At the same time, the system of voluntary quotas on auto imports from Japan is being relaxed. These factors are projected to limit domestic output growth to 1.7 percent a year from 1984 to 1995, compared to prerecession gains in the 3- to 5-percent range. Imports, which represented 13.5 percent of the real value of total production in 1977, and

23.4 percent in 1984, are projected to account for 28.2 percent of the market by 1995. Given that all of the projected increases in domestic output will be accomplished with productivity gains, industry employment is projected to fall to 828,000 in 1995.

Machinery and other capital equipment. In the moderate-growth set of projections, many machinery and electrical equipment producers are expected to enjoy very healthy output gains over the next decade as a result of the investment boom. The material handling equipment industry, for example, is projected to experience output growth of 5.5 percent a year. This is the industry that supplies robotic handling equipment for moving goods within plants and factories, including hoists, cranes, and conveyors. Employment is projected to rise 3.7 percent a year, placing the industry among the top five fastest job gainers. (The level of employment remains very small, however. Total jobs are expected to rise from 80,000 to 119,000.)

Other durable goods industries expected to benefit from the investment and defense upswing include guided missiles and space vehicles, scientific and controlling instruments, medical and dental instruments and supplies, optical and ophthalmic equipment, electric transmission equipment, and miscellaneous electrical machinery (which includes electromedical equipment). All of these industries have projected output growth rates of over 4.0 percent, compared to 2.9 percent for the economy as a whole.

The high level of investment spending will also help several industries that are still struggling out of a recession slump. The industry manufacturing construction, mining, and oilfield machinery picked up production and jobs in 1984, but full recovery is not yet complete. Output and employment are projected to post 3.4-percent and 1.8-percent rates of gain through 1995, but the industry's 1995 employment level is still far short of the 1981 peak.

Another industry for which recovery has been slow is that producing farm and garden machinery. In recent years, low prices for farm commodities, changes in Federal support programs, and reduced foreign demand have seriously crimped the U.S. agricultural sector, forcing many farmers into foreclosures and bankruptcies. In the long run, however, recovery in the agricultural sector is anticipated, and the Nation's farm machinery producers should benefit from an improving world economy and from the favorable economic conditions projected to stimulate investment spending on all types of capital goods. Despite this projected upturn, though, both production and jobs in farm machinery are not expected to return to their prerecession levels by 1995.

Steel. The steel industry lost more than one-third of its jobs in the 1980–82 recessionary period, and regained virtually none of them in 1984. The decline in the steel industry actually began long before 1980. Because of such factors as the strength of the dollar, large international wage differentials, and the lag in introducing new technologies such as continuous casting, domestic steel could not compete with cheaper-priced substitutes or foreign imports. The steady substitution of lighter-weight materials in transportation and other equipment accelerated as energy prices rose in the wake of the 1973–74 oil crisis. Even where steel continues to be used, it is often rolled thinner. By 1984, imports of steel had captured 18.7 percent of the total U.S. market, compared to 12.7 percent in 1977.

By 1995, imports are projected to represent 32 percent of the total value of steel used in this country. Domestic production is anticipated to be only a little above 1984's level. Whatever small gains are made in production will be achieved through rising productivity. In the BLS projections, steel employment drops from 335,000 in 1984 to only 261,000 in 1995.

Nondurable goods. As noted, many nondurable manufacturing industries are projected to lose jobs over the next decade. Limited demand growth coupled with improved production methods will contribute to this development.

Job losses occur in all of the 10 food processing industries included in the BLS projections. Employment is projected to decline from 1.6 million jobs in 1984 to fewer than 1.5 million in 1995. Some output gains will be registered, particularly for grain mill products, soft drinks, confectionery products, alcoholic beverages, and canned and frozen foods.

In apparel and other textile products, imports are expected to inhibit domestic production growth. Clothing imports are projected to rise to about 38 percent of the total market in 1995. The use of the computer in pattern grading and marker preparation, laser cutting of fabrics, and numerically controlled cutting and sewing machines are some of the new technologies projected to be more widespread in the 1990's. Employment in apparel manufacturing is projected to be 818,000 in 1995, compared to 1.023 million in 1984.

The chemical products industry is not expected to enjoy the rapid output growth characteristic of this industry during the sixties and early seventies. During that time span, production expanded in the 5- to 7-percent range, but after oil prices started to rise dramatically, the United States began to lose its competitive edge in producing chemicals. Annual output growth slowed to 2.8 percent between 1973 and 1979, and, as was the case for many other industries, production actually fell during the recession. Output picked up in 1984 and is projected to grow by 2.8 percent a year through 1995, but productivity gains will check increases in employment.

The only exceptions to the job-loss trend in nondurable industries will be printing and publishing, drugs, and miscellaneous plastics products. Projected job growth in these industries, however, represents a slowdown from past trends.

In printing and publishing, output growth offsets the mod-

est increases expected in productivity. Electronic composition, already prevalent in the production of big-city daily newspapers, is expected to become widely used by many smaller publications as well. Employment in newspapers, books, and other printing and publishing is projected to rise from 1.5 million in 1984 to 1.8 million by 1995, but the average rate of gain of 1.6 percent compares unfavorably to the 1.8 percent posted for 1959–84.

The drug industry is projected to show very rapid output growth—4.5 percent a year—between 1984 and 1995. A high rate of new product introductions and the growing number of elderly in the population will stimulate production. The industry has typically enjoyed strong productivity growth, however, and this is expected to continue. Employment increases are projected to average 1.6 percent a year through 1995, compared to 2.7 percent over the past 25 years.

In plastics products, historically a high-growth, low-productivity industry, output advances an average 4.3 percent a year and employment, 2.5 percent, over the projections period. Productivity improvements are limited in this industry due to the small size and specialized operations of its many firms and to the diversity of items produced.

High tech. High technology is often touted as the source of new employment opportunities to help replace jobs lost in declining "smokestack" industries. While faster-growing than the average for all sectors, and particularly the manufacturing sector, high tech industries are projected to account for only a small proportion of new jobs through 1995.

The Bureau's definition of a high technology industry rests on the level of research and development expenditures, the ratio of scientific and technical personnel to total employment, and product sophistication. BLS developed three definitions of high tech, ranging from very broad to very narrow, in its first look at this subject.[5] New employment projections for industries meeting the tests for the intermediate definition are shown in table 6.

Employment in these high technology industries accounted for 6.1 percent of all wage and salary jobs in 1972, 6.4 percent in 1984, and is projected to represent 7.0 percent by 1995. About 1.7 million, or almost 11 percent, of the 15.9 million total new jobs added between 1984 and 1995 will be in those high technology industries. As can be seen in table 6, 40 percent of the new high tech jobs will be in computer and data processing services.

Under the very broadest definition, which includes some mining, communications, trade, and professional services industries as well as additional manufacturing sectors, high tech will account for 14.6 percent of all jobs in 1995, an increase of 3.2 million from 1984's level. Under the narrowest definition, which is limited to drugs, computers, communications equipment, electronic components, and aircraft and guided missiles, the high tech share in 1995 will be 3.2 percent, reflecting the addition of 0.7 million new jobs.

Government

Very little growth is expected in total government employment within the next 15 years. Most of the increased defense expenditures projected for the rest of this decade will be for materiel purchases and not for civilian personnel. Nondefense expenditures in real terms are projected to grow only very slowly, and employment is projected to remain at 1984's level.

In State and local governments, a 1.2 million job gain is projected, bringing employment to 14.3 million in 1995. The projected upturn, which follows several years of employment cutbacks, primarily reflects an increase in the elementary school age population. Many more women have recently entered the prime childbearing ages, and while birth rates are not increasing, the total number of births is. This "echo effect" of the postwar baby boom is beginning to stimulate demand for elementary schoolteachers, most of whom are in the public sector. Employment in public education is projected to rise from 6.7 million in 1984 to 7.2 million in 1995, accounting for about 3 out of every 7 new jobs in State and local governments.

Table 6. Wage and salary employment in high technology industries,[1] 1972–95

[In thousands]

SIC[2]	Industry	1972	1984	Projected, 1995
	Total nonfarm wage and salary	73,675	94,461	110,092
	High technology	4,469	6,024	7,730
	Percent of total	6.1	6.4	7.0
281	Industrial inorganic chemicals	141	143	152
282	Plastic materials and synthetics	229	177	161
283	Drugs	159	206	243
284	Cleaners and toilet preparations	122	145	160
285	Paints and allied products	69	62	57
286	Industrial organic chemicals	143	164	165
287	Agricultural chemicals	56	61	61
289	Miscellaneous chemical products	90	92	90
291	Petroleum refining	151	151	142
348	Ordnance and accessories	82	76	86
351	Engines and turbines	115	115	124
355	Special industry machinery	177	168	197
357	Office, computing, and accounting machines	260	526	756
361	Electric transmission equipment	128	116	131
362	Electrical industrial apparatus	209	206	241
365	Radio and television receiving equipment	140	91	85
366	Communication equipment	458	617	787
367	Electronic components and accessories	355	673	846
369	Miscellaneous electrical machinery and supplies	132	156	186
372	Aircraft and parts	495	596	670
376	Guided missiles and space vehicles	93	155	196
381	Engineering and laboratory instruments	65	80	92
382	Measuring and controlling instruments	160	250	310
383	Optical instruments and lenses	18	35	34
384	Medical and dental instruments and supplies	91	172	234
386	Photographic equipment and supplies	117	124	135
737	Computer and data processing services	107	474	1,149
7391	Research and development laboratories	111	193	240

[1]See text footnote 5.

[2]Standard industrial classification as defined by the U.S. Office of Management and Budget through 1972.

Employment in private education, on the other hand, is not expected to rise until after 1995, when today's larger birth cohorts begin to reach college age. Most of private school employment is concentrated in colleges and universities. Because of the 1970's "baby bust," enrollment in these institutions in 1995 is projected to reach its lowest level since 1968.

It should be noted that the rise in public school employment reflects only enrollment gains and a slight improvement in teacher-student ratios. If many States approve new graduation requirements, longer schooldays or schoolyears, and more rigorous academic standards, additional staff may be needed.

Employment in public hospitals is projected to remain almost level over the next decade at 1.1 million, as hospital cost-containment programs and a shift to private hospitals limit job growth in this part of State and local government operations. Jobs in other functions of State and local governments such as police, firefighting, sanitation, welfare, and administration are expected to rise modestly from 5.4 million in 1984 to 6.1 million in 1995. Declines in Federal grants-in-aid to States and localities and fiscal conservatism in general will keep the rate of job growth much lower than in the sixties and seventies.

Construction

The construction industry is projected to benefit from the expected growth in capital investment, particularly after 1990. Nonresidential construction is projected to recover from the recent oversupply of commercial office buildings, and to grow as factory modernization accelerates. In the BLS projections, business expenditures on construction increase by 1.6 percent annually through 1990, and 2.6 percent a year, 1990–95.

Residential construction shows the opposite pattern. The growth rate projected for the years 1984–90 is 2.4 percent, but only 1.8 percent, 1990–95. The initial expansion results as interest rates drop slowly and the industry continues to recover from the slump in new residential construction during the 1980–82 recession years. After 1990, demographic effects such as a slowdown in the rate of new household formation and a drop in the population of potential first-time homeowners begin to slow the rate of new home construction again.

Productivity is projected to accelerate in the construction industry as the prefabrication of modular buildings and other new construction techniques become more widespread. Employment in construction is projected to rise from 5.9 million to over 6.6 million by 1995. The rate of job growth is somewhat slower than past trends.

Alternatives

Evaluations of previous BLS projections have shown that at the industry level, the employment estimates can vary from actual experience by as much as 17 percent.[6] The largest percentage errors tend to occur in the smallest industries, however. When the industry errors are weighted by employment, the average absolute error for each industry declines to about 8 to 12.5 percent. In addition, while actual growth rates for the 149 industries will vary widely, projected growth rates usually fall within a much narrower band. The very fastest rates of growth or the very fastest rates of decline are usually underestimated.

To help address the fact that 10- to 15-year projections obviously entail uncertainty, BLS prepares alternatives to its baseline, or moderate-growth, projection. The alternatives developed for this set of projections include a high-growth case (with a larger labor force, lower unemployment, and greater GNP), and a low-growth case (with the opposite characteristics).

Under low-growth assumptions, total employment only reaches 117.3 million by 1995, compared to 122.8 million in the baseline projection. Because the lower employment level is reflected across all industries, the distribution of employment among the major sectors remains about the same. The only difference in the distribution is that government accounts for a larger share, because Federal employment is assumed to be the same in all three scenarios and State and local government employment is only slightly lower than in the base case. (See table 1 for employment estimates for all three scenarios by major industrial sector, and table 7 for detailed industry projections.)

In the high-trend version, total employment stands at 127.7 million in 1995, 5 million more than the base case. Again, the distribution of employment among the major sectors resembles that of the baseline scenario.

Differences from previous projections

In 1983, BLS published its first estimates of economic growth and employment through 1995.[7] The new projected employment level is lower than the previous projection for two main reasons: the new projection of the 1995 labor force is lower because of a slowdown in the rate of increase in women's labor force participation that started in 1978 and continued through 1984; and there was a downward revision in the exogenously determined adjustment factor which converts household employment (number of persons working) to establishment employment (number of jobs).[8] At the industry level, the new output and employment trends differ from previous estimates in a variety of ways:

- The last projections for 1995 used 1982, a recession year, as the latest historical reference point. Many industries were expected to show high rates of growth primarily because of recovery from recession lows. Because this recovery has already occurred for many sectors, the projected growth rates for 1984–95 appear to be lower.
- Some industries have not fully recovered yet from their recession troughs but are still expected to do so. This may result in projections of unusually high rates of growth

Table 7. Employment[1] by industry, 1959–95

[In thousands]

Industry	Actual				Projected					
					1990			1995		
	1959	1969	1979	1984	Low	Moderate	High	Low	Moderate	High
Agriculture, forestry, and fisheries:										
Dairy and poultry products	1,479	754	449	374	318	324	327	297	305	310
Meat animals and livestock	933	701	527	472	439	448	452	398	404	415
Cotton	539	159	58	46	33	31	38	24	29	33
Food and feed grains	915	589	583	604	536	555	561	500	506	515
Agricultural products, n.e.c.	1,369	1,037	1,155	1,155	1,150	1,155	1,167	1,135	1,157	1,168
Forestry and fishery products	63	55	80	78	73	77	78	76	82	89
Agricultural services	285	327	488	564	575	574	578	540	576	598
Mining:										
Iron and ferroalloy ores mining	33	30	31	17	14	15	16	12	13	15
Copper ore mining	23	34	33	16	14	16	18	12	14	16
Nonferrous metal ores mining	31	25	38	24	21	22	24	16	18	19
Coal mining	201	138	261	198	191	199	203	181	185	189
Crude petroleum and natural gas	202	157	212	285	283	291	296	274	289	303
Stone and clay mining and quarrying	105	99	104	90	91	96	97	87	92	97
Chemical and fertilizer mineral mining	19	18	25	21	19	21	22	18	20	22
Construction:										
Maintenance and repair construction	870	868	1,339	1,246	1,275	1,332	1,358	1,373	1,404	1,430
New construction	3,040	3,506	4,540	4,674	4,635	4,857	4,918	4,957	5,232	5,427
Manufacturing:										
Durable goods:										
Ordnance	50	175	73	95	103	108	110	105	111	118
Guided missiles and space vehicles	94	107	81	120	143	149	151	143	152	158
Logging	149	137	149	125	107	111	114	100	107	114
Sawmills and planing mills	305	230	237	203	184	192	195	183	190	195
Millwork, plywood, and wood products, n.e.c.	264	310	393	360	366	380	385	363	381	394
Wooden containers	43	36	19	14	11	12	13	8	9	10
Household furniture	259	316	329	295	303	317	322	303	321	332
Furniture and fixtures, except household	126	153	176	211	241	247	254	249	262	275
Glass	153	188	202	169	167	171	175	164	173	179
Cement and concrete products	210	228	255	231	238	245	248	238	249	255
Structural clay products	78	64	52	38	32	35	36	26	30	33
Pottery and related products	49	45	52	45	44	47	48	46	47	50
Stone and other mineral products, n.e.c.	125	140	165	133	146	150	154	144	149	156
Blast furnaces and basic steel products	588	644	571	335	283	311	339	235	261	325
Iron and steel foundries and forgings	269	312	324	209	192	205	208	182	194	204
Primary copper and copper products	137	160	161	133	132	137	140	127	133	140
Primary aluminum and aluminum products	111	153	170	147	147	153	157	150	158	162
Primary nonferrous metals and products	78	93	93	77	71	75	76	66	70	74
Metal cans and containers	75	87	80	58	54	58	59	48	52	55
Heating equipment and plumbing fixtures	71	76	76	63	60	63	64	57	60	62
Fabricated structural metal products	345	440	535	448	479	496	507	501	525	542
Screw machine products	88	114	117	97	99	106	108	101	108	113
Metal stampings	189	255	245	211	219	229	231	224	232	240
Cutlery, handtools, and general hardware	135	165	185	148	155	161	163	156	164	169
Fabricated metal products, n.e.c.	232	315	376	344	372	387	393	381	402	423
Engines and turbines	90	112	145	116	115	121	123	117	124	130
Farm and garden machinery	128	141	184	111	125	131	135	129	136	145
Construction, mining, oilfield machinery	162	202	276	178	203	208	211	206	216	226
Materials handling equipment	65	95	106	80	99	104	105	113	119	123
Metalworking machinery	252	347	379	313	346	360	366	357	377	392
Special industry machinery	164	206	205	168	176	187	190	186	197	204
General industrial machinery	221	291	329	273	292	309	313	308	325	336
Nonelectrical machinery, n.e.c.	168	246	312	301	326	338	344	337	356	366
Computers and peripheral equipment	111	224	339	479	614	640	648	680	713	741
Typewriters and other office machines	28	52	59	48	46	50	50	41	44	47
Service industry machines	97	147	188	171	178	187	191	186	194	201
Electric transmission equipment	157	207	221	224	221	228	230	221	231	238
Electrical industrial apparatus	176	223	251	206	223	230	232	229	241	250
Household appliances	157	187	178	150	147	153	155	146	150	156
Electric lighting and wiring equipment	134	205	225	201	212	221	223	213	223	234
Radio and television receiving equipment	114	156	116	93	89	90	95	83	87	91
Telephone and telegraph apparatus	105	146	165	144	168	171	173	176	180	184
Radio and communication equipment	252	409	357	472	537	556	564	584	607	622
Electronic components and accessories	213	394	525	673	750	797	808	802	846	877
Electrical machinery and supplies, n.e.c.	112	125	176	163	181	183	189	186	194	205
Motor vehicles	696	912	991	863	820	852	863	795	828	861
Aircraft	722	805	632	634	666	692	710	680	714	737
Ship and boat building and repair	152	193	230	199	206	222	225	215	225	237
Railroad equipment	41	51	74	36	36	36	39	35	36	38
Motorcycles, bicycles, and parts	9	14	20	16	15	17	18	14	16	19

See footnotes at end of table.

Table 7. Continued—Employment[1] by industry, 1959–95

[In thousands]

Industry	Actual				Projected					
					1990			1995		
	1959	1969	1979	1984	Low	Moderate	High	Low	Moderate	High
Manufacturing:–Continued										
Durable goods—Continued										
Transportation equipment, n.e.c.	23	89	103	86	98	102	105	99	106	114
Scientific and controlling instruments	166	195	215	222	263	268	274	287	304	315
Medical instruments and supplies	45	82	144	172	207	216	220	223	234	244
Optical and ophthalmic equipment	85	75	81	77	76	80	82	73	78	81
Photographic equipment and supplies	69	111	134	124	130	133	134	130	136	143
Watches and clocks	30	35	28	15	15	16	17	14	15	17
Jewelry and silverware	67	78	92	78	75	78	82	73	78	81
Musical instruments and sporting goods	116	149	145	141	136	143	144	136	143	149
Manufactured products, n.e.c.	232	233	244	208	208	211	215	195	203	210
Nondurable goods:										
Meat products	325	344	363	361	335	345	350	320	331	339
Dairy products	327	260	189	164	129	134	138	122	127	133
Canned and frozen foods	249	291	316	286	273	287	293	261	275	284
Grain mill products	140	137	147	130	128	132	135	124	128	135
Bakery products	314	286	238	218	191	197	200	182	188	194
Sugar	38	36	31	25	21	22	23	18	19	20
Confectionery products	79	87	80	77	67	71	73	61	66	71
Alcoholic beverages	107	97	86	72	61	63	65	51	58	64
Soft drinks and flavorings	111	142	153	144	134	139	141	127	134	154
Food products, n.e.c.	144	151	160	157	146	150	151	139	148	154
Tobacco manufacturing	95	83	70	65	59	61	61	54	56	58
Fabric, yarn, and thread mills	619	616	531	440	390	406	408	343	361	381
Floor covering mills	39	58	61	54	44	47	49	41	44	45
Textile mill products, n.e.c.	74	82	71	56	49	52	54	44	47	49
Hosiery and knit goods	221	251	227	206	179	185	186	160	169	177
Apparel	1,101	1,244	1,125	1,023	883	924	937	775	818	851
Fabricated textile products, n.e.c.	144	182	198	194	184	191	200	177	186	197
Paper products	415	483	494	486	465	486	492	455	480	498
Paperboard containers and boxes	175	231	214	196	179	190	192	173	184	190
Newspaper printing and publishing	329	376	432	463	497	512	522	526	548	565
Periodical and book printing and publishing	156	210	230	274	289	298	307	296	313	325
Printing and publishing, n.e.c.	450	549	639	725	792	826	839	856	890	925
Industrial chemicals	260	296	328	300	291	302	307	287	306	322
Agricultural chemicals	54	65	70	61	61	62	64	60	62	64
Chemical products, n.e.c.	82	124	99	99	95	102	104	96	102	105
Plastic materials and synthetic rubber	81	108	100	88	83	87	89	79	83	86
Synthetic fibers	79	132	112	88	75	82	89	74	79	82
Drugs	106	143	193	206	222	229	235	234	245	254
Cleaning and toilet preparations	89	123	140	145	149	154	156	154	160	166
Paints and allied products	62	72	69	62	57	60	61	54	58	60
Petroleum refining and related products	217	182	210	189	179	183	185	168	175	182
Tires and inner tubes	105	119	127	94	87	90	92	82	86	92
Rubber products except tires and tubes	178	162	167	148	140	145	148	126	132	137
Plastics products, n.e.c.	94	320	494	544	620	659	676	670	712	753
Leather tanning and finishing	36	29	20	17	13	15	15	11	13	13
Leather products including footwear	341	316	232	178	145	152	161	121	130	139
Transportation:										
Railroad transportation	930	651	559	378	314	323	325	272	283	298
Local transit and intercity buses	315	314	302	317	316	325	332	323	330	338
Truck transportation	1,019	1,212	1,551	1,560	1,673	1,750	1,783	1,766	1,868	1,950
Water transportation	239	234	222	206	207	218	222	220	230	239
Air transportation	185	357	443	498	516	538	545	556	579	607
Pipelines, except natural gas	24	18	20	19	19	20	21	20	20	22
Transportation services	71	111	198	262	318	333	339	362	382	399
Communications:										
Radio and television broadcasting	90	131	191	237	253	263	268	278	290	303
Communications, except radio and TV	749	919	1,121	1,116	1,176	1,222	1,243	1,228	1,295	1,353
Public utilities:										
Electric utilities, public and private	430	460	608	702	738	763	778	784	827	863
Gas utilities	215	220	220	223	218	227	233	214	226	235
Water and sanitary services	63	88	94	115	118	121	124	118	124	133
Trade:										
Wholesale trade	3,380	4,159	5,501	5,897	6,471	6,710	6,827	6,632	6,985	7,291
Eating and drinking places	2,002	2,806	4,857	5,733	6,190	6,470	6,597	6,625	6,936	7,250
Retail trade, except eating and drinking places	8,110	9,706	11,953	12,660	13,329	13,926	14,282	13,590	14,351	15,004
Finance, insurance, and real estate:										
Banking	644	987	1,498	1,678	1,706	1,780	1,857	1,777	1,865	1,946
Credit agencies and financial brokers	391	652	900	1,239	1,400	1,467	1,492	1,538	1,621	1,689
Insurance	1,150	1,368	1,748	1,904	2,075	2,150	2,173	2,112	2,237	2,335
Real estate	774	852	1,368	1,475	1,518	1,594	1,624	1,598	1,675	1,747

See footnotes at end of table.

Table 7. Continued—Employment[1] by industry, 1959–95

[In thousands]

Industry	Actual				Projected					
					1990			1995		
	1959	1969	1979	1984	Low	Moderate	High	Low	Moderate	High
Services:										
Hotels and lodging places	906	1,060	1,543	1,914	2,063	2,146	2,198	2,153	2,299	2,420
Personal and repair services	1,202	1,226	1,231	1,388	1,486	1,535	1,572	1,579	1,664	1,732
Beauty and barber shops	576	629	626	663	638	670	671	636	675	709
Business services	830	1,688	3,173	4,612	5,995	6,200	6,310	6,887	7,245	7,535
Advertising	123	134	165	213	246	250	253	260	267	277
Professional services, n.e.c.	785	1,041	1,804	2,295	2,702	2,823	2,876	3,170	3,335	3,483
Automobile repair and services	443	566	834	1,022	1,015	1,079	1,102	1,123	1,194	1,249
Motion pictures	232	247	309	328	346	358	366	377	390	408
Amusements and recreation services	378	496	768	869	1,003	1,045	1,066	1,084	1,135	1,181
Doctors' and dentists' services	642	801	1,346	1,650	1,902	1,949	1,989	2,120	2,190	2,284
Hospitals	975	1,776	2,614	3,001	3,093	3,242	3,300	3,071	3,256	3,400
Medical services, n.e.c.	313	671	1,432	1,821	2,347	2,449	2,495	2,725	2,886	3,023
Educational services	853	1,227	1,718	1,928	1,983	2,057	2,085	2,025	2,147	2,235
Noncommercial organizations	1,333	1,764	2,072	2,182	2,261	2,339	2,380	2,396	2,486	2,602
Household industry	2,279	1,856	1,326	1,242	1,106	1,148	1,174	982	1,023	1,060
Government enterprises:										
U.S. Postal Service	574	732	661	703	657	699	712	640	677	721
Federal enterprises, n.e.c.	104	152	155	123	129	134	136	133	140	145
Local government passenger transit	71	87	130	174	194	197	200	202	209	219
State and local enterprises, n.e.c.	225	351	541	485	493	513	525	509	536	568

[1]Includes wage and salary jobs, the self-employed, and unpaid family workers.

n.e.c. = not elsewhere classified.

for some industries between 1984 and 1995. Examples are construction and mining machinery, farm machinery, and some of the mining industries.

- The composition of GNP in 1995 in the new projections is shifted more towards producers' durable equipment, exports and imports, and defense. Purchases of nondurable goods, on the other hand, are now projected to be lower.
- More investment in capital goods results in higher productivity in the new BLS projections, especially in manufacturing. Consequently, manufacturing employment in 1995 is lower than previously estimated. In the last projections, many manufacturing industries were not expected to reattain historical peaks, and that is even more true in the new projections.
- The shift to service employment is even more pronounced in the new projections. Despite a lower total employment level in 1995, service sector employment is almost the same as in the previous set of projections. The service sector had been expected to account for 24.5 percent of total jobs in 1995; now, it is expected to hold a 25.4-percent share. □

FOOTNOTES

[1]In developing projections, BLS procedures yield employment at two distinct levels of disaggregation. In the input-output model used, the economy is divided into 156 sectors, of which 149 have employment. As the projections proceed, a second level of disaggregation produces employment projections for 378 separate industries at the 3-digit SIC (Standard Industrial Classification) level, which match the industry detail in the industry-occupation matrix used in developing the projections of employment by occupation.

[2]As reported in personal interviews with industry executives conducted by BLS staff.

[3]See footnote 1.

[4]For descriptions of many of these new technologies, see the series of publications developed by the Bureau's Office of Productivity and Technology. The latest report, *The Impact of Technology on Labor in Four Industries*, Bulletin 2228 (Bureau of Labor Statistics, May 1985), contains a complete list of these studies.

[5]The BLS intermediate definition of high tech includes manufacturing industries having a ratio of R&D expenditures to net sales that is close to or above the average for all industries, and a ratio of technology-oriented workers to total employment equal to or greater than the average for all manufacturing industries. Two nonmanufacturing industries—computer and data processing services and research and development laboratories—are included because their product is technical support for manufacturing industries.

The broadest definition of a high technology industry specifies only that the proportion of technology-oriented workers to total employment must be one and a half times the average for all industries. The narrowest definition requires the industry ratio of R&D expenditures to net sales to be twice the all-industry average.

For more information on high tech industries, see Richard W. Riche, Daniel E. Hecker, and John U. Burgan, "High-technology today and tomorrow; a small slice of the employment pie," *Monthly Labor Review*, November 1983, pp. 50–58.

[6]John H. Tschetter, "An evaluation of BLS's projections of 1980 industry employment," *Monthly Labor Review*, August 1984, pp. 12–22.

[7]See several articles in the *Monthly Labor Review*, November 1983, pp. 3–49; and *Employment Projections for 1995*, Bulletin 2197 (Bureau of Labor Statistics, March 1984).

[8]For a discussion of the differences between household and establishment employment, see the Explanatory Notes in any monthly issue of the BLS publication *Employment and Earnings*.

Occupational employment projections: the 1984–95 outlook

The occupational structure of the economy is estimated to change through the mid-1990's as employment growth rates for many occupations depart from historical trends

GEORGE T. SILVESTRI AND JOHN M. LUKASIEWICZ

According to the most recent projections of the Bureau of Labor Statistics, occupational employment growth trends over the 1984–95 period are expected to depart from the recent past for some broad occupational groups and for many detailed occupations. Some occupations, especially in the clerical group, are expected to slow their rate of growth considerably, while others, mainly blue-collar occupations, that grew in the past are expected to decline. These changes result from a projected slowing of total employment growth, from changes in industry growth trends, and from technological change affecting the occupational structure of industries. Many occupations that expanded rapidly from the early 1970's to the mid-1980's will still grow faster than average, although they are expected to have slower growth rates through the mid-1990's. Despite the slowing of total employment growth, from 23 percent to 15 percent, a few occupations are expected to grow faster over the 1984–95 period than over the previous 11 years.

Broad occupational structure

Insights into the changing occupational structure of the United States, implied by the Bureau's projections, can be obtained by viewing the data in several different ways. The first approach presented here is a comparison of past and projected growth for the 10 major occupational groups that include all the detailed occupations found in the economy. (See table 1.)

Over the 1984–95 period, the three major occupational groups having the largest proportion of workers with a college education or specialized post-secondary technical training are expected to increase faster than the average for all occupations (that is, the projected growth rate for total employment). The first of these three major groups, executive, administrative, and managerial workers, is projected to increase by 22 percent, compared with the 15-percent growth rate for total employment. The demand for salaried managers is expected to increase rapidly as firms increasingly depend on trained management specialists. The projected rate of growth for professional specialties is 22 percent, with an increase of 2.8 million jobs. Many occupations in this group are expected to surge, including computer-related occupations, engineering, and health specialties. The ranks of technicians and related support workers, with a 29-percent increase, are projected to grow the fastest of all the major occupational groups. This group also had the fastest rate of growth from 1973 to 1984. The rate of expansion of all three groups, while faster than average, will be slower than in the past.

The number of salesworkers is projected to increase faster than average from 1984 to 1995, adding about 2.2 million jobs. The projected increase of 20 percent, however, is about half of the growth rate experienced from 1973 to 1984.

Administrative support workers, including clerical, which grew about as fast as average during the 1973–84 period,

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Table 1. Total civilian employment by broad occupational group, actual 1984 and projected 1995, and percent change in employment, 1973–84 and 1984–95

[Numbers in thousands]

Occupation	1984		1995		Percent change in employment	
	Number	Percent	Number	Percent	1973–84	1984–95
Total employment	106,843	100.0	122,760	100.0	23.4	14.9
Executive, administrative, and managerial workers	11,274	10.6	13,762	11.2	48.4	22.1
Professional workers	12,805	12.0	15,578	12.7	46.2	21.7
Technicians and related support workers	3,206	3.0	4,119	3.4	58.3	28.7
Salesworkers	11,173	10.5	13,393	10.9	41.5	19.9
Administrative support workers, including clerical	18,716	17.5	20,499	16.7	24.7	9.5
Private household workers	993	.9	811	.7	−27.0	−18.3
Service workers, except private household workers	15,589	14.6	18,917	15.4	37.6	21.3
Precision production, craft, and repair workers	12,176	11.4	13,601	11.1	20.2	11.7
Operators, fabricators, and laborers	17,357	16.2	18,634	15.2	−7.2	7.3
Farming, forestry, and fishing workers	3,554	3.3	3,447	2.8	−5.9	−3.0

NOTE: Estimates of 1984 employment, the base year for the 1995 projections, were derived from data collected in the Occupational Employment Statistics (OES) Surveys. The 1973–84 change was derived from Current Population Survey (CPS) data because OES Surveys for 1973 were not available. The occupational groups in this table conform to the CPS classification and do not match the OES classification found in table 2.

are projected to grow more slowly than average through the mid-1990's. This group is expected to add 1.8 million jobs during the 1984–95 period, however, and remain the largest group, with 20.5 million workers in 1995. Workers in this occupational group are not concentrated in any specific industry sector; they are found in virtually every industry in the economy. Therefore, differences in employment growth trends among industries will have less of an impact on clerical workers than on most other broad groups. What is already having an effect on the employment of clerical workers and should be more pronounced through the mid-1990's is the rapid spread of computerized office equipment and other related office automation. The automation of clerical tasks will slow the growth of many detailed occupations, including secretaries and typists and cause others, such as payroll and timekeeping clerks, to decline. As a result, the share of total employment accounted for by the administrative support group, is projected to decline from 17.5 percent in 1984 to 16.7 percent in 1995.

Private household workers are expected to continue their long-term employment decline. However, the rate of decline is projected to be considerably slower than the rate of decline from 1973 to 1984.

Service workers, except private household workers, are projected to continue to grow faster than total employment, despite a significant slowing of the growth rate from 38 percent during the 1973–84 period to 21 percent for the 1984–95 period. This occupational group is expected to account for more job growth than any other broad group and to account for 3.3 million of the 16 million jobs expected to be added from 1984 to 1995. In contrast, during the 1973–84 period, three other occupational groups, managers, professional workers, and clerical workers, each added more jobs than service workers. The large number of new jobs expected to be added by service workers is a result of the continued shift of the economy from goods production to services production. As in the recent past, employment in service-producing industries, particularly those in which service workers are concentrated, is expected to continue to increase faster than goods-producing industries and account for a much greater share of total employment.

Precision production, craft, and repair occupations are projected to grow by nearly 12 percent—somewhat more slowly than total employment. Their percent of total employment is expected to decline slightly from 11.4 to 11.1 percent. The increase of these workers is heavily tied to the growth of the construction and manufacturing industries in which they are concentrated; manufacturing is projected to grow slowly, while construction is projected to have average growth, thereby slowing the growth of the precision production, craft, and repair occupations.

Operators, fabricators, and laborers are projected to increase by only 7 percent from 1984 to 1995. Nevertheless, this represents a change from the 1973–84 period when the rate for these workers declined. However, during the 1973–84 period, employment declined in many manufacturing industries in which these workers are concentrated because the effects of the 1980–82 recession period were still felt in many industries in 1984. Over the 1984–95 period, manufacturing is projected to grow slowly. Many detailed occupations in this major occupational group, including machine operators, assemblers, and inspectors, are expected to be affected by the new technologies in manufacturing, such as computer-aided manufacturing and robotics. However, technological change is expected to have less of an impact on transportation and material moving occupations in this group, such as truck drivers, bus drivers and airplane pilots.

Farming, forestry, and fishing workers are expected to continue to decline because of productivity growth in agriculture. The projected decline for these workers, about 3 percent, however, is expected to be about half that in the recent past.

Methodological approach

The Bureau's method of developing occupational projections provides a method for Bureau analysts to account for

the effects of the wide variety of factors that are expected to cause changes in employment for specific occupations. An industry-occupation matrix is the primary statistical tool used for developing occupational projections. The matrix for 1984 presents, in percentage terms, the distribution of more than 500 occupations in 378 industries based on recent surveys of occupational employment by industry.[1] The occupational structure for each industry was projected to 1995 through analyses of the factors that are expected to change the structure. The projected structure was applied to the projected total industry employment derived from the Bureau's economic model, which captures expected changes in the structure of demand among industries, changes in labor requirements per unit of output, and other factors as specified in the accompanying articles.

The complex factors that affect the employment growth for detailed occupations can be classified into two categories—the expansion of detailed industries and the changing occupational structure of industries. The growth of specific industries has a significant bearing on the growth of occupations because occupations account for widely different proportions of employment in different industries. For example, the growth of health-related occupations is closely tied to the growth of the health services industry, but the growth of the banking industry has little direct impact on health occupations.

The main causes of occupational structure changes within industries are: (a) technological change, (b) changes in business practices and methods of operation, and (c) product demand changes. Technological innovations may increase or reduce labor requirements for an occupation. For example, the growing use of computer technology is expected to increase the requirements for systems analysts and computer programmers and in nearly all industries these workers are expected to account for an increasing share of total employment during the 1984–95 period. However, requirements for typists are expected to be reduced because of the spreading use of word processing equipment and the amount of these workers is projected to decline as a proportion of employment in virtually all industries. Nevertheless, in many industries, employment of typists is expected to rise as the increase in total industry employment overrides the impact of technology.

In addition to technological innovations, changes in business practices and methods of operation affect the occupational structure of an industry. For example, the growing tendency of businesses to contract out building cleaning services will reduce the proportion of employment accounted for by janitors and cleaners in most industries. However, the negative effect on employment of janitors of this trend will be offset by significant employment gains in the building cleaning services industry.

Changes in the demand for goods and services provided by an industry will also affect its occupational structure. For example, the educational services industry will have an increase in demand for elementary schoolteachers as the number of elementary school age children rises, but a decline in demand for college teachers as the number of college age students declines. Therefore, the occupational structure of the educational services industry in 1995 is projected to have a larger proportion of elementary schoolteachers than in 1984 but to also have a smaller proportion of college teachers.

It is important to remember that occupational structure changes and industry employment shifts do not operate in isolation. The factors interact with one another and it is usually not possible to attribute an occupational employment change solely to one factor. Computer programmers, for example, are generally increasing as a proportion of employment in most industries, but overall employment growth for this occupation is also affected by increasing total employment within most industries that are large employers of these computer-related occupations.

The Bureau has developed three sets of occupational projections with each set tied to one of the economic and industry employment alternatives presented elsewhere in this publication. The projected staffing patterns of industries used to translate industry employment into occupational employment were identical for all alternatives. The different growth rates for occupations among the alternatives, therefore, reflect the assumptions and analyses that underlie the alternative industry employment projections.

The basic changes in the occupational structure of the economy from 1984 to 1995 among the three alternatives are similar. Thus, although this article focuses on the moderate scenario, the discussion would be very similar if either of the other scenarios were highlighted. The major differences in trends among the alternatives are discussed later in this article. Differences in the occupational projections among the three alternatives should not be considered as the potential range within which projected 1995 employment will fall. The potential range is wider because most occupations are sensitive to a much wider variety of assumptions than those that were considered in the alternatives that are presented.

Detailed occupational employment trends

Projections for detailed occupations having 25,000 or more workers in 1984 are presented in table 2.[2] The job market over the 1984–95 period implied by these projections can be viewed from a variety of perspectives. One view indicates occupations that are expected to provide the largest numerical growth. Another view presents occupations that are expected to have the most rapid growth or the largest percentage declines. It is also useful to view occupations from the perspective of job clusters that contain occupations concentrated in specific industrial sectors of the economy or which perform related types of activities. Within each cluster, occupations generally have wide ranges of skill or training requirements. *(Text continues on page 50)*

Table 2. Civilian employment in occupations with 25,000 workers or more, actual 1984 and projected 1995

Occupation	Total employment (in thousands)				1984–95 employment change					
		1995			Numbers in thousands			Percent		
	1984	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Total, all occupations	106,843	117,268	122,760	127,718	10,425	15,918	20,875	10	15	20
Managerial and management related occupations	11,274	13,139	13,762	14,310	1,865	2,487	3,035	17	22	27
Managerial and administrative occupations	8,833	10,247	10,739	11,176	1,414	1,906	2,344	16	22	27
Elementary and secondary school principals and assistant principals	125	133	137	142	9	12	17	7	10	14
Food service and lodging managers	657	711	746	778	55	89	121	8	14	18
Public administrators, chief executives, legislators, and general administrators	141	154	158	162	13	17	21	9	12	15
Management support occupations	2,441	2,892	3,022	3,133	451	581	692	18	24	28
Accountants and auditors	882	1,135	1,189	1,235	253	307	353	29	35	40
Compliance and enforcement inspectors, except construction	122	129	131	134	7	10	12	6	8	10
Construction and building inspectors	55	58	59	61	2	4	6	4	7	10
Cost estimators	114	130	136	140	15	21	26	13	19	23
Personnel specialists and related workers	319	365	381	394	46	62	75	14	19	23
Employment interviewers, private or public employment service	72	90	95	98	19	23	26	26	32	37
Personnel, training, and labor relations specialists	198	223	232	240	25	34	42	13	17	21
Special agents, insurance	26	29	31	32	3	5	6	12	18	23
Purchasing agents and buyers	418	460	482	500	43	64	83	10	15	20
Purchasing agents, except wholesale, retail, and farm products	189	216	225	232	28	36	43	15	19	23
Wholesale and retail buyers, except farm products	229	244	258	269	15	28	39	6	12	17
Tax examiners, collectors, and revenue agents	52	50	51	51	−2	−1	−1	−3	−3	−2
Underwriters	78	90	95	100	12	17	21	15	22	27
Engineers, architects, and surveyors	1,468	1,896	1,980	2,051	427	511	582	29	35	40
Engineers	1,331	1,734	1,811	1,877	403	480	546	30	36	41
Aeronautical and astronautical engineers	48	60	62	64	12	14	16	25	30	33
Chemical engineers	56	66	69	72	10	13	16	18	24	29
Civil engineers, including traffic engineers	175	214	222	229	39	46	53	22	27	30
Electrical and electronics engineers	390	571	597	617	181	206	227	46	53	58
Industrial engineers, except safety engineers	125	154	162	168	29	37	43	23	29	35
Mechanical engineers	237	303	317	329	66	81	93	28	34	39
Architects, including landscape architects	93	113	118	122	20	25	29	21	27	31
Surveyors	44	48	50	52	4	6	8	10	14	17
Natural, computer, and mathematical scientists	658	886	921	951	229	263	293	35	40	45
Computer systems analysts, electronic data processing	308	498	520	539	190	212	231	62	69	75
Life scientists	113	126	129	132	13	16	19	12	14	17
Biological scientists	54	62	64	65	8	9	11	14	17	20
Foresters and conservation scientists	25	27	27	27	2	2	2	6	7	8
Mathematical scientists	51	61	63	65	10	12	13	19	23	26
Physical scientists	186	202	209	216	16	24	30	9	13	16
Chemists	85	90	94	97	5	9	12	5	10	14
Geologists, geophysicists, and oceanographers	46	51	53	55	5	7	8	11	15	18
Social scientists	186	212	219	226	26	33	40	14	18	21
Economists	38	44	45	47	6	7	8	16	19	22
Psychologists	97	113	118	122	16	21	25	17	22	26
Social, recreational, and religious workers	789	878	910	946	89	121	157	11	15	20
Clergy	296	303	315	328	7	19	32	2	6	11
Directors, religious activities and education	34	35	36	38	1	2	4	2	6	11
Recreation workers	123	144	149	155	21	26	32	17	21	26
Social workers	335	396	410	425	61	75	90	18	22	27
Lawyers and judges	524	674	705	732	151	181	208	29	35	40
Judges, magistrates, and other judicial workers	33	39	40	41	6	7	8	18	21	24
Lawyers	490	635	665	691	145	174	200	30	36	41
Teachers, librarians, and counselors	4,510	4,815	4,965	5,131	305	456	621	7	10	14
Teachers, preschool, kindergarten, and elementary	1,660	1,922	1,981	2,047	262	321	387	16	19	23
Teachers, preschool	278	307	319	330	29	41	52	10	15	19
Teachers, kindergarten and elementary	1,381	1,615	1,662	1,716	234	281	335	17	20	24
Teachers, secondary school	1,045	1,062	1,093	1,129	17	48	83	2	5	8
College and university faculty	731	636	654	675	−96	−77	−56	−13	−11	−8
Other teachers and instructors	747	833	864	894	86	117	147	12	16	20
Farm and home management advisors	27	23	24	25	−3	−3	−2	−12	−10	−7
Graduate assistants, teaching	145	134	137	142	−12	−8	−4	−8	−6	−2
Instructors, adult (nonvocational) education	132	161	166	171	29	34	39	22	26	30
Teachers and instructors, vocational education and training	124	134	138	143	9	14	19	8	11	15
Librarians, archivists, curators, and related workers	174	186	192	198	12	18	24	7	10	14
Librarians	155	166	171	177	11	16	22	7	10	14
Counselors	152	176	182	188	23	29	36	15	19	23
Health diagnosing and treating occupations	2,610	3,203	3,349	3,489	594	739	879	23	28	34
Chiropractors	31	39	40	42	8	9	11	24	29	34
Dentists	156	185	195	203	28	39	47	18	25	30
Dietitians and nutritionists	48	58	60	62	10	12	15	21	26	31
Opticians, dispensing and measuring	42	49	51	54	7	10	12	18	23	29
Optometrists	29	35	36	38	6	8	10	20	27	34
Pharmacists	151	158	166	173	7	15	22	5	10	14
Physicians assistants	25	33	35	37	8	10	12	33	40	46

Table 2. Continued—Civilian employment in occupations with 25,000 workers or more, actual 1984 and projected 1995

Occupation	Total employment (in thousands)				1984–95 employment change					
		1995			Numbers in thousands			Percent		
	1984	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Physicians and surgeons	476	556	585	607	81	109	131	17	23	28
Registered nurses	1,377	1,753	1,829	1,908	376	452	532	27	33	39
Therapists	225	276	287	299	51	62	74	23	28	33
Occupational therapists	25	32	33	35	7	8	9	27	31	37
Physical therapists	58	79	83	86	21	25	28	36	42	48
Respiratory therapists	55	63	66	69	9	11	15	16	21	27
Speech pathologists and audiologists	47	54	55	57	6	8	10	14	17	21
Veterinarians and veterinary inspectors	40	47	48	50	7	9	10	18	22	26
Writers, artists, entertainers, and athletes	1,192	1,406	1,473	1,530	214	281	337	18	24	28
Artists and commercial artists	204	252	264	274	48	60	70	23	29	34
Designers, except interior designers	205	239	251	261	34	46	56	17	22	27
Musicians	192	208	217	226	16	26	35	8	13	18
Photographers and camera operators	101	123	129	134	23	29	34	23	29	33
Producers, directors, actors, and entertainers	50	58	61	63	9	11	14	17	23	27
Public relations specialists and publicity writers	95	119	125	130	24	30	35	26	32	36
Radio and TV announcers and newscasters	56	60	62	65	4	6	9	7	11	16
Reporters and correspondents	69	79	82	86	10	13	17	14	19	24
Writers and editors, including technical writers	191	234	245	254	42	54	63	22	28	33
Technician occupations	3,049	3,770	3,935	4,088	720	886	1,039	24	29	34
Health technicians and technologists	1,188	1,329	1,388	1,447	140	199	259	12	17	22
Dental hygienists	76	92	98	102	16	22	26	21	29	34
Emergency medical technicians	47	49	50	52	2	3	5	4	7	11
Licensed practical nurses	602	680	708	739	78	106	137	13	18	23
Medical and clinical laboratory technologists and technicians	236	243	254	265	6	18	28	3	7	12
Medical records technicians and technologists	33	42	44	46	9	10	12	26	31	37
Radiologic technicians and technologists	115	135	141	148	20	27	33	18	23	29
Surgical technicians	36	40	41	43	3	5	7	9	14	20
Engineering and science technicians and technologists	1,314	1,615	1,686	1,747	301	371	433	23	28	33
Engineering technicians	730	978	1,022	1,059	248	292	329	34	40	45
Civil engineering technicians and technologists	58	71	74	77	13	16	19	23	28	32
Electrical and electronics technicians and technologists	404	579	607	629	175	202	225	43	50	56
Industrial engineering technicians and technologists	27	32	34	35	5	7	8	20	26	31
Mechanical engineering technicians and technologists	55	71	75	78	16	20	23	30	37	42
Drafters	345	366	384	400	21	39	55	6	11	16
Physical and life science technicians and technologists	239	270	279	288	31	40	49	13	17	20
Technicians, except health, engineering, and science	546	826	862	894	279	315	347	51	58	64
Broadcast technicians	25	29	30	31	4	5	6	16	21	25
Computer programmers	341	559	586	609	218	245	268	64	72	79
Paralegal personnel	53	100	104	108	47	51	55	90	98	105
Technical assistants, library	42	45	46	47	3	4	5	6	9	12
Marketing and sales occupations	11,173	12,697	13,393	13,990	1,525	2,220	2,817	14	20	25
Cashiers	1,902	2,343	2,469	2,579	441	566	677	23	30	36
Counter and rental clerks	96	93	98	101	−3	2	5	−3	2	6
Insurance salesworkers	371	384	405	422	13	34	51	3	9	14
Manufacturing salesworkers	[1]547	[1]569	[1]598	[1]623	22	51	75	4	9	14
Real estate agents and brokers	363	396	415	432	33	52	69	9	14	18
Brokers, real estate	43	48	50	52	5	7	9	12	16	21
Sales agents, real estate	320	348	365	380	28	45	60	9	14	19
Real estate appraisers	38	42	45	46	5	7	8	13	19	22
Salespersons, retail	2,732	2,916	3,075	3,213	184	343	480	7	13	18
Securities and financial services salesworkers	81	107	113	118	26	32	36	32	39	45
Stock clerks, sales floor	574	607	641	670	33	67	96	6	12	17
Travel agents	72	98	103	108	26	32	36	37	44	50
Wholesale trade salesworkers	[1]1,248	[1]1,536	[1]1,617	[1]1,688	288	369	440	23	30	35
Administrative support occupations, including clerical	18,716	19,572	20,499	21,332	856	1,783	2,616	5	10	14
Adjusters and investigators	530	603	632	655	74	102	125	14	19	24
Adjustment clerks	65	74	78	81	9	13	17	14	21	26
Bill and account collectors	115	137	144	150	22	28	34	19	25	30
Insurance adjusters, examiners, and investigators	134	158	166	171	24	32	38	18	24	28
Insurance claims and policy processing clerks	125	132	138	143	7	13	18	6	11	15
Welfare eligibility workers and interviewers	59	68	69	71	8	10	12	14	17	20
Communications equipment operators	472	535	561	585	62	89	113	13	19	24
Telephone operators	456	519	545	568	63	89	112	14	19	25
Central office operators	77	64	68	71	−12	−9	−6	−16	−11	−7
Directory assistance operators	32	28	30	31	−4	−2	−1	−12	−7	−3
Switchboard operators	347	426	447	466	79	100	118	23	29	34
Computer operators and peripheral equipment operators	311	434	454	472	122	143	161	39	46	52
Computer operators, except peripheral equipment	241	337	353	366	96	111	125	40	46	52
Peripheral EDP equipment operators	70	97	102	106	27	32	36	38	45	51
Duplicating, mail, and other office machine operators	153	170	178	185	17	25	32	11	17	21
Financial records processing occupations	2,629	2,676	2,812	2,929	47	183	300	2	7	11
Billing, cost, and rate clerks	216	240	254	265	25	38	49	11	18	23
Billing, posting, and calculating machine operators	234	258	272	283	25	38	50	11	16	21
Bookkeeping, accounting, and auditing clerks	1,973	1,990	2,091	2,178	17	118	205	1	6	10
Payroll and timekeeping clerks	207	188	196	204	−20	−11	−4	−10	−5	−2
Information clerks	737	810	855	894	72	117	157	10	16	21
Hotel desk clerks	99	109	116	122	10	17	23	10	17	23

Table 2. Continued—Civilian employment in occupations with 25,000 workers or more, actual 1984 and projected 1995

Occupation	Total employment (in thousands)				1984–95 employment change					
		1995			Numbers in thousands			Percent		
	1984	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
New accounts clerks, banking	72	78	82	85	6	10	14	9	14	19
Receptionists and information clerks	458	512	542	566	54	83	108	12	18	24
Reservation and transportation ticket agents and travel clerks	109	111	116	121	3	7	12	2	6	11
Mail and message distribution workers	802	757	796	842	−45	−5	40	−6	−1	5
Mail clerks, except mailing machine operators and postal service	136	135	140	144	−2	3	8	−1	3	6
Messengers	67	74	78	81	7	10	14	10	16	20
Postal mail carriers	281	273	389	308	−8	8	27	−3	3	10
Postal service clerks	317	274	290	309	−43	−27	−8	−13	−9	−3
Material recording, scheduling, dispatching, and distributing occupations	2,417	2,426	2,545	2,650	10	128	234	0	5	10
Dispatchers	203	225	235	243	22	32	40	11	16	20
Dispatchers, except police, fire, and ambulance	144	161	169	176	17	25	32	12	17	22
Dispatchers, police, fire, and ambulance	59	63	65	67	5	6	8	8	11	14
Meter readers, utilities	50	51	53	55	1	3	5	1	6	10
Order fillers, wholesale and retail sales	226	208	219	229	−18	−7	3	−8	−3	1
Procurement clerks	53	56	58	60	3	5	7	6	10	14
Production, planning, and expediting clerks	214	222	233	242	9	19	29	4	9	13
Stock clerks, stockroom, warehouse, or yard	788	734	772	805	−54	−16	17	−7	−2	2
Traffic, shipping, and receiving clerks	651	676	711	742	26	61	91	4	9	14
Weighers, measurers, checkers, and samplers, recordkeeping	37	37	39	41	0	2	4	0	5	10
Records processing occupations, except financial	893	957	1,001	1,040	63	107	146	7	12	16
Brokerage clerks	29	33	35	37	4	6	7	13	20	25
File clerks	289	282	296	308	−7	7	19	−2	2	7
Library assistants and bookmobile drivers	122	130	134	139	9	12	17	7	10	14
Order clerks, material, merchandise, and service	297	337	355	370	40	57	73	13	19	25
Personnel clerks, except payroll and timekeeping	108	123	127	131	14	19	22	13	17	21
Statement clerks	37	39	41	42	2	4	6	6	11	16
Secretaries, stenographers, and typists	4,027	4,027	4,209	4,372	0	182	345	0	5	9
Secretaries	2,797	2,928	3,064	3,186	131	268	389	5	10	14
Stenographers	239	138	143	148	−102	−96	−92	−42	−40	−38
Typists	991	962	1,002	1,038	−29	11	47	−3	1	5
Other clerical and administrative support workers	5,744	6,177	6,455	6,707	433	711	963	8	12	17
Court clerks	33	40	41	42	6	7	9	19	23	26
Credit checkers	34	41	43	44	7	9	10	21	26	31
Customer service representatives, utilities	92	103	108	113	11	16	21	12	18	23
Data entry keyers, except composing	324	319	334	347	−5	10	23	−2	3	7
General office clerks	2,398	2,511	2,629	2,734	113	231	336	5	10	14
Loan and credit clerks	123	137	144	150	14	21	27	11	17	22
Statistical clerks	93	78	81	84	−15	−12	−9	−16	−13	−9
Teacher aides and educational assistants	479	548	566	586	70	88	107	15	18	22
Tellers	493	492	517	539	−1	24	47	0	5	9
Service occupations	16,582	18,891	19,728	20,548	2,309	3,147	3,966	14	19	24
Building service occupations	2,981	3,274	3,425	3,566	293	444	584	10	15	20
Janitors and cleaners, including maids and housekeeping cleaners	2,940	3,233	3,383	3,522	293	443	582	10	15	20
Pest controllers and assistants	41	41	42	44	0	1	3	−1	3	7
Food and beverage preparers and service occupations	6,637	7,772	8,130	8,490	1,135	1,493	1,853	17	23	28
Bakers, bread and pastry	68	76	80	84	9	13	17	13	19	25
Bartenders	400	489	512	535	89	112	135	22	28	34
Cooks, except short order	884	1,050	1,095	1,140	165	210	256	19	24	29
Cooks, institutional or cafeteria	421	478	494	512	57	73	91	13	17	22
Cooks, restaurant	463	572	601	628	109	138	164	23	30	36
Cooks, short order and specialty fast food	425	476	499	521	51	74	96	12	17	23
Dining room and cafeteria attendants and barroom helpers	307	364	381	399	56	74	91	18	24	30
Food preparation and service workers, fast food	1,201	1,354	1,417	1,481	152	215	279	13	18	23
Food preparation workers, except fast food	987	1,155	1,205	1,258	169	219	271	17	22	28
Hosts and hostesses, restaurant, lounge, and coffee shop	132	160	168	176	29	36	44	22	28	34
Waiters and waitresses	1,625	1,953	2,049	2,142	329	424	517	20	26	32
Health service and related occupations	1,666	2,080	2,164	2,259	415	498	593	25	30	36
Dental assistants	169	204	217	226	35	48	57	20	28	34
Medical assistants	128	195	207	216	67	79	88	53	62	69
Nursing aides and psychiatric aides	1,268	1,567	1,621	1,693	299	353	424	24	28	33
Nursing aides, orderlies, and attendants	1,204	1,501	1,552	1,621	297	348	416	25	29	35
Psychiatric aides	64	66	69	72	2	5	8	3	8	13
Pharmacy assistants	37	42	43	45	4	6	8	12	17	22
Physical and correctional therapy assistants and aides	33	40	42	44	7	9	11	23	28	35
Personal service occupations	1,574	1,782	1,870	1,950	208	295	375	13	19	24
Amusement and recreation attendants	149	181	189	196	32	39	46	21	26	31
Baggage porters and bellhops	31	31	33	35	0	2	4	1	7	12
Barbers	94	94	98	104	0	4	9	0	4	10
Child care workers	572	596	626	651	24	55	80	4	10	14
Cosmetologists and related workers	524	639	674	704	116	150	180	22	29	34
Flight attendants	64	74	77	81	10	13	17	15	20	26
Social welfare service aides	98	122	126	132	24	28	33	24	29	34
Ushers, lobby attendants, and ticket takers	42	44	46	48	2	4	6	5	9	13
Private household workers	993	778	811	840	−215	−182	−153	−22	−18	−15

Table 2. Continued—Civilian employment in occupations with 25,000 workers or more, actual 1984 and projected 1995

Occupation	Total employment (in thousands)				1984–95 employment change					
	1984	1995			Numbers in thousands			Percent		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Protective service occupations	1,924	2,227	2,306	2,379	303	382	455	16	20	24
Correction officers and jailers	130	171	175	180	41	45	50	31	35	38
Firefighting occupations	308	347	356	365	39	48	57	13	16	19
Firefighters	243	273	280	287	31	38	45	13	16	18
Firefighting and prevention supervisors	57	64	66	68	8	9	11	13	16	20
Police and detectives	520	572	586	600	51	66	80	10	13	15
Police and detective supervisors	104	113	116	118	9	12	15	9	11	14
Police detectives and investigators	64	69	70	71	5	6	7	8	10	11
Police patrol officers	353	390	400	411	37	48	58	10	13	17
Crossing guards	75	80	82	84	4	7	9	6	9	12
Guards	733	879	921	958	146	188	225	20	26	31
Agriculture, forestry, fishing, and related occupations	3,554	3,291	3,447	3,567	−264	−108	12	−7	−3	0
Supervisors, farming, forestry, and agriculture related occupations	82	75	78	81	−7	−4	−1	−8	−5	−2
Agriculture related occupations	740	798	830	857	58	90	117	8	12	16
Animal caretakers, except farm	69	78	81	83	9	12	14	13	17	20
Gardeners and groundskeepers, except farm	650	699	727	752	49	77	102	8	12	16
Farm workers	1,079	911	958	988	−168	−121	−91	−16	−11	−8
Farmers and farm managers	1,442	1,315	1,380	1,432	−127	−62	−11	−9	−4	−1
Fishers, hunters, and trappers	46	42	44	47	−4	−2	1	−9	−4	2
Forestry and logging occupations	135	119	125	131	−16	−10	−4	−12	−7	−3
Blue-collar worker supervisors	1,470	1,481	1,555	1,622	11	85	152	1	6	10
Construction trades	3,347	3,583	3,743	3,877	236	396	530	7	12	16
Bricklayers and stone masons	140	148	155	161	8	15	20	5	11	15
Carpenters	944	998	1,046	1,085	54	101	140	6	11	15
Carpet installers	71	78	82	86	8	11	15	11	16	21
Ceiling tile installers and acoustical carpenters	25	28	29	29	3	4	5	11	15	18
Concrete and terrazzo finishers	106	118	123	127	12	17	21	12	16	20
Drywall installers and finishers	106	112	117	121	6	11	15	6	11	14
Drywall installers	62	65	69	71	4	7	10	6	12	16
Tapers	31	33	34	35	2	3	4	8	11	14
Electricians	545	606	633	657	61	88	112	11	16	20
Glaziers	37	43	45	46	6	8	9	15	21	25
Hard tile setters	25	27	28	29	2	3	4	9	12	14
Highway maintenance workers	143	147	151	155	4	8	12	3	6	9
Insulation workers	52	57	59	61	5	7	9	9	14	17
Painters and paperhangers	378	378	395	409	0	17	31	0	4	8
Pipelayers and pipelaying fitters	48	54	56	58	5	7	9	11	15	19
Plumbers, pipefitters, and steamfitters	395	436	455	472	42	61	77	11	15	20
Roofers	122	132	138	143	10	16	21	8	13	17
Structural and reinforcing metal workers	86	98	102	106	12	16	19	14	18	22
Reinforcing metal workers	35	39	41	42	5	7	8	14	19	22
Structural metal workers	52	59	61	63	7	9	12	13	18	22
Extractive and related workers, including blasterers	175	170	178	184	−5	2	8	−3	1	5
Roustabouts	81	77	81	84	−4	0	3	−5	0	3
Mechanics, installers, and repairers	4,391	4,806	5,038	5,247	414	647	855	9	15	19
Communications equipment mechanics, installation, and repair	73	72	76	79	−1	3	6	−2	4	8
Central office and PBX installers and repairers	39	42	44	46	3	5	7	7	13	18
Electrical and electronic equipment mechanics, installers, and repairers	503	530	557	580	27	53	76	5	11	15
Data processing equipment repairers	50	74	78	81	24	28	31	49	56	63
Electric motor, transformer, and related repairers	25	28	30	31	4	5	6	15	21	25
Electronic home entertainment equipment repairers	52	56	59	62	4	7	10	7	13	19
Electronics repairers, commercial and industrial equipment	56	62	64	65	6	8	10	11	14	18
Station installers and repairers, telephone	111	87	92	96	−24	−19	−15	−22	−17	−14
Telephone and cable TV line installers and repairers	183	193	202	211	10	20	28	5	11	15
Machinery and related mechanics, installers, and repairers	1,452	1,559	1,632	1,702	106	179	250	7	12	17
Industrial machinery mechanics	430	443	464	483	13	34	54	3	8	12
Machinery maintenance mechanics, marine equipment	27	29	30	31	2	3	4	6	11	15
Machinery maintenance mechanics, textile machine	26	21	22	23	−5	−4	−3	−19	−15	−10
Machinery maintenance mechanics, water and power plant	32	34	36	37	2	3	5	5	10	15
Machinery maintenance workers	61	61	64	67	0	3	6	1	5	10
Maintenance repairers, general utility	878	970	1,015	1,057	92	137	179	10	16	20
Millwrights	84	85	89	95	1	6	11	1	7	13
Vehicle and mobile equipment mechanics and repairers	1,577	1,786	1,874	1,951	209	297	374	13	19	24
Aircraft mechanics and engine specialists	106	122	125	128	15	18	22	14	17	21
Automotive body and related repairers	183	204	215	224	21	32	41	11	18	22
Automotive and motorcycle mechanics	922	1,052	1,107	1,154	131	185	232	14	20	25
Bus and truck mechanics and diesel engine specialists	211	246	259	270	36	48	59	17	23	28
Mobile heavy equipment mechanics, except engines	77	86	89	92	9	12	15	12	15	19
Rail car repairers	27	20	21	22	−7	−6	−5	−25	−22	−18
Small engine specialists	33	36	38	40	4	6	8	12	17	23
Other mechanics, installers, and repairers	786	859	899	935	73	114	150	9	14	19
Coin and vending machine servicers and repairers	33	36	38	40	3	5	7	9	15	20
Heating, air conditioning, and refrigeration mechanics and installers	173	194	203	210	20	29	37	12	17	21
Home appliance and power tool repairers	83	87	92	97	4	9	14	5	11	16

Table 2. Continued—Civilian employment in occupations with 25,000 workers or more, actual 1984 and projected 1995

Occupation	Total employment (in thousands)				1984–95 employment change					
		1995			Numbers in thousands			Percent		
	1984	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Office machine and cash register servicers	53	65	68	71	13	16	19	24	30	35
Precision instrument repairers	57	63	65	68	5	8	11	9	14	19
Tire repairers and changers	85	91	96	100	6	11	15	7	13	18
Precision production occupations	2,854	2,992	3,140	3,266	138	287	412	5	10	14
Precision food workers	302	280	293	304	−22	−9	2	−7	−3	1
Bakers, manufacturing	48	47	50	52	−1	2	4	−1	3	7
Butchers and meatcutters	222	203	213	220	−18	−9	−1	−8	−4	−1
Precision metal workers	944	995	1,044	1,084	52	100	141	5	11	15
Boilermakers	38	40	41	43	2	4	6	6	10	15
Jewelers and silversmiths	32	33	35	37	1	3	5	2	8	14
Machinists	354	372	391	407	18	37	53	5	10	15
Sheet metal workers	232	254	265	274	22	33	41	9	14	18
Tool and die makers	165	172	181	188	8	16	23	5	10	14
Precision printing workers	113	125	129	134	12	16	21	10	14	18
Compositors, typesetters, and arrangers, precision	37	39	41	42	2	4	5	7	10	14
Lithography and photoengraving workers, precision	45	51	53	55	6	7	9	12	17	21
Precision textile, apparel, and furnishings workers	266	259	273	284	−7	7	18	−3	3	7
Custom tailors and sewers	127	133	141	146	6	13	19	5	10	15
Shoe and leather workers and repairers, precision	43	34	35	37	−10	−8	−7	−23	−19	−15
Upholsterers	63	66	69	72	3	6	9	5	10	14
Precision woodworkers	199	219	231	241	20	32	41	10	16	21
Cabinetmakers and bench carpenters	99	113	118	123	13	19	24	13	19	24
Furniture finishers	34	35	37	39	1	4	5	4	10	16
Wood machinists	45	49	52	54	4	7	9	9	15	19
Inspectors and related occupations	689	732	769	802	43	80	113	6	12	16
Inspectors, testers, and graders, precision	254	288	302	315	34	49	61	14	19	24
Other production inspectors, testers, graders, and sorters	435	444	467	487	9	31	52	2	7	12
Other precision workers	340	381	401	417	41	60	77	12	18	23
Dental laboratory technicians, precision	51	57	61	64	6	10	13	11	19	25
Photographic process workers, precision	25	30	32	33	5	7	8	21	27	32
Machine setters, set-up operators, operators and tenders	5,553	5,472	5,748	5,996	−81	196	443	−1	4	8
Numerical control machine tool operators and tenders, metal and plastic	57	70	74	77	14	17	20	24	30	35
Combination machine tool setters, set-up operators, operators, and tenders	108	131	136	141	23	29	33	22	27	31
Machine tool cutting and forming setters, operators, and tenders, metal and plastic	846	779	820	857	−66	−26	12	−8	−3	1
Drilling machine tool setters and set-up operators, metal and plastic	64	61	64	67	−3	0	2	−5	0	4
Extruding and drawing machine setters and set-up operators, metal and plastic	28	24	25	27	−4	−3	−1	−14	−9	−2
Grinding machine setters and set-up operators, metal and plastic	95	89	94	98	−5	0	3	−5	−1	3
Lathe machine tool setters and set-up operators, metal and plastic	98	93	98	102	−5	0	4	−5	0	4
Machine forming operators and tenders, metal and plastic	171	157	165	173	−15	−7	1	−9	−4	1
Machine tool cutting operators and tenders, metal and plastic	170	155	163	170	−16	−8	−1	−9	−4	0
Milling machine setters and set-up operators, metal and plastic	35	34	35	37	−2	0	1	−5	0	4
Press machine setters and set-up operators, metal and plastic	48	45	47	49	−4	−2	0	−8	−3	1
Punching machine setters and set-up operators, metal and plastic	63	58	61	64	−5	−2	1	−8	−3	1
Metal fabricating machine setters, operators, and related workers	192	220	231	240	28	39	49	15	20	25
Metal fabricators, structural metal products	44	51	53	55	7	10	11	17	22	26
Welding machine operators, tenders, setters, and set-up operators	130	149	157	163	19	26	33	14	20	25
Metal and plastic process machine setters, operators, and related workers	304	342	362	382	39	58	79	13	19	26
Electric plating machine operators, tenders, setters, and set-up operators, metal and plastic	48	55	58	60	6	9	12	13	19	25
Metal molding machine operators, tenders, setters, and set-up operators	37	38	40	42	0	3	5	1	7	12
Plastic molding machine operators, tenders, setters, and set-up operators	144	175	185	195	31	42	52	22	29	36
Printing, binding, and related workers	407	443	461	478	36	54	71	9	13	18
Bindery machine operators, setters, and set-up operators	70	79	82	86	9	13	16	14	18	23
Printing press operators	222	239	248	257	17	26	35	7	12	16
Offset lithographic press setters and set-up operators	69	76	78	81	6	9	12	9	13	17
Printing press machine operators and tenders	113	123	128	133	10	15	20	9	14	18
Typesetting and composing machine operators and tenders	36	38	39	41	2	4	5	6	10	14
Textile and related setters, operators, and related workers	1,422	1,190	1,253	1,310	−232	−169	−113	−16	−12	−8
Laundry and drycleaning machine operators and tenders, except pressers	125	134	141	148	9	16	23	7	13	18
Pressing machine operators and tenders, textile, garment, and related	116	101	106	110	−15	−10	−6	−13	−9	−5
Sewing machine operators, garment	676	534	563	586	−141	−113	−89	−21	−17	−13
Sewing machine operators, nongarment	136	128	135	142	−7	−1	6	−5	0	4
Shoe sewing machine operators and tenders	33	21	22	24	−12	−10	−9	−36	−32	−28

Table 2. Continued—Civilian employment in occupations with 25,000 workers or more, actual 1984 and projected 1995

Occupation	Total employment (in thousands)				1984–95 employment change					
	1984	1995			Numbers in thousands			Percent		
		Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend	Low trend	Moderate trend	High trend
Textile machine operators, tenders, setters, and set-up operators, winding	279	223	235	247	−55	−44	−32	−20	−16	−11
Woodworking machine setters, operators, and other related workers	145	149	157	162	4	12	17	3	8	12
Sawing machine operators, tenders, setters, and set-up operators	63	65	68	70	2	5	8	3	9	12
Woodworking machine operators, tenders, setters, and set-up operators	73	75	79	81	3	6	9	4	9	12
Other machine setters, set-up operators, operators, and tenders	1,978	2,045	2,147	2,236	67	169	258	3	9	13
Boiler operators and tenders, low pressure	44	45	47	49	1	3	5	3	7	10
Cementing and gluing machine operators and tenders	45	42	45	46	−2	0	2	−5	0	4
Chemical equipment controllers, operators, and tenders	77	75	79	83	−2	2	6	−2	3	7
Crushing and mixing machine operators and tenders	122	119	125	131	−3	3	9	−3	2	7
Cutting and slicing machine operators and tenders	61	59	62	64	−2	0	3	−4	1	5
Electronic semiconductor processors	30	36	38	40	6	8	9	19	25	30
Extruding and forming machine operators and tenders	71	72	76	79	1	5	8	2	7	12
Furnace, kiln, or kettle operators and tenders	63	47	50	52	−16	−13	−11	−25	−21	−17
Packaging and filling machine operators and tenders	369	382	402	419	13	33	50	3	9	14
Painting machine operators and tenders	69	72	76	79	3	7	11	5	10	15
Painters, transportation equipment	60	66	69	72	6	9	12	10	15	20
Paper goods machine setters and set-up operators	60	59	63	65	−1	2	4	−2	3	7
Photographic processing machine operators and tenders	26	32	33	35	5	7	8	21	27	32
Hand working occupations, including assemblers and fabricators	2,624	2,755	2,893	3,015	131	269	391	5	10	15
Precision assemblers	353	399	419	434	46	66	82	13	19	23
Electrical and electronic equipment assemblers, precision	176	196	205	213	20	29	37	11	17	21
Electromechanical equipment assemblers, precision	61	72	75	78	10	14	17	17	23	28
Machine builders and other precision machine assemblers	52	60	64	66	8	11	14	16	22	27
Other hand workers, including assemblers and fabricators	2,271	2,356	2,475	2,581	85	203	309	4	9	14
Cannery workers	77	68	72	74	−9	−5	−3	−12	−7	−3
Cutters and trimmers, hand	49	44	46	48	−6	−3	−1	−12	−7	−3
Electrical and electronic assemblers	259	288	302	313	28	42	54	11	16	21
Machine assemblers	51	59	62	64	7	10	13	14	20	24
Meat, poultry, and fish cutters and trimmers, hand	98	90	93	95	−8	−5	−3	−8	−5	−3
Painting, coating, and decorating workers, hand	41	43	45	47	2	4	7	5	11	17
Welders and cutters	308	333	349	364	25	41	56	8	13	18
Plant and system occupations	275	285	297	309	10	22	34	4	8	12
Chemical plant and system operators	35	35	36	38	0	1	3	−1	4	9
Power distributors and dispatchers	26	29	30	32	3	4	6	10	16	21
Stationary engineers	54	56	58	61	2	4	6	3	7	11
Water and liquid waste treatment plant and system operators	82	88	91	94	7	9	12	8	11	15
Transportation and material moving machine and vehicle operators	4,678	4,969	5,206	5,418	291	528	740	6	11	16
Aircraft pilots and flight engineers	79	94	97	101	15	18	22	19	23	28
Motor vehicle operators	3,061	3,422	3,586	3,729	361	525	668	12	17	22
Busdrivers	459	522	536	552	63	77	93	14	17	20
Busdrivers, local and intercity	131	145	149	153	14	18	22	11	14	17
Busdrivers, school	328	377	387	399	49	59	71	15	18	22
Tax drivers and chauffeurs	118	132	138	143	13	20	25	11	17	21
Truck drivers	2,484	2,768	2,911	3,033	284	428	549	11	17	22
Rail transportation workers	113	84	88	93	−29	−25	−20	−25	−22	−18
Railroad brake, signal, and switch operators	48	33	35	37	−14	−13	−11	−30	−26	−22
Water transportation and related workers	56	57	60	62	1	3	6	2	6	10
Parking lot attendants	40	39	42	44	−1	1	3	−2	3	8
Service station attendants	303	281	297	310	−21	−6	7	−7	−2	2
Material moving equipment operators	928	896	938	976	−32	9	48	−3	1	5
Conveyor operators and tenders	38	37	39	41	−1	1	3	−2	3	8
Hoist, winch, and crane operators	103	110	115	122	6	12	19	6	12	18
Industrial truck and tractor operators	389	326	342	357	−63	−46	−31	−16	−12	−8
Operating engineers	357	385	400	413	27	43	56	8	12	16
Helpers, laborers, and material movers, hand	4,166	4,231	4,436	4,615	64	269	448	2	6	11
Helpers, construction trades	443	449	470	486	6	27	43	1	6	10
Helpers, extractive workers	29	30	31	32	1	2	3	3	7	11
Machine feeders and offbearers	278	281	296	309	3	18	31	1	6	11
Refuse collectors	99	112	116	120	14	17	22	14	18	22
Hand packers and packagers	325	327	344	358	3	19	33	1	6	10
Vehicle washers and equipment cleaners	144	145	153	160	1	9	16	1	6	11

[1]Wage and salary workers only.

Occupations adding largest number of jobs. Thirty-seven of the 500 detailed occupations for which projections were developed account for about one-half of the projected total job growth between 1984 and 1995. (See table 3.) About one-fourth of the occupations generally require a college degree, roughly the same proportion found among all jobs in the economy. In general, these occupations are numerically large (only two had less than 300,000 workers in 1984). Some of these occupations have projected rates of growth that are average or higher. However, others are projected to grow more slowly than average, but because of their employment size they will add significant numbers of new jobs over the 1984–95 period. Collectively, these 37 occupations accounted for 36 percent of total employment in 1984, and this proportion is expected to increase only to 39 percent by 1995.

The detailed occupations in table 3 do not include what are called residual categories for the major occupational groups. The residual categories are often very large because they contain a wide range of job titles and therefore account for much of the group's employment growth. For instance, the residual category, "all other managers and administrators," is projected to grow by more than 1.8 million workers out of a total growth of 1.9 million workers in the major occupational group, managerial and administrative workers.

Fastest growing and fastest declining occupations. The fastest growing occupations provide a different perspective on future occupational employment changes. (See table 4.) It is important to note that some of these occupations are increasing rapidly from relatively small employment levels and, therefore, are not found on the list of occupations that will add the most new jobs. Notable exceptions are computer programmers, computer systems analysts, electrical and electronics engineers, and electrical and electronics technicians and technologists. These technologically oriented occupations, however, collectively do not account for a large portion of jobs projected to be added in 1995. Almost half of the 20 fastest growing occupations are in the computer field or health field, which will continue to be among those with the strongest future growth.

Table 5 shows the 20 most rapidly declining occupations. Most are concentrated in industries that have recently contracted and are expected to continue to do so. Several are in the apparel and textile industries, both of which have suffered employment losses because of foreign competition

Table 3. Occupations with the largest job growth, 1984–95

[Numbers in thousands]

Occupation	Employment		Change in employment 1984–95		Percent of total job growth 1984–95
	1984	1995	Number	Percent	
Cashiers	1,902	2,469	556	29.8	3.6
Registered nurses	1,377	1,829	452	32.8	2.8
Janitors and cleaners, including maids and housekeeping cleaners	2,940	3,383	443	15.1	2.8
Truck drivers	2,484	2,911	428	17.2	2.7
Waiters and waitresses	1,625	2,049	424	26.1	2.7
Wholesale trade salesworkers	1,248	1,617	369	29.6	2.3
Nursing aides, orderlies, and attendants	1,204	1,552	348	28.9	2.2
Salespersons, retail	2,732	3,075	343	12.6	2.2
Accountants and auditors	882	1,189	307	34.8	1.9
Teachers, kindergarten and elementary	1,381	1,662	281	20.3	1.9
Secretaries	2,797	3,064	268	9.6	1.7
Computer programmers	341	586	245	71.7	1.5
General office clerks	2,398	2,629	231	9.6	1.4
Food preparation workers, excluding fast food	987	1,205	219	22.1	1.4
Food preparation and service workers, fast food	1,201	1,417	215	17.9	1.4
Computer systems analysts, electronic data processing	308	520	212	68.7	1.3
Electrical and electronics engineers	390	597	206	52.8	1.3
Electrical and electronics technicians and technologists	404	607	202	50.0	1.3
Guards	733	921	188	25.6	1.2
Automotive and motorcycle mechanics	922	1,107	185	20.1	1.2
Lawyers	490	665	174	35.5	1.1
Cosmetologists and related workers	524	674	150	28.7	.9
Cooks, restaurant	463	601	138	29.7	.9
Maintenance repairers, general utility	878	1,015	137	15.6	.9
Bookkeeping, accounting, and auditing clerks	1,973	2,091	118	6.0	.7
Bartenders	400	512	112	27.9	.7
Computer operators, excluding peripheral equipment	241	353	111	46.1	.7
Physicians and surgeons	476	585	109	23.0	.7
Licensed practical nurses	602	708	106	17.6	.7
Carpenters	944	1,046	101	10.7	.6
Switchboard operators	347	447	100	28.7	.6
Food service and lodging managers	657	746	89	13.6	.6
Electricians	545	633	88	16.2	.6
Teacher aides and educational assistants	479	566	88	18.3	.6
Blue-collar worker supervisors	1,470	1,555	85	5.8	.5
Receptionists and information clerks	458	542	83	18.2	.5
Mechanical engineers	237	317	81	34.0	.5

Table 4. Fastest growing occupations, 1984–95

[Numbers in thousands]

Occupation	Employment		Change in employment 1984–95		Percent of total job growth 1984–95
	1984	1995	Number	Percent	
Paralegal personnel	53	104	51	97.5	.3
Computer programmers	341	586	245	71.7	1.5
Computer systems analysts, electronic data processing (EDP)	308	520	212	68.7	1.3
Medical assistants	128	207	79	62.0	.5
Data processing equipment repairers	50	78	28	56.2	.2
Electrical and electronics engineers	390	597	206	52.8	1.3
Electrical and electronics technicians and technologists	404	607	202	50.7	1.3
Computer operators, except peripheral equipment	241	353	111	46.1	.7
Peripheral EDP equipment operators	70	102	32	45.0	.2
Travel agents	72	103	32	43.9	.2
Physical therapists	58	83	25	42.2	.2
Physician assistants	25	35	10	40.3	.1
Securities and financial services salesworkers	81	113	32	39.1	.2
Mechanical engineering technicians and technologists	55	75	20	36.6	.1
Lawyers	490	665	174	35.5	1.1
Correction officers and jailers	130	175	45	34.9	.3
Accountants and auditors	882	1,189	307	34.8	1.9
Mechanical engineers	237	317	81	34.0	.5
Registered nurses	1,377	1,829	452	32.8	2.8
Employment interviewers, private or public employment service	72	95	23	31.7	.1

and technological improvements. These two industries combined are projected to lose about 350,000 jobs by 1995. Other declining occupations are in railroad transportation, agriculture, and private households, industries which are expected to continue their long-run declines. Occupations that are expected to be affected adversely by technological changes are stenographers, industrial truck and tractor operators, telephone station installers and repairers, and statistical clerks.

Job clusters

Computer occupations. The applications for computers have expanded dramatically over the last two decades, and it appears that they will continue to do so through the mid-1990's. Workers engaged in developing computer-based systems and in operating these systems are projected to increase substantially by 1995. The number of computer systems analysts is projected to grow 69 percent from 1984 to 1995, adding more than 212,000 jobs. This occupation will benefit from the rise in new computer applications. Computer programmers are expected to increase 72 percent by 1995, or by 245,000 jobs over this period. The mounting number of new computer applications and the need to modify existing systems should bring about rapid employment growth for computer programmers, despite the increasing efficiency of programming methods.

Computer operators should continue their healthy employment growth, increasing 46 percent or by 111,000 jobs between 1984 and 1995. This increase is expected to occur as more small and medium size firms introduce more comprehensive computer systems.

The number of data processing equipment repairers is projected to increase about 56 percent, adding 28,000 jobs by 1995. Many of these workers will be needed to service the more mechanical computer-related equipment, such as disk and tape drives and printers, in addition to computers. Computers have become increasingly modular in construction, leading to greater ease of repair, but the number of computers is expected to increase rapidly enough to require the services of numerous data processing equipment repairers.

Data entry keyers are the only computer-related occupation not expected to grow rapidly. The technology for data entry is changing so fast that fewer keypunch operators are needed. These workers are being replaced by terminal operators, many of whom do this work only incidentally to their main functions, for example, airline ticket agents, cashiers, and so forth. Optical character recognition equipment and direct sensing equipment are other ways of inputting data without using data entry keyers.

Scientific and technical occupations. High technology industry growth and the increasing use of high technology products in the economy as a whole will lead to the increasing employment of scientific and technical personnel. Engineers are projected to increase 36 percent during the 1984–95 period, adding 480,000 jobs. Much of this sharp rise will be found among electrical and electronic engineers (up 206,000) engaged in developing computers, communications equipment, and defense-related electronic equipment. Mechanical engineers and civil engineers are two other numerically important engineering specialties which are expected to grow rapidly. Mechanical engineers, with projected growth of 81,000 jobs from 1984 to 1995, will be needed to keep product design and production methods up-to-date as a part of industry's desire to remain competitive. Civil engineers, up 46,000 jobs, will be needed for additional heavy construction.

Engineering and scientific technicians and technologists are projected to grow 28 percent between 1984 and 1995, adding 371,000 jobs. These occupations follow the employment trends of their related scientific and engineering occupations. Drafters are expected to be a major exception

among the technician occupations. They are expected to increase more slowly than the average for total employment, owing to the introduction of computer-aided design (CAD) equipment, which has increased the efficiency of drafting operations, and is expected to continue. The expanding need for drafting work and the ability of management to improve the quality of work by using CAD, however, will prevent a decline in drafters, despite the greater efficiency of the new equipment.

Biological scientists are projected to increase about average between 1984 and 1995, as they continue to develop drugs, food products, and chemicals. The number of chemists is projected to rise 10 percent, or slower than average, reflecting the relatively mature industries in which they are concentrated. Mathematical scientists should have faster than average growth, mainly as a result of increased statistical work and mathematical modeling.

Health-related occupations. Occupations in the health care field, including medical professionals, technicians, and service workers, are projected to increase by 26 percent and add 1.4 million jobs by 1995. This faster than average rate of growth, however, will not be uniform across industries and occupations related to the delivery of health care. The hospital industry, in particular, is undergoing major changes in the services it provides and in the occupational skill mix needed to provide them. Hospital employment soared over the 1973–84 period, but slower than average growth is projected for the 1984–95 period. Despite the deceleration in hospital employment, faster than average growth is projected for nursing homes, doctors' offices, and outpatient care facilities.

Cost-containment pressures, technological advances that allow sophisticated care to be provided on an outpatient basis, and consumer demand for community-based and home health care will have an adverse impact on some occupations and a favorable impact on others. Surgical technicians are projected to grow as fast as the average employment growth for all occupations and medical and clinical laboratory technologists are projected to grow more slowly than average. The number of physicians' assistants, however, is expected to grow much faster than the economy's projected average growth as hospitals and health maintenance organizations employ more of them to help contain costs. Additional opportunities for physicians' assistants are also expected in large multi-specialty offices of physicians. The number of medical records technologists and technicians is also expected to grow much faster than average, owing to the great importance of the medical records department to hospitals in monitoring and reducing costs. Medical assistants are also projected to grow much faster than average. Contributing to future job growth is the projected increase in the number of physicians in practice and the extremely rapid growth in outpatient care facilities, such as urgent care centers and "surgicenters."

Most other health occupations are expected to experience faster or higher than average growth. Registered nurses are expected to remain the largest specialty with 1.8 million workers in 1995—an increase of 33 percent over 1984, creating 452,000 jobs. Most of the job growth for registered nurses is expected to occur in hospitals, despite the relatively slow rate of growth for this industry within the health services sector. Their importance in hospitals will increase as they take over some of the functions performed by other health personnel. The next largest group, nursing aides, orderlies, and attendants, is projected to increase by 29 percent and 348,000 new jobs, followed by licensed practical nurses—up 18 percent and 106,000 new jobs. The dominant factor contributing to job growth for both nurses aides and licensed practical nurses is the aging of the population. Care of the aged, however, is expected to continue to shift away from hospitals to nursing homes and home health care. By 1995, nursing homes (with a projected rate of growth of 44 percent) should move ahead of hospitals as the primary employer of both nurses aides and licensed practical nurses.

Physicians and surgeons are another large occupational group that is projected to increase faster than average—up 23 percent. Other smaller health occupations that are projected to grow rapidly include physical therapists, occupational therapists, dental hygienists, dental assistants, and dietitians.

Education-related occupations. Occupations in education,

Table 5. Fastest declining occupations, 1984–95

[Numbers in thousands]

Occupation	Employment		Percent decline in employment
	1984	1995	
Stenographers	239	143	−40.3
Shoe sewing machine operators and tenders	33	22	−31.5
Railroad brake, signal, and switch operators	48	35	−26.4
Rail car repairers	27	21	−22.3
Furnace, kiln, or kettle operators and tenders	63	50	−20.9
Shoe and leather workers and repairers, precision	43	35	−18.6
Private household workers	993	811	−18.3
Station installers and repairers, telephone	111	92	−17.4
Sewing machine operators, garment	676	563	−16.7
Textile machine operators, tenders, setters, and set-up operators, winding	279	235	−15.7
Machinery maintenance mechanics, textile machines	26	22	−14.8
Statistical clerks	93	81	−12.7
Industrial truck and tractor operators	389	342	−11.9
Central office operators	77	68	−11.5
Farm workers	1,079	958	−11.2
College and university faculty	731	654	−10.6
Farm and home management advisers	27	24	−9.6
Extruding and drawing machine setters and set-up operators, metal and plastic	28	25	−9.1
Pressing machine operators and tenders, textile, garment and related	116	106	−8.8
Postal service clerks	317	290	−8.5

as a group, are projected to grow about as fast as average. However, different rates of change are expected for the various specialties owing to changing demographics of the school-age population and other factors determining the rates of growth or decline of employment at the elementary, secondary, and post-secondary levels.

Kindergarten and elementary schoolteachers are projected to increase 20 percent and add 281,000 new jobs. School enrollments at the elementary level are expected to become a larger proportion of total enrollments and teacher-pupil ratios are also expected to increase. Favorable employment opportunities are expected for teacher aides and educational assistants—up 18 percent and about 88,000 new jobs.

Secondary schoolteachers are projected to grow more slowly than average (5 percent), adding 48,000 jobs. While secondary school enrollments are expected to become a smaller proportion of total school enrollments, the effect of this relative decline will be moderated somewhat by an increase in teacher-pupil ratios.

College and university faculty are projected to decline from 731,000 in 1984 to 654,000 in 1995, a loss of 77,000 jobs to the profession. The primary reason for this drop is the expected decline in college enrollments through 1995.

The number of vocational education and training teachers and instructors is expected to have an average rate of increase. The number of 18- to 24-year-olds, who are the primary consumers of vocational education, will decline through 1995. However, this decline is expected to be partially offset by an increase in the number of adults who may need retraining because of technological displacement.

Preschool teachers also grew rapidly in the past and are now projected to increase only as fast as average in the future. The rate of increase in the population under 5 years of age and in the labor force participation rate of women are both expected to slow down through 1995.

The numbers of professional librarians, library technicians, and library assistants are all expected to grow more slowly than average because of the slow enrollment growth in schools, where most library occupations are found, and the continued trend to automate the circulation, cataloging, and acquisition departments of most libraries.

Office clerical workers. This group experienced a rapid growth in the 1960's and average growth in the 1970's but is projected to grow more slowly than average between 1984 and 1995. In addition to the direct impact that computerized office equipment will have on the clerical work force, the rate of employment growth of these workers is expected to be further slowed as more and more professionals and managers use desktop personal computers and executive workstations to do some of the work previously delegated to support staff.

In spite of the slowing employment growth, it is important to remember that office clerical workers are projected to add almost 2 million jobs and remain the largest major occupational group in 1995 with 20.5 million workers. The number of new jobs created is large, even with slow growth, because of the relatively large employment base in 1984. Significant numbers of new jobs in the future are expected to be added in several clerical fields, including secretaries (268,000 jobs); general office clerks (231,000 jobs); bookkeeping, accounting, and auditing clerks (118,000 jobs); and receptionists and information clerks (83,000 jobs).

Other occupations are expected to be more severely affected by office automation and other types of technological changes that will result in little or no job growth for some and declining employment for others. Typists, for example, will continue to be affected by developments in word processing and are expected to have little change in employment from 1984 to 1995. Low growth rates are also expected for file clerks; reservation and transportation ticket agents; traffic, shipping, and receiving clerks; and production, planning, and expediting clerks. Several occupations are expected to decline in employment between 1984 and 1995, including stenographers (down 40 percent), statistical clerks (down 13 percent), and payroll and timekeeping clerks (down 5 percent).

Technological changes in specific industries are also expected to adversely affect certain occupations. The implementation of electronic switching in the telephone industry, for example, is projected to cause the number of central office operators to decline by 11 percent. Also, the rapid spread of automated teller machines and the increased use of electronic funds transfer in banking is expected to cause tellers to increase more slowly than average, in contrast to the rapid growth that has occurred for many years. United States Postal Service clerks are projected to decline by 9 percent owing to the further application of technologies that reduce labor requirements in this occupation, including computer forwarding, optical character recognition, sorting devices, and electronic weighing of mail. Many of these same technological advances will curtail the need for mail clerks (except mailing machine operators and postal service), but rapid growth of private express mail companies is expected to moderate some of the impact and result in little change in employment for the occupation.

Some clerical occupations are projected to increase significantly, despite technological changes because they are concentrated in industries that are expected to increase in employment. Among these occupations are switchboard operators, adjustment clerks, bill and account collectors, insurance adjusters and investigators, court clerks, and credit checkers.

Service occupations, except private household workers. A continued trend toward eating outside the home is foreseen, but within the eating and drinking industry, a slowing in the growth of employment in fast-food establishments and an increase in restaurants is expected. A rapid projected rate of growth for the industry overall will result in a faster than

average increase for food and beverage service occupations with 1.5 million jobs added by 1995. Among the occupations in this group projected to add large numbers of new jobs are waiters and waitresses (424,000); food preparation workers, except fast-food (219,000); and restaurant cooks (138,000). Because of their large employment size, food preparation and service workers in fast food restaurants are projected to add 215,000 jobs, despite only average growth.

The number of janitors and cleaners is projected to show average growth, 15 percent, but because of the size of the occupation this will result in 443,000 new jobs. In most industries, however, janitors and cleaners will decline as a proportion of employment, as contractors will increasingly provide these services. An exception is the services to buildings industry, in which the large concentration of these employees is expected to grow very rapidly.

The numbers of police and detectives and of workers in firefighting occupations are both projected to increase as fast as the average, adding 66,000 and 48,000 new jobs. Guards are expected to increase at a faster than average rate, adding almost 188,000 new jobs. As with janitors and cleaners, their services are increasingly being purchased by contracting out.

About 295,000 new jobs are expected to be added by personal service workers. Several of the detailed occupations are projected to grow faster than average, including flight attendants, cosmetologists and related workers, social welfare service aides, and amusement and recreation attendants.

Construction trades. The construction trades are expected to experience a moderate employment growth of 12 percent between 1984 and 1995. However, even this moderate growth should generate 396,000 additional jobs because of the large employment in this group of occupations.

Carpenters, the largest of the construction trades, are projected to grow about as fast as average and add about 100,000 jobs between 1984 and 1995. Electricians, another large construction trade, should have more significant employment growth between 1984 and 1995, with a growth rate of 16 percent and 88,000 additional jobs. The employment of electricians is split about evenly between those working in the construction industry and those doing maintenance work throughout the rest of the economy.

Mechanics and repairers. Mechanics, installers, and repairers are projected to increase 15 percent, adding 647,000 new jobs by 1995. Many of these occupations are employed in manufacturing which tends to slow their growth, but they are also found outside manufacturing, sharing the more rapid expansion of those industries. Wherever mechanics, installers, and repairers are employed, they have increased employment to some extent because of the growing use of capital equipment which requires maintenance and repair.

Automotive and motorcycle mechanics are projected to add 185,000 jobs. Bus and truck mechanics and diesel engine specialists should add another 48,000 jobs. Automotive body and related repairers should gain 32,000 jobs by 1995. Thus, motor vehicles are expected to be responsible for about two-fifths of the total growth of the mechanics and repairs occupational group.

Other occupations in this group also contribute significantly to its employment growth. General utility maintenance repairers are projected to add 137,000 jobs. Heating, air conditioning, and refrigeration mechanics and installers are expected to add 29,000 new jobs.

Production occupations. Employment growth of production occupations is closely tied to the growth of manufacturing employment. Within the production worker cluster, the occupational group of helpers, laborers, and material movers (hand) should increase more slowly than average because of the growing use of automation in manufacturing. Blue-collar worker supervisors are projected to increase more slowly than average but add 85,000 additional jobs because of the large size of the occupation. Other occupations within the production worker cluster are also affected by changing practices within the manufacturing industries.

Precision production jobs overall are projected to increase by 10 percent, with about 287,000 new jobs. Precision inspectors, testers, and graders should increase rapidly, up almost 49,000 jobs, as more emphasis is placed on quality control of high technology products. Sheet metal workers should gain almost 33,000 jobs. Machinists are being affected by the introduction of numerically controlled machine tools which require less specialized set-up procedures and therefore, their numbers are expected to grow more slowly than average.

Machine setters, set-up operators, and tenders are projected to increase by only 4 percent because of increasing automation in most manufacturing industries. However, this slow growth should still yield 196,000 more jobs on account of the large size of this group of occupations. The number of plastic molding machine operators and tenders would, under the assumptions used by BLS in developing these projections, grow faster than average between 1984 and 1995. This growth results from the increasing substitution of plastics for other materials in manufactured goods. Many of the textile and garment occupations in this group should decline mainly as employment in the apparel and textile industries decline as a result of increasing foreign competition.

The handworking occupations, including assemblers and fabricators, are projected to grow more slowly than average. Precision assemblers, however, should increase as fast as average, adding 66,000 jobs in the high technology industries, such as electronics, aircraft, and machine tools.

Transportation and material moving occupations. Employment in this group of occupations generally follows overall economic activity, increasing when total employ-

ment is increasing and declining in recessions. After peaking in 1979, employment for this group declined during the recessions of 1980 and 1982. With recovery in 1984, employment rose again and is now projected to increase about as fast as total employment, adding 528,000 jobs by 1995.

The largest detailed occupation in the group is truck drivers, with employment projected to increase from 2.5 million in 1984 to 2.9 million in 1995. No significant technological developments are anticipated that would adversely affect their employment. Average growth is also expected for both the drivers of school buses and local and intercity buses. The fastest growing occupation in this group is aircraft pilots and flight engineers (23 percent), whose employment is expected to be favorably influenced by the faster than average growth projected for the air transportation industry.

Some transportation and material moving occupations will be adversely affected by declining industry employment and others by technological change. The rapid decline in employment projected for the railroad industry (from 369,000 to 272,000) will cause railroad transportation workers to decline. The shift to self-service gasoline stations will continue to have an impact on the employment of service station attendants, with little change in employment projected over the 1984–95 period. Industrial truck and tractor operators are projected to lose 46,000 jobs owing to technological innovations. New industrial trucks that are linked to the dispatcher by computer will make their operators more productive and the growth of automated warehouses will eliminate the need for many of these workers.

Low and high alternative projections

Total employment in the moderate-trend projections varies by only about 4 percent from both the low and high alternatives. The distribution of employment by broad occupational group varies little among the alternatives (table 6) because of offsetting changes within the major occupational groups. In looking at specific occupations, however, significant differences may exist between the moderate and either the low and high alternatives (table 2). The differences in occupational employment from one scenario to another are caused only by differences in projected industry employment levels because the same set of occupational staffing patterns were used for all three scenarios. The following identifies the top 10 occupations with the greatest numerical differences between the alternative (high or low) projected employment and the moderate-trend employment:

Occupation	*Employment difference*
Salespersons, retail	159,000
Janitors and cleaners	150,000
Truckdrivers	143,000
Secretaries	137,000
Cashiers	126,000
General office clerks	118,000
Bookkeeping, accounting, and auditing clerks	101,000
Waiters and waitresses	96,000
Registered nurses	76,000
Blue-collar worker supervisors	74,000

Table 6. Percent distribution of total employment by major occupation group, 1984 and projected 1995 alternatives

Occupation	1984	1995		
		Low	Moderate	High
Total employment	100.0	100.0	100.0	100.0
Executive administrative, and managerial workers	10.6	11.2	11.2	11.2
Professional workers	12.0	12.8	12.7	12.6
Technical and related support	3.0	3.4	3.4	3.4
Salesworkers	10.5	10.8	10.9	11.0
Administrative support workers, including clerical	17.5	16.7	16.7	16.7
Private household workers	.9	.7	.7	.7
Service workers, except private household workers	14.6	15.4	15.4	15.4
Precision production, craft, and repair workers	11.4	11.1	11.1	11.1
Operators, fabricators, and laborers	16.2	15.1	15.2	15.2
Farming, forestry, and fishing workers	3.3	2.8	2.8	2.8

Data uses and limitations

The current and projected occupational employment data presented in this article were developed at a detailed industry level as part of a national industry-occupation employment matrix. Data on specific occupations from the matrix along with other information on training requirements, nature of work, working conditions, and earnings will be used in the 1986–87 edition of the *Occupational Outlook Handbook* which will be issued in the spring of 1986. In addition to being used in the development of career guidance information, national occupational employment data and projections are used at all levels of government, and by others, to formulate education plans, including vocational education and training requirements.

Most discussions of future job opportunities focus on the employment growth in industries and occupations. Because faster growing industries and occupations generally offer better opportunities for employment and advancement, employment growth is an important gauge of job outlook. However, it is not the only one. Another element in the employment outlook is replacement needs. Replacement openings occur as people leave occupations. Some individuals transfer to other occupations as a step up the career ladder or to change careers. Some temporarily stop working, perhaps to return to school or care for a family, and some leave the labor force permanently—retirees, for example. In many occupations, as a consequence, replacement needs are more important than openings owing to growth in an occupation.[3] Another consideration in interpreting the data on occupational demand is the availability or supply of workers trained or educated to enter an occupation. Even with rapidly expanding job openings from either growth or replacement needs, jobseekers may have a difficult time finding a job because the supply of workers is expanding at an even faster pace. □

——FOOTNOTES——

[1] Data on occupational distribution patterns are derived from the Occupational Employment Statistics surveys for all nonagricultural industries, except private households. See *Handbook of Methods*, Bulletin 2134 (Bureau of Labor Statistics, 1982), for a description of the OES survey.

[2] Table 2 includes only detailed occupations with employment of 25,000 or more in 1984. Projections developed in greater detail with employment of 5,000 or more in 1984 will be published in the spring of 1986 in *Occupational Projections and Training Data*, 1986 edition. Current and projected occupational employment estimates are developed by the Bureau in the National Industry–Occupational Employment Matrix program. The national matrix is developed by applying data on occupational staffing patterns of industries collected in the Occupational Employment Statistics program to estimates of annual average industry employment collected in the Current Employment Statistics program. These surveys count jobs rather than people; therefore, the employment estimates contained in this report are different from those derived from a count of individuals in the Current Population Survey.

[3] A discussion of replacements, including rates for selected occupations, will appear in *Occupational Projections and Training Data* to be available in the spring of 1986.

Part II. Projection Methods

Overview

For several decades, the Bureau of Labor Statistics has been preparing 5 to 15 year projections of the U.S. economy. Since the early 1970's, projections have been prepared on a regular 2-year cycle. The projections cover the future size and composition of the labor force, the rate of aggregate economic growth, industrial production, and industrial and occupational employment. The data serve a number of users who need information on future changes in the U.S. economy. The information on future employment opportunities by occupation, for example, is used by counselors, educators, and others helping young persons choose a career, and by officials who plan education and training programs.

Over the years, the procedures used to develop the projections have undergone many changes, as new data series were released and economic and statistical tools improved. Since the late 1970's, the BLS projection methodology has been relatively unchanged and it is that system which is described below.

The BLS projections are developed in a series of five steps each of which is based on a separate model: (1) labor force; (2) aggregate economic performance; (3) industry final demand and total industry production; (4) industry employment; and (5) occupational employment. While each of these five steps is conducted separately, the projection model used in each step depends upon inputs from the earlier steps and feeds logically into the next. Although the models used to develop projections for each step in the process are complex, they provide only a framework for detailed analysis of the structure and composition of the economy in the future. As a result of detailed analyses, the models are run and rerun, assumptions are revised, and the results are reviewed until, in the judgment of the BLS staff, projections are achieved for all of the integral parts of the system which are both reasonable and internally consistent.

Labor force

The labor force projections, the first step in the BLS projections sequence, are determined by the future age, sex, and racial composition of the population and by trends in the labor force participation rates—the percent of a specified group in the population who will be working or seeking work. The population projections, prepared by the U.S. Bureau of the Census, are based on trends in birth rates, death rates, and net migration. With the population projections in hand, BLS analyzes and projects changes in labor force participation rates for 82 age, sex, and race groups.

The labor force participation rate projection for each group is developed by first selecting a trend rate of change based on participation rate behavior during 1962–1984 or for some sub-period which analysis indicates is more appropriate. Second, the rate is modified when the time-series projections for the specific group appear inconsistent with the results of cross-sectional and cohort analyses. This second step, in which many of the selected growth rates are averaged, ensures consistency among the various groups. Finally, the sizes of the anticipated labor force are calculated by applying the labor force participation rates to the population projections. The results are again reviewed for consistency.

Aggregate economy

Aggregate economic performance–the second model in the BLS projection procedures–is developed by projecting the Gross National Product (GNP), and major categories of demand and income. Because the purpose of the BLS projections is to identify long-term trends, no attempt is made to project cyclical movements. The labor force and population projections are but two of many inputs used in the model. Alternative economic scenarios, usually three, are developed to provide controls for the various categories of demand and employment. The scenarios encompass a range of possible rates of growth. In later stages of the projection process, industry output and employment projections and occupational projections are developed that are consistent with the aggregate economic alternatives.

Wharton Econometrics developed the model used by the Bureau to project aggregate economic trends, in response to a competitive procurement process. The Wharton long-term model is a system of behavioral relationships and identities based on annual data and designed to allow an analyst to explore the determinants of medium- to long-term growth in the U.S. economy. Made up of approximately 2,400 equations, the model is driven by a set of 900 exogenous variables. Under the terms of this agreement, the Bureau uses the Wharton long-term macroeconomic model to develop the BLS projections. BLS analysts determine the assumptions and

values for the exogenous variables and equation adjustments in the Wharton model.

The exogenous variables include true policy variables, such as various Federal transfer programs, the response of the monetary authority to growth in the economy, and the level of the armed forces. They also include variables for which other reliable and generally accepted projections are available, such as the population projections developed by the U.S. Bureau of the Census. Finally, the exogenous variables include those items which are too volatile or too politically determined to project. The former group includes such items as economic growth and inflation rates in the economies of the major trading partners of the United States and the long-term behavior of the U.S. dollar's exchange value. The latter group includes items such as energy prices.

It should be noted that the BLS does not rely on the Wharton model alone for projecting possible trends in the future. Rather, the model provides a framework for the preparation of a consistent set of economy-wide projections given a set of exogenous assumptions. BLS analysts then review the aggregate results for reasonableness. The review includes checks on internal consistency, evaluation of continuity with past trends, and comparisons with projections made by others. Although the review tends to focus on such items as GNP, unemployment, and productivity, the model's framework ensures that other important measures of economic performance are not overlooked.

Final demand

The BLS projection procedure then moves from the aggregate to the industrial level. For the industry demand projections, the U.S. economy is disaggregated into 156 producing sectors that cover the U.S. industrial structure, both the public and private. The framework for this procedure is an input-output model. The initial input-output data used by BLS are prepared by the Bureau of Economic Analysis, U.S. Department of Commerce.

The development of projections of industry output begins with the aggregate demand projections from the Wharton model. In this model, projections are made for 14 categories of consumption, 4 types of investment, 15 end-use categories of foreign trade, and 6 categories of government spending. A further disaggregation of the values from the model is then undertaken: purchases of producers' durable equipment, for example, are estimated for 107 consuming industries.

Furthermore, to develop industry demand projections, provision is made to allow for shifts in the industrial makeup of a given demand category. This is accomplished by projecting "bridge tables" relating individual types of demand to producing industries. The bridge table is a percent distribution for each given demand category, such as for a consumption category or for investment, among each of the 156 industries in the BLS input-output model. In projecting changes in these bridge tables, expected changes in technology, consumer tastes or buying patterns, the industrial pattern of exports and imports, the future composition of each industry's business investment, and other structural factors are considered.

Input-output model

The next element in developing industry output projections is the projection of the input-output table which accounts for the changes in the input pattern or the way in which goods or services are produced by each industry. In general, two types of changes in these input patterns are made in developing a future input-output table: (a) those made to the inputs of a specific industry (as, for example, the changes in inputs in the publishing industry); and, (b) those made to the inputs of a specific commodity in all or most industries (as for increased use of business services across a wide spectrum of industries). These changes are based on studies of specific industries conducted internally or by other organizations both within and outside of government. Changing the input patterns in the future input-output table is the procedure used to accommodate the impacts of expected relative price changes, or future changes in technology. The output requirements by industry are developed by multiplying the projected input-output table by the projected levels of final demand.

Industry employment

The projected changes in industry employment are computed based on the projected changes in output and other factors. BLS uses a regression model containing an equation for each industry to estimate worker-hours as a function of (a) the industry's output, (b) aggregate capacity utilization, (c) the relative price of labor, and (d) a technology variable as approximated by the output/capital ratio. For each industry, worker-hours are converted into jobs using trends in average annual hours for that industry. In order to balance total employment from the aggregate projections with the sum of employment projections, a number of iterations of the process are necessary.

The projections of employment for the 156 producing sectors in the economic growth model are further disaggregated using a time series regression model into 378 industries that, with few exceptions, correspond to three-digit Standard Industrial Classification codes. The 378 resulting projections are reviewed in light of a broad range of economic information. These projections are then used as inputs into the process of projecting occupational employment.

Occupational employment

The model used to develop the occupational employment projections is an industry-occupation matrix showing the distribution of employment for 378 industries and for more than 550 detailed occupations. Occupational staffing patterns for the industries are based on data collected by State Employment Security Agencies and analyzed by BLS.

Staffing patterns of industries in the base-year industry-occupation matrix are projected to the target year of the projections to account for changes expected to occur because of technological change, shifts in product mix, and other factors. The changes introduced into the input-output model for expected technological change, as an example, may also change future staffing patterns in industries using the new technology. (For example, one would expect greater employment of computer specialists as computer technology spreads across industries.) The projected industry employment data are applied to the projected industry occupational staffing patterns, yielding employment by occupation for each industry. This is aggregated across all industries to yield total occupational employment for the projected year.

Final review

An important element of the projection system is its comprehensive structure. To ensure the internal consistency of this large structure, the BLS projection procedure encompasses detailed review and analysis of the results at each stage for reasonableness and for consistency with the results from other stages of the BLS projections. For example, changes in staffing patterns in the occupational model are closely related to changes in industry productivity and technology. Productivity projections are reviewed in detail by the BLS Office of Productivity and Technology. In short, the final results reflect innumerable interactions among staff members who focus on particular variables in the model. Because of this review, BLS' projection process converges to an internally consistent set of employment projections across a substantial number of industries and occupations. The continued cross-checking of the assumptions and results makes it difficult to quantify the effects of each change in each variable.

The projection process at the Bureau of Labor Statistics does not end with the development and publication of a set of projections. Once the target year is reached, BLS evaluates the projections to determine what changes in assumptions or models would have made them more accurate. Knowing the sources of errors helps improve the projection process. It also highlights for users the imprecise nature of making statements about future economic, industrial activity, or employment growth.

Labor Force

The Bureau of Labor Statistics (BLS) projections of the labor force are developed by age, sex, and race for 1985-95. They are based on the middle population projections of the Bureau of the Census and BLS assumptions concerning future trends in labor force participation. The projections are presented with three alternative scenarios to cover a range of possibilities for future labor force growth.

Population

The Census projections are for the total population including the Armed Forces and the institutional population. (See Bureau of the Census, *Current Population Reports*, Series P-25, No. 952.) These projections use the cohort-component method, in which the components of population change (births, deaths, and net migration) are projected separately for each birth cohort (persons born in each year). The base-year population estimate is moved forward year by year using projected survival rates and net immigration by single year of age, sex, and race. Each year, a new birth cohort of persons under the age of 1 is added to the population by applying projected age-race-specific fertility rates to the female population.

In Census' middle scenario, fertility is assumed to reach an ultimate completed cohort fertility of 1.9 births per woman. This is consistent with recent levels of fertility, women's expectations of future births, and social and economic trends leading to lower fertility, namely, increases in labor force participation, educational attainment, and age at first marriage.

Mortality is assumed to decline rapidly through the year 2005. The Census' middle scenario assumes life expectancy at birth will be 72.3 years for men in 1995, 79.8 years for women.

Finally, Census' scenario assumes immigration will be a constant annual net inflow of 450,000, roughly equal to the measured level of net immigration over the past decade.

From Census' total population estimates, BLS substracts estimates of the 1995 Armed Forces and institutional population. At the time the projections were prepared, the goal of the Department of Defense for 1989 was an active duty force of 2,253,000. To make the projections consistent with Current Population Survey estimates (source for the historical labor force data), it is necessary to include the Coast Guard and reserves on active duty for less than 6 months.

To prepare the labor force projections, it is also necessary to have an age-sex-race distribution. To obtain that, we assume that the Armed Forces will have the same age-sex-race structure as in 1983, the most recent year for which Census data are available. From 1990 on, the Armed Forces are assumed to have the same structure as in 1989. With the addition of the Coast Guard and reserves, the Armed Forces are projected to have the following composition (in thousands):

	Total	*Men*	*Women*
1985	2,235	2,005	230
1986	2,276	2,041	235
1987	2,299	2,059	240
1988	2,314	2,072	242
1989	2,322	2,079	243

The 1995 noninstitutional population estimates are obtained by assuming that the 1983 ratio of institutional population to total population by age, sex, and race continues to hold.

Participation rates

The second element in the labor force projections is BLS projections of labor force participation rates, which are projected in two steps for 82 different age, sex, and race groups. First, past trends are extrapolated to 1995. Second, these extrapolated trends are modified when cross-sectional and cohort analyses show an inconsistency with the time series analysis. The second step has its largest impact for black women, its smallest impact for white men.

Trends in participation for each group are estimated by regressing participation rates against time for two periods, designated the longer (1954-84) and the shorter (1977-84). The initial projections of participation rates are extrapolations of the historical trends to the year 1995. In some instances, the longer trend is used; in others, the shorter trend. These initial 1995 estimates are then reviewed to ensure that they result in a coherent cross-sectional pattern in 1995 and that the resulting cohort labor force pattern also is meaningful. For those that are not, participation rates are changed and the resulting time-series projection reviewed.

The steps in this methodology are illustrated in table 1. Columns 1 and 2 show the historical time trends as

Table 1. Selected variables for labor force participation model, whites and blacks and others

Age/sex/ race group	Average annual percent change		Used in middle scenario	Actual 1984 participation rate	Participation rate, 1995		
	1965–84	1977–84			Based on extrapolating 1977–84 trend	Middle scenario estimate	Difference between the two estimates
	(Col. 1)	(Col. 2)	(Col. 3)	(Col. 4)	(Col. 5)	(Col. 6)	(Col. 7)
White women							
16 to 17	0.93	−0.46	1977–84	44.8	39.7	44.9	5.2
18 to 19	0.83	0.13	"	65.2	66.6	64.8	−1.8
20 to 24	1.29	0.66	"	72.5	79.8	79.0	−0.8
25 to 29	1.99	1.33	"	70.8	85.4	81.7	−3.7
30 to 34	1.87	1.85	"	68.8	89.1	81.4	−7.7
35 to 39	1.54	1.56	"	69.5	86.7	81.2	−5.5
40 to 44	1.28	1.30	"	69.7	84.0	79.3	−4.7
45 to 49	0.86	1.35	"	66.1	80.9	74.0	−6.9
50 to 54	0.45	0.72	"	59.3	67.2	66.7	−0.5
55 to 59	0.05	0.18	"	49.4	51.4	51.3	−0.1
60 to 61	−0.13	−0.11	1965–84	39.6	38.4	38.1	−0.3
62 to 64	−0.11	0.17	"	28.3	30.2	28.3	−1.9
65 to 69	−0.19	−0.04	"	14.1	13.7	12.1	−1.6
70 to 71	−0.17	−0.01	"	8.5	8.4	6.7	−1.7
72 to 74	−0.06	−0.03	"	6.5	6.2	5.1	−1.1
75 and over	−0.06	−0.01	"	2.4	2.3	1.6	−0.7
Black and other women							
16 to 17	0.14	−0.36	1977–84	24.6	20.6	27.0	6.4
18 to 19	0.07	−0.35	"	45.8	41.9	45.5	3.6
20 to 24	0.29	−0.24	"	60.5	57.9	64.5	6.6
25 to 29	0.78	−0.02	"	68.4	68.2	76.5	8.3
30 to 34	1.07	0.17	"	70.6	72.5	81.5	9.0
35 to 39	0.72	0.86	"	74.0	83.5	81.9	−1.6
40 to 44	0.71	1.20	"	72.3	85.5	80.9	−4.6
45 to 49	0.25	0.77	"	67.2	75.7	78.0	2.3
50 to 54	0.03	0.12	"	60.0	61.3	69.1	7.8
55 to 59	−0.17	0.28	"	53.0	56.1	54.7	−1.4
60 to 61	−0.04	0.25	1965–84	43.8	46.5	42.9	−3.6
62 to 64	−0.36	0.22	"	32.7	35.1	32.5	−2.6
65 to 69	−0.28	−0.57	"	14.8	8.5	11.6	3.1
70 to 71	−0.23	−0.40	"	8.6	4.2	5.3	1.1
72 to 74	−0.45	−0.39	"	5.5	1.2	3.0	1.8
75 and over	−0.15	−0.02	"	2.7	2.5	1.2	−1.3
White men							
16 to 17	0.21	−1.25	1965–84	47.0	33.3	49.3	16.0
18 to 19	0.44	−0.53	"	70.7	64.9	75.6	10.7
20 to 24	0.21	0.02	"	86.5	86.7	89.5	2.8
25 to 29	−0.09	−0.07	"	94.8	94.0	94.9	0.9
30 to 34	−0.14	−0.13	"	96.0	94.6	95.6	1.0
35 to 39	−0.09	−0.01	"	96.3	96.2	95.3	−0.9
40 to 44	−0.12	−0.21	1977–84	95.7	93.4	94.7	1.3
45 to 49	−0.15	−0.06	"	94.1	93.4	92.7	−0.7
50 to 54	−0.31	−0.04	"	89.9	89.5	89.3	−0.2
55 to 59	−0.59	−0.27	"	81.6	78.6	78.7	0.1
60 to 61	−1.24	−0.98	"	69.2	58.4	59.0	0.6
62 to 64	−1.39	−1.42	"	48.0	32.4	37.7	5.3
65 to 69	−1.03	−0.76	"	24.8	16.4	16.8	0.4
70 to 71	−0.74	−0.54	"	18.3	12.4	12.5	0.1
72 to 74	−0.53	−0.56	"	14.5	8.3	10.6	2.3
75 and over	−0.26	−0.14	"	7.7	6.2	6.1	−0.1

Table 1. Selected variables for labor force participation model, whites and blacks and others—Continued

Age/sex/ race group	Average annual percent change		Used in middle scenario	Actual 1984 participation rate	Participation rate, 1995		
	1965–84	1977–84			Based on extrapolating 1977–84 trend	Middle scenario estimate	Difference between the two estimates
	(Col. 1)	(Col. 2)	(Col. 3)	(Col. 4)	(Col. 5)	(Col. 6)	(Col. 7)
Black and other men							
16 to 17	−0.71	−1.27	No change	26.9	12.9	17.7	14.8
18 to 19	−0.56	−0.71	"	55.3	47.5	54.5	7.0
20 to 24	−0.65	−0.17	"	77.2	75.3	76.6	1.3
25 to 29	−0.46	−0.62	Half, 1965–84	87.1	80.3	84.2	3.9
30 to 34	−0.41	−0.83	"	89.5	80.4	87.2	6.8
35 to 39	−0.24	−0.66	"	90.8	83.5	89.5	6.0
40 to 44	−0.22	−0.71	No change	90.3	82.5	90.3	7.8
45 to 49	−0.35	0.28	"	87.3	90.4	87.3	−3.1
50 to 54	−0.49	−0.56	"	81.9	75.7	81.7	6.0
55 to 59	−0.90	−1.36	"	68.9	53.9	64.4	10.5
60 to 61	−1.20	−1.34	1977–84	58.8	44.1	52.1	8.0
62 to 64	−1.56	−0.66	"	43.4	36.1	39.5	3.4
65 to 69	−1.14	−1.39	"	22.5	7.2	16.5	9.3
70 to 71	−0.70	−0.56	"	16.7	10.5	11.5	1.0
72 to 74	−0.51	−0.59	"	13.3	6.8	7.2	0.4
75 and over	−0.33	−0.41	"	6.2	1.7	3.8	2.1

estimated in a least squares regression equation. Column 3 shows the trends used in the middle scenario for initial calculation of a 1995 participation rate. Column 4 shows actual levels of participation in 1984. Column 5 shows participation for the year 1995 if the 1977-84 trend were to continue, 11 (years) times the short-run (1977-84) trend added to the 1984 rate. Column 6 is the projected participation rate for the BLS middle scenario. Column 7 is the difference between the extrapolated and final estimates. These differences (usually labeled "addfactors" in an econometric model) reflect the judgments made by BLS for each group, judgments based on cohort, cross-sectional, and time-series analyses.

As seen in table 1, the addfactors (column 7) for male teenagers are large; the addfactors for most white male groups between 25 and 59 years old are modest. For male teenagers, the addfactors reflect, among other things, substituting the long-run trend for the short-run trend. The long-run trends put less emphasis on the cyclical swings which have affected teenage participation in recent years. For prime-age white men, the addfactors reflect the constraining of the various rates to be nearly equal in 1995. This near equality has been a cross-sectional pattern for men for several decades.

For white women, ages 20 to 24, the short trend is used and not adjusted, largely because of the Census fertility assumption. Fertility trends play a significant role in determining female participation over time. Census' assumed fertility trends for the 1984-95 period (a slight increase) parallel the trends for the 1977-84 period (a slight increase) and are considerably different from the 1965-77 trends (a substantial decline). The short trend is also used because it emphasizes a period when the percentage of women entering and graduating from college has been relatively stable; prior to 1977, that percentage was increasing. For white women ages 25 to 49, the addfactors reflect a constraining of participation to be nearly equal and slightly above the rate for white women ages 20 to 24. These addfactors are necessary to impose a cross-sectional pattern that has been evolving over the past decade. Projected trends for younger "black and other women" are increased, compared to historical trends, for it is assumed that cross-sectional patterns for black and other women and white women will be comparable.

For several reasons, the methodology for projecting black-only participation rates differs from the methodology for projecting white and black-and-other rates. Data for blacks only were not collected before 1972; are not available at the same level of aggregation as for whites and for blacks and others; and the historical trends for blacks only are considerably more volatile than the trends for blacks and others. Most important, the black-only estimates have to be consistent with the black-and-other estimates. Thus to a great extent the addfactors for blacks-only reflect this last constraint. (See table 2.)

Total and civilian labor force

The total labor force is calculated by multiplying the projected total labor force participation ratios by the Series II population projection; the civilian labor force is then projected by subtracting the Armed Forces from the total labor force. Two ratios are then calculated: The

ratio of the civilian labor force to the projected civilian noninstitutional population—the civilian labor force participation rate; and the ratio of the total labor force to the total noninstitutional population, the total labor force participation rate. Since the labor force participation rates as published for survey data are based on annual averages the rates are not strictly comparable with the historical data.

Table 2. Selected variables for labor force participation model, blacks

Age/sex/ race group	Average annual percent change 1972–84	Used in middle scenario	Actual 1984 participation rate	Participation rate, 1995		
				Based on extrapolating 1972–84 trend	Middle scenario estimate	Difference between the two estimates
	(Col. 1)	(Col. 2)	(Col. 3)	(Col. 4)	(Col. 5)	(Col. 6)
Black women						
16 to 17	0.01	1972–84	23.9	24.0	25.8	1.8
18 to 19	0.00	"	45.3	45.3	45.9	0.6
20 to 24	0.02	"	60.6	60.8	64.0	3.2
25 to 34	0.08	"	71.5	72.4	79.2	6.8
35 to 44	0.08	"	73.7	74.6	82.5	7.9
45 to 54	0.04	"	64.5	64.9	71.1	6.2
55 to 59	0.18	"	53.6	55.6	54.0	−1.6
60 to 64	0.07	"	37.5	38.3	37.9	−0.4
65 and over	−0.15	"	8.0	6.4	5.8	−0.6
Black men						
16 to 17	−0.06	"	26.9	26.2	24.8	−1.4
18 to 19	−0.04	"	56.1	55.7	52.3	−3.4
20 to 24	−0.05	"	79.1	78.5	76.3	−2.3
25 to 34	−0.14	"	88.9	87.4	87.1	−0.3
35 to 44	−0.04	"	90.1	89.7	89.2	−0.5
45 to 54	−0.04	"	83.8	83.4	82.3	−1.1
55 to 59	−0.23	"	68.4	65.9	63.6	−2.3
60 to 64	−0.12	"	48.3	47.0	42.8	−4.2
65 and over	−0.11	"	13.7	12.5	7.4	−5.1

Aggregate Economy

The purpose of this step in the projections process is to develop a consistent view of the aggregate economy under a reasonable set of policy assumptions. The major inputs to the aggregate model are the labor force projections developed in the first step of the process, projections of the population and other demographic variables developed by the U.S. Bureau of the Census, and assumptions developed by BLS regarding likely future paths for fiscal and monetary policy instruments and for foreign economic growth.

The major results passed along to the next step of the projections are the level of gross national product and its major demand components, as well as the level and distribution of aggregate employment in the economy. The flow of data into and out of this stage of the projections is detailed in table 1.

The model used by the Bureau to develop aggregate economic projections is selected through a competitive procurement process. The most recent award was to Wharton Econometric Forecasting Associates, Inc., for their Long-Term Model of the U.S. Economy. It should be noted that, although the Bureau uses the Wharton model for aggregate projections development, it does not use the projections developed by Wharton. The assumptions and results of the aggregate projections are developed entirely within BLS.

Specifying the assumptions

The first step in developing a set of aggregate economic projections is to specify all of the exogenous assumptions necessary to solve the model. This includes fiscal policy items such as defense and nondefense purchases of goods and services, various Federal transfer programs, personal and corporate tax policy, and grants-in-aid to State and local governments. Assumptions are also made about factors affecting monetary policy. These would include the manner in which the Federal Reserve Board responds to real growth and inflation, as well as many of the components of the broadly defined money supply, M3.

These exogenous assumptions include some variables for which other reliable and generally accepted projections are available, such as the population and other demographic variables projected by the U.S. Bureau of the Census and the labor force projected by BLS. In addition, there are variables which the model was not designed to project or which do not follow predictable relationships. The first category includes such items as the rate of economic growth and the inflation rate in the countries that are major trading partners of the United States. Although world trade models exist which attempt to predict these variables for all major world trade areas, the Wharton Long-Term Model (and virtually all other long-term U.S. growth models) is not designed to make these kinds of projections. The second group includes variables which are subject to political influences, such as the supply and price of foreign crude oil.

Running the model and reviewing the results

Once a reasonable set of assumptions for all of the exogenous variables has been formulated, the second step is to run the model and review the results with the overall goal of consistency and reasonableness in mind. Generally, many runs of the model are required, each with changes to exogenous factors or to the underlying behavioral relationships, before a set of acceptable figures for final demand and employment is arrived at.

Further runs are often performed as a result of the review of the results carried out at the industry and occupational levels of the projections. The final result is a set of consistent aggregate and industry projections of output, employment, and occupations in the U.S. economy.

Because a considerable amount of judgment enters into the process of deciding which results are "reasonable" and which are not, BLS also produces alternative projections which attempt to focus on those areas of judgment which are the most critical or which are subject to the widest range of possibilities for future growth. The resulting alternatives generally present a range of possible growth paths wide enough to incorporate all the differing views.

Table 1. Sources and disposition of data for macroeconomic stage of the projections

I. Variables incorporated from earlier projection stages
- Level of the Armed Forces
- Male labor force, age 16 and over
- Female labor force, age 16 and over
- Male resident population, all age groups
- Female resident population, all age groups

II. Variables incorporated as part of the macroeconomic stage of the projections

Fiscal policy assumptions
- Grants-in-aid to State and local governments
- Defense purchases of goods and services
- Nondefense purchases of goods and services
- Subsidies less current surplus
- Compensation per employee
- Ratio of compensation to purchases
- Earnings covered by social insurance taxes
- Synfuel subsidies
- Transfers to foreigners
- Food stamp benefits
- Military retirement and veterans' benefits
- Medicare
- Social Security
- Other transfer payments
- Value of a standard deduction
- Value of an individual exemption
- Old Age and Survivors Insurance (OASI) taxable income
- Effective tax rate on homeowners
- Effective tax rate on landlords
- Total OASI tax rate
- Wage accruals less disbursements
- Interest paid to foreigners

Monetary policy assumptions
- Overnight repurchase agreements
- Term repurchase agreements at commercial banks
- Other checkable deposits
- Money market mutual funds
- Term repurchase agreements at thrifts
- Overnight Eurodollars
- Travelers' checks
- Free reserves
- Reserve requirement on demand deposits
- Reserve requirement on time deposits
- Interest rate on large certificates of deposit

Foreign economic activity assumptions
- World gross domestic product
- World gross domestic product deflator
- Import deflator, non-energy
- Merchandise import deflator
- Exchange value of the dollar

Energy price and availability assumptions
- Gross output price, crude petroleum and natural gas liquids
- Barrel price of imported crude oil, fob
- Gross output price, natural gas
- MCF price, imported natural gas
- Gross output price, coal
- Relative mine-mouth price, eastern vs. western coal

III. Variables passed from the macroeconomic model to later stages of the projections

Gross national product

Personal consumption expenditures
- New cars
- Trucks and recreational vehicles
- Used cars
- Tires, tubes, and accessories
- Durable furnishings and household equipment
- Other durable goods
- Clothing and shoes
- Food
- Gasoline and oil
- Fuel oil and coal
- Other nondurable goods
- Housing
- Telephone and telegraph
- Electricity
- Natural gas
- Water
- Other household operations
- Transportation
- Health-related expenditures
- Other services

Gross private domestic investment
- Producers' durable equipment, nonresidential
- Nonresidential structures
- Producers' durable equipment, residential
- Residential farm structures
- Residential nonfarm structures

Inventory change
- Farm
- Nonfarm, nonmanufacturing
- Manufacturing, non-auto
- Auto

Exports of goods and services
- Food, feed, and beverages
- Consumer goods
- Industrial supplies and materials
- Capital goods
- Autos and parts
- Other merchandise
- Factor income
- Other services

Imports of goods and services
- Food, feed, and beverages
- Consumer goods
- Crude petroleum
- Refined residuals
- Other refined petroleum products
- Natural gas
- Other industrial supplies and materials
- Capital goods
- Autos and parts
- Other merchandise
- Factor income
- Other services

Table 1. Sources and disposition of data for macroeconomic stage of the projections—Continued

III.—Continued	Adjustment factor, household to establishment data
Government	Mining
Federal	Durable manufacturing
Defense purchases less compensation	Nondurable manufacturing
Defense compensation	Transportation
Nondefense purchases less compensation	Utilities
Nondefense compensation	Communications
State and local	Construction
Education purchases less compensation	Finance, insurance, and real estate
Education compensation	Wholesale and retail trade
Health, welfare, and sanitation purchases	Other services
Safety purchases less compensation	Federal
Safety compensation	State and local
Other purchases less compensation	Miscellaneous
Other compensation	Stock of plant and equipment, by industry
Employment	Value-added, by industry
Agricultural	Compensation, by industry
Self-employed	Manufacturing workweek
Unpaid family workers	Unemployment rate
Private household workers	

Final Demand

Final demand is one of the three ways in which gross national product (GNP) can be viewed; the others are from the income side and from the output side. Final demand is national product distributed among final users, broadly categorized into four groups: Persons, business, foreign, and government. Final demand analysis is concerned with the distribution of GNP, first, by demand user and then, for each user, by producing industry.

Final demand determines the output and thus the employment distribution of the economy. The purpose of the production process is the satisfaction of demand. Changes in the level and distribution of employment over time are a result of variation in the demand for goods and in the means of producing these goods. To measure the impact of both these changes, an input-output system is used. An input-output system describes the interrelationships between industries that are necessary to create a final product. Each industry within the economy relies on a number of other industries to supply inputs for further processing, which are called intermediate products. When dollar purchases of inputs are expressed as a percent distribution, the intermediate purchases are referred to as coefficients of production. Input-output tables are used to measure the ramifications to all industries of changes in outputs. The demand for intermediate products varies as the production process changes over time due to changes in technology and other factors. In order to project employment levels by industry for a future year, it is necessary to construct final demand bills of goods and an input-output table that reflect assumed changes.

Definitions

Consumption. Demand on the part of persons is represented by personal consumption expenditures (PCE) ; persons are defined as individuals and certain nonprofit institutions. Purchases of dwellings are not considered part of the consumption sector; they are included in the business or capital investment sector. However, annual housing costs are reflected in PCE by the calculation of an imputed rental value of owner-occupied dwellings that is added to consumption outlays.

Investment. Demand on the part of business is represented by capital investment, which is composed of fixed investment and the change in business inventories. Fixed investment represents purchases of durable equipment and structures by business and nonprofit institutions and purchases of dwellings by persons. Change in business inventories represents the value of the increase or decrease in raw materials, semifinished goods, and finished goods held by business.

Foreign trade. Net exports represent the value of total exports of goods and services less the value of total imports of goods and services. Exports and imports are handled separately and are netted out only at a final stage to present a conceptually consistent level of GNP.

Although exports are treated in the same manner as any other component of final demand, imports require a unique treatment. Total imports are divided into two categories: (1) imports by final users, as well as intermediate imports, which are competitive with domestic products; (2) imports which have no domestic counterparts, such as coffee and diamonds.

Competitive imports are shown as a negative column of demand; that is, they are subtracted from final demand in order to yield demand for domestic output. For example, final and intermediate demand for automobiles includes some share that is met by foreign producers. By subtracting the value of foreign automobiles from total demand for autos, the demand for domestic automobiles is derived. This is done for every industry for which there are competitive imports; the result is the demand for domestic goods by each industry.

Noncompetitive imports encompass products that have no domestic substitutes. Under existing production processes, they cannot be replaced by domestic items without altering the nature of the product. These imports are directly allocated to the industries which use them as purchases from the noncompetitive import industry. Thus, coffee, which is not produced in the United States, is directly allocated to the food products industry, where it is processed before being sold to the personal consumption expenditure category of final demand. Other kinds of noncomparable imported products, such as bananas and tapestries, which require no further processing are sold directly to final users and allocated to the "noncomparable imports" industry. In the import bill of goods, there is a negative entry which equals the sum of these final

demand purchases of noncomparable products plus those purchases of noncomparable products used as inputs in the production process.

Government. Government demand is defined as the goods and services purchased by all government units. Government purchases are the direct spending on the part of government units to carry out their missions. Government purchases differ from expenditures in that expenditures include transfer payments, interest payments, and subsidy payments, all of which represent money given by government to other GNP sectors. Monies paid to groups or individuals who are the final spenders of these funds are included in those sectors of demand. Sales of government assets are accounted for as negative purchases and thus offset the total value of direct government purchases. For analytical purposes, government purchases are separated into two major functions—Federal Government and State and local government—each of which is further disaggregated. There are two categories in the Federal function—defense and nondefense—and four in the State and local function—education; health, welfare, and sanitation; safety; and all other.

Historical data

In general, projections of final demand entail the compilation of historical data in a form that helps one determine the industry distribution of the economy in some future year. For past years, large amounts of data in various forms are available which must be fashioned to the requirements of the projections model. This fashioning of data includes the combination of data series into the more comprehensive categories upon which the macro model is constructed as well as adjustments to better reflect basic changes in the economy. The data must incorporate the definitions and concepts of final demand upon which this system is constructed. The industry composition of final demand components is called a bill of goods.

The creation of a bill of goods requires a level of detail that is available only from the economic censuses. Therefore, the historical series depends heavily on the census years of 1958, 1963, 1967, 1972, and 1977. The present set of projections uses 1977 as the base year, as did the previous set. However, an actual input-output table, rather than an estimated table, was available for these projections. In addition, supplementary data series were available through 1984, enabling the incorporation of the most recent economic trends into the projections.

The construction of a bill of goods for years for which no input-output data are available is carried out by the replication of the procedures for developing the previous bill. Economic census data become available years prior to the publication of the input-output table for that census year, the delay resulting from the extensive data manipulations required to construct input-output tables. Worksheets are included along with each input-output table describing the census sources from which each purchase is derived.

The preparation of each new bill of goods includes changes or improvements to the concepts that were used to produce the previous bills, along with adjustments to the GNP accounts. These improvements involve benchmark changes to GNP as well as adjustments to remove the effect of purely definitional changes. In addition, the latest bills of goods were priced in 1977 dollars rather than in 1972 dollars.

Consumption expenditures. Personal consumption expenditures are compiled by the Bureau of Economic Analysis (BEA) of the Department of Commerce as part of its measurement of GNP. They are available annually from 1929, disaggregated into 82 components or types of consumption expenditures. Each of the 82 components is composed of goods similar in length of usefulness—durables, nondurables, and services. Each of the 82 PCE categories is distributed—via a "bridge" table—to certain of the 537 producing industries. It is useful to have data at this low level of allocation since it allows removal of effects due to temporary influences, such as shortages or surpluses of certain goods caused by weather, interruptions in the movement of goods due to international events, strikes, and/or business cycles. Transitory events that affect the base year are neutralized to the extent necessary to avoid distortion of the historical series.

Equipment. Historical data for equipment investment are available annually in two distinct forms. The first shows producers' durable equipment (PDE) as a bundle of investment goods and services which are purchased by individual industries to carry out the production process. The second shows the annual level of investment of the economy allocated to distinct types of capital goods categories. Data on investment by industry, the first basis, are obtained from the Office of Business Analysis (OBA) of the Department of Commerce for all 3-digit and for several 4-digit industries, which BLS aggregates to 107 consuming industries. A capital flows matrix converts these 107 bundles of investment goods into the producing industries required by the input-output system. Each industry's production process calls for its own kinds of capital goods, reflected in a capital flows matrix. Capital flows tables are calculated only in input-output years and so have been constructed in current dollars for 1958, 1963, and 1972. Since 1977 was not available for this set of projections, an estimated table was created based on the 1972 table.

The second form of annual PDE data is by 24 major types or categories such as aircraft, agricultural machinery, passenger cars, and communication equipment.

Again, these values represent a composite of different types of investment goods which must be disaggregated into the various producing industries required by the input-output system. This disaggregation is accomplished by the use of a bridge table which distributes each major category to the input-output industry that actually produces the investment good. Producers' durable equipment by category is available in the National Income and Product Accounts (NIPA) annually in current and in 1972 dollars, while the bridge table is available only for input-output years. The data in this form have proven most useful in the construction of bills of goods for recent years and as a check in the creation of the 1977 capital flows matrix.

Structures. Historical data for investment in structures are available from the Department of Commerce as part of the National Income and Product Accounts. Detail for nonresidential structures includes expenditures for industrial, commercial, educational, and telephone and telegraph facilities. For residential structures, detailed data include expenditures such as for single-family homes, multi-family units, mobile homes, and farm housing units. In some cases, these detailed series have to be further disaggregated. For example, nonresidential commercial buildings are disaggregated to office buildings, warehouses, garages and service stations, and stores and restaurants. In total, expenditures for 26 types of nonresidential and 9 types of residential structures are developed in this set of projections.

The new construction industry is different from the rest in that it produces only for final demand; no output is sold to other industries as an input for further processing. In the BEA input-output system, this is represented as an industry which has a column of inputs summing to the total output of the industry and equal to final demand. BLS, on the other hand, removes the new construction industry from the body of the table and represents the direct purchases as a bill of goods. A special industry called the new construction industry has been created to account for the value-added portion of construction. For the input-output years, the construction bill of goods is the same as the input column, while for the non-input-output years, changes are introduced into the input distribution to reflect economic and technological variations in the production process.

Inventory change. The change in business inventories is very different from the other components of investment. First, there are entries, either negative or positive, in almost every industry except construction and services. In addition, the relative importance of any entry can change greatly from year to year.

Historical data for the bill of goods for inventory change are available only for the input-output years. Input-output conventions allocate inventory changes to the producing industry, no matter which industry holds the inventory. Using data from the Annual Survey of Manufactures, inventory-shipments ratios for historical years are derived and benchmarked to input-output conventions.

Foreign trade. Unlike other sectors of final demand, historical data on imports and exports are plentiful and detailed. Instead of problems of disaggregation and estimation, foreign trade data must be aggregated. Data on both exports and imports can be obtained from the detailed merchandise trade statistics published annually by the Bureau of the Census. For exports, this includes data by SIC product code and by Schedule B commodity code. For imports, data are available by SIC-based product code and by special U.S. tariff schedule code.

For most industries, the foreign trade data rely on an analysis of the trends of imports and exports as shares of output. The ratios for 1978, 1979, 1981, 1982, and, for merchandise trade, 1977 are all compared. Data requirements after aggregation involve modification and augmentation to reflect balance-of-payments and input-output conventions.

Government. Historical data for government purchases of goods and services are available annually, for the two Federal and four State and local purchases categories in total only. Although some data by industry are available for defense purchases, little or no industry data are available for the other categories, thus making it difficult to disaggregate the series. This lack of industry data is not such a weakness as it might appear, however, since, with the exception of a few defense-related industries, the portion of any industry's output going to satisfy government demand is minor.

Government is, however, a major consumer of new construction, and in this area, good historical series are available from the Bureau of the Census in the *Construction Review*. As discussed earlier, the BLS ' procedure for handling of new construction differs from that of BEA. New construction bills of goods are created by applying appropriate control totals to the new construction input columns of the most recent input-output table. The new construction control totals at low levels of detail are derived by comparing data obtained from the *Construction Review* with construction values from the published input-output table. Adjustments made to the *Construction Review* data in input-output years are assumed to be constant for non-input-output years. Then, after the construction bills of goods are initially scaled to these controls, they are changed to reflect known technological changes and economic effects that would vary the pattern.

For one other category of government purchases,

compensation of employees, there is a consistent series of data. Real-dollar compensation is equal to the change in the number of employees from the base year plus a measure of the increase in productivity of these workers. Since the base year for the historical data is 1977, changes in employment levels from 1977 are used to move the series forward.

Projections

Consumption expenditures. The macro model projects personal consumption expenditures at a 15-category level. These 15 categories are a composite of the 82 categories which are available annually from BEA. For the projected year, an input distribution is created for each of the 15 macro model categories that reflect the collapsing of the 82-category distribution down to 15. Each of the 15 categories is then modified to reflect technological and economic assumptions as well as trends that have been observed in industry input patterns and which are expected to continue over the projected time span.

The following table shows how the 82 detailed product categories collapse to the 15 major product groups.

Durables	
Autos and parts	Motor vehicles; auto parts.
Furniture and household equipment	Household furniture; household appliances; china, glassware, and utensils; other durable household furnishings; radio, television receivers, records, and musical instruments.
Other durable goods	Jewelry and watches; ophthalmic and orthopedic products; books and maps; wheel goods, durable toys, and sports equipment.
Nondurables	
Food and beverages	Food for off-premise consumption; purchased meals and beverages; food furnished employees; food produced and consumed on farms; alcoholic beverages.
Clothing and shoes	Shoes; clothing and luggage; military-issue clothing.
Gasoline and oil	Gasoline and oil.
Fuel oil and coal	Other fuels.
Other nondurables	Tobacco products; toilet articles and preparations; semidurable house furnishings; cleaning and lighting supplies; stationery and writing supplies; drug preparations and sundries; magazines, newspapers, and sheet music; nondurable toys and sporting goods; flowers, seeds, and potted plants; expenditures abroad by Government personnel; personal remittances to foreigners.
Services	
Housing	Owner-occupied nonfarm dwellings; nonfarm rental expenditures; rental value of farm houses; other housing.
Electric utilities	Electricity.
Gas utilities	Natural utilities.
Telephone services	Telephone and telegraph.
Other household operations	Water and sanitary services; domestic services; other household services.
Transportation services	Automobile repair; road tolls; automobile insurance less claims paid; bus and trolley car transportation; taxicabs; commuter rail transportation; railway transportation; intercity buses; airline transportation; other intercity transportation.
Health and other services	Shoe cleaning and repair; laundering and dry cleaning; other clothing maintenance services; barbershops, beauty parlors, and baths; physicians; dentists; other professional services; private hospitals and sanitariums; health insurance; brokerage charges and investment counseling; bank service charges; imputed bank and credit union services; expense of handling life insurance; legal services; funeral and burial expenses; other business services; radio and television repair; motion picture admissions; legitimate theater admissions; admissions to sport events; clubs and fraternal organizations; commercial participant amusements; parimutuel net receipts; other recreation services; private higher education; private elementary and secondary education; other private education and research; religious and welfare activities; foreign travel by U.S. residents; expenditures in the U.S. by foreigners.

Equipment. For the first time, BLS has developed and used a model for projecting equipment investment. The model is used for projecting nonresidential equipment only, but this accounts for over 98 percent of total producers' durable equipment; residential equipment, the remaining 2 percent, is not within the scope of the investment model.

The model deals with investment trends for 107 consuming industries—87 manufacturing and 20 nonmanufacturing industries. The most important element of this investment model is its industrial detail.

Investment trends by industry are projected in three stages. The first step is projecting equipment trends by consuming industry. To operate this model, three explanatory variables are required: The lagged value of output by industry, capacity, and cost of capital. A behavioral equation to estimate equipment investment is specified as:

$$E_t = a_0 + a_1 Y_{t-1} + a_2 C_t + a_3 P_t + U_t$$

Where

E : gross investment, equipment, by industry
Y : output, by industry
C : capacity utilization, economywide
P : cost of capital, economywide
U : error term

and

a_0 is a constant term
a_1, a_2, a_3 are parameters
t indicates the time period.

Equipment data for this model, as mentioned earlier, are from the Department of Commerce. The projections system deals with 156 industries—95 manufacturing, 49 nonmanufacturing, 5 government enterprises, and 7 special industries. However, equipment data for nonmanufacturing industries are available only at the less detailed 2-digit SIC level; equipment data for some manufacturing industries, such as sugar and confectionery products, are lumped together as a single industry. Also, government enterprises and special industries are not included in this investment model because their acquisition of investment goods is not part of PDE in the National Income and Product Accounts.

Output data are from the BLS industry data base, and are collapsed to 107 industries. For manufacturing industries, capacity is measured by capacity utilization rates from the Federal Reserve Board. For nonmanufacturing, capacity is measured by unemployment rates from the Current Population Survey. The cost of capital is measured in one of two ways: (1) the ratio of the PDE deflator to the GNP deflator; and (2) the "real" corporate bond interest rate, which is computed as:

corporate bond interest rate = (coraaa *(1-cortax /corpro))-chppde

Where

coraaa = Moody's AAA corporate new issue rate
cortax = corporate profits tax liability
corpro = corporate profits before tax
chppde = change in PDE deflator

The cost of capital also is obtained from the macro model data base.

For these projections, annual time series data from 1958 to 1981, in 1977 constant dollars, are used to estimate real equipment investment at the industry level. Several specifications of the investment equation are estimated for each industry. [1] This is required because the lag structure for output varies by industry. For example, the public utilities industry has a long lag structure, while the motor vehicles industry has a relatively short lag structure. Also, two price variables are experimented with, to ensure a reasonable coefficient for the cost of capital.

The second step of this model is to project equipment purchases by industry of origin. To convert the estimates of step 1 into producing industries of step 2 on input-output conventions, two approaches are required: (1) factors or scalers; and (2) an equipment flows matrix. First, factors are used for adjusting the investment estimates of step 1 initially stated by industry of owner, into the estimates by industry of user. The OBA's industry investment series is based on data which reflect ownership, while the equipment flows matrix is based on data which reflect users. They differ because of leasing.

Second, the equipment flows matrix disaggregates an industry's equipment to a bundle of investment goods and services, which are purchased by individual industries. The estimates of equipment investment by industry, when multiplied by the equipment flows matrix, yield the estimates of investment goods and services by type, that is, PDE bills of goods.

The third step of the model is to make the investment estimates consistent with the macro data. Several definitional inconsistencies exist among the many investment data sources. Notably, PDE underlying the NIPA includes purchases of government surplus assets, passenger autos owned by households that are used for business purposes, and the capitalized trade margins on purchases of used equipment assets; OBA's series excludes these components. As a result, the NIPA and OBA's equipment investment differ both in level and in trends. In addition, scrap, used, and secondhand goods are not within the investment flows matrix, because this matrix deals with the purchases of new equipment only. Thus, in the third step of the model, additional calculations are required. By adding up the initial estimates from step 2 and scaling to the control totals, this step eliminates the inconsistency among the NIPA estimates, equipment flows matrix on input-output conventions, and the OBA equipment estimates. In essence, this step scales the investment estimates by industry to the investment estimates from a macro solution. Only total nonresidential equipment controls are derived from the macro model over the projection period. For this reason, a single investment control is allocated to producing industries for the projected years.

As mentioned earlier, residential durable equipment of landlords is not within the scope of the investment model. In the macro model, investment in residential equipment is also treated as an individual investment component. Therefore, this category is projected based on historical trends as a share of total PDE, and is then scaled to the projected control of the macro model.

Finally, feedback from the review of the result requires extensive reworking of data. This is required especially for the computer industry, because all major industries are expected to make heavy commitments to computers during the next 10 years. First, the equipment flows matrix is modified by changing the relationship between computers and the other equipment which industry purchases. Second, the investment estimates of 107

purchasing industries are then run through the adjusted matrix, giving a PDE of 156 producing industries. Changes in the distribution of computers by industry are made repeatedly until the demand for computers in all industries is equal to the level of investment that is required by the distribution of output.

Structures. Initial estimates of the projected bills of goods for structures are made at the level of the most detailed categories. First, data from 1958 to 1984 are used to project the movement of these detailed categories into the future. Second, these estimates are transformed to a set of final demand producing industries. Changes that could be expected in the input structure are incorporated in the projected bills of goods. The initial projections are aggregated and evaluated against the projected controls of the macro model. Further adjustments are made as necessary after review.

Inventory change. Projections of inventory change by producing industry are based primarily on projected industry outputs. A constant percentage of output for each industry is used as an initial estimate of the bills of goods. Industries which have a perishable product are adjusted to be more in line with past levels. The initial projections are modified as necessary in later stages in the projection process. Less effort is expended on the allocation of inventory changes to the producing industries, because this investment category is relatively unimportant in long-term projections.

Foreign trade. The projection of competitive imports by industry is mainly based on analysis of existing and expected shares of the domestic market. Trade agreements which might restrict imports are also taken into account.

The value of total exports is distributed by industry, primarily on the basis of time trends and expected world conditions. It is necessary to rely on simple projection techniques to project exports by industry because long-term estimates of foreign income and prices are not widely available.

There are seven components for exports and eight components for imports in the final demand sector of the macro model. The seven export components are: Foods, feeds, and beverages; consumer goods; industrial supplies and materials; capital goods; autos and parts; other merchandise; and services. Imports consist of the same components as exports, with the addition of an eighth component, petroleum and petroleum products. Adjustment factors are calculated for the import and export components of the final demand sector of the macro model. These factors are applied to the import/export control values from the macro model, in order to translate from 1972 NIPA concepts to 1977 input-output concepts. The industry levels of imports and exports are added and scaled to the total values of the macro model.

For most industries, it is assumed that the ratios of imports and exports to output would continue to change according to past trends. Specific assumptions are made for some labor-intensive industries, such as apparel products and textiles. Imports of these products have grown substantially as a share of the total output of these items purchased in the United States. This rise is assumed to continue, as developing countries seek larger shares of the U.S. market.

Government. The macro model projects purchases in total for the two Federal categories of demand and for the four State and local categories. Total government employment is also projected and allocated to the Federal and State and local functions. The labor force projections include an estimate of the level of the Armed Forces in the projected year, which must be added to the projection of Federal civilian employment to arrive at an estimate of Federal purchases of compensation. The projected compensation purchases are the change in level from 1977 to the projected year of the number of employees plus the change in productivity, resulting in a 1977 dollar value.

Projections of new construction purchases are derived for each of the six government categories based on assumptions affecting future needs on the part of each government category as well as trends which are observable by a study of historical data. These construction controls are then applied to the projected industry distribution of each government construction category. The remaining level of purchases, i.e., total purchases less compensation and new construction, for each category is distributed to the producing industries. This distribution reflects adjustments for technological and economic change.

—FOOTNOTES—

[1]Nine specifications of the investment equation are used as:

(1.1) $E_t = a_0 + a_1*KY_t + a_2*OC_t + a_3*PP_t$

(1.2) $E_t = a_0 + a_1*KY_t + a_2*OC_t + a_3*IN_t$

(1.3) $E_t = a_0 + a_1*LY_t + a_2*OC_t + a_3*PP_t$

(1.4) $E_t = a_0 + a_1*LY_t + a_2*OC_t + a_3*IN_t$

(1.5) $E_t = a_0 + a_1*Y_{t-1} + a_2*Y_{t-2} + a_3*OC_t + a_4*PP_t$

(1.6) $E_t = a_0 + a_1*Y_{t-1} + a_2*Y_{t-2} + a_3*OC_t + a_4*IN_t$

(1.7) $E_t = a_0 + a_1*Y_{t-1} + a_2*Y_{t-2} + a_3*Y_{t-3} + a_4*OC_t + a_5*PP_t$

(1.8) $E_t = a_0 + a_1*Y_{t-1} + a_2*Y_{t-2} + a_3*Y_{t-3} + a_4*OC_t + a_5*IN_t$

(1.9) $E_t = a_0 + a_1*Y_{t-1} + a_2*Y_{t-2} + a_3*Y_{t-3} + a_4*OC_t$

The variables in (1.1) through (1.9) are specified as follows:

E_t = gross equipment investment

Y_t = output

$KY_t = 1/2*Y_{t-1} + 1/2*Y_{t-2}$

$LY_t = 3/6*Y_{t-1} + 2/6*Y_{t-2} + 1/6*Y_{t-3}$

C_t = capacity utilization or unemployment rate

$OC_t = 3/4*C_t + 1/4*C_{t-1}$

PP_t = PDE deflator$_t$ /GNP deflator$_t$

IN_t = (coraaa$_t$*(1 − cortax$_t$ /corpro$_t$)) − chppde$_t$

where
coraaa, cortax, corpro, and chppde are specified in the same manner as described in the text.

To choose among the nine equations for each industry, all equations are estimated over the 1958–76 period, and then equipment investment is forecast over the 1977–81 period. The average error over the years 1978 to 1981 is computed, and the equation yielding the lowest average error is the one used in the projection model.

Input-Output Model

After final demand purchases are projected, the intermediate demand, or additional output of each industry that is required to support the projected final demand, is calculated using an input-output model. This model provides a framework for projecting industry outputs, or the total of final demand and intermediate sales required of each industry.

An input-output "use" table is a rectangular matrix in which the entries represent the transactions of each sector with all other sectors. Each row of the matrix shows the sales of each commodity (the primary product of the industry with the same name) to every consuming industry and to final demand. The sum of all the entries in a row represents commodity output. Each column of the matrix shows the inputs of commodities to that industry which were used to produce its output. The sum of purchased inputs plus value added (returns to capital, labor, and entrepreneurial ability) equals the output of the industry.

A second table, the "make" table, is a matrix which shows the production of commodities by each industry. Each row of the matrix shows which commodities that industry produces, and each row sums to industry output. Each column of the matrix represents a commodity and shows which industries produce the commodity. Each column sums to commodity output.

The 1977 BEA input-output study represents a change from the 1972 and earlier benchmark input-output studies. The 1977 study was used as a basis for the revised BLS projections, even though changes in the study and timing difficulties limited BLS ' ability to create a times series of consistent input-output tables for this set of projections. Midway through the process, an attempt was made to estimate a 1984 input-output table with preliminary data. This resulted in an unbalanced estimate of 1984 final demand, output, and intermediate demand. This table allowed BLS to begin to estimate the changes which had occurred since 1977, although the inability to balance the system means that it had not properly captured all of these changes.

The changes introduced in the 1977 input-output study were of four major kinds. The most obvious change was the use of 1977 SIC codes, which resulted in a few changes in industry definitions. A second change was in the handling of some of the secondary products. Although secondary products are always redefined, the specific method used for some of the products was changed for 1977. The third major change was the inclusion of "coverage adjustments" in the calculation of 1977 output for many commodities. The impact of this was generally minor, although for a specific industry the impact might be large. The last major change was to update the dollar base of the table to 1977.

The make table, or market shares matrix, mechanically redefines many of the secondary products using an "industry technology" approach. This means that the secondary products are assumed to have the same technology as the primary products of the industry where they were produced. When redefining these commodities, the structure of the producing industry is left unchanged, but the structure of the primary producer is modified to account for the differing technologies of the different industries which may be producing the commodity. Other secondary products which were not included in the make table were redefined using a "commodity technology" approach. This assumes that the secondary products differed greatly from primary products of the industry in which they were produced. For these, the input structure of the primary industry was used to adjust the input structure of the producing industry. These specific redefinitions were taken care of in the use table.

Input-output relationships may be expressed either in producers' values or purchasers' values. Both BLS and BEA value inputs purchased by a consuming industry at the price the producer received. Trade margins and transportation costs associated with these inputs appear as direct purchases by the consuming industry from the trade and transportation industries. Since the input-output tables are in producers' values, all trade and transportation margins have to be stated as demand on those sectors. This method allows BLS to maintain the detail on actual purchases of specific materials—materials are not sold to or purchased from the trade industry. The output of these trade sectors is measured in terms of total margins—operating expenses plus profits.

The transactions recorded in the input-output tables are based on data contained in the Census of Manufactures and the other economic censuses. The Bureau of the Census assigns establishments to an industry based on the establishment's primary output—those products or services which produce the largest part of its revenue. Many establishments also produce other products which

are different from the primary output—secondary products. A commodity is the primary production of the industry with the same name, but may be produced anywhere in the economy. Final demand is expressed in terms of commodities, as is the demand for goods used in production. But these commodities may be produced by a variety of industries. The market shares matrix, derived from the make table, indicates what proportion of each commodity is produced in each industry. This allows an increase in demand for a commodity to increase production in each industry which produces it.

The Economic Growth projections for 1995 involved three sets of input-output tables—1977, 1984, and 1995. All tables were prepared in 1977 constant dollars. The 1977 tables represent an aggregation of the 537-order BEA tables to the 156 BLS sectors. The major difference in the BLS and BEA tables resulted from the movement of new construction materials purchases to final demand and the inclusion of a dummy industry to handle compensation and value added in new construction. The 1984 tables were estimated in 1977 dollars, based upon the 1977 BEA tables and 1977 input-output concepts. The 1995 tables were also projected in constant dollars based upon the 1977 and 1984 tables.

Coefficients are projected to change for several reasons—technological change is an important factor, but not the only one. Changes in product mix or relative prices can also cause significant changes in coefficients. Because the BLS industries are aggregates of the more detailed BEA sectors, a simple change in the relative importance of those sectors can have a large impact on the coefficients. Also, as the relative price or availability of substitute inputs change, substitutions might occur.

The methodology for projecting 1995 input-output coefficients was somewhat different from that used for previous projections. As this was to be an update, rather than a completely new set of projections, an attempt was made to adjust the projections previously released in November 1983. This was more difficult to do than it would seem. The first set of 1995 projections was prepared before the release of the BEA 1977 input-output study, so the basis of those projections was the 1972 BEA study and an estimate of the 1977 relationships prepared by BLS. When the 1977 BEA table was released, it was found that the two tables were significantly different. Thus, the first step was to examine the old projections for 1995 in light of the BEA 1977 table to determine what the 1995 coefficient would have been had the 1977 BEA data been available. This necessitated the repricing of the previous projections from 1972 dollars to 1977 dollars. As mentioned previously, there were numerous conceptual changes which further distorted the comparison of the 1972 and 1977 BEA input-output tables.

Further changes were made to the 1995 coefficients based on sources (articles, industry studies, etc.) which had recently become available. Then, projected final demands were combined with the projected input-output coefficients to generate projected outputs, which were then evaluated based on historical data and expected relationships. This led to further revisions in the projected tables and final demands for 1995. BLS was also estimating data for 1984, and, when this was available, the 1995 projections were again evaluated in light of these data. In some cases, it was found that coefficients had changed more between 1977 and 1984 than had been thought. This necessitated further changes to the projections.

Coefficients were projected in several diffent ways. Industry studies were evaluated, and coefficents in specific industries were modified based on the expectations of the industry analyst. In other industries, expected changes were incorporated by making changes across the row of the table (for example, plastics were expected to grow at the expense of metals). When analysis of projected outputs indicated a problem, specific inputs were examined to determine a pattern of change which may have been missed earlier.

The same total requirements tables, calculated to show industry output required to meet demand for commodities, were used for each of the alternative models. The use and make tables consistent with each of these scenarios were calculated, and are available upon request.

Industry Output and Employment

The estimates of employment by industry are projected by a labor model developed by BLS. The labor model has an equation for each of the Economic Growth sectors for which there is employment, 149 in all. The results of the labor model are useful in and of themselves to describe future job trends among industries, and are also used as inputs in the industry-occupation matrix, which projects employment by occupation.

Specification of labor model

The labor model uses as one of its prime variables the industry output projections developed in the preceding steps of the Economic Growth projections system. The expected level of demand for an industry's product (both final and intermediate demand) is a key determinant of the demand for labor in that industry. Other variables affecting the demand for labor are the relative cost of labor compared to the costs of other inputs (such as capital), the state of technology (as approximated by the output/capital ratio), and the degree of capacity utilization (which reflects the stage of the business cycle). Projections of these last three variables are obtained from the macroeconomic model, described earlier. Altogether, the four variables determine the productivity of labor for each industry, that is, how much labor will be required to produce the output determined by the final demand and input-output projections.

In order to make this projection, the labor model estimates a regression equation for each industry. These regression equations have as their theoretical underpinning a production function, which is a technological relationship describing the output that can be produced in each industry with a certain combination of labor and capital inputs.[1] The production function implies that labor and capital can be substituted for one another to produce a given level of output. The actual combination of labor and capital inputs will depend upon their relative costs.

Theoretically, the production function can be solved for the labor input by respecifying the equation and setting the marginal product of labor equal to the marginal price of the labor input (since under conditions of profit maximization and perfect competition, the marginal product of any input equals its marginal cost). One could, at least conceptually, solve the estimated coefficients of such a model for the substitution parameters and economies of scale, as well as for the effect of technical change on the demand for labor.

As a practical matter, however, we do not have sufficient industry-specific historical data to adequately estimate these parameters. In the BLS model, the regression equation for labor productivity relates total hours paid by industry to the output of the industry, the relative price of labor (real wages), a measure of technology (the output/capital ratio), and capacity utilization (as approximated by the unemployment rate). It is expressed in log form:

$$\ln L = a_0 + a_1 \ln(w/p) + a_2 \ln Y + a_3 \ln(Y/K) + a_4 \ln CAP$$

where L = labor
w = the wage rate
p = all prices
Y = output
Y/K = the state of technology
CAP = capacity utilization.

To estimate the values of the coefficients a_0, a_1, a_2, a_3, and a_4, standard regression techniques are used. The relative wage term and the output/capital term are only available for 26 industrial sectors (see table 1), and the measure of capacity utilization is economywide. Thus, the only industry-specific variable in the labor demand model is the output estimate. The values of the coefficients for each of the 149 industries in the model are available upon request.

Solving the model

Once the values of the independent variables are projected by the macroeconomic and final demand and input-output portions of the model system, the equations for industry hours can be solved.

The dependent variable in the labor model is wage and salary worker hours for each industry (or total worker hours for the agriculture and household sectors). To convert worker hours to number of jobs, a projection of average annual hours is made for each sector based on the projection of the average workweek from the macro model. Worker hours divided by average annual hours yields wage and salary employment for each sector. The individual industry results are then scaled to total wage and salary employment in durable goods manufacturing, nondurable goods manufacturing, and nonmanufacturing, which are obtained from the macro model.

Projections of self-employed and unpaid family worker

Table 1. Industry sectors in Wharton macroeconomic model

Wharton sector	Corresponding Economic Growth sectors
1. Agriculture, forestry, fisheries	1–7
2. Mining	8–14
3. Lumber and wood products	35–38
4. Furniture and fixtures	39–40
5. Stone, clay, and glass	60–64
6. Primary metals	65–69
7. Fabricated metals	16, 70–76
8. Machinery	77–87
9. Electrical and electronic equipment	88–96
10. Motor vehicles	97
11. Other transportation equipment and miscellaneous manufacturing	17, 98–102, 108–110
12. Instruments and related products	103–107
13. Food and kindred products	18–27
14. Tobacco	28
15. Textile mill products	29–32
16. Apparel	33–34
17. Paper products	41–42
18. Printing and publishing	43–45
19. Chemicals	46–53
20. Petroleum products	54
21. Rubber and plastics	55–57
22. Leather	58–59
23. Transportation	111–117
24. Communications	118–119
25. Public utilities	120–122
26. Commercial and other	15, 123–128, 130–145, 147–149, 152, 155

jobs for each industry are based on the wage and salary projection plus a projection of the trend in the relationship between wage and salary employment and self-employment. The results are also scaled to a control total from the macro model.

Equations are also estimated for seven farm sectors, but for total hours only, not wage and salary hours. The seven farm industries are then scaled to total farm employment from the macro model.

Adjustments to the model results

For some industries, the labor model equations may not be appropriate and may produce results that are incongruous with past experience or with widely accepted expectations about the future. This comes about most frequently in industries which do not operate near the conditions of profit maximization (or economic equilibrium) required for estimating the production function. Adjustments are usually required when the historical and projected output trends are very divergent; when the output and employment series are unrelated; when new technologies are expected; and when the labor productivity trend may imply negative employment. These adjustments are implemented with the use of addfactors.

In the set of projections presented at the beginning of this bulletin, several specific assumptions were made to override the initial results of the labor model. The most important was a general assumption in the macro model of higher productivity growth than in the recent past. The control totals for the employment from the macro model, as a consequence of the higher productivity assumption, forced the employment projections of the labor model to be scaled back 12 percent across all durable manufacturing industries and 22 percent across all nondurable manufacturing industries in 1995.

In addition to the general assumption about a major shift to new technologies in all industries, specific industry assumptions were made to further adjust the results of the labor model projections. These additional assumptions are described in detail in the next chapter.

Disaggregation of results

Once the employment projections for the 149 Economic Growth sectors are final, they are used to develop the projections of occupational employment. The data for the 149 sectors are disaggregated to the 3-digit SIC level, totaling 368 detailed industries. This is accomplished by independently developing time series regression estimates for each of the 368 industries, and then scaling the results to the 149 sectors in the labor model. These adjusted projections for the 368 detailed industries serve as the basis for the industry-occupational projections, which are described in the next chapter.

Historical data used in estimation of labor model

To estimate the values of the coefficients for the four variables in each industry's labor demand equation, standard regression techniques are used. The values of these coefficients for each of the 149 industries in the model are available upon request.

The data used in estimating the coefficients of the 149 industry equations in the labor model are time series for the years 1958-83. A description of the data follows.

Labor

Labor, the dependent variable in the labor model, is measured in terms of worker hours: the number of jobs times the average number of hours per year. The labor model is estimated with wage and salary worker hours for each industry in the private nonagricultural sector and in government enterprises, and with total worker hours (wage and salary plus self-employed and unpaid family workers) in the farm sectors and in private households. Government enterprises are included in the labor model as separate industries, but general government workers are not included since general government employment is projected in the macroeconomic model, not in the industry-level labor model.

Data on jobs and hours for nonagricultural wage and salary workers come from the Bureau's Current Employment Survey (the establishment survey). Data for other classes of workers, which include the self-employed,

unpaid family workers, agriculture, and private household workers, come from the Bureau's Current Population Survey (the household survey). The data from the two surveys are published monthly by BLS in *Employment and Earnings.*[2]

The wage and salary data from the Current Employment Survey are disaggregated by industry based on the 1972 version of the Standard Industrial Classification (SIC) . Within manufacturing, these data are usually available for 4-digit SIC industries. In some nonmanufacturing industries, however, there is not enough detail to construct employment measures for an Economic Growth sector. In these instances, the Bureau's unemployment insurance data base provides the missing detail. This employment data base is compiled by State agencies from reports of establishments covered under State unemployment insurance laws. These tabulations cover about 98 percent of employees on nonagricultural payrolls in the United States, and are available at the 4-digit SIC level.

The paid hours of nonagricultural wage and salary workers are the number of jobs within an industry times average weekly hours in the industry, multiplied by 52. Average weekly hours for production or nonsupervisory workers are available from the establishment survey. For nonproduction workers in goods-producing industries, the hours data assume a 39.7-hour week for all years in the durable goods industries and 39.3 hours in nondurable goods. For supervisory workers in service-producing industries, the workweek is assumed to be the same as for nonsupervisory workers.

In some cases, employment and hours data are not published in *Employment and Earnings* for years prior to 1972 because of substantial changes between the 1967 and 1972 Standard Industrial Classification systems. In these instances, 1958-71 data for the Economic Growth sectors were linked to data previously published, ensuring a consistent employment time series.

The last 3 years of the employment and hours data from the establishment survey are preliminary. Each year, the last 3 years of data are benchmarked to the unemployment insurance data mentioned earlier.

Estimates for other classes of workers besides wage and salary workers are derived annually from the Current Population Survey (CPS), or household survey. The CPS provides employment information on self-employed and unpaid family workers, private household workers, total agriculture, forestry and fisheries, and agricultural services. The distribution of the agricultural jobs by type of commodity (i.e., meat, dairy, cotton, etc.) is derived from Department of Agriculture data on hours worked by enterprise group.

The data for other classes of workers from the CPS are revised as information from each new decennial Census of Population becomes available. The last revision, based on the 1980 Census, affected data for the years 1971 to 1982.

Output

Current-dollar output is measured as gross domestic output, or duplicated output. It is a gross or duplicated measure in that it includes not only the value added in each industry but also the value of all intermediate inputs into the production process. Output is expressed in producer's value, exclusive of trade or transportation margins. (These margins are part of the output of the trade and transportation industries.) Output is measured as production (including inventory change) by a group of establishments as classified by their SIC code, and includes primary and some secondary products and miscellaneous receipts. This measure of industry output differs from a measure of commodity output because of the inclusion of these secondary products. Commodity output is defined as the production of the characteristic products of the corresponding industry, wherever made.

Historical output data are developed from a variety of sources. For manufacturing, the time series is based on the value of shipments plus inventory change from the Census or Annual Survey of Manufactures for each 4-digit SIC industry within the Economic Growth sector. For nonmanufacturing industries, many different sources are used, including *Agricultural Statistics*, the *Minerals Yearbook,* Internal Revenue Service data, and numerous others. A description of the detailed methods used to develop time series output for each of the nonmanufacturing industries is available upon request.

For every industry, the output time series data are benchmarked to the industry gross output measures from the Bureau of Economic Analysis' input-output table for the year 1977. Benchmarking is done to adjust the data so that it is conceptually and statistically consistent with input-output accounting. For example, one important adjustment is the inclusion of manufacturers' excise taxes in the producer's value of commodity shipments. In addition, some departures from the strict establishment definition of industry output are made in the input-output table. For example, in the seven agricultural industries and in the two construction industries, products are grouped by type and thus reflect a commodity, not an establishment, classification. Another modification involves redefining certain types of secondary products to the industries which are the primary producers of the products. An example is electric energy produced and sold by the manufacturing, mining, or railroad industries; it is redefined to the electric utility industry. Similarly, rental activities of all industries are redefined to the real estate industry; manufacturing in trade and services industries is redefined to the appropriate manufacturing industry; construction work performed by all other industries is redefined to the construction industry. This

approach is used where the input structure for the redefined commodity is significantly different from the producing industry's input structure.[3]

To develop the benchmark for each industry, a ratio of the domestic output from the BEA input-output table to the current-dollar output measure is calculated for 1977. This ratio is then multiplied by the base output measures for the years 1958-83 to derive benchmarked current-dollar output.

The benchmarking is even more significant for nonmanufacturing than for manufacturing industries, since it is more difficult to develop precise output measures that conform exactly to input-output definitions of output for nonmanufacturing industries. In many sectors, several data series are combined to try to measure all the different types of output included. For example, the output of the local transit industry includes the services of taxicabs, intracity buses, mass transit rail systems, and long-distance or intercity buses. A different data source is used for each, and each piece is individually benchmarked to its corresponding 1977 input-output value, obtained from unpublished BEA data.

The definitions and conventions used to develop the input-output tables deal only with nominal or current-dollar output, since each table is concerned only with the structure of the economy at a given time. However, since this Office is concerned with economic growth or change over time, it must adjust the time series of nominal output for price change to arrive at real output. To be consistent with the National Income and Product Accounts, the price measures used to derive real output are current-year-weighted. The price data rely heavily on the detail of the industry sector price indexes and the consumer price indexes prepared and published by BLS. The output data for the 1995 projections were based on constant 1977 prices.

To develop constant-dollar output for manufacturing industries, the shipments and inventory change data at the 4-digit level (before benchmarking) are deflated by a 4-digit industry sector price index, then the 4-digit values are summed for each Economic Growth sector. This sum is then divided by the unbenchmarked current-dollar output total for that industry to yield a weighted deflator. The deflator is then multiplied by the benchmarked current-dollar output figure to arrive at benchmarked constant-dollar output.

To develop constant-dollar output for nonmanufacturing industries, a variety of price deflators are used, including BLS consumer price indexes and BEA gross product originating deflators.

Other variables

Relative wage is measured as the ratio of current-dollar compensation to total value added. This variable is projected in the macroeconomic model (the Wharton model) for each of 26 industrial sectors. Table 1 shows the Economic Growth Sectors which correspond to each of these 26 macro sectors.

The output/capital ratio is also developed for the 26 sectors in the Wharton model. The numerator uses constant-dollar value added, and the denominator is a constant-dollar measure of the capital stock, determined by the accumulation of investment less depreciation. It is expected that, in future versions of the labor model, this term will be linked to the investment model recently developed by BLS for 107 industries (described in the section on final demand).

Capacity utilization is approximated by the unemployment rate, which is used to capture the stages of the business cycle. As the economy moves toward full employment, capacity utilization tends to be high, while in recession, capacity is typically underutilized. This variable is projected in the macro model.

Limitations of historical employment and output data

Users should be aware that in many cases historical data have been estimated because adequate information is not available on an annual basis. Further, although consistency has been aimed at, employment and output series could not be made conceptually consistent in all cases.

In addition, the last few years of the historical output data for each sector are preliminary and may not be as reliable as the rest of the time series. The Annual Survey of Manufactures, which is the basis for the output data for the manufacturing industries, has about a 2-year time lag. For service industries, the time lag of the data sources varies. Outputs based on IRS data may contain a 3-year lag; other data sources such as agricultural statistics, transportation revenues, or utilities production may have only a 1-year lag. When the original source data are not yet available, annual updates are made with Federal Reserve Board indexes of production for manufacturing and mining industries, or with gross product originating data from BEA for all other industries.

Users should also be aware that the historical labor productivity measures implicitly contained in the Economic Growth industry time series data are not the Bureau's official industry indexes. The official indexes of historical labor productivity are prepared by the Office of Productivity and Technology. Those indexes are developed in considerably more detail than the data used for the Economic Growth labor model. For a description of the methods used in compiling the official measures, see *Productivity Measures for Selected Industries,* annual editions, Bureau of Labor Statistics.[4] However, for input-output work, the Office of Economic Growth's measures are useful.

—FOOTNOTES—

[1]For more information on production functions, the reader can consult a variety of econometric textbooks. As an example, see Michael D. Intriligator, *Econometric Models, Techniques, and Applications* (Prentice-Hall, Inc., 1978), pp. 262–280.

[2]See Explanatory Notes in the monthly periodical *Employment and Earnings* for a full description of the establishment and household data.

[3]For more information on the concept of industry output, see *Definitions and Conventions of the 1972 Input–Output Study* (Bureau of Economic Analysis, July 1980). A similar bulletin, based on the 1977 input–output study of the Bureau of Economic Analysis, is expected to be published shortly.

[4]The most recent of these annual bulletins is *Productivity Measures for Selected Industries, 1958–84,* Bulletin 2256 (Bureau of Labor Statistics, 1986).

Industry Assumptions

In the current set of projections, several 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. Projections of lower real interest rates, a stable, noninflationary economy, and pent-up demand for new capital equipment postponed during the 1980-82 recessionary period led 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 incorporate industrial robots and allow much greater automation for processes such as welding, fastening, material 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, too, as well as in factories. Computerized recordkeeping and office automation were projected to become even more diffused than they are now.

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. These additional industry-specific assumptions are described in detail in table 1.

Table 1. Specific industry assumptions for 1995 projections

Industry	Assumptions
Forestry and fishery products	Negative government demand reflects sales from national timberlands. Logging will be adversely affected by a reduction in the average size of houses, a result of energy conservation and smaller families.
Iron and ferroalloy ores mining	Slower growth reflects a continuation of the shift away from dependence on these metals.
Copper ore mining	Copper production is expected to be adversely affected by the increased use of fiber optics and satellites for communications.
Nonferrous metal ores mining	Assumes increased use of platinum in the making of glass and as a catalyst in cleaning auto emissions and in petroleum refining. Increased use of lead batteries will not overcome the impact of decreased use of silver in photography; silver is being replaced by electronic storage and display of both motion and still pictures. Also assumes the continued movement of the aluminum mining industry to less developed nations. Imports projected to rise to almost half of total output.
Coal mining	Productivity may be higher than initially projected by the labor model because of the expected continued shift to more capital-intensive western coal.
Crude petroleum and natural gas	Slow output growth reflects the continued shift away from petroleum as an energy source to electricity produced by nuclear and hydro plants, as well as conservation of all energy in all production processes. The shift by the economy to an increased share of services also requires less energy. Imports projected to rise only modestly. Assumed the recent increases in employment in response to 1981's higher oil prices would not continue. Long-term stability of oil prices would lead to a stable employment level and higher productivity, as only the more proven drilling sites will be profitable.
Food industries	Health-conscious consumers are expected to restrict their purchases of dairy, sugar, confectionery, and bakery products and to slightly increase their use of prepared convenience foods as well as restaurant meals. Processed foods and animal feeds will contain less sugar; other types of sweeteners will be substituted.
Fabric, yarn, and thread mills	Productivity assumed to be even higher than projected by the labor model. New equipment for textile manufacturing, especially open-end spinning and shuttleless-loom weaving, will be more widespread as the industry consolidates.

Table 1. Specific industry assumptions for 1995 projections—Continued

Industry	Assumptions
Apparel	Assumes apparel imports will rise from 25 percent of total real output in 1984 to over 38 percent by 1995. Productivity higher than labor model projects because of more widespread use of new technologies, such as laser cutting of fabric and computer-designed layouts.
Sawmills and planing mills	Higher productivity than projected by labor model because of greater use of new technologies.
Millwork, plywood, and wood products	Demand for these products is related to wood products, the new construction industry, and the maintenance and repair industry. Moderate long-term growth is expected. A continuing shift from plywood to waferboard, which uses wood scraps reinforced with glass and synthetic fibers, is foreseen.
Wooden containers	The use of wooden containers will continue to decline as other materials, especially plastics, become stronger and less expensive, and as other packaging materials and methods become more developed and widely used.
Furniture and fixtures except household	Investment spending on furnishings for commercial and office buildings is expected to continue its upward trend, spurred by the overall capital spending boom as well as the need for many new types of furnishings for office modernization.
Paperboard containers and boxes	Paper is expected to continue to replace metals as a container for noncarbonated beverages.
Industrial inorganic and organic chemicals	Growth in exports is assumed to be severely limited, as production shifts to foreign sites closer to petroleum sources. A shift in the inputs to domestic production of industrial alcohol from petroleum to grains and corn is expected to continue.
Drugs	Past research is expected to provide drugs in the near future which improve memory and alertness, retard aging, and attack genetic disorders such as sickle cell anemia, hemophilia, muscular dystrophy, and others. An aging population will contribute to an increasing demand for drugs.
Cleaning and toilet preparations	Rising per capita real incomes will insure the continued growth in the consumption of cosmetics and perfumes, along with continued increased use by men.
Petroleum refining and related products	Increased energy efficiency of autos will allow consumers to increase miles driven with little or no increase in gasoline consumption.
Tires and inner tubes	The use of radial tires and the lighter weight of cars as well as a leveling off in the number of cars on the road will result in a static demand for tires. Imports will continue to gain market share, from 14 percent of all output in 1984 to over 23 percent in 1995.
Plastics products, n.e.c	Continued replacement of glass bottles with polyethlene terephthalate (PET) along with the overcoming of problems in its use in less than 2-liter bottles will increase the growth of this industry's output. The technology for making plastic containers has improved sufficiently to make likely a drastic decline in the use of glass bottles and jars and metal cans for many food products and beverages. The production of more frozen foods and microwave products will add to growth. Productivity is expected to turn up in the future despite decreases in past years; some consolidation of small firms is expected, and new techniques will permit automatic remolding.
Leather products, including footwear	Imports will account for a larger share of the market. The disparity in labor costs between many foreign suppliers and U.S. producers could be narrowed significantly with the application of new technologies, but the large capital investment required is beyond the reach of small and medium-sized producers.
Glass	Some increased use of glass is expected for solar heating and for the transmission of audio and visual data by glass cable, although the continued shift to plastic packaging will limit demand for glass.
Cement and concrete products	Modest long-term growth is expected because of expanded use by the construction industry. Low-cost and better fire-safety gypsum board is expected to gain market share in mobile homes and office buildings.
Structural clay products	Very slow long-term growth is expected. Housing construction will still be the major factor in determining the demand for clay. The replacement of brick and clay products in construction by plastic sewer pipe and metal fireplaces will have an adverse effect on this industry's growth.
Blast furnaces and basic steel	New techniques for making stronger lighter weight steel will allow the industry to maintain many of the current markets. The inputs to this new steel will be less, resulting in a drop in the value of inputs and value of sales of this steel. Also, substitution of plastics and composites for steel will continue. Imports will rise to 32 percent of total output from 19 percent in 1984. Because the slight projected increases in domestic output will only be possible if the steel industry continues to restructure and modernize, productivity was assumed to rise faster than past trends. Assumes accelerated shift to minimills and widespread use of more efficient technologies such as continuous casting.

Table 1. Specific industry assumptions for 1995 projections—Continued

Industry	Assumptions
Iron and steel foundries	New techniques for making stronger lighter weight steel will allow the industry to maintain many of the current markets. The inputs to this new steel will be less, resulting in a drop in the value of inputs and value of sales of this steel. Higher productivity than projected by labor model; assumed increased use of computer-controlled molding equipment and material moving equipment.
Primary copper and copper products	Slow growth in demand as a result of substitution of other products as well as an increasing share taken by imports from foreign sources located in less developed countries. General decrease in relative usage of copper, especially due to fiber optics and satellite communication systems. Higher productivity than projected by labor model because of increased use of modern, automated equipment.
Primary aluminum and aluminum products	Increased offshore supplies are expected with the end of cheap hydroelectric supplies in the Northwest and the movement of processing facilities to the primary producing nations.
Primary nonferrous metals	More than half of all output will be supplied by imports. Higher productivity than projected by labor model because of new technologies.
Metal cans and containers	The technology for making plastic containers has improved sufficiently to make likely a drastic decline in the use of both glass bottles and jars and metal cans for many food products and beverages. The production of more frozen foods and microwave products will add to growth. Also assumes higher productivity than projected by labor model.
Fabricated structural metals	Moderate growth is expected mainly because of increases in industrial and office building construction, and increases in maintenance and repair construction for bridges and tunnels.
Farm and garden machinery	Weak food prices, high interest rates on machinery purchases, and a strong dollar brought farmers' buying power to a record low in 1984. A long-term recovery is anticipated, but this industry is not projected to return to its 1979 peak by 1995. Recovery of output from current low levels is projected to be accomplished with higher productivity; more computer-controlled assembly of machinery equipment is expected.
Construction, mining, and oilfield machinery	A small increase in the mining industry is the major factor behind a small increase in investment purchases. Exports are expected to show healthy growth. Projection of recovery of output from current low levels will be accomplished with higher productivity; more computer-controlled assembly of machinery equipment.
Metalworking machinery	Assumes a rapid growth in investment demand reflecting the continued efforts to automate operations with robotics and machine tools linked by computer controls. Imports will increase in market share. The expansion of robots from the present tasks of welding and painting to the textile, drugs, electronics, and other industries with improvement in software and communications will ensure healthy growth.
Special industry machinery	Small increases in investment demand reflect the adoption of computer-controlled monitoring of production. Imports will rise as a share of output.
Computers and peripheral equipment	Assumes a significant increase in equipment investment spending on computers as all major industries make heavy commitments to computers. Also, intense competition and continued technological change will combine to increase capabilities and decrease prices. Exports and imports both projected to show very rapid growth, but net trade balance will still be in U.S. favor.
Typewriters and other office machines	An increase in business spending on office machines reflects increasing office automation; replacment demand for word processors, electronic typewriters, and advanced copiers will be strong. Imports will substantially increase their market share.
Electric transmission equipment	A moderate growth in investment is based on the expansion and maintenance plans of the industry and new residential and nonresidential construction activity.
Radio and television receiving equipment	Replacement of silver-based negatives with electronic movie and still pictures along with the continued sales of video cassette recorders and television monitors for home computers will insure healthy growth for this industry. Domestic production will expand despite large increase in imports.
Telephone and telegraph apparatus	New telecommunications products and services will lead to substantial consumer demand. A continued rapid growth in investment purchases is expected because of increased use of computers and intercommunications of business with computers, the modernization programs of the telephone companies, and the expansion of other common carriers.
Radio and communication equipment	Laser systems are included in this industry's output and are expected to add to an already strong Defense Department demand. A significant increase in investment demand reflects the continued growth in industrial electronic equipment as well as the introduction of new high-technology products.
Electronic components and accessories	Exports and imports will both rise substantially. The inclusion of electronic components or small computers in virtually every type of machinery will lead to "smart" machines, capable of doing more and communicating more with other machinery or with the operator.

Table 1. Specific industry assumptions for 1995 projections—Continued

Industry	Assumptions
Motor vehicles	Prices will be held down by new efficient production methods and by such changes as a shift from the unitized steel body, which creates the chassis and body from one mold, to production of body and chassis parts in the form of plastic panels. The retarding effects of increases in fuel and auto prices and in interest rates over the 1979 to 1982 period are not expected during the projected period. Car usage will also rise somewhat as a result of the movement to the Sunbelt. However, demand will be adversely affected by a smaller population of first-time car buyers, a smaller proportion of multicar families, and an increase in the average age of cars on the road. Imports are assumed to increase their market share only slightly, as many foreign producers set up plants in the United States.
Aircraft	Continued replacement of aging, fuel-inefficient, and noisy aircraft will result in increased investment demand, while joint production ventures will lead to increased imports. Productivity was lowered below model estimate; modern technologies are already widely diffused. Assumes further technological improvements to be limited.
Ship and boat building and repair	Exports will show healthy growth. Higher productivity is assumed because of increased improvements to shipbuilding facilities. These include floating drydocks, cranes with greater lifting capacity, automated equipment, and increased use of prefabricated modular components.
Railroad equipment	A slight increase in investment is expected between 1984 and 1995, but output will remain substantially less than its 1979 peak. Imports will more than double their market share.
Motorcycles, bicycles, and parts	Imports will increase their already substantial market share.
Transportation equipment, n.e.c	Demand for mobile homes is projected to decrease somewhat.
Scientific and controlling instruments	Investment purchases will grow faster than the historical trend because of the increase in expenditures on research and development.
Medical and dental instruments	A very rapid growth in investment is expected because of technological change and product innovation.
Optical and ophthalmic equipment	Investment spending will grow rapidly, mainly due to the greater use of new products which incorporate more advanced technology.
Photographic equipment and supplies	Growth will be fueled by the shift to the use of electronics from the use of traditional silver-based negatives. Imports will gain market share.
Watches and clocks	Imports will rise from 54 percent to 75 percent of total output.
Truck transportation	Projected employment was lowered because of expectations of higher productivity and lower employment levels due to deregulation in the trucking industry. Deregulation has eliminated several uneconomic rules and reduced the problem of empty backhauls; increased competition could lead to a greater volume of business and may encourage truckers to utilize their equipment more efficiently. Technologies expected to be in greater use include twin trailers, diesel-powered engines, and computer scheduling and recordkeeping.
Radio and television broadcasting	Productivity assumed to rise despite past declines.
Communication, except radio and television	Significant increases in business spending due to the introduction of new high-tech services and the rising use of data communications in the telephone industries. The prevalence of computers and their communication needs, as well as electronic mail, will cause the normal business to need more telephone services. As the prices of these services decline, they will be used instead of some business travel. Higher productivity than projected by labor model because of technological advances in telecommunications.
Electric utilities, private and public	The inability of many industries to further conserve energy will mean an increase in their usage of electricity, especially in view of the expected shift away from gas and oil as sources of energy, and the use of more automated plants and offices. Electricity is three times as expensive to produce as natural gas and fossil fuels but is more efficient in the production process. Assumes higher productivity than projected by labor model.
Gas utilities	Industries will use relatively less gas to heat their plants and as a raw material in manufacturing.
Eating and drinking places	Business expenditures on restaurants and bars are expected to decline relatively as firms make an effort to contain costs in this area. New techniques in communications will lower the amount of business travel.
Banking	Higher productivity than projected by labor model because of accelerating use of automated teller machines and electronic funds transfer systems.
Insurance	Higher productivity than projected by labor model because of computerized underwriting; paperflow requirements cut.
Hotels and lodging places	As companies control costs by cutting back on business trips per unit of output, there will be relatively less business expenditures for hotels.
Business services	This industry includes computer and data processing services, as well as photocopy and management and consulting services. Firms are expected to greatly increase their contracting-out for these services.

Table 1. Specific industry assumptions for 1995 projections—Continued

Industry	Assumptions	Industry	Assumptions
Advertising	Industries will spend relatively more on advertising as competition intensifies, and as firms seek to differentiate their products and extend their markets.	Professional services n.e.c.	This industry includes legal, engineering, and accounting services. Firms are expected to increase their contracting-out for these services.
		U.S. Postal Service	Higher productivity than projected by labor model because of improvements in mail handling equipment.

Occupational Employment

The national industry-occupation matrix was the basic analytical tool used by the Bureau of Labor Statistics to develop the 1984-95 occupational projections. The matrix presents data on employment by detailed occupation for wage and salary workers by industry. A matrix for a specific year can be viewed from two perspectives. One view focuses on the occupational composition of each industry and thereby indicates how an industry utilizes workers in different occupations to produce its products or services. Another view focuses on how each occupation is distributed across industries. In addition to its descriptive characteristics, the matrix is used as the basic tool to project occupational employment between a current (base) year and the target year of the projections.

This section describes how the 1984 matrix was developed and how the 1995 matrix was projected using the 1984 matrix as the base. It also describes how estimates of occupational employment of self-employed workers and unpaid family workers were developed and added to wage and salary employment data to derive estimates of total 1984 and projected 1995 employment by occupation.

Summary

1984 matrix

The occupational distribution of wage and salary workers for the 1984 matrix was developed for each of 378 detailed industries. The most current Occupational Employment Statistics (OES) survey data for each industry were used to develop occupational distribution (staffing) patterns for industries covered by the survey. For other industries, either 1980 Decennial Census data or 1984 Current Population Survey (CPS) data were used, except for the Federal Government, for which staffing patterns were developed from data compiled by the Office of Personnel Management.

Estimates of employment by occupation in 1984 were derived by multiplying the occupational distribution of employment for each of these 378 industries by 1984 wage and salary worker employment for each industry. For all industries except agriculture and private households, data on total wage and salary worker employment were obtained from the Bureau's Current Employment Statistics (CES) program. For agriculture and private households, CPS data were used.

Total 1984 employment

Estimates of self-employed and unpaid family workers by occupation were developed only at the total (all industry) level based on data in the 1984 Current Population Survey. They were added to the sum of wage and salary workers in all 378 industries in the matrix to derive estimates of total employment by detailed occupation for the economy.

1995 matrix

For wage and salary workers, the occupational patterns in the 1984 matrix were projected to 1995. The projected patterns were based on an analysis of the factors expected to cause change over the 1984-95 period. The projected 1995 pattern for each industry was then multiplied by projected total wage and salary worker employment for each industry derived through the Bureau's projections of employment by industry.

Total 1995 projected employment

Estimates of self-employed and unpaid family workers were projected based on an analysis of trends in the ratio of employment for each of these classes of workers to employment of wage and salary workers. Projected employment for these workers was added to wage and salary worker projections to derive total employment projections for each detailed occupation.

1984 Matrix

All industries, except agriculture, forestry, fishing, hunting and trapping, private households, and Federal Government

Occupational distribution patterns from the OES surveys were used to develop estimates of 1984 employment of wage and salary workers in industries covered by the surveys. The OES surveys are conducted on a 3-year cycle, with about one-third of the industries covered each year of the cycle. The surveys are based on a sample of employers in all nonagricultural industries except private households and the Federal Government.

To develop the 1984 matrix, occupational staffing patterns were developed from the most recent national survey data available. The survey years were as follows: Manufacturing industries and hospitals, 1983; trade, transportation, communications, public utilities, and

State and local governments, 1982; mining, construction, finance, insurance, real estate, and services, other than hospitals and education, 1981; and education, 1979. The staffing patterns from these surveys were then applied to 1984 annual average industry employment estimates. Because the OES surveys of hospitals and educational institutions combine government and private employment, they were combined for these industries in the matrix.

Occupational classification. The 1984 matrix conforms to the classification system first used in the 1983 OES surveys of manufacturing and hospitals. That classification is compatible with the Standard Occupational Classification (SOC). The 1981 and 1982 OES survey data, however, were based on a different classification system and had to be reclassified into the new system for use in the 1984 matrix. A crosswalk relating old to new OES survey occupations was used in this process. Difficulties were encountered in using the crosswalk because some occupations were split into more than one occupation in the new classification. In addition, some occupations in the new classification were not previously identified separately and therefore had been included in broader (or residual) categories. For such occupations, employment data from the 1983 manufacturing and hospital surveys were collapsed into residuals in the 1984 matrix, if employment was expected to be found in other industries. When data become available from a complete OES survey cycle, these occupations can be identified separately in the matrix.

Modifications to OES occupational patterns. In some industries, some detailed occupations contained in the OES classification system were not listed on the OES survey questionnaire but were included in a broader group or a residual category. To develop economywide employment estimates for these occupations, it was necessary to "enhance" the survey data by disaggregating employment from the appropriate survey category. The following paragraphs describe the enhancement procedures and other modifications designed to increase accuracy.

To enhance 1983 data, occupational data from the 1980 census were used. Although data from the census and the OES surveys are based on the same classification framework, they are not identical. To use census data, a crosswalk between the census and the new OES classification system was used. In classifying census data into the new OES system, comparability problems arose similar to those encountered in integrating the old OES data into the new system. In this process, considerable judgment had to be used to match some census occupations with occupations in the matrix; for some occupations, the relationship was considered to be tenuous at best. Therefore, staffing patterns of industries from the 1980 census were used only for detailed occupations that were comparable.[1] Occupations that were not comparable and that were judged not to be fully covered in the OES surveys were collapsed or combined into residual occupational categories in the industry-occupation matrix.

For scientists, engineers, and engineering and science technicians, the OES survey classification included a residual category in all industries. When a detailed occupation in each of these groups was not listed separately in the OES survey questionnaire for a specific industry, it was included in the residual. Because the 1980 census collected data in a format comparable to the OES survey for these groups, but included all detailed occupations, a percent distribution of census data for occupations not covered in the survey was applied to the residual category in the OES survey for that industry to develop employment estimates for the detailed occupations.

For all other occupations that were judged to require enhancement, the proportion that the occupation represented of total wage and salary worker employment in the industry in the 1980 census was applied to total industry employment in the comparable OES survey industry. The resulting employment total was used for the occupation, and a comparable total was subtracted from the appropriate OES survey residual. To avoid developing estimates that were very small and that would be both unreliable and have little bearing on total occupational employment, data were disaggregated using this procedure only for occupations for which employment in an industry accounted for more than 0.5 percent of the total for the occupation in the census. In addition, if the procedure resulted in employment of less than 50 in a specific OES survey industry, no enhancement was made. In instances where one census industry was equivalent to more than one OES survey industry, the computed census ratio was used in each comparable matrix industry in the group. In industries where the enhancement procedure resulted in an employment total greater than the appropriate residual in the OES survey data, the enhancement was limited to total employment in the residual.

To enhance 1981 and 1982 data, the 1970 census was used in a manner similar to that described above.

In a few instances, other modifications were made based on data available from other sources, such as the National Center for Education Statistics (NCES). NCES data on preschool teachers, elementary school teachers, secondary school teachers, and college and university faculty were judged to be more accurate than OES data for these workers. Data for these occupations were placed into the matrix for the educational services industry, and all other occupations were adjusted proportionally through an iteration procedure. In a similar manner, data

from the Interstate Commerce Commission for selected occupations in the railroad industry were used in the matrix. Data from religious organizations on the number of clergy were also substituted for OES data in developing the 1984 matrix.

For a small number of other occupations, an analysis of CPS data indicated that employment patterns in 1984 probably had changed significantly from the reference period of the 1981 and 1982 OES surveys. For example, rapid growth of cashiers was observed in the CPS between 1981 and 1984 in gasoline stations, department stores, and grocery stores. Modifications were made to coefficients for cashiers in the 1981 OES surveys in these industries, and other occupations were adjusted proportionally.

Agriculture, forestry, fishing, hunting, and trapping

Data on the occupational distribution of wage and salary workers in agriculture, forestry, fishing, hunting, and trapping were derived from the 1980 census. Occupational distribution patterns were developed for five industries: (1) agriculture production, crops; (2) agriculture production, livestock; (3) agricultural services (including horticultural); (4) forestry; and (5) fishing, hunting, and trapping. Similar data could have been developed from the 1984 CPS, but it was believed that the larger sample used in the census would provide more reliable data. However, 1984 CPS data were used as the industry controls in the 1984 matrix. Also, for the very large occupations that dominate these industries—farmers, farm managers, and farm workers—1984 CPS annual averages were used in the 1984 matrix.

Private households

Data on the occupational distribution of employment in private households were derived from the 1984 CPS rather than from 1980 census data because the census total was roughly one-third less than the totals in the CPS each year from the late 1970's to 1984. Because the census covers only 1 month, April 1980, it was judged that the annual average data based on monthly surveys would be more accurate.

Federal Government

Data on the occupational composition of Federal Government employment are maintained by the Office of Personnel Management. These data, however, are compiled in greater detail than needed for immediate use in the matrix. It was necessary, therefore, to convert SMC data to the OES survey classification. For most occupations, converted SMC data for 1982 were the latest available. However, for a few detailed occupations—postmasters, postal service clerks, postal mail carriers, and air traffic controllers—1984 data were available and were used in the matrix: Data were developed separately for the postal service and all other Federal employment.

Problems occurred primarily in classifying occupations found only in the Federal Government into their proper place in the OES survey system. Some of these occupations, such as postal service clerks and postal mail carriers, are classified separately in the matrix.

Total 1984 Employment

To develop total employment estimates by occupation, estimates of self-employed and unpaid family workers were developed to add to wage and salary worker employment. These estimates, developed at the all-industry level only, were taken directly from the CPS.

Estimates of wage and salary workers by occupation are based on payroll records of establishments and represent the number of jobs by occupation rather than a count of individuals. Since individuals may hold more than one job, they are counted in all jobs they hold. However, for the agriculture and private household industries, each person is only counted once within these industries since the CPS only counts an individual once in his or her primary job. If these workers also held wage and salary jobs in other industries, however, they would be counted in those jobs as well.

In preparing the matrix for publication, occupations with total employment (wage and salary workers and self-employed and unpaid family workers) of less than 5,000 workers were collapsed into appropriate residuals. Exceptions were made for occupations requiring significant training, and for residual categories that were needed to complete subtotals considered to be of significance. As a result of the collapsing of occupations into residual categories, the total number of occupations covered in the 1984 matrix available to the public is 500, of which 60 are residual categories.

1995 Matrix

The basic procedure used to develop the 1995 occupational projections for wage and salary workers was to project the staffing patterns in the 1984 matrix to 1995 and then apply the projected staffing patterns to projections of industry employment developed through the Bureau's economic growth system. Self-employed and unpaid family workers were projected separately and added to the sum of wage and salary workers for all industries to derive the projections of total occupational employment.

The analytical efforts involved in developing the projections can best be described in a series of steps.

Review and analysis of historical data

In projecting the staffing patterns from 1984 to 1995, the first step was to review historical employment data to identify trends. A variety of data sources were reviewed, including past OES surveys, the CPS surveys conducted by other Federal agencies such as the National Center for Education Statistics and the National Science Foundation, and studies conducted by nongovernment organizations.

Analyses were then conducted to identify the factors underlying the trends identified through the review of historical data. In this process, use was made of analytical studies of specific industries and occupations, technological change, and a wide variety of economic data.

Based on these analyses, judgments were made whether the factors identified as causing changes in occupational utilization in the past would have less, more, or the same effect in the future. Factors identified were wide ranging. They included technological change, both in the processes used to produce products and services and in products and services themselves, changes in the ways business activities are conducted, changes in organizational management and objectives, changes in the mix of products and services produced by industries, and changes in the size of business establishments within industries.

Identification of new factors

Studies were also conducted to identify technological changes and other factors that could cause the future utilization of workers to change within industries when an analysis of past trends was not applicable. For example, an analysis of past trends could not identify the impact of robots on staffing patterns because, for most industries, this technology has not yet been put in place to any significant extent. However, robots are expected to have a significant impact on some occupations, especially in the automobile manufacturing industry. Information of this nature can be identified from studies conducted by other organizations as well as through studies conducted by BLS staff. Research conducted by the Bureau's Office of Productivity and Technology was used intensively in these analyses. Much information of this nature was also obtained during the course of the research conducted in preparing the 1986-87 edition of the *Occupational Outlook Handbook*.

An example will serve to identify the nature of the analytical judgments that were made to reflect technological change. In historical data, employment of typists has shown little change over the past several years despite overall growth of the economy and an increasing amount of associated paperwork. The increasing use of word processing equipment was identified as the major factor underlying the declining proportion of typists. Analyses indicated that this trend would continue, since word processing equipment is not yet found in all organizations and because improvements in word processing equipment are expected to continue. However, because a very large proportion of establishments already use such equipment, the trend is not likely to accelerate. Table 1 identifies matrix occupations for which industry-occupation cell coefficients were projected to change over the 1984-95 period. The table also provides a brief description of the reasons underlying the change.

Preparing numerical estimates

The translation of analytical judgments into numerical estimates is the most subjective step in the projections procedure. For example, most analysts would agree with the judgment described above on the effect of word processing on employment of typists. Yet numerical estimates of the reduction in the proportion of typists in each industry in which they are employed could vary significantly among individual analysts.

To maintain consistency among the judgments of the analysts the following procedure was used to develop the initial projected coefficients for all occupations across industries. A determination was made as to whether the coefficient should be changed and, if so, whether the change, either a decrease or an increase, would be small, moderate, significant, or very significant. Guidelines for changing coefficients across all industries were as follows: Small—1 percent to 4 percent; moderate—5 percent to 9 percent; significant—10 percent to 20 percent, and very significant—20 percent or more. Table 1 identifies the groups in which the occupations fell. Analysts could use any percent change within the guidelines. For example, a moderate change on the high side would be 8 or 9 percent and on the low side 5 or 6 percent. Coefficients were also projected for specific industries that differed from the economywide analysis.

Balancing the results

All projected changes were then processed through the computer system prepared to compile an industry-occupation matrix. Since the projected ratios for virtually all industries at this point did not add to precisely 100 percent, an iteration procedure was used to balance the industry to 100 percent.

Applying the ratios to projected employment

The resulting occupational distribution patterns were then applied to the projections of industry employment. The initial projections for all occupations derived by adding across industries and adding preliminary projections of self-employed and unpaid family workers were arranged in several table formats suitable for analysis. This included arrangement of data by growth rate and by total numerical change, the development of a change factor matrix for each occupation (the percent change from 1984-95 for each occupation/industry cell coeffi-

cient), and the distribution of each occupation across all industries in 1984 and 1995.

Detailed review

A detailed review was then made of all the projections. Staff participating in the review brought their knowledge gained through experience and studies in preparing the *Occupational Outlook Handbook and* related activities. Consistency of analyses and assumptions used in other aspects of the Bureau's projection model were a significant input to the review process. As a result of the review, numerous changes were made to the occupational coefficients, which were then processed into a revised matrix.

Final review

A final review was then conducted in which knowledgeable persons in specific fields were asked for their comments on the implications of the projections. The projections were again reviewed for consistency with the general assumptions made in developing the economic model and those made when the analyses underlying historical changes in coefficients and employment trends were made. Resulting changes were made in the matrix and the final projections of wage and salary workers developed.

Adding self-employed and unpaid family workers

Projections of self-employed and unpaid family workers were developed based largely on historically observed ratios of these workers to wage and salary workers in each occupation. Analyses showed that these trends were generally consistent over the past 10 years, although in some occupations the ratios increased, in others declined, and in others remained relatively unchanged. It should be noted that self-employment is a significant proportion of employment in only a small number of occupations, including physicians, dentists, and other medical specialists; the construction crafts; and manager-owners of small businesses in retail trade. For most occupations, the data have little bearing on the projections. Unpaid family workers represent a significant proportion of workers only for farm workers, cashiers, and some clerical occupations such as receptionists, secretaries, and bookkeepers. The totals for self-employed, unpaid family workers, and wage and salary workers were then summed to arrive at the final projections.

—FOOTNOTES—

[1]The problems discussed here were also encountered in developing estimates for data placed in the matrix from sources other than the OES surveys, including agricultural industries, the private household industry, self-employed workers, and unpaid family workers. For these categories, either 1980 census or 1984 CPS data were used, both of which have the same occupational classification system.

Table 1. Occupations with projected changes to employment coefficients in the National Industry-Occupation Matrix, 1984 to 1995

Occupation	Reasons underlying projected changes
Significant increases	
Accountants and auditors	Significant increases in virtually all industries due to the growing emphasis on the use of financial data in day-to-day business decisionmaking, as well as the rapid growth of internal auditing functions directed at improving employees' efficiency. Only small to moderate increases are expected in accounting, auditing, and bookkeeping services in Federal, State, and local governments.
Aeronautical and astronautical engineers	Significant increases in aircraft and parts manufacturing and the Federal Government to reflect expected increases in research and development activity and defense expenditures.
Artists and commercial artists	The use of computers to produce images is not technologically advanced enough to produce images as well as human artists can. Therefore, a significant increase is expected in mailing, reproduction, commercial art and photography, and stenographic services due to increased demand for artwork. A moderate increase in advertising.
Automotive and motorcyle mechanics	A significant increase in motor vehicle dealers (new and used) due to the growing complexity of automotive technology, particularly increasing applications of electronics, which are expected to make automobiles more difficult to service and repair. Only a moderate increase in automobile repair shops is expected because establishments in this industry will be forced to limit the range of work they perform due to limited expertise or lack of expensive diagnostic or repair equipment. A small decrease in gasoline service stations as the trend toward more self-service stations that do not perform repair is expected to continue.
Cashiers	Significant increases in all retail trade industries, reflecting the growing importance of self-service. The only important exception is gasoline service stations, where only a moderate increase is projected. Automated payment systems are expected to offset partially the increased demand for cashiers in self-service stations.
Computer programmers	Significant increases in all industries, reflecting the increasing use of computers throughout the economy as improvements to both hardware and software make computer technology more versatile, cheaper, and easier to use.
Computer systems analysts, electronic data processing	Significant increases in all industries, reflecting the rising use of computers.
Correction officers and jailers	Significant increases in Federal, State, and local government due to the public's increasing concern about law and order.
Electrical and electronics engineers	Significant increases in virtually all industries to develop, install, and maintain computers and other electronic equipment, and to incorporate electronic devices in new products and in production facilities.
Electrical and electronics technicians and technologists	Significant increases in almost all industries due to the expected increased use of computers and other electronic equipment throughout the economy which will require more technicians for research and development, maintenance, installation, and sales support.
Industrial engineers	Significant increases in virtually all industries due to the expected increase in expenditures for capital equipment and the need to integrate separate areas of factory automation into whole automated factories. They are also expected increasingly to be used to develop systems for office automation.
Instructors, adult (nonvocational) education	A significant increase in educational services to reflect the growing adult population and the increasing emphasis on self-improvement and leisure studies.
Mechanical engineers	Significant increases in nearly all industries due to expected increases in expenditures for research and development, national defense, and capital outlays.
Medical assistants	A significant increase in offices of physicians as assistants continue to take over some of the duties of other workers. These workers are valued for their flexibility and versatility in both the clerical and clinical areas.
Occupational therapists	A significant increase in hospitals due to the more intensive use of therapy services to reduce average length of patient stays.
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.
Physical therapists	A significant increase in hospitals due to the expectation that therapy services will be used more intensively to reduce the average length of patient stays.
Registered nurses	A significant increase in hospitals due to changes in staffing patterns brought about by continued pressure to contain costs plus increasing complexity of care. A significant increase in offices of other health practitioners, reflecting the growing acceptance of nurse practitioners.
Securities and financial services sales workers	A significant increase in commercial and stock savings banks due to legislation that has reduced regulation in the financial services industry to allow banks to offer products such as money market funds and stocks.

Table 1. Occupations with projected changes in employment coefficients in the National Industry-Occupation Matrix, 1984, to 1995—Continued

Occupation	Reasons underlying projected changes
Teachers, kindergarten and elementary	A significant increase in educational services as kindergarten and elementary school enrollments become a larger proportion of total school enrollments.
Moderate increases	
Bakers, bread and pastry	A moderate increase in grocery stores due to an expected continuation of the trend toward large supermarkets with their own bakeries.
Bartenders	A moderate increase in eating and drinking places, reflecting expected slow growth of this industry's fast-food segment, which employs few bartenders, and more rapid growth of other segments, where employment of bartenders is concentrated.
Biological scientists	Moderate increases in almost all industries outside of government due to increasing interest and research opportunities in biological and medical research caused by advances in biotechnology and the applications of biotechnology to other areas.
Bus and truck mechanics and diesel engine specialists	Moderate increases in all industries due to the expected increase in the demand for small and medium-sized diesel engines for power trucks, buses, automobiles, and generators.
Bus drivers, school	A moderate increase in educational services as elementary and secondary school enrollments become a larger proportion of total school enrollments, and as a growing proportion of the school age population becomes concentrated in suburban areas.
Chemical engineers	Moderate increases in manufacturing industries due to expected increases in research and development expenditures.
Computer operators, except peripheral equipment	Moderate increases in all industries, reflecting an expected rise in computer usage throughout the economy.
Cooks, restaurant	A moderate increase in eating and drinking places, reflecting expected continued growth of full-service restaurants at the expense of fast-food establishments.
Court clerks	A moderate increase in local government due to the public's increasing concern about law and order and the expected continued backlog of cases waiting to be heard. A significant increase in State government due to the expected rapid growth of judicial functions.
Data processing equipment repairers	Moderate increases in all industries, reflecting the rising use of computers.
Electricians	Moderate increases in all manufacturing industries as electricians become increasingly involved in the maintenance of electronic controllers used on production equipment.
Geologists, geophysicists, and oceanographers	Moderate increases in industries concerned with locating increasingly scarce and harder to find oil, gas, and mineral deposits.
Guards	A moderate increase in the rapidly growing miscellaneous business services industry, which includes contract security firms. Significant decreases in virtually all other industries, reflecting an increasing use of technologically advanced security systems as well as a trend by firms to contract out security services because it is easier and less expensive than operating a proprietary security staff.
Hosts and hostesses, restaurant, lounge, and coffee shop	A moderate increase in eating and drinking places due to expected rapid growth in full-service restaurants and slower growth in fast-food restaurants.
Industrial engineering technicians and technologists	Moderate increases in virtually all manufacturing industries because of expected increases in expenditures for research and capital equipment needed to integrate separate areas of factory automation.
Judges, magistrates, and other judicial workers	Moderate increases in Federal and local governments due to the public's increasing concern about law and order and the expected continued backlog of cases waiting to be heard. A significant increase in State government due to expected rapid growth of judicial functions.
Lawyers	Significant increases in industries other than the legal services industry and government as more legal work is expected to be done in-house.
Mechanical engineering technicians and technologists	Moderate increases in virtually all manufacturing industries because of expected increases in expenditures for research and development, defense, and capital equipment.
Peripheral EDP equipment operators	Moderate increases in all industries due to the expected rise in computer usage throughout the economy.
Pharmacy assistants	A moderate increase in hospitals due to expected continuing pressure to contain costs. Hospitals are expected to expand their utilization of technological advances such as computer profiles of patients and automated dispensing of medication.
Physician assistants	A moderate increase in hospitals as physician assistants replace some medical residents due to pressure to contain costs. A significant increase in outpatient care facilities, where their use is cost-effective.
Public relations specialists	Moderate increases in all industries, reflecting the expected growing importance of public relations activities throughout the economy.
Radiologic technologists and technicians	Moderate increases in hospitals due to the expected continued expansion of diagnostic and therapeutic applications in radiology; in offices of physicians, reflecting the expected acceleration of the trend toward large medical group practices offering an expanded range of services; and in outpatient care facilities, reflecting the growth of freestanding diagnostic imaging centers.

Table 1. Occupations with projected changes in employment coefficients in the National Industry-Occupation Matrix, 1984, to 1995—Continued

Occupation	Reasons underlying projected changes
Teacher aides and educational assistans	A moderate increase in educational services as elementary and secondary school enrollments become a larger proportion of total school enrollments.
Teachers, preschool	A moderate increase in educational services due to the expected increase in enrollments in church-operated schools and day care centers. A significant increase in religious organizations due to the expected increase in demand for day care services.
Small increases	
Chemists	Small increases in all manufacturing industries due to rising research and development expenditures and a shift in composition of output toward specialty chemicals, which require more work by chemists.
Elementary and secondary school principals and assistant principals	Small increase in educational services as elementary and secondary school enrollments become a larger proportion of total school enrollments.
Emergency medical technicians	Small increases in local government and hospitals, reflecting an expected increase in local government support for public safety and health services, and an attempt by hospitals to increase their share of the emergency medical services market.
Underwriters	A small increase in the insurance industry. The increasing complexity of policies and greater competition among insurance carriers will cause insurance companies to analyze risks more carefully.
Waiters and waitresses	A small increase in eating and drinking places due to the expected faster growth of full-service restaurants than fast-food restaurants.
Small decreases	
Hotel desk clerks	A small decrease in hotels, motels, and tourist courts, reflecting the trend toward larger hotels with computerized reservation systems.
Painting machine operators and tenders	Small decreases in furniture, primary metals, fabricated metal products, nonelectrical machinery, electrical machinery, and transportation equipment as production painters become more productive due to technological advances which utilize robotic equipment.
Pharmacists	A small decrease in drug stores and proprietary stores due to the expected continued shift to larger drug and variety stores or drug and department stores. As the average number of employees in these establishments increases, pharmacists are expected to become a smaller proportion of the total industry employment. A moderate increase is expected in hospitals due to the growing emphasis on clinical pharmacy.
Salespersons, retail	Small decreases in all retail trade industries due to the continuing shift to self-service and discount operations that reduce the demand for salespeople. A significant decrease in grocery stores where the shift to self-service is expected to be stronger than in other retail establishments.
Teachers, secondary school	A small decrease in educational services as secondary school enrollments become a smaller proportion of total school enrollments.
Moderate decreases	
Bookkeeping, accounting, and auditing clerks	Moderate decreases in all industries, reflecting the continuation of the trend toward automation of bookkeeping operations.
Blue-collar worker supervisors	Moderate decreases in all manufacturing industries as firms are expected to assign more workers to each supervisor in order to compete with foreign firms. Also, to the extent that the use of automated machinery eliminates production worker jobs, there are expected to be corresponding declines in supervisory positions.
Broadcast technicians	Moderate decreases in all industries reflecting the increased use of electronic broadcasting equipment that increases the productivity of technicians.
Cooks, short order and specialty fast food	A moderate decrease in eating and drinking places due to expected slower growth of the fast-food segment than other parts of the industry.
Electrical and electronics assemblers	Moderate decreases in all industries due to the expected greater application of industrial robots to perform assembly operations.
Electronic home entertainment equipment repairers	Moderate decreases in all industries due to the lower maintenance requirements of equipment made with microelectronic circuitry.
Food preparation and service workers, fast food	A moderate decrease in eating and drinking places due to expected slower growth of the fast-food segment than other parts of the industry.
Janitors and cleaners, including maids and housekeeping cleaners	Moderate decreases in virtually all industries due to an expected increase in contracting out cleaners of cleaning services. A small increase in services to dwellings and other buildings where contractual cleaning services are located.
Jewelers and silversmiths	A moderate decrease in miscellaneous shopping goods stores as new jewelry stores are expected to be primarily sales outlets which either contract out repair work or centralize repair services in one location. A small decrease in jewelry manufacturing due to increased productivity resulting from the use of lasers and other more efficient equipment.

Table 1. Occupations with projected changes in employment coefficients in the National Industry-Occupation Matrix, 1984 to 1995—Continued

Occupation	Reasons underlying projected changes
Machinists	Moderate decreases in all industries, reflecting the increasing use of more productive metalworking technologies such as numerical-control machine tools, machining centers, and flexible manufacturing systems.
Physicians	A moderate decrease in offices of physicians as large group practices provide more complex therapeutic and diagnostic procedures that require more support personnel.
Postal service clerks	A moderate decrease in the Postal Service due to the further application of technologies that reduce labor requirements in this occupation such as computer forwarding, presorting programs, bar code sorters, and optical character readers.
Production, planning, and expediting clerks	Moderate decreases in all industries as automation continues to reduce the need for these workers.
Reservation and transportation ticket agents	A moderate decrease in certificated air transportation due to the continued reduction in labor requirements resulting from the computerization of reservation and ticketing functions.
Roustabouts	Moderate decreases due to greater mechanization and greater use of new equipment such as backhoes, electronic testers, power tools, and hoists.
Service station attendants	A moderate decrease in gasoline service stations, reflecting the continued shift to self-service stations.
Stock clerks, sales floor	Moderate decreases in all industries due to computerized technology which has simplified inventory control and the use of optical scanners which read bar codes to register prices of item purchased. The use of scanners means that prices do not have to be marked on each item, thereby lowering the demand for these workers.
Tellers	Moderate decreases in commercial and stock savings banks and savings and loan associations due to an expected increase in the number of automated teller machines.
Traffic, shipping, and receiving clerks	Moderate decreases in all industries as more of these workers use computer technology in their work.
Wholesale and retail buyers except farm products	A moderate decrease in all industries as computerized equipment is used more to record transactions.
Significant decreases	
Architects, including landscape architects	A significant decrease in engineering, architectural, and surveying services as the demand for architectural services is not expected to grow as fast as the demand for engineering services.
Barbers	A significant decrease in beauty shops, where employment of barbers is not expected to grow as fast as for cosmetologists.
Brokerage clerks	Significant decreases in financial industries due to the increasing use of data processing equipment that greatly increases the efficiency of these workers.
Butchers and meatcutters	A significant decrease in grocery stores and a small increase in meat products manufacturing, reflecting the continued shift in the processing of beef from retail to manufacturing establishments.
Central office operators	A significant decrease in telephone communication due to the increasing centralization and automation of routine operator tasks.
College and university faculty	A significant decrease in educational services as college and university enrollments decline sharply as a proportion of total school enrollments.
Compositors, typesetters, and arrangers	Significant decreases in newspapers and commercial printing, reflecting a continued diffusion of technology that already has substantially reduced requirements for these workers through the use of video display terminals and photocomposition.
Data entry keyers, except composing	Significant decreases in all industries due to expected improvements to data entry techniques, such as on-line processing, optical character recognition technologies, and improvements to data communications systems.
Directory assistance operators	A significant decrease in telephone communication due to an expected increase in automated responses to customer inquiries and an expected decrease in demand for services arising from charging for directory assistance.
Drafters	Significant decreases in all industries due to the expected continuing spread of computer-aided design technology which allows drafters to become more productive.
Farm and home management advisors	A significant decrease in educational services due to the projected decline in the number of farmers who rely on the services of these workers.
File clerks	Significant decreases in all industries due to the expected continued growth of computerized filing systems which enable other office personnel to assume some of the duties of these workers
Graduate assistants, teaching	A significant decrease in educational services as college and university enrollments decline sharply as a proportion of total school enrollments.
Industrial truck and tractor operators	Significant decreases in all industries due to anticipated productivity increases and warehouse automation. New industrial trucks that are linked to the dispatcher by computer and the growth of automated warehouses are expected to eliminate the need for many industrial trucks and operators.

Table 1. Occupations with projected changes in employment coefficients in the National Industry-Occupation Matrix, 1984 to 1995—Continued

Occupation	Reasons underlying projected changes
Licensed practical nurses	A significant decrease in hospitals as changes in patient care requirements resulting from shorter length of stays and use of sophisticated medical technologies accelerates the long-term trend toward reliance on nursing personnel at higher levels of clinical skill.
Mail clerks, except mailing machine operators and Postal Service	Significant decreases in all industries due to the expected widespread adaptation of innovations such as electronic mail, facsimile transmission, and optical character recognition.
Medical and clinical laboratory technologists and technicians	A significant decrease in hospitals as much of the work currently being performed in hospital laboratories is expected to be shifted to other industry sectors, including offices of physicians and commercial labs.
Nursing aides, orderlies, and attendants	A significant decrease in hospitals as changes in patient care requirements resulting from shorter length of stays and use of sophisticated medical technologies accelerate the long-term trend toward reliance on nursing personnel at higher levels of clinical skill.
Order fillers, wholesale and retail sales	Significant decreases in all industries due to continued automation of the duties of these workers.
Payroll and timekeeping clerks	Significant decreases in all industries due to the expected widespread application of computer technology to the payroll and timekeeping functions.
Radio and TV announcers and newscasters	A significant decrease in radio and TV broadcasting, where much of the future industry growth is expected in "behind the scenes" jobs such as sales and clerical workers. Cable TV, which is expected to be the fastest growing segment within the industry, employs relatively few announcers.
Secretaries	Significant decreases in all industries, reflecting the impact of office automation.
Station installers and repairers, telephone	A significant decrease in telephone communication due to an increasing use of telephones that are cheaper to replace than to repair, and to modular plugs that allow consumers to install their own telephones.
Statistical clerks	Significant decreases in all industries due to the expected impact of computer technology on recordkeeping and statistical analyses. '
Stenographers	Significant decreases in all industries due to the expected continued spread of dictation equipment.
Stock clerks; stock room, warehouse, or yard	Significant decreases in all industries due to expected further application of computer technology to inventory control.
Surveyors	A significant decrease in engineering, architectural, and surveying services as the demand for surveying services is not expected to grow as fast as the demand for engineering services.
Typists	Significant decreases in virtually all industries, reflecting the widening implementation of office automation equipment and expected continued improvements in word processing technology. A significant increase in mailing, reproduction, commercial art and photography, and stenographic services, which includes commercial word processing bureaus, the expansion of which will increase the demand for typists.

Part III. Supplementary Data

Table A-1. Values of selected aggregate economic variables, 1984, and assumptions for 1990 and 1995

Variable	1984	Low		Moderate		High	
		1990	1995	1990	1995	1990	1995
Federal							
Defense purchases (billions of 1972 dollars)	92.356	122.017	129.513	122.017	129.513	122.017	129.513
Nondefense purchases (billions of 1972 dollars)	31.075	35.385	37.080	35.385	37.080	35.385	37.080
Food stamp benefits (billions of 1972 dollars)	4.880	4.967	5.484	4.967	5.484	4.967	5.484
Military retirement (billions of 1972 dollars)	14.927	15.503	15.894	15.503	15.894	15.503	15.894
Medicare payments (billions of 1972 dollars)	26.583	31.800	38.134	31.800	38.134	31.800	38.134
Social Security benefits (billions of 1972 dollars)	79.122	87.972	93.656	87.972	93.656	87.972	93.656
Other transfers (billions of 1972 dollars)	23.430	25.235	27.862	25.235	27.862	25.235	27.862
Old-age and survivors insurance maximum taxable salary (billions of current dollars)	36.751	56.189	78.509	56.189	78.509	56.189	78.509
Old-age and survivors insurance combined tax rate (percent)	14.000	15.300	15.300	15.300	15.300	15.300	15.300
Grants-in-aid (billions of current dollars)	92.454	126.623	167.223	126.623	167.223	126.623	167.223
Subsidies (billions of current dollars)	24.200	20.407	27.052	20.407	27.052	20.407	27.052
Transfers to foreigners (billions of current dollars)	7.984	9.079	11.047	9.079	11.047	9.079	11.047
Interest paid to foreigners (billions of current dollars)	19.393	26.260	28.993	26.260	28.993	26.260	28.993
Average compensation (thousands of 1972 dollars)	8.781	9.593	10.745	9.593	10.745	9.593	10.745
Ratio of compensation to purchases	0.328	0.272	0.272	0.272	0.272	0.272	0.272
Value of a standard deduction (current dollars)	3.598	4.541	6.058	4.541	6.058	4.541	6.058
Value of individual exemption (current dollars)	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Effective tax rate, homeowners (percent)	37.413	37.413	37.413	37.413	37.413	37.413	37.413
Effective tax rate, landlords (percent)	54.388	54.387	54.387	54.387	54.387	54.387	54.387
Federal gasoline tax (cents per gallon)	9.000	9.000	9.000	9.000	9.000	9.000	9.000
State and local							
Education purchases (billions of 1972 dollars)	71.398	78.070	84.103	80.641	88.344	82.316	89.996
Health, labor, and welfare purchases (billions of 1972 dollars)	33.102	36.625	39.650	38.992	43.901	40.927	46.080
Civil safety purchases (billions of 1972 dollars)	14.628	16.377	17.643	17.334	19.589	18.191	20.581
Other purchases (billions of 1972 dollars)	56.672	63.822	70.120	68.535	78.419	71.295	81.454
Transfers to persons (billions of 1972 dollars)	24.106	29.217	32.884	29.217	32.884	29.217	32.884
Dividend income (billions of current dollars)	3.249	4.190	4.731	4.190	4.731	4.190	4.731
Subsidies (billions of current dollars)	-7.270	-11.264	-13.126	-11.264	-13.126	-11.264	-13.126
Average compensation (thousands of 1972 dollars)	8.675	9.053	9.514	9.053	9.514	9.053	9.514
Education employment (thousands)	88.393	82.997	78.423	82.997	78.423	82.997	78.423
Health, labor, and welfare employment (thousands)	35.619	33.402	31.529	33.402	31.529	33.402	31.529
Civil safety employment (thousands)	90.579	84.943	80.081	84.943	80.081	84.943	80.081
Other employment (thousands)	70.612	66.217	62.503	66.217	62.503	66.217	62.503
Personal income subject to State and local tax (proportion)	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Effective tax rate, all States (percent)	5.861	6.083	6.083	6.083	6.083	6.083	6.083
State and local gasoline tax (cents per gallon)	12.067	18.321	24.518	18.321	24.518	18.321	24.518
Monetary							
Reserve requirement, demand deposits (percent)	0.175	0.175	0.175	0.175	0.175	0.175	0.175
Reserve requirement, time deposits (percent)	0.012	0.012	0.012	0.012	0.012	0.012	0.012
Free reserves (billions of current dollars)	0.068	0.488	0.488	0.488	0.488	0.488	0.488
Money market mutual funds (billions of current dollars)	184.158	271.004	417.352	271.004	417.352	271.004	417.352
Other checkable deposits (billions of current dollars)	137.792	216.513	293.539	216.513	293.539	216.513	293.539
Overnight repurchase agreements (billions of current dollars)	50.540	82.732	110.228	82.732	110.228	82.732	110.228
Term repurchase agreements, commercial banks (billions of current dollars)	29.860	47.384	65.076	47.384	65.076	47.384	65.076
Term repurchase agreements, thrifts (billions of current dollars)	26.324	47.219	66.544	47.219	66.544	47.219	66.544
Overnight Eurodollars (billions of current dollars)	9.996	24.153	37.292	24.153	37.292	24.153	37.292
Travelers checks (billions of current dollars)	5.059	6.484	8.160	6.484	8.160	6.484	8.160
Demographic							
Number of families (millions)	61.996	68.183	72.250	68.183	72.250	68.183	72.250
Number of households (millions)	84.985	95.598	102.446	95.598	102.446	95.598	102.446
Number of unrelated individuals (millions)	31.905	34.287	36.747	34.287	36.747	34.287	36.747
Civilian labor force, men, age 16 and over (millions)	63.835	65.841	67.258	67.146	69.282	68.144	71.452
Civilian labor force, women, age 16 and over (millions)	49.709	54.259	57.842	55.507	59.886	56.156	61.448
Armed Forces (millions)	2.239	2.322	2.322	2.322	2.322	2.322	2.322
Self-employed (millions)	7.785	7.974	8.175	8.191	8.632	8.363	8.921
Unpaid family workers (millions)	0.335	0.310	0.202	0.354	0.235	0.374	0.336
Private household workers and conceptual difference (millions)	-0.899	-0.898	-0.283	-1.107	-0.678	-1.172	-0.727
Foreign activity							
World gross domestic product (billions of 1972 dollars)	4,529.500	5,283.698	5,948.898	5,567.898	6,361.296	5,764.398	6,617.893
World gross domestic product deflator (1972 = 100)	297.100	433.500	610.900	412.000	528.300	391.400	480.800
Exchange rate (1972 = 100)	71.48	82.90	92.42	89.21	105.74	93.62	120.06
Miltary agency transfers (billions of 1972 dollars)	5.200	6.692	8.011	6.692	8.011	6.692	8.011
Exports, factor income (billions of 1972 dollars)	40.116	51.217	60.270	51.217	60.270	51.217	60.270

Table A-1. Values of selected aggregate economic variables, 1984, and assumptions for 1990 and 1995—Continued

Variable	1984	Low		Moderate		High	
		1990	1995	1990	1995	1990	1995
Foreign activity—Continued							
Direct defense expenditures abroad (billions of 1972 dollars)	5.600	6.400	7.000	6.400	7.000	6.400	7.000
Imports of automobiles and parts (billions of 1972 dollars)	13.700	23.800	27.900	23.800	27.900	23.800	27.900
Imports, factor income (billions of 1972 dollars)	23.300	35.300	45.679	35.300	45.679	35.300	45.679
Miscellaneous							
Ratio of minimum wage to average hourly earnings	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Capital consumption adjustment, corporate profits (billions of 1972 dollars)	55.075	92.145	97.109	92.145	97.109	92.145	97.109
Ratio of consumption of small trucks to new cars	30.512	33.091	33.102	33.091	33.102	33.091	33.102
Military clothing and shoes (billions of 1972 dollars)	0.098	0.113	0.131	0.113	0.131	0.113	0.131
Food furnished employees (billions of 1972 dollars)	3.509	4.015	4.514	4.015	4.514	4.015	4.514
Financial services furnished free (billions of 1972 dollars)	19.940	23.133	25.677	23.133	25.677	23.133	25.677
Capacity value, new housing (millions)	1.948	1.851	1.900	1.851	1.900	1.851	1.900
Farm housing starts (millions)	0.016	0.016	0.016	0.016	0.016	0.016	0.016
Public multi-unit housing starts (millions)	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Public single-unit housing starts (millions)	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Residential equipment (billions of 1972 dollars)	2.210	2.460	2.650	2.523	2.785	2.563	2.872
Farm residential structures (billions of 1972 dollars)	0.527	0.546	0.557	0.554	0.571	0.563	0.586
Gas mileage, city driving, all cars (miles per gallon)	15.859	18.815	20.651	18.815	20.651	18.815	20.651
Gas mileage, highway driving, all cars (miles per gallon)	30.036	35.698	39.183	35.698	39.183	35.698	39.183
Persons traveling to work by non-automobile means (millions)	13.369	12.769	12.269	12.769	12.269	12.769	12.269
Domestic wellhead price, lower 48, crude petroleum (dollars per barrel)	28.15	40.18	56.10	40.18	56.10	40.18	56.10
Domestic wellhead price, natural gas (dollars per million cubic feet)	2.75	4.10	5.91	4.10	5.91	4.10	5.91
Ratio of consumption of new automobiles to total personal consumption expenditures	0.65	0.61	0.61	0.61	0.61	0.61	0.61
Ratio of non old-age survivors insurance contributions to personal income less transfer payments	1.79	1.79	1.79	1.79	1.79	1.79	1.79
Business transfer payments (billions of 1972 dollars)	17.162	23.632	30.962	23.632	30.962	23.632	30.962

Table B-1. Civilian noninstitutional population and labor force by age and sex, 1984 and projected 1985-95

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

Group	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Population												
Total, 16 and over	176,386	178,177	180,167	182,154	183,785	185,284	186,655	188,082	189,438	190,875	192,294	193,817
Men	83,609	84,485	85,437	86,402	87,187	87,905	88,568	89,262	89,921	90,621	91,312	92,065
16 to 24	17,495	17,028	16,674	16,426	16,012	15,567	15,162	14,914	14,700	14,580	14,409	14,254
24 to 54	45,041	46,105	47,226	48,312	49,391	50,456	51,407	52,229	52,983	53,655	54,348	55,054
55 and over	21,073	21,352	21,537	21,664	21,784	21,882	21,999	22,119	22,238	22,386	22,555	22,757
Women	92,777	93,692	94,730	95,752	96,598	97,379	98,087	98,820	99,517	100,254	100,982	101,752
16 to 24	17,928	17,475	17,114	16,868	16,477	16,054	15,653	15,406	15,188	15,068	14,898	14,746
24 to 54	47,437	48,439	49,551	50,595	51,614	52,631	53,544	54,320	55,043	55,679	56,338	56,994
55 and over	27,412	27,778	28,065	28,289	28,507	28,694	28,890	29,094	29,286	29,507	29,746	30,012
White	152,349	154,004	155,487	156,936	158,076	159,095	160,017	160,984	161,889	162,862	163,818	164,860
Men	72,725	73,587	74,313	75,030	75,592	76,092	76,549	77,031	77,481	77,969	78,447	78,975
Women	79,624	80,417	81,174	81,906	82,484	83,003	83,468	83,953	84,408	84,893	85,371	85,885
Black and other	24,037	24,173	24,680	25,218	25,709	26,189	26,638	27,098	27,549	28,013	28,476	28,957
Men	10,884	10,898	11,124	11,372	11,595	11,813	12,019	12,231	12,440	12,652	12,865	13,090
Women	13,153	13,275	13,556	13,846	14,114	14,376	14,619	14,867	15,109	15,361	15,611	15,867
Black	19,347	19,597	19,934	20,297	20,615	20,920	21,204	21,491	21,765	22,063	22,349	22,658
Men	8,652	8,753	8,909	9,075	9,223	9,365	9,498	9,631	9,759	9,902	10,037	10,185
Women	10,695	10,844	11,025	11,222	11,392	11,555	11,706	11,860	12,006	12,161	12,312	12,473
Labor force participation												
Total, 16 and over	64.4	64.5	64.7	64.9	65.2	65.4	65.7	66.0	66.2	66.3	66.5	66.6
Men	76.3	76.2	76.1	75.9	75.8	75.8	75.8	75.7	75.6	75.5	75.4	75.3
16 to 24	72.7	72.9	72.7	72.6	72.8	73.2	73.6	73.9	74.1	74.2	74.1	73.9
24 to 54	93.9	93.8	93.8	93.7	93.6	93.6	93.5	93.4	93.3	93.2	93.1	93.0
55 and over	41.8	40.7	39.7	38.7	37.8	36.8	35.9	35.2	34.5	33.9	33.5	33.1
Women	53.6	54.0	54.5	54.9	55.5	56.1	56.6	57.1	57.6	58.0	58.5	58.9
16 to 24	62.8	63.1	63.1	63.2	63.5	64.0	64.5	64.9	65.1	65.2	65.3	65.3
24 to 54	68.2	69.1	70.2	71.1	72.2	73.1	74.0	74.9	75.8	76.6	77.4	78.1
55 and over	22.2	21.8	21.5	21.1	20.7	20.4	20.0	19.7	19.5	19.3	19.2	19.1
White	64.6	64.8	65.0	65.1	65.4	65.7	65.9	66.1	66.3	66.5	66.6	66.8
Men	77.1	76.9	76.8	76.6	76.5	76.5	76.5	76.4	76.2	76.1	76.0	75.8
Women	53.3	53.7	54.2	54.6	55.2	55.7	56.2	56.8	57.2	57.7	58.0	58.4
Black and other	62.6	62.7	63.0	63.3	63.7	64.1	64.5	64.9	65.2	65.5	65.7	65.9
Men	71.4	71.3	71.4	71.4	71.4	71.6	71.7	71.8	71.8	71.8	71.8	71.7
Women	55.3	55.6	56.2	56.7	57.3	57.9	58.6	59.2	59.7	60.2	60.7	61.1
Black	62.2	62.5	62.9	63.1	63.4	63.8	64.1	64.5	64.8	65.0	65.2	65.3
Men	70.8	70.9	70.9	70.8	70.8	70.9	71.0	71.0	71.1	71.0	70.9	70.8
Women	55.2	55.8	56.4	56.9	57.4	58.0	58.6	59.2	59.6	60.0	60.5	60.8
Labor force												
Total, 16 and over	113,537	114,950	116,574	118,217	119,739	121,256	122,653	124,042	125,318	126,596	127,860	129,168
Men	63,833	64,380	64,978	65,605	66,129	66,662	67,146	67,598	67,998	68,405	68,832	69,282
16 to 24	12,727	12,421	12,124	11,928	11,657	11,401	11,163	11,027	10,891	10,814	10,674	10,540
24 to 54	42,302	43,268	44,300	45,285	46,246	47,207	48,079	48,794	49,446	50,012	50,611	51,200
55 and over	8,804	8,691	8,554	8,392	8,226	8,054	7,904	7,777	7,661	7,579	7,547	7,542
Women	49,704	50,570	51,596	52,612	53,610	54,594	55,507	56,444	57,320	58,191	59,028	59,886
16 to 24	11,260	11,020	10,799	10,660	10,469	10,279	10,089	9,991	9,887	9,829	9,728	9,623
24 to 54	32,360	33,493	34,775	35,997	37,241	38,470	39,632	40,709	41,722	42,663	43,584	44,519
55 and over	6,084	6,057	6,022	5,955	5,900	5,845	5,786	5,744	5,711	5,699	5,716	5,744
White	98,491	99,799	101,019	102,242	103,363	104,467	105,467	106,459	107,361	108,260	109,147	110,086
Men	56,061	56,608	57,039	57,486	57,845	58,203	58,524	58,814	59,065	59,317	59,594	59,894
Women	42,430	43,191	43,980	44,756	45,518	46,264	46,943	47,645	48,296	48,943	49,553	50,192
Black and other	15,046	15,151	15,555	15,975	16,376	16,789	17,186	17,583	17,957	18,336	18,713	19,082
Men	7,772	7,772	7,939	8,119	8,284	8,459	8,622	8,784	8,933	9,088	9,238	9,388
Women	7,274	7,379	7,616	7,856	8,092	8,330	8,564	8,799	9,024	9,248	9,475	9,694
Black	12,032	12,252	12,530	12,806	13,067	13,344	13,602	13,859	14,094	14,332	14,564	14,796
Men	6,127	6,206	6,315	6,423	6,527	6,638	6,740	6,842	6,934	7,030	7,119	7,215
Women	5,905	6,046	6,215	6,383	6,540	6,706	6,862	7,017	7,160	7,302	7,445	7,581

Table B-2. Civilian noninstitutional population and labor force by race, age, and sex, 1984 and projected 1990 and 1995

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

Group	Population			Labor force participation			Labor force		
	1984	1990	1995	1984	1990	1995	1984	1990	1995
White, 16 and over	152,349	160,017	164,860	64.6	65.9	66.8	98,491	105,467	110,086
Men	72,725	76,549	78,975	77.1	76.5	75.8	56,061	58,524	59,894
16 to 17	3,019	2,672	2,787	47.0	48.2	49.3	1,420	1,288	1,374
18 to 19	3,094	2,806	2,519	70.7	73.4	75.6	2,189	2,060	1,904
20 to 24	8,522	7,117	6,450	86.5	88.1	89.5	7,370	6,270	5,773
25 to 29	8,775	8,655	7,454	94.8	94.9	94.9	8,315	8,214	7,074
30 to 34	8,041	9,019	8,776	96.0	95.8	95.6	7,721	8,640	8,390
35 to 39	7,103	8,272	9,061	96.3	95.7	95.3	6,842	7,916	8,635
40 to 44	5,751	7,521	8,321	95.7	95.2	94.7	5,506	7,160	7,880
45 to 49	4,800	5,914	7,465	94.1	93.4	92.7	4,518	5,524	6,920
50 to 54	4,635	4,790	5,782	89.9	89.5	89.3	4,165	4,287	5,163
55 to 59	4,756	4,351	4,581	81.6	79.9	78.7	3,880	3,476	3,605
60 to 61	1,837	1,773	1,639	69.2	63.2	59.0	1,271	1,121	967
62 to 64	2,624	2,597	2,403	48.0	42.1	37.7	1,259	1,093	906
65 to 69	3,635	3,953	3,853	24.8	20.1	16.8	900	795	647
70 to 71	1,197	1,331	1,406	18.3	14.9	12.5	219	198	176
72 to 74	1,577	1,696	1,885	14.5	12.3	10.6	229	209	200
75 and over	3,359	4,082	4,593	7.7	6.7	6.1	257	273	280
Women	79,624	83,468	85,885	53.3	56.2	58.4	42,430	46,943	50,192
16 to 17	2,899	2,568	2,675	44.8	44.9	44.9	1,300	1,153	1,201
18 to 19	3,135	2,848	2,574	65.2	64.9	64.8	2,043	1,848	1,668
20 to 24	8,782	7,380	6,717	72.5	76.2	79.0	6,363	5,624	5,306
25 to 29	8,897	8,705	7,511	70.8	77.0	81.7	6,297	6,703	6,136
30 to 34	8,176	9,124	8,804	68.8	75.9	81.4	5,624	6,925	7,166
35 to 39	7,335	8,422	9,161	69.5	76.2	81.2	5,101	6,418	7,439
40 to 44	5,936	7,676	8,422	69.7	74.7	79.3	4,139	5,734	6,679
45 to 49	4,998	6,107	7,630	66.1	70.7	74.0	3,302	4,318	5,646
50 to 54	4,916	5,040	6,033	59.3	63.5	66.7	2,915	3,200	4,024
55 to 59	5,248	4,713	4,923	49.4	50.5	51.3	2,593	2,380	2,525
60 to 61	2,106	1,975	1,809	39.6	38.7	38.1	833	764	689
62 to 64	3,058	2,988	2,724	28.3	28.4	28.3	866	849	771
65 to 69	4,475	4,873	4,653	14.1	12.9	12.1	631	629	563
70 to 71	1,677	1,733	1,827	8.5	7.4	6.7	142	128	122
72 to 74	2,137	2,325	2,566	6.5	5.9	5.1	138	137	131
75 and over	5,849	6,991	7,856	2.4	1.9	1.6	143	133	126
Black and other, 16 and over	24,037	26,638	28,957	62.6	64.5	65.9	15,046	17,186	19,082
Men	10,884	12,019	13,090	71.4	71.7	71.7	7,772	8,622	9,388
16 to 17	636	599	618	26.9	27.5	27.7	171	165	171
18 to 19	638	595	552	55.3	55.0	54.5	353	327	301
20 to 24	1,586	1,373	1,328	77.2	76.7	76.6	1,224	1,053	1,017
25 to 29	1,476	1,645	1,502	87.1	85.6	84.2	1,285	1,408	1,265
30 to 34	1,304	1,589	1,741	89.5	88.3	87.2	1,167	1,403	1,518
35 to 39	1,052	1,367	1,640	90.8	90.2	89.5	955	1,233	1,468
40 to 44	813	1,119	1,383	90.3	90.2	90.3	734	1,009	1,249
45 to 49	684	837	1,117	87.3	87.3	87.3	597	731	975
50 to 54	607	679	812	81.9	81.6	81.7	497	554	663
55 to 59	562	562	640	68.9	66.4	64.4	387	373	412
60 to 61	216	208	217	58.8	54.3	52.1	127	113	113
62 to 64	290	290	294	43.4	41.0	39.5	126	119	116
65 to 69	365	420	431	22.5	18.6	16.5	82	78	71
70 to 71	144	139	148	16.7	13.7	11.5	24	19	17
72 to 74	158	165	194	13.3	9.7	7.2	21	16	14
75 and over	353	432	473	6.2	4.9	3.8	22	21	18

Table B-2. Civilian noninstitutional population and labor force by race, age, and sex, 1984 and projected 1990 and 1995—Continued

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

Group	Population			Labor force participation			Labor force		
	1984	1990	1995	1984	1990	1995	1984	1990	1995
Women	13,153	14,619	15,867	55.3	58.6	61.1	7,274	8,564	9,694
16 to 17	642	597	618	24.6	26.1	27.0	158	156	167
18 to 19	672	641	596	45.8	45.4	45.5	308	291	271
20 to 24	1,798	1,619	1,566	60.5	62.8	64.5	1,088	1,017	1,010
25 to 29	1,751	1,845	1,704	68.4	72.9	76.5	1,198	1,345	1,304
30 to 34	1,579	1,816	1,916	70.6	76.7	81.5	1,115	1,393	1,562
35 to 39	1,259	1,611	1,847	74.0	78.6	81.9	932	1,266	1,513
40 to 44	1,002	1,345	1,622	72.3	77.3	80.9	724	1,040	1,312
45 to 49	830	1,014	1,339	67.2	73.5	78.0	558	745	1,044
50 to 54	758	839	1,005	60.0	65.0	69.1	455	545	694
55 to 59	721	737	821	53.0	54.1	54.7	382	399	449
60 to 61	267	286	294	43.8	43.4	42.9	117	124	126
Black, 16 and over	19,347	21,204	22,658	62.2	64.1	65.3	12,032	13,602	14,796
Men	8,652	9,498	10,185	70.8	71.0	70.8	6,127	6,740	7,215
16 to 17	524	482	492	26.9	25.7	24.8	141	124	122
18 to 19	531	483	434	56.1	54.0	52.3	298	261	227
20 to 24	1,292	1,116	1,045	79.1	77.6	76.3	1,022	866	797
25 to 34	2,164	2,596	2,587	88.9	87.8	87.1	1,924	2,279	2,253
35 to 44	1,411	1,907	2,346	90.1	89.6	89.2	1,271	1,709	2,093
45 to 54	1,012	1,145	1,436	83.8	83.0	82.3	848	950	1,182
55 to 59	453	438	475	68.4	64.6	63.6	310	283	302
60 to 64	404	396	388	48.3	44.7	42.8	195	177	166
65 and over	861	935	982	13.7	9.7	7.4	118	91	73
Women	10,695	11,706	12,473	55.2	58.6	60.8	5,905	6,862	7,581
16 to 17	532	486	496	23.9	24.9	25.8	127	121	128
18 to 19	574	525	475	45.3	45.7	45.9	260	240	218
20 to 24	1,491	1,322	1,240	60.6	62.4	64.0	904	825	794
25 to 34	2,625	2,961	2,879	71.5	76.0	79.2	1,876	2,250	2,280
35 to 44	1,756	2,292	2,715	73.7	79.0	82.5	1,294	1,811	2,240
45 to 54	1,276	1,450	1,788	64.5	68.2	71.1	823	989	1,271
55 to 59	593	584	635	53.6	53.9	54.0	318	315	343
60 to 64	526	557	551	37.5	37.7	37.9	197	210	209
65 and over	1,322	1,529	1,694	8.0	6.6	5.8	106	101	98

Table C-1. Gross national product by industry, 1977, 1984, and projected 1995

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
Total	1,976,566	2,367,276	3,006,427	3,240,651	3,550,885
1. Dairy and poultry products	2,375	2,612	2,826	3,029	3,322
2. Meat animals and livestock	-1,156	-1,240	-1,017	-1,324	-1,704
3. Cotton	1,705	2,272	2,107	2,299	2,484
4. Food and feed grains	8,793	11,534	13,903	15,213	16,497
5. Other agricultural products	14,397	16,573	18,136	20,458	23,235
6. Forestry and fishery products	-1,175	-2,007	-2,878	-2,836	-2,700
7. Agricultural, forestry, fishery services	1,053	1,436	1,888	2,035	2,170
8. Iron and ferroalloy ores mining	-1,334	-949	-1,018	-1,129	-1,272
9. Copper ore mining	-40	13	84	103	123
10. Nonferrous metal ores mining except copper	-69	-243	-324	-262	-202
11. Coal mining	2,525	3,741	5,395	6,054	6,727
12. Crude petroleum and gas, except drilling	-33,955	-19,620	-26,311	-26,805	-27,262
13. Stone and clay mining and quarrying	1,028	1,168	1,245	1,404	1,501
14. Chemical and fertilizer mineral mining	128	-33	176	281	387
15. Maintenance and repair construction	16,339	18,032	20,186	22,005	22,889
16. Ordnance	3,574	5,549	7,509	7,836	8,156
17. Guided missiles and space vehicles	4,657	4,844	9,166	9,218	9,269
18. Meat products	28,260	31,150	36,264	39,009	42,845
19. Dairy products	17,864	18,071	18,440	19,749	21,581
20. Canned and frozen foods	17,353	19,382	22,553	24,342	26,888
21. Grain mill products	8,275	10,526	14,173	15,259	16,758
22. Bakery products	10,072	10,936	9,946	10,630	11,615
23. Sugar	53	407	-329	-266	-162
24. Confectionery products	5,313	7,344	8,909	9,533	10,483
25. Alcoholic beverages	10,533	12,024	14,292	15,359	17,049
26. Soft drinks and flavorings	7,677	8,373	10,341	11,069	12,141
27. Other food products	12,267	16,135	19,377	20,882	22,962
28. Tobacco manufacturing	10,195	9,334	8,191	8,804	9,769
29. Fabric, yarn, and thread mills	2,151	988	1,200	1,601	2,085
30. Floor covering mills	3,881	3,641	4,601	5,131	5,725
31. Other textile mill products	280	160	175	280	398
32. Hosiery and knit goods	1,957	1,251	2,315	2,508	2,753
33. Apparel	29,235	31,647	27,879	31,259	35,642
34. Other fabricated textile products	4,671	4,162	4,903	5,378	6,041
35. Logging	977	1,115	1,516	1,714	1,923
36. Sawmills and planing mills	4,316	4,213	3,806	4,071	4,203
37. Other millwork, plywood, and wood products	11,166	14,388	19,173	20,207	20,968
38. Wooden containers	-17	14	16	20	25
39. Household furniture	9,655	11,070	12,546	14,376	16,595
40. Furniture and fixtures, except household	5,977	8,839	11,590	13,008	14,738
41. Paper products	6,319	7,558	9,587	10,913	12,557
42. Paperboard	679	541	772	868	970
43. Newspaper printing and publishing	3,741	4,000	3,962	4,233	4,682
44. Periodical, book printing and publishing	7,747	10,257	12,891	13,992	15,093
45. Other printing and publishing	3,648	4,768	6,175	6,828	7,458
46. Industrial inorganic and organic chemicals	4,132	4,968	1,330	2,284	3,255
47. Agricultural chemicals	1,118	2,824	2,262	2,576	2,905
48. Other chemical products	2,005	2,604	4,127	4,498	4,997
49. Plastic materials and synthetic rubber	1,327	1,914	2,817	3,301	3,814
50. Synthetic fibers	210	521	925	1,069	1,219
51. Drugs	8,001	10,139	17,091	18,847	21,008
52. Cleaning and toilet preparations	12,245	12,952	16,609	17,845	19,759
53. Paints and allied products	2,167	2,231	2,441	2,592	2,691
54. Petroleum refining and related products	43,570	37,561	37,876	41,974	44,372
55. Tires and inner tubes	4,202	4,168	3,125	3,335	4,202

See footnotes at end of table.

Table C-1. Gross national product by industry, 1977, 1984, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
56. Rubber products except tires and tubes	1,746	2,469	2,233	2,525	2,850
57. Plastic products	3,502	4,990	7,791	8,832	9,987
58. Leather tanning and industrial leather	10	-46	-70	-49	-26
59. Leather products including footwear	5,523	4,270	3,004	3,542	4,251
60. Glass	1,479	984	1,159	1,399	1,646
61. Cement and concrete products	9,180	9,014	10,398	11,134	11,592
62. Structural clay products	1,307	1,167	1,307	1,385	1,433
63. Pottery and related products	782	710	505	641	808
64. Other stone and clay products	2,711	2,452	3,533	3,832	4,163
65. Blast furnaces and basic steel products	-1,219	-3,790	-11,141	-11,109	-10,954
66. Iron and steel foundries and forgings	1,580	1,401	1,760	1,932	2,070
67. Primary copper and copper products	2,677	2,127	1,669	1,963	2,342
68. Primary aluminum and aluminum products	21	-687	-3,250	-3,119	-2,951
69. Primary nonferrous metals and products	-1,793	-3,301	-6,573	-6,641	-6,684
70. Metal containers	295	279	404	461	525
71. Heating apparatus and plumbing fixtures	2,053	1,586	1,509	1,603	1,679
72. Fabricated structural metal products	17,272	15,736	21,551	23,229	24,864
73. Screw machine products	61	-25	-166	-95	-9
74. Metal stampings	1,908	2,013	2,042	2,336	2,654
75. Cutlery, handtools, general hardware	3,165	2,705	3,255	3,670	4,152
76. Other fabricated metal products	5,702	6,298	7,873	8,927	9,963
77. Engines, turbines, and generators	4,681	2,627	3,588	4,140	4,695
78. Farm machinery	9,460	6,072	7,575	8,893	10,359
79. Construction, mining, oilfield machinery	13,691	11,422	15,952	16,786	16,939
80. Material handling equipment	4,058	3,197	5,555	6,135	7,075
81. Metalworking machinery	8,615	9,228	11,915	13,326	16,307
82. Special industry machinery	6,745	6,069	7,416	8,415	9,799
83. General industrial machinery	7,962	8,163	10,563	12,141	13,818
84. Other nonelectrical machinery	490	1,103	1,119	1,269	1,446
85. Computers and peripheral equipment	10,167	35,852	77,876	87,639	99,082
86. Typewriters and other office equipment	1,759	2,833	2,776	3,332	3,973
87. Service industry machines	7,257	7,464	10,855	12,026	13,438
88. Electric transmission equipment	6,232	7,168	8,678	9,727	10,791
89. Electrical industrial apparatus	2,991	2,416	3,326	3,794	4,308
90. Household appliances	9,177	11,173	11,916	13,517	15,392
91. Electric lighting and wiring	4,992	5,677	6,698	7,299	8,007
92. Radio and television receiving sets	4,051	6,339	6,552	9,123	12,355
93. Telephone and telegraph apparatus	5,550	10,252	17,680	19,903	22,920
94. Radio and communication equipment	12,482	25,305	42,633	46,010	50,143
95. Electronic components	2,069	1,986	-438	1,866	4,383
96. Other electrical machinery and equipment	4,436	4,849	8,207	9,046	10,272
97. Motor vehicles	77,166	70,008	75,708	83,531	101,581
98. Aircraft	19,592	28,523	35,621	37,790	40,096
99. Ship and boat building and repair	8,558	9,573	12,656	13,218	13,738
100. Railroad equipment	3,266	1,553	1,044	1,330	1,629
101. Motorcycles, bicycles, and parts	568	819	399	552	688
102. Other transportation equipment	6,527	6,497	9,082	9,414	10,224
103. Scientific and controlling instruments	5,620	6,766	10,292	11,560	12,786
104. Medical and dental instruments	3,379	5,204	8,581	9,298	9,800
105. Optical and ophthalmic equipment	1,931	3,174	4,354	4,812	5,310
106. Photographic equipment and supplies	6,094	7,868	9,932	11,211	12,656
107. Watches and clocks	722	172	-147	-17	116
108. Jewelry and silverware	4,324	3,015	2,863	3,534	4,219
109. Musical instruments and sporting goods	5,487	7,031	7,990	8,798	9,939
110. Other manufactured products	3,841	2,997	2,776	3,190	3,630

See footnotes at end of table.

Table C-1. Gross national product by industry, 1977, 1984, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
111. Railroad transportation	7,685	7,495	8,146	8,748	9,562
112. Local transit and intercity buses	7,640	6,767	7,947	8,568	9,151
113. Truck transportation	16,908	18,980	26,826	28,846	31,212
114. Water transportation	8,454	10,761	11,164	11,854	12,564
115. Air transportation	14,824	15,106	19,688	21,519	23,610
116. Pipeline transportation	912	906	1,225	1,341	1,427
117. Transportation services	777	1,405	2,376	2,602	2,841
118. Radio and television broadcasting	344	697	745	791	860
119. Communications except radio and television	30,168	44,328	82,578	89,244	98,200
120. Electric utilities, public and private	30,733	37,758	50,408	54,498	59,027
121. Gas utilities, excluding public	11,152	10,485	8,248	9,199	10,177
122. Water and sanitary services, except public	5,452	6,532	7,995	8,557	9,289
123. Wholesale trade	105,163	147,968	172,489	186,296	202,944
124. Eating and drinking places	65,836	78,150	90,816	96,560	105,555
125. Retail trade, except eating and drinking	185,390	233,093	276,053	295,009	323,775
126. Banking	26,378	36,814	50,828	54,237	58,753
127. Credit agencies and financial brokers	11,994	19,566	33,193	35,348	38,384
128. Insurance	33,297	40,500	45,242	48,319	52,472
129. Owner-occupied real estate	131,812	166,171	247,358	261,423	292,015
130. Real estate	68,443	85,009	127,588	134,984	147,787
131. Hotels and lodging places	12,010	12,879	16,694	17,721	19,386
132. Personal and repair services	18,822	19,969	20,127	21,393	23,197
133. Barber and beauty shops	7,149	7,252	6,966	7,399	8,039
134. Miscellaneous business services	17,151	27,088	38,211	40,151	42,123
135. Advertising	1,026	1,072	1,514	1,680	1,767
136. Miscellaneous professional services	26,624	38,781	54,465	58,360	62,317
137. Automobile repair	27,193	28,037	29,705	32,055	34,565
138. Motion pictures	3,482	4,824	7,291	7,865	8,597
139. Amusements and recreation services	13,436	17,829	27,154	28,834	31,308
140. Doctors' and dentists' services	42,001	55,724	78,841	84,027	91,121
141. Hospitals	44,669	56,533	66,056	70,826	76,475
142. Medical services, except hospitals	18,166	23,388	35,042	38,040	40,937
143. Educational services (private)	23,099	25,421	27,149	28,721	31,041
144. Nonprofit organizations	24,468	31,428	41,444	44,023	47,816
145. Post Office	3,741	4,160	4,532	4,867	5,260
146. Commodity Credit Corporation	-81	-70	-8	-8	-8
147. Other Federal enterprises	-37	52	173	213	254
148. Local government passenger transit	0	0	0	0	0
149. Other State and local enterprises	3,746	4,249	4,365	4,668	5,061
150. Noncomparable imports	-13,374	-20,673	-14,896	-14,821	-14,221
151. Scrap, used and secondhand goods	-2,673	3,619	-2,396	-3,526	-3,174
152. New construction industry	73,870	83,446	105,170	110,522	115,318
153. Government industry	203,934	211,463	229,979	235,421	238,491
154. Rest-of-world industry	23,464	17,550	57,094	66,586	75,965
155. Private households	5,930	5,161	3,868	4,133	4,524
156. Inventory valuation adjustment	-18,582	-9,000	-18,347	-22,112	-26,774

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

Table C-2. Personal consumption expenditures by industry, 1977, 1984, and projected 1995

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
Total	1,246,481	1,522,188	1,929,209	2,053,484	2,257,935
1. Dairy and poultry products	2,210	2,410	2,577	2,739	2,990
2. Meat animals and livestock	301	609	795	844	917
3. Cotton	0	0	0	0	0
4. Food and feed grains	493	555	613	652	712
5. Other agricultural products	7,232	8,347	8,870	9,432	10,321
6. Forestry and fishery products	788	1,210	2,231	2,372	2,591
7. Agricultural, forestry, fishery services	353	703	973	1,034	1,124
8. Iron and ferroalloy ores mining	0	0	0	0	0
9. Copper ore mining	0	0	0	0	0
10. Nonferrous metal ores mining except copper	0	0	0	0	0
11. Coal mining	215	288	314	335	353
12. Crude petroleum and gas, except drilling	0	0	0	0	0
13. Stone and clay mining and quarrying	20	18	39	41	46
14. Chemical and fertilizer mineral mining	2	2	1	2	2
15. Maintenance and repair construction	0	0	0	0	0
16. Ordnance	630	945	1,174	1,265	1,359
17. Guided missiles and space vehicles	0	0	0	0	0
18. Meat products	27,204	29,688	34,039	36,174	39,487
19. Dairy products	16,334	16,749	17,532	18,632	20,338
20. Canned and frozen foods	16,834	18,412	22,388	23,792	25,971
21. Grain mill products	6,702	8,736	11,570	12,296	13,422
22. Bakery products	9,676	10,575	9,438	10,030	10,949
23. Sugar	1,315	1,178	1,068	1,135	1,239
24. Confectionery products	5,754	7,771	9,498	10,094	11,019
25. Alcoholic beverages	11,777	13,977	17,554	18,655	20,363
26. Soft drinks and flavorings	7,395	8,017	9,880	10,500	11,462
27. Other food products	10,516	14,810	17,318	18,404	20,090
28. Tobacco manufacturing	8,437	8,470	7,452	7,946	8,781
29. Fabric, yarn, and thread mills	882	1,196	1,375	1,468	1,597
30. Floor covering mills	1,852	2,082	2,498	2,826	3,227
31. Other textile mill products	192	222	234	258	291
32. Hosiery and knit goods	1,828	1,133	2,293	2,450	2,651
33. Apparel	31,366	40,598	45,992	49,134	53,174
34. Other fabricated textile products	4,068	4,148	5,138	5,506	6,078
35. Logging	0	0	0	0	0
36. Sawmills and planing mills	0	0	0	0	0
37. Other millwork, plywood, and wood products	548	672	1,442	1,625	1,847
38. Wooden containers	0	0	0	0	0
39. Household furniture	8,642	9,724	11,342	12,834	14,654
40. Furniture and fixtures, except household	566	1,030	1,255	1,420	1,622
41. Paper products	5,307	6,261	8,444	9,006	9,925
42. Paperboard	192	171	263	280	309
43. Newspaper printing and publishing	3,715	3,985	3,949	4,210	4,653
44. Periodical, book printing and publishing	5,469	7,579	9,385	10,086	10,903
45. Other printing and publishing	1,054	1,573	2,536	2,705	2,990
46. Industrial inorganic and organic chemicals	89	114	84	89	99
47. Agricultural chemicals	285	253	347	370	409
48. Other chemical products	775	1,109	1,373	1,427	1,604
49. Plastic materials and synthetic rubber	0	0	0	0	0
50. Synthetic fibers	0	0	0	0	0
51. Drugs	5,598	6,685	13,707	14,616	16,152
52. Cleaning and toilet preparations	11,322	11,879	15,170	16,170	17,875
53. Paints and allied products	168	150	230	245	271
54. Petroleum refining and related products	38,595	33,761	33,306	35,646	36,502
55. Tires and inner tubes	3,984	4,545	4,506	4,570	5,290

See footnotes at end of table.

Table C-2. Personal consumption expenditures by industry, 1977, 1984, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
56. Rubber products except tires and tubes	1,477	1,649	1,722	1,833	2,012
57. Plastic products	983	1,850	3,261	3,657	4,155
58. Leather tanning and industrial leather	0	0	0	0	0
59. Leather products including footwear	7,609	8,729	8,630	9,228	9,989
60. Glass	829	791	834	937	1,067
61. Cement and concrete products	1	2	2	2	2
62. Structural clay products	0	0	0	0	0
63. Pottery and related products	776	774	719	813	929
64. Other stone and clay products	346	356	521	553	610
65. Blast furnaces and basic steel products	11	11	14	14	16
66. Iron and steel foundries and forgings	0	0	0	0	0
67. Primary copper and copper products	10	14	12	14	16
68. Primary aluminum and aluminum products	38	34	22	25	28
69. Primary nonferrous metals and products	0	0	0	0	0
70. Metal containers	0	0	0	0	0
71. Heating apparatus and plumbing fixtures	314	178	202	228	261
72. Fabricated structural metal products	60	67	57	65	74
73. Screw machine products	69	75	96	103	114
74. Metal stampings	729	649	672	760	868
75. Cutlery, handtools, general hardware	1,586	1,746	2,014	2,212	2,486
76. Other fabricated metal products	452	433	511	552	617
77. Engines, turbines, and generators	207	190	314	339	362
78. Farm machinery	105	118	144	163	186
79. Construction, mining, oilfield machinery	0	0	0	0	0
80. Material handling equipment	0	0	0	0	0
81. Metalworking machinery	281	315	376	425	485
82. Special industry machinery	92	103	101	114	130
83. General industrial machinery	0	0	0	0	0
84. Other nonelectrical machinery	40	63	66	67	78
85. Computers and peripheral equipment	86	1,000	7,133	8,071	9,216
86. Typewriters and other office equipment	334	375	582	658	752
87. Service industry machines	432	604	812	900	1,030
88. Electric transmission equipment	47	48	77	82	90
89. Electrical industrial apparatus	44	49	47	54	61
90. Household appliances	7,014	9,336	9,425	10,633	12,121
91. Electric lighting and wiring	1,318	1,625	1,728	1,881	2,122
92. Radio and television receiving sets	7,617	14,607	19,796	22,368	25,543
93. Telephone and telegraph apparatus	30	64	418	473	541
94. Radio and communication equipment	681	1,818	1,902	2,152	2,458
95. Electronic components	529	1,644	3,038	3,422	3,910
96. Other electrical machinery and equipment	2,003	2,519	3,766	3,912	4,469
97. Motor vehicles	46,124	51,324	63,101	63,967	74,100
98. Aircraft	427	597	651	703	750
99. Ship and boat building and repair	2,734	3,823	3,985	4,304	4,590
100. Railroad equipment	0	0	0	0	0
101. Motorcycles, bicycles, and parts	1,379	1,429	1,664	1,798	1,917
102. Other transportation equipment	2,949	3,386	4,237	4,328	4,969
103. Scientific and controlling instruments	53	61	77	85	96
104. Medical and dental instruments	599	891	1,247	1,338	1,453
105. Optical and ophthalmic equipment	952	1,729	2,106	2,274	2,426
106. Photographic equipment and supplies	1,427	2,244	3,323	3,565	3,874
107. Watches and clocks	1,275	824	1,430	1,559	1,685
108. Jewelry and silverware	5,158	5,657	6,673	7,261	7,831
109. Musical instruments and sporting goods	5,573	8,790	9,002	9,661	10,647
110. Other manufactured products	1,954	1,687	1,736	1,883	2,092

See footnotes at end of table.

Table C-2. Personal consumption expenditures by industry, 1977, 1984, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
111. Railroad transportation	3,295	3,745	3,940	4,162	4,620
112. Local transit and intercity buses	5,852	5,054	5,859	6,298	6,807
113. Truck transportation	8,379	8,973	10,608	11,260	12,375
114. Water transportation	1,873	2,379	2,194	2,339	2,511
115. Air transportation	12,769	13,350	17,816	19,084	20,681
116. Pipeline transportation	579	552	680	728	746
117. Transportation services	462	814	1,389	1,494	1,614
118. Radio and television broadcasting	344	697	745	791	860
119. Communications except radio and television	22,394	30,867	52,992	56,589	61,919
120. Electric utilities, public and private	25,816	31,313	43,728	47,250	51,509
121. Gas utilities, excluding public	11,237	10,952	9,966	10,695	11,587
122. Water and sanitary services, except public	4,771	5,703	6,940	7,414	8,104
123. Wholesale trade	51,956	71,062	78,838	84,184	92,107
124. Eating and drinking places	67,477	79,382	91,884	97,648	106,591
125. Retail trade, except eating and drinking	170,594	214,609	254,352	271,680	298,816
126. Banking	22,304	32,604	45,304	48,120	52,279
127. Credit agencies and financial brokers	11,088	18,588	31,893	33,875	36,803
128. Insurance	32,140	39,214	44,012	46,904	50,898
129. Owner-occupied real estate	131,812	166,171	247,358	261,423	292,015
130. Real estate	49,502	60,980	95,343	100,770	112,526
131. Hotels and lodging places	11,039	11,583	14,508	15,369	16,945
132. Personal and repair services	18,273	19,304	19,080	20,278	22,047
133. Barber and beauty shops	7,149	7,252	6,966	7,399	8,039
134. Miscellaneous business services	4,210	7,396	11,079	11,794	12,815
135. Advertising	19	18	31	33	36
136. Miscellaneous professional services	9,634	11,717	20,605	21,886	23,778
137. Automobile repair	25,437	26,000	27,051	29,089	31,434
138. Motion pictures	2,726	3,584	5,113	5,431	5,904
139. Amusements and recreation services	13,292	17,658	26,861	28,532	31,002
140. Doctors' and dentists' services	39,189	52,018	74,520	79,153	85,994
141. Hospitals	37,784	48,346	54,743	58,146	63,172
142. Medical services, except hospitals	11,067	13,980	24,103	25,601	27,814
143. Educational services (private)	21,113	23,914	25,320	26,894	29,219
144. Nonprofit organizations	24,255	31,169	41,084	43,638	47,409
145. Post Office	2,692	3,000	3,295	3,519	3,850
146. Commodity Credit Corporation	0	0	0	0	0
147. Other Federal enterprises	0	0	0	0	0
148. Local government passenger transit	0	0	0	0	0
149. Other State and local enterprises	3,575	4,050	4,061	4,339	4,722
150. Noncomparable imports	8,727	13,659	14,487	15,433	16,851
151. Scrap, used and secondhand goods	5,502	6,888	9,424	9,327	11,138
152. New construction industry	0	0	0	0	0
153. Government industry	0	0	0	0	0
154. Rest-of-world industry	-7,221	-8,134	-11,270	-11,972	-13,013
155. Private households	5,930	5,161	3,868	4,133	4,524
156. Inventory valuation adjustment	0	0	0	0	0

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

Table C-3. Gross private domestic investment by industry, 1977, 1984, and projected 1995

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
Total	336,629	452,370	569,119	615,596	672,484
1. Dairy and poultry products	75	119	120	144	175
2. Meat animals and livestock	-1,258	-1,645	-2,020	-2,435	-2,948
3. Cotton	-143	-166	-229	-276	-334
4. Food and feed grains	-682	-871	-1,509	-1,819	-2,203
5. Other agricultural products	2,656	2,752	2,606	3,141	3,803
6. Forestry and fishery products	34	43	54	65	79
7. Agricultural, forestry, fishery services	131	149	168	173	178
8. Iron and ferroalloy ores mining	-437	-716	-702	-847	-1,025
9. Copper ore mining	-3	-5	-4	-5	-6
10. Nonferrous metal ores mining except copper	434	384	523	599	671
11. Coal mining	161	300	258	311	377
12. Crude petroleum and gas, except drilling	806	648	585	739	892
13. Stone and clay mining and quarrying	641	600	748	781	822
14. Chemical and fertilizer mineral mining	39	63	63	76	92
15. Maintenance and repair construction	179	211	249	257	267
16. Ordnance	181	334	291	348	420
17. Guided missiles and space vehicles	-36	-43	-31	-43	-57
18. Meat products	345	544	638	769	931
19. Dairy products	159	196	255	307	372
20. Canned and frozen foods	532	891	854	1,029	1,246
21. Grain mill products	169	315	354	427	517
22. Bakery products	108	151	173	209	253
23. Sugar	104	84	84	102	123
24. Confectionery products	20	27	32	38	46
25. Alcoholic beverages	150	177	183	219	264
26. Soft drinks and flavorings	119	222	191	230	278
27. Other food products	-83	-55	-92	-111	-135
28. Tobacco manufacturing	365	280	171	206	250
29. Fabric, yarn, and thread mills	1,082	1,017	994	1,199	1,451
30. Floor covering mills	1,953	1,778	2,752	2,940	3,128
31. Other textile mill products	109	176	172	196	225
32. Hosiery and knit goods	133	108	130	157	190
33. Apparel	2,355	2,383	2,952	3,554	4,299
34. Other fabricated textile products	257	179	233	273	324
35. Logging	93	173	149	179	217
36. Sawmills and planing mills	5,935	5,957	5,730	5,916	5,978
37. Other millwork, plywood, and wood products	10,591	14,234	18,180	18,887	19,354
38. Wooden containers	8	14	12	15	18
39. Household furniture	1,163	1,598	1,566	1,880	2,264
40. Furniture and fixtures, except household	4,692	7,876	9,834	10,942	12,403
41. Paper products	1,184	1,899	1,778	2,039	2,360
42. Paperboard	185	142	172	206	249
43. Newspaper printing and publishing	6	12	15	18	22
44. Periodical, book printing and publishing	215	401	345	416	504
45. Other printing and publishing	377	702	605	729	882
46. Industrial inorganic and organic chemicals	1,247	1,222	1,450	1,683	1,940
47. Agricultural chemicals	222	233	107	129	156
48. Other chemical products	504	593	733	817	923
49. Plastic materials and synthetic rubber	201	475	419	505	612
50. Synthetic fibers	58	57	59	72	87
51. Drugs	388	524	458	552	668
52. Cleaning and toilet preparations	268	367	422	494	583
53. Paints and allied products	1,558	1,573	1,760	1,825	1,860
54. Petroleum refining and related products	5,914	5,520	7,045	7,897	8,959
55. Tires and inner tubes	673	539	722	842	991

See footnotes at end of table.

Table C-3. Gross private domestic investment by industry, 1977, 1984, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
56. Rubber products except tires and tubes	284	337	427	489	561
57. Plastic products	1,919	2,811	3,057	3,327	3,638
58. Leather tanning and industrial leather	18	24	29	35	42
59. Leather products including footwear	211	363	256	308	372
60. Glass	294	290	329	366	414
61. Cement and concrete products	6,777	6,875	7,448	7,731	8,045
62. Structural clay products	1,149	1,137	1,179	1,221	1,258
63. Pottery and related products	425	529	684	726	782
64. Other stone and clay products	1,962	1,860	2,576	2,725	2,908
65. Blast furnaces and basic steel products	4,048	3,328	3,910	4,199	4,624
66. Iron and steel foundries and forgings	820	698	1,050	1,128	1,218
67. Primary copper and copper products	2,668	2,785	3,657	3,861	4,184
68. Primary aluminum and aluminum products	666	756	748	870	1,022
69. Primary nonferrous metals and products	180	249	266	315	377
70. Metal containers	193	186	238	282	336
71. Heating apparatus and plumbing fixtures	1,495	1,287	1,113	1,152	1,179
72. Fabricated structural metal products	12,517	11,704	15,815	16,835	18,136
73. Screw machine products	186	321	303	350	409
74. Metal stampings	251	248	326	388	463
75. Cutlery, handtools, general hardware	1,309	1,131	1,542	1,649	1,778
76. Other fabricated metal products	4,139	5,377	7,068	7,776	8,534
77. Engines, turbines, and generators	2,086	1,321	1,637	1,885	2,139
78. Farm machinery	9,071	5,897	8,251	9,417	10,731
79. Construction, mining, oilfield machinery	9,595	8,261	10,812	10,797	10,108
80. Material handling equipment	3,586	3,052	4,907	5,376	6,214
81. Metalworking machinery	7,933	9,275	13,145	14,381	17,173
82. Special industry machinery	5,435	6,535	6,778	7,437	8,467
83. General industrial machinery	6,271	7,901	9,259	10,306	11,456
84. Other nonelectrical machinery	241	412	420	489	578
85. Computers and peripheral equipment	6,160	26,529	57,556	63,590	71,056
86. Typewriters and other office equipment	1,829	2,772	3,745	4,163	4,670
87. Service industry machines	5,008	5,411	7,445	8,154	9,139
88. Electric transmission equipment	5,180	5,219	6,730	7,489	8,286
89. Electrical industrial apparatus	2,210	1,974	2,280	2,534	2,831
90. Household appliances	2,320	2,495	3,442	3,701	3,966
91. Electric lighting and wiring	2,726	3,521	3,999	4,226	4,539
92. Radio and television receiving sets	436	930	952	1,064	1,216
93. Telephone and telegraph apparatus	5,315	11,023	17,095	19,148	21,976
94. Radio and communication equipment	5,994	14,650	21,153	23,540	26,670
95. Electronic components	525	1,888	1,942	2,331	2,812
96. Other electrical machinery and equipment	2,001	2,058	3,610	3,942	4,259
97. Motor vehicles	35,280	39,127	42,758	48,575	55,628
98. Aircraft	2,964	4,059	4,626	5,379	6,244
99. Ship and boat building and repair	2,427	1,055	2,026	2,222	2,421
100. Railroad equipment	2,904	1,352	1,309	1,561	1,836
101. Motorcycles, bicycles, and parts	129	120	169	196	234
102. Other transportation equipment	3,461	3,111	4,646	4,848	4,980
103. Scientific and controlling instruments	3,531	4,709	7,281	8,217	9,133
104. Medical and dental instruments	1,812	3,019	5,215	5,559	5,715
105. Optical and ophthalmic equipment	1,108	1,637	2,468	2,689	2,971
106. Photographic equipment and supplies	3,267	4,907	5,459	6,040	6,793
107. Watches and clocks	95	87	70	84	102
108. Jewelry and silverware	473	582	511	616	746
109. Musical instruments and sporting goods	491	492	859	942	1,053
110. Other manufactured products	1,511	1,366	1,455	1,627	1,805

See footnotes at end of table.

Table C-3. Gross private domestic investment by industry, 1977, 1984, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
111. Railroad transportation	1,718	1,972	2,336	2,542	2,766
112. Local transit and intercity buses	70	82	98	102	107
113. Truck transportation	3,657	4,089	6,514	7,072	7,743
114. Water transportation	412	508	668	736	816
115. Air transportation	409	618	770	842	934
116. Pipeline transportation	96	127	151	178	212
117. Transportation services	1	1	1	1	1
118. Radio and television broadcasting	0	0	0	0	0
119. Communications except radio and television	3,941	8,751	17,976	19,965	22,730
120. Electric utilities, public and private	277	330	390	401	417
121. Gas utilities, excluding public	144	169	199	205	214
122. Water and sanitary services, except public	53	61	73	75	79
123. Wholesale trade	28,848	45,834	52,045	57,282	63,333
124. Eating and drinking places	126	162	175	181	187
125. Retail trade, except eating and drinking	13,829	17,357	20,095	21,523	23,070
126. Banking	576	668	775	799	832
127. Credit agencies and financial brokers	5	8	9	9	9
128. Insurance	932	1,049	1,271	1,315	1,389
129. Owner-occupied real estate	0	0	0	0	0
130. Real estate	11,105	14,412	18,319	18,655	18,456
131. Hotels and lodging places	135	147	191	197	205
132. Personal and repair services	56	72	84	87	92
133. Barber and beauty shops	0	0	0	0	0
134. Miscellaneous business services	1,896	3,508	3,669	3,800	4,032
135. Advertising	11	11	14	14	14
136. Miscellaneous professional services	7,156	12,041	13,663	14,109	14,789
137. Automobile repair	677	876	1,016	1,055	1,126
138. Motion pictures	145	270	232	280	339
139. Amusements and recreation services	1	1	1	1	2
140. Doctors' and dentists' services	0	0	0	0	0
141. Hospitals	0	0	0	0	0
142. Medical services, except hospitals	0	0	0	0	0
143. Educational services (private)	0	0	0	0	0
144. Nonprofit organizations	4	4	5	5	6
145. Post Office	58	68	81	83	87
146. Commodity Credit Corporation	0	0	0	0	0
147. Other Federal enterprises	0	0	0	0	0
148. Local government passenger transit	0	0	0	0	0
149. Other State and local enterprises	30	35	42	43	45
150. Noncomparable imports	55	81	89	106	127
151. Scrap, used and secondhand goods	-10,373	-4,413	-15,566	-17,138	-19,052
152. New construction industry	58,136	68,684	83,239	85,923	89,927
153. Government industry	0	0	0	0	0
154. Rest-of-world industry	0	0	0	0	0
155. Private households	0	0	0	0	0
156. Inventory valuation adjustment	-18,582	-9,000	-18,347	-22,112	-26,774

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

Table C-4. Net exports of goods and services by industry, 1977, 1984, and projected 1995

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
Total	-2,111	-52,284	-47,071	-11,670	25,185
1. Dairy and poultry products	43	31	61	69	78
2. Meat animals and livestock	-205	-211	198	256	316
3. Cotton	1,251	1,922	1,970	2,209	2,452
4. Food and feed grains	6,215	10,012	12,969	14,543	16,147
5. Other agricultural products	4,010	4,990	6,057	7,233	8,438
6. Forestry and fishery products	-1,088	-2,160	-4,173	-4,267	-4,355
7. Agricultural, forestry, fishery services	21	25	54	61	68
8. Iron and ferroalloy ores mining	-848	-152	-206	-172	-137
9. Copper ore mining	-13	58	138	158	179
10. Nonferrous metal ores mining except copper	-512	-641	-862	-876	-888
11. Coal mining	2,010	2,995	4,673	5,246	5,830
12. Crude petroleum and gas, except drilling	-34,860	-20,355	-26,937	-27,586	-28,196
13. Stone and clay mining and quarrying	-105	77	-178	-145	-111
14. Chemical and fertilizer mineral mining	-3	-190	20	100	184
15. Maintenance and repair construction	26	30	55	62	69
16. Ordnance	896	749	1,055	1,197	1,342
17. Guided missiles and space vehicles	536	160	529	593	658
18. Meat products	-173	-75	23	307	602
19. Dairy products	21	-198	-1,113	-1,107	-1,099
20. Canned and frozen foods	-584	-548	-1,533	-1,427	-1,312
21. Grain mill products	1,293	1,343	2,075	2,345	2,621
22. Bakery products	-19	-120	-117	-113	-109
23. Sugar	-1,397	-889	-1,537	-1,564	-1,587
24. Confectionery products	-511	-513	-699	-685	-669
25. Alcoholic beverages	-1,385	-2,121	-3,429	-3,496	-3,558
26. Soft drinks and flavorings	106	68	170	226	283
27. Other food products	1,599	1,085	1,854	2,246	2,647
28. Tobacco manufacturing	1,393	584	568	652	738
29. Fabric, yarn, and thread mills	74	-1,378	-1,416	-1,325	-1,228
30. Floor covering mills	-3	-288	-766	-765	-763
31. Other textile mill products	-56	-275	-273	-220	-165
32. Hosiery and knit goods	-4	10	-109	-99	-89
33. Apparel	-5,128	-12,274	-22,090	-22,560	-22,995
34. Other fabricated textile products	77	-498	-939	-920	-899
35. Logging	884	942	1,367	1,535	1,706
36. Sawmills and planing mills	-1,777	-1,898	-2,124	-2,067	-2,002
37. Other millwork, plywood, and wood products	-717	-1,222	-1,424	-1,380	-1,330
38. Wooden containers	-30	-7	-7	-5	-3
39. Household furniture	-271	-375	-544	-536	-527
40. Furniture and fixtures, except household	-178	-959	-732	-714	-692
41. Paper products	-1,575	-2,060	-2,319	-2,010	-1,683
42. Paperboard	165	63	96	117	139
43. Newspaper printing and publishing	-14	-39	-59	-59	-60
44. Periodical, book printing and publishing	281	278	503	614	728
45. Other printing and publishing	75	-107	28	69	113
46. Industrial inorganic and organic chemicals	1,267	2,119	-1,524	-877	-202
47. Agricultural chemicals	389	2,107	1,587	1,832	2,083
48. Other chemical products	248	363	1,157	1,355	1,558
49. Plastic materials and synthetic rubber	1,101	1,401	2,354	2,751	3,157
50. Synthetic fibers	139	441	814	946	1,080
51. Drugs	176	539	-959	-676	-380
52. Cleaning and toilet preparations	189	144	218	305	395
53. Paints and allied products	154	121	47	68	91
54. Petroleum refining and related products	-8,673	-8,534	-9,379	-9,179	-8,949
55. Tires and inner tubes	-638	-1,125	-2,396	-2,418	-2,436

See footnotes at end of table.

Table C-4. Net exports of goods and services by industry, 1977, 1984, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
56. Rubber products except tires and tubes	-498	-156	-852	-812	-768
57. Plastic products	140	-159	825	1,138	1,462
58. Leather tanning and industrial leather	-9	-70	-99	-84	-68
59. Leather products including footwear	-2,348	-4,890	-5,987	-6,117	-6,239
60. Glass	36	-397	-364	-313	-259
61. Cement and concrete products	-85	-257	-337	-330	-323
62. Structural clay products	-68	-169	-178	-178	-177
63. Pottery and related products	-499	-670	-1,008	-1,019	-1,028
64. Other stone and clay products	8	-139	-39	37	116
65. Blast furnaces and basic steel products	-5,770	-7,497	-15,514	-15,823	-16,107
66. Iron and steel foundries and forgings	93	-5	-150	-130	-109
67. Primary copper and copper products	-424	-1,086	-2,629	-2,599	-2,562
68. Primary aluminum and aluminum products	-813	-1,634	-4,192	-4,190	-4,179
69. Primary nonferrous metals and products	-1,997	-3,569	-6,859	-6,976	-7,082
70. Metal containers	24	-20	-2	7	17
71. Heating apparatus and plumbing fixtures	106	-17	-32	-20	-7
72. Fabricated structural metal products	769	481	1,286	1,483	1,684
73. Screw machine products	-311	-563	-766	-755	-741
74. Metal stampings	751	925	773	898	1,026
75. Cutlery, handtools, general hardware	-140	-526	-820	-759	-695
76. Other fabricated metal products	-151	-860	-1,561	-1,417	-1,263
77. Engines, turbines, and generators	1,525	431	510	771	1,040
78. Farm machinery	183	-59	-981	-866	-745
79. Construction, mining, oilfield machinery	3,607	2,567	4,409	5,204	6,018
80. Material handling equipment	226	-140	257	351	447
81. Metalworking machinery	135	-694	-2,068	-1,952	-1,826
82. Special industry machinery	1,106	-718	338	662	998
83. General industrial machinery	1,220	-310	509	1,008	1,525
84. Other nonelectrical machinery	65	468	419	492	567
85. Computers and peripheral equipment	2,722	2,134	208	2,903	5,700
86. Typewriters and other office equipment	-796	-643	-2,270	-2,253	-2,230
87. Service industry machines	1,022	672	1,325	1,567	1,816
88. Electric transmission equipment	245	978	882	1,121	1,367
89. Electrical industrial apparatus	339	-37	307	503	706
90. Household appliances	-308	-836	-1,245	-1,139	-1,026
91. Electric lighting and wiring	220	-193	-62	57	180
92. Radio and television receiving sets	-4,124	-9,332	-14,459	-14,589	-14,691
93. Telephone and telegraph apparatus	111	-980	-834	-718	-597
94. Radio and communication equipment	796	-118	1,820	2,473	3,148
95. Electronic components	241	-3,500	-8,579	-7,128	-5,603
96. Other electrical machinery and equipment	96	-133	253	576	911
97. Motor vehicles	-7,289	-23,543	-34,665	-34,125	-33,484
98. Aircraft	6,399	5,173	7,211	8,569	9,962
99. Ship and boat building and repair	368	-174	-480	-454	-426
100. Railroad equipment	209	143	-452	-442	-430
101. Motorcycles, bicycles, and parts	-972	-770	-1,501	-1,531	-1,560
102. Other transportation equipment	85	-32	151	184	217
103. Scientific and controlling instruments	924	511	927	1,201	1,483
104. Medical and dental instruments	350	519	1,169	1,355	1,546
105. Optical and ophthalmic equipment	-388	-549	-896	-840	-781
106. Photographic equipment and supplies	186	-604	-842	-535	-215
107. Watches and clocks	-693	-801	-1,760	-1,777	-1,790
108. Jewelry and silverware	-1,301	-3,227	-4,347	-4,374	-4,392
109. Musical instruments and sporting goods	-925	-2,607	-2,431	-2,414	-2,391
110. Other manufactured products	-311	-530	-1,112	-1,093	-1,072

See footnotes at end of table.

Table C-4. Net exports of goods and services by industry, 1977, 1984, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
111. Railroad transportation	1,988	910	658	761	867
112. Local transit and intercity buses	0	0	0	0	0
113. Truck transportation	1,744	2,000	3,587	4,020	4,462
114. Water transportation	5,358	6,683	6,376	6,819	7,264
115. Air transportation	-86	-376	-1,802	-1,485	-1,151
116. Pipeline transportation	125	92	230	258	287
117. Transportation services	296	569	941	1,054	1,170
118. Radio and television broadcasting	0	0	0	0	0
119. Communications except radio and television	985	2,137	5,708	6,398	7,100
120. Electric utilities, public and private	-290	-449	-519	-500	-480
121. Gas utilities, excluding public	-1,641	-2,150	-4,408	-4,480	-4,544
122. Water and sanitary services, except public	7	6	16	18	20
123. Wholesale trade	17,733	23,291	29,776	32,099	34,439
124. Eating and drinking places	81	166	464	520	577
125. Retail trade, except eating and drinking	58	86	141	158	175
126. Banking	179	247	365	409	454
127. Credit agencies and financial brokers	112	158	241	270	300
128. Insurance	-185	-178	-715	-662	-606
129. Owner-occupied real estate	0	0	0	0	0
130. Real estate	3,705	5,008	7,219	8,091	8,979
131. Hotels and lodging places	16	22	34	38	42
132. Personal and repair services	13	25	73	82	91
133. Barber and beauty shops	0	0	0	0	0
134. Miscellaneous business services	1,195	1,925	3,019	3,452	3,895
135. Advertising	23	34	55	63	72
136. Miscellaneous professional services	2,162	4,005	7,403	8,298	9,210
137. Automobile repair	-9	-13	-22	-22	-22
138. Motion pictures	406	715	1,514	1,705	1,900
139. Amusements and recreation services	0	0	0	0	0
140. Doctors' and dentists' services	1	1	3	4	4
141. Hospitals	0	0	0	0	0
142. Medical services, except hospitals	0	0	0	0	0
143. Educational services (private)	0	0	0	0	0
144. Nonprofit organizations	73	103	158	177	197
145. Post Office	40	58	90	101	112
146. Commodity Credit Corporation	0	0	0	0	0
147. Other Federal enterprises	154	216	330	370	411
148. Local government passenger transit	0	0	0	0	0
149. Other State and local enterprises	1	1	1	1	1
150. Noncomparable imports	-26,610	-38,948	-35,613	-36,503	-37,343
151. Scrap, used and secondhand goods	1,294	166	2,536	2,903	3,277
152. New construction industry	1	1	1	1	1
153. Government industry	0	0	0	0	0
154. Rest-of-world industry	31,001	25,969	69,063	79,257	89,677
155. Private households	0	0	0	0	0
156. Inventory valuation adjustment	0	0	0	0	0

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

Table C-5. Government purchases of goods and services by industry, 1977, 1984, and projected 1995

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
Total	395,566	445,002	555,170	583,242	595,281
1. Dairy and poultry products	47	53	68	77	80
2. Meat animals and livestock	7	7	10	11	11
3. Cotton	597	517	366	366	366
4. Food and feed grains	2,767	1,837	1,830	1,837	1,840
5. Other agricultural products	499	484	603	653	674
6. Forestry and fishery products	-909	-1,099	-991	-1,006	-1,015
7. Agricultural, forestry, fishery services	548	560	693	768	799
8. Iron and ferroalloy ores mining	-49	-82	-110	-110	-110
9. Copper ore mining	-25	-41	-50	-50	-50
10. Nonferrous metal ores mining except copper	9	14	15	15	15
11. Coal mining	140	157	149	161	167
12. Crude petroleum and gas, except drilling	99	87	42	42	42
13. Stone and clay mining and quarrying	471	473	636	727	744
14. Chemical and fertilizer mineral mining	89	91	92	104	110
15. Maintenance and repair construction	16,134	17,791	19,881	21,686	22,553
16. Ordnance	1,868	3,521	4,989	5,025	5,035
17. Guided missiles and space vehicles	4,158	4,727	8,669	8,669	8,669
18. Meat products	885	993	1,564	1,759	1,826
19. Dairy products	1,351	1,324	1,766	1,917	1,970
20. Canned and frozen foods	571	628	845	947	983
21. Grain mill products	112	131	174	191	198
22. Bakery products	307	330	451	504	522
23. Sugar	30	34	56	62	64
24. Confectionery products	51	59	78	85	87
25. Alcoholic beverages	-10	-10	-16	-19	-20
26. Soft drinks and flavorings	56	66	99	113	118
27. Other food products	235	295	297	343	360
28. Tobacco manufacturing	0	0	0	0	0
29. Fabric, yarn, and thread mills	114	154	246	260	265
30. Floor covering mills	79	69	117	130	133
31. Other textile mill products	35	37	41	45	47
32. Hosiery and knit goods	0	0	0	0	0
33. Apparel	641	941	1,025	1,131	1,164
34. Other fabricated textile products	269	332	471	519	538
35. Logging	0	0	0	0	0
36. Sawmills and planing mills	158	155	200	221	227
37. Other millwork, plywood, and wood products	745	704	975	1,074	1,098
38. Wooden containers	5	7	10	10	10
39. Household furniture	121	123	182	198	204
40. Furniture and fixtures, except household	897	892	1,233	1,360	1,406
41. Paper products	1,403	1,458	1,685	1,877	1,954
42. Paperboard	137	164	241	265	273
43. Newspaper printing and publishing	34	42	58	64	67
44. Periodical, book printing and publishing	1,782	1,999	2,657	2,876	2,957
45. Other printing and publishing	2,142	2,601	3,006	3,324	3,473
46. Industrial inorganic and organic chemicals	1,529	1,513	1,319	1,388	1,419
47. Agricultural chemicals	223	231	221	245	256
48. Other chemical products	479	539	863	898	912
49. Plastic materials and synthetic rubber	25	38	45	45	45
50. Synthetic fibers	14	23	52	52	52
51. Drugs	1,839	2,392	3,885	4,356	4,568
52. Cleaning and toilet preparations	465	563	799	876	906
53. Paints and allied products	286	388	404	454	469
54. Petroleum refining and related products	7,733	6,814	6,903	7,610	7,859
55. Tires and inner tubes	183	209	292	341	356

See footnotes at end of table.

Table C-5. Government purchases of goods and services by industry, 1977, 1984, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
56. Rubber products except tires and tubes	483	638	937	1,015	1,045
57. Plastic products	459	488	649	710	731
58. Leather tanning and industrial leather	1	1	0	0	0
59. Leather products including footwear	51	69	104	124	129
60. Glass	320	300	360	408	425
61. Cement and concrete products	2,486	2,394	3,285	3,731	3,869
62. Structural clay products	225	199	306	341	352
63. Pottery and related products	80	77	110	121	124
64. Other stone and clay products	395	375	475	518	529
65. Blast furnaces and basic steel products	492	368	449	500	514
66. Iron and steel foundries and forgings	666	707	859	934	961
67. Primary copper and copper products	423	415	629	687	704
68. Primary aluminum and aluminum products	130	157	171	177	179
69. Primary nonferrous metals and products	23	19	20	21	21
70. Metal containers	79	113	168	171	172
71. Heating apparatus and plumbing fixtures	137	138	225	242	246
72. Fabricated structural metal products	3,926	3,484	4,393	4,847	4,970
73. Screw machine products	117	142	201	207	209
74. Metal stampings	176	191	271	290	297
75. Cutlery, handtools, general hardware	410	354	518	567	582
76. Other fabricated metal products	1,261	1,348	1,855	2,016	2,075
77. Engines, turbines, and generators	862	685	1,127	1,144	1,154
78. Farm machinery	100	115	161	179	187
79. Construction, mining, oilfield machinery	489	594	731	785	813
80. Material handling equipment	246	286	391	408	414
81. Metalworking machinery	267	331	462	472	475
82. Special industry machinery	111	149	199	202	204
83. General industrial machinery	471	572	794	826	837
84. Other nonelectrical machinery	144	160	214	221	224
85. Computers and peripheral equipment	1,199	6,190	12,980	13,075	13,110
86. Typewriters and other office equipment	392	329	719	763	782
87. Service industry machines	796	777	1,273	1,405	1,452
88. Electric transmission equipment	759	923	990	1,035	1,048
89. Electrical industrial apparatus	398	430	691	704	709
90. Household appliances	151	177	293	322	331
91. Electric lighting and wiring	729	723	1,033	1,136	1,165
92. Radio and television receiving sets	123	134	263	280	287
93. Telephone and telegraph apparatus	94	145	1,000	1,000	1,000
94. Radio and communication equipment	5,011	8,954	17,758	17,844	17,868
95. Electronic components	774	1,954	3,160	3,241	3,264
96. Other electrical machinery and equipment	336	405	579	616	631
97. Motor vehicles	3,051	3,100	4,514	5,114	5,337
98. Aircraft	9,802	18,694	23,133	23,139	23,140
99. Ship and boat building and repair	3,029	4,869	7,124	7,146	7,153
100. Railroad equipment	152	58	187	211	223
101. Motorcycles, bicycles, and parts	31	40	66	90	97
102. Other transportation equipment	32	32	49	55	57
103. Scientific and controlling instruments	1,112	1,485	2,006	2,057	2,074
104. Medical and dental instruments	618	776	949	1,046	1,087
105. Optical and ophthalmic equipment	259	357	676	689	694
106. Photographic equipment and supplies	1,215	1,321	1,992	2,141	2,203
107. Watches and clocks	45	61	113	117	118
108. Jewelry and silverware	-6	2	25	31	34
109. Musical instruments and sporting goods	349	356	559	610	630
110. Other manufactured products	687	474	697	774	803

See footnotes at end of table.

Table C-5. Government purchases of goods and services by industry, 1977, 1984, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1977	1984	1995 Low	1995 Moderate	1995 High
111. Railroad transportation	685	867	1,212	1,284	1,309
112. Local transit and intercity buses	1,718	1,630	1,990	2,168	2,237
113. Truck transportation	3,128	3,919	6,117	6,493	6,632
114. Water transportation	811	1,191	1,926	1,960	1,973
115. Air transportation	1,733	1,514	2,904	3,078	3,146
116. Pipeline transportation	111	135	164	177	182
117. Transportation services	18	20	46	53	56
118. Radio and television broadcasting	0	0	0	0	0
119. Communications except radio and television	2,848	2,574	5,902	6,292	6,451
120. Electric utilities, public and private	4,929	6,564	6,809	7,347	7,581
121. Gas utilities, excluding public	1,413	1,514	2,492	2,779	2,920
122. Water and sanitary services, except public	621	762	965	1,050	1,086
123. Wholesale trade	6,626	7,781	11,831	12,732	13,064
124. Eating and drinking places	-1,848	-1,560	-1,707	-1,789	-1,799
125. Retail trade, except eating and drinking	909	1,042	1,465	1,649	1,714
126. Banking	3,319	3,295	4,384	4,909	5,187
127. Credit agencies and financial brokers	789	812	1,051	1,194	1,272
128. Insurance	410	414	675	763	791
129. Owner-occupied real estate	0	0	0	0	0
130. Real estate	4,131	4,609	6,707	7,467	7,825
131. Hotels and lodging places	820	1,126	1,961	2,117	2,194
132. Personal and repair services	480	567	890	946	967
133. Barber and beauty shops	0	0	0	0	0
134. Miscellaneous business services	9,850	14,259	20,444	21,105	21,381
135. Advertising	972	1,009	1,414	1,569	1,645
136. Miscellaneous professional services	7,672	11,018	12,794	14,067	14,540
137. Automobile repair	1,088	1,174	1,660	1,933	2,028
138. Motion pictures	205	255	430	448	454
139. Amusements and recreation services	143	170	291	301	304
140. Doctors' and dentists' services	2,811	3,705	4,317	4,870	5,123
141. Hospitals	6,885	8,187	11,313	12,680	13,303
142. Medical services, except hospitals	7,098	9,408	10,939	12,439	13,123
143. Educational services (private)	1,986	1,507	1,829	1,826	1,822
144. Nonprofit organizations	136	152	197	203	205
145. Post Office	951	1,035	1,066	1,165	1,212
146. Commodity Credit Corporation	-81	-70	-8	-8	-8
147. Other Federal enterprises	-191	-165	-157	-157	-157
148. Local government passenger transit	0	0	0	0	0
149. Other State and local enterprises	139	163	261	284	292
150. Noncomparable imports	4,453	4,535	6,141	6,143	6,144
151. Scrap, used and secondhand goods	904	978	1,210	1,382	1,462
152. New construction industry	15,734	14,761	21,930	24,598	25,389
153. Government industry	203,934	211,463	229,979	235,421	238,491
154. Rest-of-world industry	-317	-285	-699	-699	-699
155. Private households	0	0	0	0	0
156. Inventory valuation adjustment	0	0	0	0	0

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

Table D-1. Gross duplicated output by industry, selected years, 1959-84, and projected 1995

(Millions of 1977 dollars)

Industry	1959	1969	1977	1979	1984	1995 Low	1995 Moderate	1995 High
1. Dairy and poultry products	19,579	19,041	20,048	20,805	23,185	23,789	25,512	27,926
2. Meat animals and livestock	30,654	33,566	32,633	35,595	38,142	44,837	47,926	52,295
3. Cotton	3,417	2,962	4,091	4,073	4,643	4,467	4,920	5,448
4. Food and feed grains	20,199	25,685	31,135	34,320	37,207	43,369	46,789	51,019
5. Other agricultural products	20,051	26,124	30,497	32,423	34,690	38,048	41,960	46,963
6. Forestry and fishery products	4,326	3,116	4,508	3,711	4,548	4,596	5,220	6,036
7. Agricultural, forestry, fishery services	5,783	7,595	8,082	9,044	9,984	12,029	12,993	14,273
8. Iron and ferroalloy ores mining	1,937	3,072	2,084	3,068	1,911	1,680	1,946	2,312
9. Copper ore mining	1,037	1,931	1,883	1,989	1,515	1,688	1,917	2,204
10. Nonferrous metal ores mining except copper	1,358	1,479	1,480	1,497	1,181	914	1,187	1,515
11. Coal mining	10,823	13,844	16,878	18,890	19,820	23,591	25,978	28,780
12. Crude petroleum and gas, except drilling	36,599	53,133	49,253	50,564	51,667	50,908	58,045	65,357
13. Stone and clay mining and quarrying	3,531	4,632	4,872	5,346	4,749	5,530	6,062	6,579
14. Chemical and fertilizer mineral mining	1,230	2,003	2,182	2,436	2,568	2,489	2,849	3,264
15. Maintenance and repair construction	58,418	61,452	74,753	80,280	84,920	93,400	100,733	109,714
16. Ordnance	1,957	10,423	3,851	4,169	5,776	7,932	8,308	8,694
17. Guided missiles and space vehicles	5,503	8,751	5,163	6,086	5,723	10,293	10,460	10,644
18. Meat products	26,910	35,930	43,798	44,100	48,316	54,694	58,805	64,557
19. Dairy products	19,208	19,599	23,907	22,850	24,959	25,717	27,544	30,112
20. Canned and frozen foods	11,771	17,798	23,325	23,818	26,362	31,117	33,512	36,906
21. Grain mill products	14,109	19,092	23,869	23,846	28,061	35,221	37,837	41,480
22. Bakery products	11,876	13,207	12,828	12,786	14,131	13,967	14,926	16,308
23. Sugar	3,062	3,846	4,170	3,525	4,136	3,620	4,007	4,580
24. Confectionery products	4,167	5,314	6,419	6,833	8,629	10,441	11,178	12,288
25. Alcoholic beverages	7,735	11,924	15,897	17,522	17,904	21,342	22,923	25,355
26. Soft drinks and flavorings	4,585	7,891	11,216	12,220	12,381	14,896	15,944	17,476
27. Other food products	18,113	24,440	25,482	29,174	32,634	37,950	40,834	44,846
28. Tobacco manufacturing	11,394	11,913	12,924	12,493	11,888	10,387	11,163	12,381
29. Fabric, yarn, and thread mills	20,927	26,179	29,387	28,468	28,444	28,269	31,738	36,243
30. Floor covering mills	1,108	3,097	4,784	5,564	4,396	5,694	6,310	7,033
31. Other textile mill products	2,486	3,737	4,218	4,549	4,888	5,364	5,975	6,828
32. Hosiery and knit goods	3,542	6,838	9,545	9,479	8,724	9,134	10,111	11,375
33. Apparel	21,831	29,260	33,250	32,207	34,724	32,169	35,927	40,777
34. Other fabricated textile products	3,407	6,460	8,278	7,936	7,700	8,912	9,754	11,057
35. Logging	4,469	6,151	9,212	8,867	11,261	13,547	14,719	15,967
36. Sawmills and planing mills	10,709	10,435	12,004	12,233	13,142	14,890	16,099	17,332
37. Other millwork, plywood, and wood products	7,179	11,376	17,905	17,762	22,461	29,280	31,167	32,963
38. Wooden containers	886	983	522	489	526	324	359	402
39. Household furniture	6,250	8,278	10,614	10,956	11,861	14,052	16,101	18,589
40. Furniture and fixtures, except household	3,082	5,534	6,542	7,148	9,293	12,234	13,689	15,478
41. Paper products	20,868	32,373	38,871	41,845	47,436	58,460	64,212	71,504
42. Paperboard	6,919	11,263	13,381	13,436	13,957	15,980	17,485	19,433
43. Newspaper printing and publishing	9,888	12,547	13,563	14,291	15,998	19,081	20,566	22,637
44. Periodical, book printing and publishing	8,727	12,927	14,566	15,916	19,463	24,420	26,438	28,732
45. Other printing and publishing	12,812	19,030	22,996	25,253	31,725	42,051	45,582	49,981
46. Industrial inorganic and organic chemicals	16,695	29,928	40,693	41,547	38,225	42,581	47,708	53,886
47. Agricultural chemicals	3,730	7,449	9,189	9,653	9,234	10,590	11,630	12,885
48. Other chemical products	4,694	7,657	8,099	10,135	9,742	12,633	13,817	15,345
49. Plastic materials and synthetic rubber	4,996	10,710	12,673	13,957	16,423	21,306	23,754	26,851
50. Synthetic fibers	1,935	4,355	7,468	8,574	7,114	8,163	9,144	10,385
51. Drugs	3,921	8,344	13,951	14,985	17,596	26,082	28,554	31,593
52. Cleaning and toilet preparations	6,037	10,665	15,165	15,853	16,556	20,771	22,373	24,732
53. Paints and allied products	3,987	5,108	6,320	6,707	6,470	7,140	7,727	8,391
54. Petroleum refining and related products	50,074	73,309	99,097	106,568	88,027	99,151	108,834	118,167
55. Tires and inner tubes	5,242	8,220	9,552	8,202	8,593	9,051	9,794	11,454

Table D-1. Gross duplicated output by industry, selected years, 1959-84, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1959	1969	1977	1979	1984	1995 Low	1995 Moderate	1995 High
56. Rubber products except tires and tubes	6,623	10,118	6,624	6,175	7,363	8,349	9,244	10,459
57. Plastic products	5,991	14,419	23,903	25,382	31,247	44,461	49,302	55,461
58. Leather tanning and industrial leather	1,820	1,658	1,575	1,038	1,112	886	1,049	1,256
59. Leather products including footwear	7,055	7,503	6,335	5,815	5,215	3,788	4,406	5,212
60. Glass	5,424	7,825	9,290	9,184	8,573	9,596	10,607	11,929
61. Cement and concrete products	10,186	13,189	14,718	15,988	14,957	16,909	18,164	19,178
62. Structural clay products	1,707	1,824	1,770	1,811	1,703	1,857	1,981	2,086
63. Pottery and related products	1,040	1,360	1,260	1,365	1,331	1,391	1,611	1,882
64. Other stone and clay products	4,948	6,461	8,244	9,182	8,391	10,940	11,947	13,184
65. Blast furnaces and basic steel products	43,897	58,761	50,802	55,940	38,688	35,103	40,100	46,911
66. Iron and steel foundries and forgings	9,802	14,877	15,288	16,432	11,877	13,693	15,117	17,095
67. Primary copper and copper products	8,853	13,795	15,107	15,597	15,314	15,702	17,683	20,221
68. Primary aluminum and aluminum products	7,791	13,735	17,337	18,850	17,499	17,527	19,946	23,121
69. Primary nonferrous metals and products	7,204	11,509	9,314	9,598	8,942	7,528	9,174	11,315
70. Metal containers	5,174	7,757	8,867	8,736	7,301	7,851	8,502	9,384
71. Heating apparatus and plumbing fixtures	2,751	3,528	3,031	3,252	2,679	2,835	3,038	3,263
72. Fabricated structural metal products	13,565	21,712	24,406	26,159	22,842	30,764	33,233	35,846
73. Screw machine products	4,369	5,225	5,056	5,892	5,811	6,753	7,534	8,585
74. Metal stampings	9,193	13,443	15,272	15,013	13,952	15,820	17,502	20,044
75. Cutlery, handtools, general hardware	4,610	7,087	8,483	8,783	7,664	9,114	10,070	11,328
76. Other fabricated metal products	9,360	14,820	18,129	19,959	20,283	25,266	28,050	31,348
77. Engines, turbines, and generators	4,395	7,884	10,473	10,956	7,727	9,850	11,005	12,346
78. Farm machinery	5,765	7,204	11,731	13,261	8,426	10,654	12,230	14,011
79. Construction, mining, oilfield machinery	9,279	13,034	17,981	19,911	15,746	21,414	22,777	23,543
80. Material handling equipment	2,421	4,778	4,900	5,911	4,174	6,845	7,534	8,599
81. Metalworking machinery	8,513	14,135	13,482	15,699	14,564	18,610	20,703	24,472
82. Special industry machinery	6,499	10,328	8,904	9,481	8,405	10,191	11,456	13,164
83. General industrial machinery	8,762	14,102	16,491	18,243	17,064	20,817	23,393	26,349
84. Other nonelectrical machinery	4,382	7,639	8,648	10,919	11,118	14,255	15,732	17,713
85. Computers and peripheral equipment	1,758	6,014	13,182	22,086	43,478	93,472	105,028	118,587
86. Typewriters and other office equipment	981	1,894	2,921	3,277	4,020	4,707	5,424	6,273
87. Service industry machines	3,357	8,326	12,127	13,639	12,507	16,572	18,273	20,498
88. Electric transmission equipment	4,364	6,969	8,433	9,860	8,969	12,554	14,019	15,592
89. Electrical industrial apparatus	5,294	9,029	9,715	11,005	9,193	11,808	13,211	14,875
90. Household appliances	4,931	8,691	10,722	11,282	11,296	13,920	15,650	17,715
91. Electric lighting and wiring	5,211	8,175	8,494	9,523	10,023	12,053	13,190	14,623
92. Radio and television receiving sets	1,515	4,071	6,301	6,927	8,839	9,935	13,047	17,038
93. Telephone and telegraph apparatus	2,431	6,085	7,929	10,566	14,304	24,242	27,087	30,915
94. Radio and communication equipment	5,323	15,121	15,232	20,138	30,722	48,336	52,155	56,778
95. Electronic components	3,141	8,533	15,116	22,300	37,746	72,956	83,378	95,868
96. Other electrical machinery and equipment	3,328	5,587	9,025	9,198	9,884	14,044	15,443	17,541
97. Motor vehicles	46,333	82,637	118,632	112,968	109,109	119,136	131,088	156,911
98. Aircraft	28,281	39,865	26,876	36,428	37,519	47,965	51,012	54,311
99. Ship and boat building and repair	4,623	6,881	9,573	9,538	10,921	13,891	14,555	15,196
100. Railroad equipment	2,398	4,740	4,509	7,043	2,076	2,212	2,606	3,041
101. Motorcycles, bicycles, and parts	273	585	1,027	1,156	1,025	1,217	1,459	1,699
102. Other transportation equipment	1,338	5,115	6,936	6,340	6,852	9,566	9,940	10,813
103. Scientific and controlling instruments	4,493	5,022	7,093	7,561	8,591	12,816	14,303	15,837
104. Medical and dental instruments	1,448	3,339	5,112	5,907	7,377	11,167	12,083	12,862
105. Optical and ophthalmic equipment	1,194	1,460	2,305	3,015	3,590	5,116	5,651	6,237
106. Photographic equipment and supplies	1,940	5,674	9,675	11,927	12,337	16,137	17,926	20,019
107. Watches and clocks	599	1,158	1,431	1,196	828	660	909	1,185
108. Jewelry and silverware	2,810	4,823	5,174	4,387	3,847	3,742	4,520	5,327
109. Musical instruments and sporting goods	2,938	4,601	6,248	6,496	7,405	9,033	9,927	11,179
110. Other manufactured products	4,769	7,438	8,761	8,770	7,474	8,349	9,230	10,285

Table D-1. Gross duplicated output by industry, selected years, 1959-84, and projected 1995—Continued

(Millions of 1977 dollars)

Industry	1959	1969	1977	1979	1984	1995 Low	1995 Moderate	1995 High
111. Railroad transportation	17,569	21,590	22,917	25,080	22,665	22,312	24,217	26,699
112. Local transit and intercity buses	8,692	9,027	9,353	9,845	8,519	9,504	10,261	11,079
113. Truck transportation	24,932	35,950	49,139	53,844	53,942	69,560	75,269	82,344
114. Water transportation	14,863	12,367	16,329	19,864	19,225	20,379	21,795	23,361
115. Air transportation	5,900	17,866	23,964	28,764	26,384	33,359	36,374	39,977
116. Pipeline transportation	1,415	2,536	3,365	3,747	3,440	3,896	4,263	4,609
117. Transportation services	1,889	3,347	3,923	4,275	5,604	7,825	8,510	9,303
118. Radio and television broadcasting	4,935	6,457	8,638	8,612	9,669	11,036	11,913	13,097
119. Communications except radio and television	14,148	29,961	53,884	64,980	81,808	152,493	164,772	180,999
120. Electric utilities, public and private	23,788	43,633	64,418	70,800	83,698	104,534	113,373	124,105
121. Gas utilities, excluding public	30,143	47,455	45,198	49,081	47,496	48,951	53,662	59,280
122. Water and sanitary services, except public	2,375	3,177	4,262	5,046	5,845	7,504	8,084	8,839
123. Wholesale trade	94,302	152,856	196,680	216,484	254,808	300,628	326,334	358,343
124. Eating and drinking places	60,174	68,331	89,975	92,729	110,822	128,318	137,051	149,751
125. Retail trade, except eating and drinking	97,438	161,267	202,344	217,464	239,682	296,449	316,773	346,989
126. Banking	18,209	29,852	46,263	51,663	61,972	84,688	90,758	98,833
127. Credit agencies and financial brokers	10,891	14,237	18,966	21,123	33,174	47,237	50,410	54,820
128. Insurance	33,795	44,171	67,619	67,750	72,376	87,130	93,216	101,617
129. Owner-occupied real estate	59,353	91,276	131,812	140,599	166,171	247,358	261,423	292,015
130. Real estate	54,511	96,237	145,026	160,510	189,236	270,164	288,687	316,734
131. Hotels and lodging places	4,803	12,369	18,804	20,129	20,973	28,302	30,299	33,137
132. Personal and repair services	17,009	19,273	24,908	26,132	26,193	29,288	31,319	34,107
133. Barber and beauty shops	7,991	9,781	7,453	7,466	7,600	7,372	7,829	8,491
134. Miscellaneous business services	17,972	47,918	79,103	94,597	138,059	221,090	238,247	259,798
135. Advertising	5,425	6,533	7,027	8,352	10,689	15,021	16,236	17,873
136. Miscellaneous professional services	24,715	36,993	52,052	62,956	81,390	117,629	126,589	137,243
137. Automobile repair	25,121	34,330	43,601	47,145	49,679	55,164	59,618	64,875
138. Motion pictures	5,898	5,291	8,438	10,348	12,738	16,891	18,295	20,114
139. Amusements and recreation services	7,051	10,056	16,998	18,169	22,171	32,707	34,774	37,761
140. Doctors' and dentists' services	19,598	30,460	43,365	46,575	60,278	81,278	86,563	93,792
141. Hospitals	12,728	26,789	47,134	50,164	57,921	69,124	74,079	79,871
142. Medical services, except hospitals	5,743	12,565	22,236	25,199	29,116	43,563	47,112	50,671
143. Educational services (private)	16,739	19,964	25,434	28,548	27,764	30,458	32,283	34,868
144. Nonprofit organizations	14,590	23,211	29,468	33,372	39,069	48,987	52,071	56,522
145. Post Office	9,152	12,238	13,589	14,665	17,034	19,756	21,306	23,288
146. Commodity Credit Corporation	0	0	0	0	0	0	0	0
147. Other Federal enterprises	1,625	3,247	4,503	4,893	4,904	6,446	6,913	7,593
148. Local government passenger transit	1,458	1,837	2,147	2,685	2,941	4,033	4,352	4,696
149. Other State and local enterprises	9,708	13,636	16,322	17,894	17,599	21,663	23,284	25,435
150. Noncomparable imports	0	0	0	0	0	0	0	0
151. Scrap, used and secondhand goods	0	0	0	0	0	0	0	0
152. New construction industry	150,084	197,553	193,580	199,579	213,343	278,776	291,869	301,616
153. Government industry	0	0	0	0	0	0	0	0
154. Rest-of-world industry	0	0	0	0	0	0	0	0
155. Private households	12,647	10,092	7,325	6,824	6,399	4,846	5,152	5,580
156. Inventory valuation adjustment	0	0	0	0	0	0	0	0

Table D-2. Wage and salary employment by industry, selected years, 1959-84, and projected 1995

(Thousands of jobs)

Industry	1959	1969	1977	1979	1984	1995 Low	1995 Moderate	1995 High
Total[1]	49,973	62,513	71,438	77,971	82,593	92,118	96,838	101,031
1. Dairy and poultry products	392	217	183	172	159	126	130	132
2. Meat animals and livestock	247	202	206	202	201	169	172	177
3. Cotton	143	46	27	22	19	10	12	14
4. Food and feed grains	243	170	217	224	257	213	215	219
5. Other agricultural products	363	299	405	443	491	483	492	497
6. Forestry and fishery products	31	33	38	39	41	47	50	55
7. Agricultural, forestry, fishery services	149	206	255	300	323	309	330	343
8. Iron and ferroalloy ores mining	33	30	25	31	17	12	13	15
9. Copper ore mining	23	34	34	33	16	12	14	16
10. Nonferrous metal ores mining except copper	28	25	32	37	22	15	17	18
11. Coal mining	198	135	225	259	197	181	185	188
12. Crude petroleum and gas, except drilling	186	146	170	198	263	249	263	276
13. Stone and clay mining and quarrying	101	97	93	99	88	85	89	94
14. Chemical and fertilizer mineral mining	19	18	23	25	21	18	20	22
15. Maintenance and repair construction	870	868	1,114	1,339	1,246	1,373	1,404	1,430
16. Ordnance	50	175	69	73	95	105	111	117
17. Guided missiles and space vehicles	94	107	66	81	120	143	152	158
18. Meat products	317	336	352	358	357	316	328	335
19. Dairy products	317	249	187	180	163	121	126	132
20. Canned and frozen foods	246	288	300	315	286	258	272	281
21. Grain mill products	134	133	142	144	130	119	124	130
22. Bakery products	301	278	236	231	211	176	181	188
23. Sugar	38	36	34	31	25	18	19	20
24. Confectionery products	78	87	77	80	76	61	66	71
25. Alcoholic beverages	104	95	84	85	71	51	57	64
26. Soft drinks and flavorings	111	142	144	153	144	127	134	139
27. Other food products	143	147	155	157	155	135	143	150
28. Tobacco manufacturing	95	83	71	70	65	54	56	58
29. Fabric, yarn, and thread mills	615	613	546	528	434	336	354	373
30. Floor covering mills	38	57	60	61	53	41	43	45
31. Other textile mill products	74	81	71	70	55	44	46	49
32. Hosiery and knit goods	220	251	233	227	204	160	168	177
33. Apparel	1,089	1,235	1,136	1,115	1,012	765	808	840
34. Other fabricated textile products	137	174	180	189	184	166	174	185
35. Logging	94	78	84	89	89	73	78	83
36. Sawmills and planing mills	305	230	228	237	203	183	190	195
37. Other millwork, plywood, and wood products	237	292	332	365	346	348	365	377
38. Wooden containers	43	36	21	19	14	8	9	10
39. Household furniture	259	316	315	329	295	303	321	332
40. Furniture and fixtures, except household	107	145	149	169	192	230	242	253
41. Paper products	413	482	483	493	485	455	480	498
42. Paperboard	174	230	209	214	196	172	183	190
43. Newspaper printing and publishing	318	368	396	420	441	489	508	525
44. Periodical, book printing and publishing	156	210	217	230	274	296	313	325
45. Other printing and publishing	414	516	529	585	658	756	785	815
46. Industrial inorganic and organic chemicals	259	295	321	327	299	287	305	321
47. Agricultural chemicals	53	64	68	70	61	59	61	63
48. Other chemical products	81	123	94	99	99	95	101	104
49. Plastic materials and synthetic rubber	81	108	98	100	88	79	83	86
50. Synthetic fibers	79	132	117	112	88	74	79	82
51. Drugs	105	143	181	192	206	233	243	253
52. Cleaning and toilet preparations	89	123	130	139	145	153	160	165
53. Paints and allied products	62	72	66	69	62	54	57	60
54. Petroleum refining and related products	216	182	202	210	189	168	175	181
55. Tires and inner tubes	105	119	130	127	94	82	86	92

See footnotes at end of table.

Table D-2. Wage and salary employment by industry, selected years, 1959-84, and projected 1995—Continued

(Thousands of jobs)

Industry	1959	1969	1977	1979	1984	1995 Low	1995 Moderate	1995 High
56. Rubber products except tires and tubes	177	160	161	166	148	126	132	137
57. Plastic products	91	317	423	488	539	666	707	748
58. Leather tanning and industrial leather	36	29	23	20	17	11	13	13
59. Leather products including footwear	338	314	232	226	176	117	127	135
60. Glass	152	185	199	199	164	158	167	172
61. Cement and concrete products	203	223	228	249	224	232	242	249
62. Structural clay products	78	64	50	52	38	26	30	33
63. Pottery and related products	48	45	46	48	39	37	38	40
64. Other stone and clay products	123	139	146	162	130	139	144	151
65. Blast furnaces and basic steel products	587	644	554	571	334	235	261	325
66. Iron and steel foundries and forgings	268	312	302	323	209	181	193	204
67. Primary copper and copper products	137	160	147	161	133	127	133	140
68. Primary aluminum and aluminum products	111	153	150	170	147	150	157	162
69. Primary nonferrous metals and products	78	92	82	91	76	66	70	74
70. Metal containers	75	87	78	80	58	48	52	55
71. Heating apparatus and plumbing fixtures	71	76	69	76	63	57	60	62
72. Fabricated structural metal products	333	432	474	523	437	490	514	530
73. Screw machine products	87	113	101	116	96	101	108	112
74. Metal stampings	188	254	238	244	209	223	232	240
75. Cutlery, handtools, general hardware	135	165	175	184	148	155	162	168
76. Other fabricated metal products	225	306	336	370	336	372	394	413
77. Engines, turbines, and generators	90	112	125	145	115	116	124	130
78. Farm machinery	126	140	167	182	110	128	136	144
79. Construction, mining, oilfield machinery	162	202	257	276	178	206	216	226
80. Material handling equipment	64	94	93	106	79	113	118	122
81. Metalworking machinery	245	341	325	369	306	348	367	382
82. Special industry machinery	164	206	190	205	168	186	197	204
83. General industrial machinery	221	291	295	329	273	308	325	336
84. Other nonelectrical machinery	145	224	241	286	271	305	322	331
85. Computers and peripheral equipment	111	224	262	339	478	679	713	741
86. Typewriters and other office equipment	27	52	49	58	48	41	43	46
87. Service industry machines	97	147	171	188	171	186	194	201
88. Electric transmission equipment	157	207	190	221	224	221	231	238
89. Electrical industrial apparatus	176	223	233	251	206	229	241	250
90. Household appliances	157	187	180	178	150	146	150	155
91. Electric lighting and wiring	134	205	205	225	201	213	223	234
92. Radio and television receiving sets	113	155	123	115	91	81	85	89
93. Telephone and telegraph apparatus	105	146	147	165	144	176	180	184
94. Radio and communication equipment	252	409	315	357	472	584	607	622
95. Electronic components	213	394	405	525	673	802	846	877
96. Other electrical machinery and equipment	106	122	151	174	156	178	186	197
97. Motor vehicles	692	911	947	990	860	793	826	859
98. Aircraft	721	804	500	632	631	680	714	737
99. Ship and boat building and repair	146	189	224	226	194	209	220	231
100. Railroad equipment	41	51	56	74	35	35	36	38
101. Motorcycles, bicycles, and parts	9	13	18	20	15	14	16	19
102. Other transportation equipment	22	88	107	103	86	97	104	112
103. Scientific and controlling instruments	165	194	190	213	222	286	302	314
104. Medical and dental instruments	45	82	128	144	172	223	234	244
105. Optical and ophthalmic equipment	82	71	68	77	75	70	75	78
106. Photographic equipment and supplies	68	111	130	134	124	129	135	142
107. Watches and clocks	29	35	30	28	15	13	14	16
108. Jewelry and silverware	67	78	93	92	78	73	78	81
109. Musical instruments and sporting goods	116	149	145	145	128	130	137	143
110. Other manufactured products	205	214	200	208	179	160	166	172

See footnotes at end of table.

Table D-2. Wage and salary employment by industry, selected years, 1959-84, and projected 1995—Continued

(Thousands of jobs)

Industry	1959	1969	1977	1979	1984	1995 Low	1995 Moderate	1995 High
111. Railroad transportation	929	650	550	559	378	272	283	298
112. Local transit and intercity buses	281	281	261	263	269	262	267	274
113. Truck transportation	848	1,086	1,222	1,339	1,324	1,487	1,571	1,639
114. Water transportation	238	231	196	216	199	198	206	215
115. Air transportation	179	353	386	438	493	552	574	602
116. Pipeline transportation	24	18	19	20	19	20	20	22
117. Transportation services	63	105	147	186	247	343	362	378
118. Radio and television broadcasting	89	131	169	188	232	272	284	297
119. Communications except radio and television	748	918	1,017	1,121	1,111	1,224	1,291	1,349
120. Electric utilities, public and private	430	460	550	608	702	784	827	863
121. Gas utilities, excluding public	215	220	212	220	222	214	225	235
122. Water and sanitary services, except public	43	68	84	92	108	115	121	129
123. Wholesale trade	3,082	3,907	4,708	5,204	5,550	6,248	6,578	6,866
124. Eating and drinking places	1,603	2,466	3,949	4,513	5,403	6,363	6,659	6,961
125. Retail trade, except eating and drinking	6,460	8,354	9,888	10,517	11,236	12,213	12,890	13,475
126. Banking	640	983	1,357	1,498	1,676	1,776	1,865	1,946
127. Credit agencies and financial brokers	369	632	755	869	1,178	1,453	1,531	1,596
128. Insurance	1,028	1,276	1,513	1,630	1,753	1,942	2,056	2,146
129. Owner-occupied real estate	0	0	0	0	0	0	0	0
130. Real estate	577	685	901	1,046	1,123	1,231	1,288	1,343
131. Hotels and lodging places	547	753	1,137	1,261	1,539	1,832	1,955	2,057
132. Personal and repair services	775	840	778	810	928	1,103	1,160	1,208
133. Barber and beauty shops	219	335	304	319	348	406	430	452
134. Miscellaneous business services	679	1,528	2,382	2,914	4,059	6,153	6,469	6,726
135. Advertising	106	121	131	146	183	221	227	235
136. Miscellaneous professional services	412	710	1,083	1,302	1,697	2,511	2,638	2,755
137. Automobile repair	245	366	498	575	683	814	864	903
138. Motion pictures	195	207	214	228	220	235	243	254
139. Amusements and recreation services	322	445	666	712	801	1,009	1,056	1,099
140. Doctors' and dentists' services	292	521	966	1,082	1,396	1,910	1,972	2,056
141. Hospitals	967	1,770	2,465	2,608	2,994	3,068	3,253	3,396
142. Medical services, except hospitals	214	592	1,168	1,323	1,751	2,667	2,824	2,958
143. Educational services (private)	716	1,113	1,409	1,580	1,748	1,853	1,964	2,044
144. Nonprofit organizations	1,311	1,751	1,918	2,038	2,127	2,308	2,394	2,506
145. Post Office	574	732	654	661	703	640	677	721
146. Commodity Credit Corporation	0	0	0	0	0	0	0	0
147. Other Federal enterprises	104	152	147	155	123	133	140	145
148. Local government passenger transit	71	87	123	130	174	202	209	219
149. Other State and local enterprises	225	351	496	541	485	509	536	568
150. Noncomparable imports	0	0	0	0	0	0	0	0
151. Scrap, used and secondhand goods	0	0	0	0	0	0	0	0
152. New construction industry	2,234	2,791	2,886	3,330	3,399	3,627	3,821	3,963
153. Government industry	0	0	0	0	0	0	0	0
154. Rest-of-world industry	0	0	0	0	0	0	0	0
155. Private households	2,228	1,826	1,395	1,264	1,238	978	1,019	1,056
156. Inventory valuation adjustment	0	0	0	0	0	0	0	0

[1] Excludes general government.

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

Table E-1. Wage and salary employment by detailed industry, 1984 and projected 1995[1]

(Employment in thousands)

Industry	SIC code	1984	1995 Low	1995 Moderate	1995 High	Percent change 1984-95		
						Low	Moderate	High
Total, all industries	-	96,957	107,396	112,360	116,905	10.8	15.9	20.6
Agriculture, forestry, and fishing	-	1,573	1,538	1,593	1,632	-2.2	1.3	3.7
Mining	-	975	926	971	1,011	-5.0	-.4	3.7
Metal mining	10	56	40	45	50	-28.9	-19.9	-10.8
Coal mining	11, 12	197	181	185	188	-8.5	-6.5	-4.7
Oil and gas extraction	13	613	603	632	657	-1.6	3.2	7.2
Crude petroleum and natural gas liquids	131, 2	263	249	263	276	-5.3	-.1	4.7
Oil and gas field services	138	350	354	370	381	1.1	5.7	9.1
Nonmetallic mining and quarrying	14	109	103	109	116	-5.6	.4	6.6
Construction	-	4,345	4,704	4,916	5,074	8.3	13.2	16.8
General contractors and operative builders	15	1,158	1,228	1,283	1,324	6.1	10.8	14.4
Residential building construction	152	577	545	570	588	-5.6	-1.3	1.8
Operative builders	153	59	57	60	62	-2.9	1.5	4.7
Nonresidential building construction	154	521	625	653	674	20.0	25.4	29.4
General contractors, except building	16	765	820	857	884	7.2	12.0	15.6
Highway and street construction	161	245	237	248	256	-3.1	1.3	4.6
Heavy construction, except highway and street	162	520	582	608	628	12.1	17.1	20.9
Special trade contractors	17	2,422	2,657	2,777	2,866	9.7	14.6	18.3
Plumbing, heating, and air-conditioning	171	561	622	650	671	10.7	15.7	19.5
Painting, paper hanging, and decorating	172	153	153	160	165	.1	4.6	8.0
Electrical work	173	447	499	522	539	11.8	16.8	20.6
Masonry, stonework, tile setting, and plastering	174	378	389	406	419	2.7	7.4	10.8
Carpentering and flooring	175	142	152	158	164	6.6	11.4	15.0
Roofing and sheet-metal work	176	183	199	208	215	9.0	13.9	17.6
Concrete work	177	142	155	162	168	9.1	14.0	17.7
All other special trade contractors	178, 9	416	488	510	526	17.3	22.6	26.5
Manufacturing	-	19,412	19,678	20,692	21,594	1.4	6.6	11.2
Durable goods manufacturing	24-25, 32-39	11,522	12,360	12,996	13,568	7.3	12.8	17.8
Lumber and wood products	24	707	685	725	757	-3.1	2.6	7.1
Logging camps and logging contractors	241	89	73	78	83	-18.3	-12.5	-7.5
Sawmills and planing mills	242	203	183	190	195	-10.0	-6.6	-4.2
Millwork, plywood, and structural wood members	243	220	232	246	252	5.3	11.6	14.3
Wood buildings and mobile homes	245	74	76	85	96	1.9	14.7	30.1
All other wood products	244, 9	120	122	126	131	1.6	5.2	9.7
Furniture and fixtures	25	487	533	563	585	9.3	15.4	20.1
Household furniture	251	295	303	321	332	2.6	8.7	12.5
Office furniture	252	64	76	80	83	18.2	24.2	30.0
Partitions and office and store fixtures	254	67	84	89	93	27.0	33.5	39.8
All other furniture and fixtures	253, 9	62	70	73	77	13.5	19.3	24.8
Stone, clay, glass, and concrete products	32	595	593	621	645	-.4	4.3	8.4
Glass and glassware, pressed or blown	322	99	89	94	97	-10.6	-5.9	-2.8
Concrete, gypsum, and plaster products	327	199	214	223	229	7.1	11.9	15.0
All other stone, clay, glass, and concrete products	321, 3-6, 8-9	297	290	304	320	-2.1	2.6	7.7
Primary metal industries	33	858	719	771	858	-16.2	-10.2	-.1
Blast furnaces and basic steel products	331	333	235	261	325	-29.7	-21.7	-2.7
Iron and steel foundries	332	149	121	128	135	-19.0	-14.1	-9.5
Nonferrous rolling and drawing	335	193	183	192	202	-5.0	-.2	5.0
Nonferrous foundries (castings)	336	87	85	89	93	-1.9	3.2	7.5
All other primary metal industries	333, 4, 9	96	96	100	103	-.3	3.5	6.5
Fabricated metal products	34	1,464	1,568	1,650	1,718	7.1	12.7	17.3
Metal cans and shipping containers	341	58	48	52	55	-16.3	-10.1	-4.8
Cutlery, handtools, and hardware	342	148	155	162	168	4.2	9.4	13.2
Heating equipment and plumbing fixtures	343	63	57	60	62	-9.8	-4.8	-2.4
Fabricated structural metal products	344	437	490	514	530	12.3	17.7	21.5
Screw machine products and bolts, nuts, and washers	345	96	101	108	112	4.6	11.7	16.6
Metal forgings and stampings	346	250	263	275	287	5.3	9.8	14.6
Coating, engraving, and allied services	347	107	124	131	138	16.0	22.6	28.8
Ordnance and accessories, nec	348	76	81	86	91	7.2	13.3	19.4
Miscellaneous fabricated metal products	349	229	248	262	276	8.5	14.6	20.4
Machinery, except electrical	35	2,197	2,617	2,755	2,863	19.1	25.4	30.3
Engines and turbines	351	114	116	124	130	1.7	8.0	13.7
Farm and garden machinery and equipment	352	110	128	136	144	16.3	23.2	30.8
Construction and related machinery and equipment	353	257	319	334	348	23.8	30.0	35.3
Metalworking machinery and equipment	354	306	348	367	382	13.9	20.1	24.9
Special industry machinery except metalworking	355	168	186	197	204	11.2	17.7	21.5
General industrial machinery and equipment	356	273	308	325	336	12.8	18.8	22.9
Office, computing, and accounting machines	357	526	720	756	787	36.8	43.6	49.5
Refrigeration and service industry machinery	358	171	186	194	201	8.7	13.6	17.7
Miscellaneous machinery, except electrical	359	271	305	322	331	12.5	18.9	22.2

See footnotes at end of table.

Table E-1. Wage and salary employment by detailed industry, 1984 and projected 1995[1]—Continued

(Employment in thousands)

Industry	SIC code	1984	1995 Low	1995 Moderate	1995 High	Percent change 1984-95		
						Low	Moderate	High
Electrical and electronic machinery and equipment	36	2,208	2,529	2,648	2,746	14.5	19.9	24.3
Electric transmission and distribution equipment	361	116	121	131	138	4.5	12.5	18.8
Electrical industrial apparatus	362	206	229	241	250	11.3	16.9	21.2
Household appliances	363	150	146	150	155	-2.8	.1	3.8
Electric lighting and wiring equipment	364	200	213	223	234	6.3	11.3	16.7
Radio and television receiving equipment	365	91	81	85	89	-10.8	-6.2	-1.9
Communication equipment	366	617	759	787	807	23.1	27.6	30.8
Electronic components and accessories	367	673	802	846	877	19.2	25.7	30.3
Miscellaneous electrical equipment and supplies	369	156	178	186	197	14.1	19.1	26.0
Transportation equipment	37	1,906	1,932	2,023	2,107	1.3	6.1	10.5
Motor vehicles and equipment	371	860	793	826	859	-7.8	-4.0	-.1
Aircraft and parts	372	596	637	670	692	6.8	12.5	16.2
Ship and boat building and repairing	373	194	209	220	231	8.0	13.4	19.1
Guided missiles and space vehicles and parts	376	155	187	196	203	20.2	26.5	30.7
All other transportation equipment	374, 5, 9	101	107	110	122	5.3	9.2	21.0
Professional and scientific instruments	38	714	821	860	894	15.0	20.4	25.1
Engineering and scientific instruments	381	80	88	92	95	10.9	15.6	19.0
Measuring and controlling instruments	382	250	297	310	319	19.1	24.2	27.9
Medical and dental instruments and supplies	384	172	223	234	244	29.6	36.0	41.7
Photographic equipment and supplies	386	124	129	135	142	4.4	8.8	14.3
All other professional and scientific instruments	383, 5, 7	89	83	89	95	-6.5	-.1	6.1
Miscellaneous manufacturing industries	39	384	363	381	395	-5.5	-.9	2.8
Jewelry, silverware, and plated ware	391	55	48	53	56	-13.0	-4.6	.6
Toys and sporting goods	394	111	117	123	128	5.7	11.4	15.8
All other miscellaneous manufacturing industries	393, 5-6, 9	218	198	205	211	-9.2	-6.1	-3.2
Nondurable goods manufacturing	20-23, 26-31	7,891	7,318	7,695	8,026	-7.3	-2.5	1.7
Food and kindred products	20	1,618	1,382	1,450	1,509	-14.6	-10.4	-6.8
Meat products	201	357	316	328	335	-11.4	-8.3	-6.1
Dairy products	202	163	121	126	132	-26.1	-22.6	-19.0
Preserved fruits and vegetables	203	236	208	222	231	-11.9	-6.1	-2.1
Grain mill products	204	130	119	124	130	-8.5	-5.3	-.4
Bakery products	205	211	176	181	188	-16.8	-14.1	-11.2
Sugar and confectionery products	206	101	79	85	91	-22.1	-16.2	-10.6
Beverages	208	214	178	191	203	-17.0	-11.0	-5.4
All other food and kindred products	207, 9	205	185	193	200	-9.7	-5.6	-2.5
Tobacco manufactures	21	65	54	56	57	-17.5	-13.8	-12.5
Textile mill products	22	746	580	612	644	-22.2	-18.0	-13.7
Weaving mills, cotton	221	119	50	52	55	-58.3	-56.0	-53.5
Weaving mills, man-made fibers	222	99	100	105	110	.4	5.5	10.9
Knitting mills	225	204	160	168	177	-21.7	-17.7	-13.4
Textile finishing, except wool and knit goods	226	68	55	57	61	-19.9	-15.6	-10.9
Yarn and thread mills	228	106	100	106	112	-5.1	.1	5.6
All other textile mill products	223-4, 7, 9	150	116	123	129	-22.3	-17.9	-13.8
Apparel and textile products	23	1,197	931	982	1,025	-22.2	-18.0	-14.4
Men's and boys' suits and coats	231	72	39	41	43	-45.7	-42.7	-40.4
Men's and boys' furnishings	232	338	287	302	315	-15.1	-10.4	-6.8
Women's and misses' outerwear	233	387	313	331	344	-19.1	-14.6	-11.2
Women's and children's undergarments	234	86	51	53	56	-40.9	-37.6	-35.1
Children's outerwear	236	64	40	42	44	-37.6	-34.2	-31.5
Miscellaneous apparel and accessories	238	46	24	25	26	-48.5	-45.7	-43.5
All other apparel and textile products	235, 7, 9	204	178	187	198	-12.7	-8.4	-3.0
Paper and allied products	26	681	627	663	688	-7.9	-2.6	.9
Paperboard mills	263	57	51	54	56	-10.9	-6.0	-2.5
Converted paper and paperboard products	264	226	241	255	264	6.7	12.5	16.8
Paperboard containers and boxes	265	196	172	183	190	-12.3	-6.7	-3.5
All other paper and allied products	261, 2, 6	201	162	171	178	-19.2	-14.7	-11.5
Printing, publishing, and allied industries	27	1,372	1,540	1,606	1,665	12.2	17.0	21.3
Newspapers	271	441	489	508	525	10.9	15.4	19.1
Periodicals	272	107	123	130	135	15.2	22.0	26.7
Books	273	102	105	111	115	2.3	8.4	12.6
Commercial printing	275	468	544	565	587	16.3	20.8	25.5
Blankbooks and bookbinding	278	69	74	77	80	6.7	10.8	15.2
All other printing, publishing and allied products	274, 6-7, 9	186	206	214	223	10.7	15.5	19.9
Chemicals and allied products	28	1,048	1,034	1,089	1,133	-1.3	3.9	8.1
Industrial inorganic chemicals	281	143	142	152	159	-.2	6.2	11.8
Plastics and synthetic materials and man-made fibers	282	177	153	161	167	-13.5	-8.9	-5.3
Drugs	283	206	233	243	253	13.2	18.4	22.9
Soap, detergents, cosmetics, and toilet goods	284	145	153	160	165	5.3	9.9	13.6
Paints and allied products	285	62	54	57	60	-12.4	-7.0	-2.8
Industrial organic chemicals	286	164	156	165	173	-4.9	.7	5.7
Agricultural chemicals	287	61	59	61	63	-2.6	.4	3.9
Miscellaneous chemical products	289	91	84	90	93	-7.9	-1.9	1.4
Petroleum refining and related industries	29	189	168	175	181	-11.1	-7.4	-3.9

See footnotes at end of table.

Table E-1. Wage and salary employment by detailed industry, 1984 and projected 1995[1]—Continued

(Employment in thousands)

Industry	SIC code	1984	1995 Low	1995 Moderate	1995 High	Percent change 1984-95		
						Low	Moderate	High
Petroleum refining	291	151	137	142	148	-9.4	-5.6	-2.0
All other petroleum refining and related industries	295, 9	38	31	32	34	-18.1	-14.7	-11.5
Rubber and miscellaneous plastics products	30	782	874	924	976	11.8	18.3	24.9
Tires and inner tubes	301	94	82	86	92	-13.1	-9.5	-3.1
Fabricated rubber products, nec	306	110	90	95	98	-17.6	-13.7	-10.4
All other rubber and miscellaneous plastics products	302-4, 7	577	701	744	786	21.5	28.9	36.2
Leather and leather products	31	192	128	139	148	-33.5	-27.5	-23.0
Footwear, except rubber	314	116	69	75	80	-40.2	-35.4	-31.3
All other leather and leather products	311, 3, 5-7, 9	76	58	64	68	-23.4	-15.6	-10.4
Transportation, communications, and utilities	-	5,873	6,240	6,562	6,871	6.2	11.7	17.0
Transportation	40-47	3,632	3,773	3,962	4,150	3.9	9.1	14.3
Railroad transportation	40	369	261	272	286	-29.2	-26.1	-22.3
Local and interurban transit	41	269	262	267	274	-2.6	-.5	1.9
Local and suburban transportation	411	85	82	83	85	-3.8	-1.8	.6
School buses	415	87	102	105	107	18.2	20.6	23.6
All other local and interurban transit	412-4, 7	97	78	79	81	-20.0	-18.3	-16.3
Trucking and warehousing	42	1,324	1,487	1,571	1,639	12.3	18.6	23.8
Trucking, local and long distance and trucking terminals	421, 3	1,231	1,401	1,480	1,545	13.8	20.3	25.5
Public warehousing	422	94	86	91	95	-8.3	-3.1	1.2
U.S. Postal Service	43	703	640	677	721	-8.9	-3.7	2.6
Water transportation	44	199	198	206	215	-.8	3.6	7.9
Water transportation services	446	108	106	111	116	-1.3	3.1	7.4
All other water transportation	441-5	92	91	95	99	-.1	4.3	8.6
Air transportation	45	493	552	574	602	12.0	16.5	22.2
Certificated air transportation	451	405	448	465	488	10.6	14.9	20.4
All other air transportation	452, 8	88	104	109	115	18.7	23.9	30.5
Pipelines, except natural gas	46	19	20	20	22	2.4	5.5	13.7
Transportation services	47	256	354	373	390	38.3	45.9	52.3
Arrangement of transportation	472	173	252	266	278	45.3	53.4	60.1
All other transportation	471, 4, 8	82	102	107	112	23.4	30.1	35.7
Communications and utilities	48,49	2,242	2,467	2,601	2,721	10.0	16.0	21.4
Communications	48	1,343	1,496	1,575	1,646	11.4	17.3	22.6
Telephone communication	481	954	937	988	1,033	-1.9	3.5	8.2
Radio and television broadcasting	483	232	272	284	297	17.5	22.5	28.0
All other communication services	482, 9	157	287	303	316	83.3	93.3	102.0
Utilities and sanitary services	49	899	971	1,026	1,076	8.0	14.1	19.6
Electric services	491	442	516	547	573	16.8	23.7	29.6
Gas production and distribution	492	172	165	174	182	-4.0	.9	5.4
Combination electric and gas, and other utilities	493	200	199	210	220	-.8	4.8	9.8
All other utilities and sanitary services	494-7	84	90	95	101	6.9	12.8	19.9
Wholesale and retail trade	-	22,134	24,820	26,122	27,296	12.1	18.0	23.3
Wholesale trade	50,51	5,550	6,248	6,578	6,865	12.6	18.5	23.7
Wholesale trade, durable goods	50	3,272	3,817	4,018	4,194	16.6	22.8	28.2
Motor vehicles and auto parts and supplies	501	424	483	509	531	14.0	20.1	25.3
Furniture and home furnishings	502	125	139	147	153	11.7	17.6	22.8
Lumber and other construction materials	503	201	227	239	250	12.8	18.7	23.9
Sporting, toy, photographic, and hobby goods	504	74	89	93	98	20.6	27.0	32.5
Metals and minerals, except petroleum	505	137	158	166	173	14.8	20.9	26.2
Electrical goods	506	477	541	570	595	13.6	19.6	24.8
Hardware, plumbing, and heating equipment and supplies	507	250	274	288	301	9.5	15.3	20.3
Machinery, equipment, and supplies	508	1,393	1,712	1,803	1,881	22.9	29.4	35.1
Miscellaneous durable goods	509	192	193	204	212	.8	6.1	10.8
Wholesale trade, nondurable goods	51	2,277	2,431	2,559	2,671	6.7	12.4	17.3
Paper and paper products	511	175	203	213	223	15.8	21.9	27.2
Drugs, proprietaries, and sundries	512	159	181	191	199	13.8	19.8	25.0
Apparel, piece goods, and notions	513	183	176	186	194	-3.7	1.3	5.8
Groceries and related products	514	710	766	806	841	7.8	13.5	18.5
Farm-product raw materials	515	144	130	137	143	-9.5	-4.6	-.4
Chemicals and allied products	516	131	146	154	160	11.7	17.6	22.7
Petroleum and petroleum products	517	207	203	213	223	-2.0	3.2	7.7
Beer, wine, and distilled alcholic beverages	518	153	174	183	191	13.5	19.5	24.8
Miscellaneous nondurable goods	519	415	452	476	497	9.0	14.7	19.7
Retail trade	52-59	16,584	18,572	19,545	20,431	12.0	17.9	23.2
Building materials, garden supplies, mobile homes	52	658	718	758	792	9.1	15.1	20.4
Lumber and other building materials dealers	521	344	371	392	410	8.1	14.1	19.3
Paint, glass, and wallpaper stores	523	65	72	76	80	11.4	17.6	22.9
Hardware stores	525	155	172	182	190	11.2	17.4	22.7
Retail nurseries, lawn and garden supply stores, and mobile home dealers	526, 7	95	102	108	113	7.8	13.7	18.9

See footnotes at end of table.

Table E-1. Wage and salary employment by detailed industry, 1984 and projected 1995[1]—Continued

(Employment in thousands)

Industry	SIC code	1984	1995 Low	1995 Moderate	1995 High	Percent change 1984-95		
						Low	Moderate	High
General merchandise stores	53	2,278	2,509	2,649	2,771	10.2	16.3	21.7
Department stores	531	1,925	2,241	2,366	2,475	16.4	22.9	28.6
Variety stores	533	216	166	176	184	-23.0	-18.8	-15.1
Miscellaneous general merchandise stores	539	136	102	107	112	-25.3	-21.2	-17.6
Food stores	54	2,655	3,045	3,214	3,359	14.7	21.0	26.5
Grocery stores	541	2,318	2,669	2,817	2,945	15.2	21.5	27.1
Meat and fish (seafood) markets	542	59	65	68	71	10.0	16.1	21.4
Retail bakeries	546	153	166	175	183	8.4	14.4	19.6
All other food stores	543-5, 9	126	146	154	161	16.2	22.4	27.8
Automotive dealers and gasoline service stations	55	1,802	1,813	1,913	2,000	.6	6.2	11.0
Motor vehicle dealers (new and used)	551	796	809	853	892	1.5	7.1	12.0
Auto and home supply stores	553	296	323	341	357	9.3	15.3	20.5
Gasoline service stations	554	581	552	582	609	-5.0	.2	4.8
All other automotive dealers	552, 5-7, 9	129	130	137	142	.7	6.1	10.7
Apparel and accessories stores	56	1,002	1,091	1,151	1,202	8.8	14.8	19.9
Men's and boys' clothing and furnishings stores	561	114	122	129	134	6.9	12.8	17.9
Women's ready-to-wear stores	562	363	396	418	437	8.9	15.0	20.2
Family clothing stores	565	200	207	218	228	3.5	9.0	13.7
Shoe stores	566	208	233	246	257	11.9	18.1	23.4
All other apparel and accessories stores	563-4, 8-9	117	133	140	147	13.9	20.2	25.6
Furniture and home furnishings stores	57	675	724	764	799	7.3	13.2	18.4
Furniture and home furnishings, except appliances	571	391	436	460	481	11.4	17.6	23.0
Household appliance stores	572	83	67	70	73	-19.7	-15.2	-11.4
Radio, television, and music stores	573	201	222	234	245	10.3	16.4	21.7
Eating and drinking places	58	5,403	6,363	6,659	6,961	17.8	23.2	28.8
Miscellaneous retail stores	59	2,111	2,309	2,437	2,547	9.4	15.4	20.7
Drug stores and proprietary stores	591	530	561	592	619	5.9	11.7	16.8
Liquor stores	592	128	133	141	147	3.8	9.5	14.5
Used merchandise stores	593	72	91	96	100	26.3	33.3	39.4
Miscellaneous shopping goods stores	594	689	826	871	911	19.8	26.4	32.1
Nonstore retailers	596	258	261	276	288	1.3	6.9	11.7
Fuel and ice dealers	598	105	89	94	99	-14.7	-10.0	-5.9
Retail stores, nec	599	328	348	366	383	5.9	11.6	16.6
Finance, insurance, and real estate	-	5,681	6,344	6,679	6,967	11.7	17.6	22.6
Banking	60	1,676	1,775	1,865	1,946	5.9	11.2	16.1
Commercial and stock savings banks	602	1,520	1,601	1,682	1,755	5.3	10.6	15.5
Mutual savings banks	603	77	87	91	95	13.2	18.9	24.0
All other banking	601, 4-5	80	87	92	96	9.7	15.3	20.2
Credit agencies other than banks	61	698	807	850	886	15.7	21.9	27.0
Savings and loan associations	612	325	365	384	400	12.2	18.1	23.0
Personal credit institutions	614	204	242	255	266	18.3	24.8	30.2
Mortgage bankers and brokers	616	102	109	115	120	7.2	13.0	17.8
All other credit agencies	611, 3, 5	66	91	96	100	38.1	45.1	51.0
Security and commodity brokers and dealers	62	340	436	459	479	28.4	35.3	41.0
Insurance carriers	63	1,233	1,392	1,474	1,538	12.9	19.5	24.7
Life insurance	631	532	530	561	585	-.4	5.4	10.0
Accident and hlth insurance, medical service plans	632	153	196	208	217	28.2	35.7	41.6
Fire, marine, and casualty insurance	633	468	569	602	628	21.6	28.6	34.2
All other insurance carriers	635-7, 9	80	97	103	108	21.3	28.7	34.5
Insurance agents, brokers, and services	64	519	550	582	608	5.9	12.1	17.0
Real estate	65	1,059	1,157	1,210	1,262	9.2	14.2	19.1
Real estate operators and lessors	651	491	547	572	596	11.4	16.4	21.4
Real estate agents and managers	653	413	440	460	479	6.4	11.3	15.9
All other real estate	654, 5	155	170	178	186	10.2	15.2	20.4
Combined real estate, insurance, loan, law offices, and holding and other investment offices	66,67	156	226	238	249	44.9	52.5	59.3
Services	-	29,417	35,077	36,633	38,148	19.2	24.5	29.7
Hotels and other lodging places	70	1,271	1,419	1,514	1,593	11.7	19.1	25.4
Personal services	72	1,024	1,098	1,157	1,209	7.2	12.9	18.0
Laundry, cleaning, and garment services	721	366	306	322	335	-16.5	-12.2	-8.6
Beauty shops	723	324	384	406	427	18.4	25.4	31.7
Funeral service and crematories	726	73	83	88	91	13.6	19.5	24.3
All other personal services	722, 4-5, 9	260	325	341	356	24.7	30.9	36.7
Business services	73	4,187	6,374	6,695	6,961	52.3	59.9	66.3
Advertising	731	183	221	227	235	20.6	23.7	28.2
Consumer credit reporting and collection agencies	732	80	90	95	99	12.7	18.4	23.2
Mailing, reproduction, commercial art, and stenography	733	165	246	258	268	48.4	55.8	61.9
Services to dwellings and other buildings	734	609	894	940	977	46.7	54.3	60.5
Personnel supply services	736	828	1,306	1,375	1,431	57.7	66.0	72.8
Computer and data processing services	737	474	1,093	1,149	1,195	130.8	142.6	152.3
All other business services	735, 9	1,847	2,525	2,652	2,757	36.7	43.6	49.2

See footnotes at end of table.

Table E-1. Wage and salary employment by detailed industry, 1984 and projected 1995[1]—Continued

(Employment in thousands)

Industry	SIC code	1984	1995 Low	1995 Moderate	1995 High	Percent change 1984-95		
						Low	Moderate	High
Automobile repair, services, and garages	75	683	814	864	903	19.1	26.4	32.2
Automobile rentals and leasing, without drivers	751	139	176	187	195	27.0	34.8	40.9
Automobile repair shops	753	425	530	562	587	24.7	32.2	38.2
All other automobile services and garages	752, 4	120	108	115	121	-9.7	-3.8	1.0
Miscellaneous repair services	76	315	412	433	451	30.8	37.6	43.2
Electrical repair shops	762	98	124	131	136	27.0	33.7	39.1
All other miscellaneous repair services	763-4, 9	217	288	303	315	32.5	39.3	45.1
Motion pictures	78	220	235	243	254	7.0	10.4	15.5
Motion picture theaters	783	109	100	103	108	-8.2	-5.2	-.9
All other motion picture production and services	781, 2	111	135	140	146	21.8	25.8	31.5
Amusement and recreation, except motion pictures	79	801	1,009	1,056	1,099	25.9	31.8	37.2
Theatrical producers, bands, and entertainers	792	94	113	118	123	20.3	25.8	31.0
Bowling alleys and billiard and pool establishments	793	99	96	100	104	-2.7	1.2	4.9
Commercial sports	794	79	85	89	92	7.9	12.2	16.2
All other amusement and recreation services, except motion pictures	791, 9	529	714	748	780	35.0	41.4	47.4
Health services	80	7,189	8,656	9,054	9,470	20.4	25.9	31.7
Offices of physicians	801	907	1,229	1,313	1,368	35.4	44.7	50.7
Offices of dentists	802	426	516	551	574	21.2	29.4	34.8
Offices of other health practitioners	804	148	277	290	308	87.0	95.8	108.0
Nursing and personal care facilities	805	1,145	1,609	1,650	1,729	40.6	44.2	51.1
Hospitals[2]	806	4,078	4,182	4,366	4,571	2.5	7.1	12.1
Medical and dental laboratories	807	113	126	135	141	11.3	19.3	24.6
Outpatient care facilities	808	191	374	390	405	96.1	104.5	112.4
All other health sevices	803, 9	181	343	359	374	89.7	98.6	106.9
Legal services	81	650	999	1,049	1,096	53.7	61.5	68.7
Educational services[3]	82	7,897	8,276	8,516	8,794	4.8	7.8	11.4
Social services	83	1,241	1,581	1,667	1,746	27.4	34.3	40.7
Individual and family social services	832	246	337	351	369	37.2	42.9	50.3
Job training and vocational rehabilitation services	833	192	254	269	280	32.2	40.0	45.8
Child day care services	835	309	320	339	353	3.5	9.6	14.2
Residential care	836	268	413	441	464	54.2	64.5	73.1
Social services, nec	839	227	258	268	281	13.6	18.1	23.8
Museums, art galleries, and zoos	84	42	44	45	48	4.0	7.9	12.9
Membership organizations	86	1,501	1,535	1,590	1,662	2.2	5.9	10.7
Business associations	861	86	89	93	97	3.7	7.8	13.2
Labor unions and similar labor organizations	863	135	135	140	147	.1	3.7	8.4
Civic, social, and fraternal associations	864	328	338	350	366	3.0	6.7	11.5
Religious organizations	866	846	842	871	910	-.5	3.1	7.7
All other membership organizations	862, 5, 9	106	130	135	142	22.6	27.1	33.1
Private households	88	1,238	978	1,020	1,056	-21.0	-17.6	-14.7
Miscellaneous services	89	1,158	1,647	1,729	1,806	42.2	49.3	55.9
Engineering, architectural, and surveying services	891	635	915	961	1,003	43.9	51.2	57.9
Accounting, auditing, and bookkeeping services	893	389	566	594	621	45.4	52.8	59.6
All other miscellaneous services	892, 9	134	167	174	182	25.0	29.9	35.9
Government	-	7,547	8,069	8,193	8,312	6.9	8.6	10.1
Federal Government	91	2,104	2,160	2,123	2,079	2.7	.9	-1.2
State government, except education and hospitals	92	1,784	2,039	2,095	2,151	14.3	17.4	20.6
Local government, except education and hospitals	93	3,659	3,870	3,975	4,082	5.8	8.6	11.6

[1] Industry employment totals presented in this table were used to develop the 1984 and projected 1995 national industry-occupation matrices.

[2] Includes State and local hospitals.

[3] Includes State and local education.

NOTE: Detail may not add to totals because of rounding. Percentages are based on unrounded data.

Appendix

Bureau of Labor Statistics input-output sectoring plan

	Industry sector number and title	Bureau of Economic Analysis Input-Output Sector	Standard Industrial Classification (SIC) 1972
	Agriculture, forestry, and fisheries		
1	Dairy and poultry products	1.01-1.02	pt. 01, pt. 02
2	Meat animals and livestock	1.03	pt. 01, pt. 02
3	Cotton	2.01	pt. 01, pt. 02
4	Food and feed grains	2.02	pt. 01, pt. 02
5	Agricultural products, n.e.c.	2.03-2.07	pt. 01, pt. 02
6	Forestry and fishery products	3.00	08 (except 085), 091, 097
7	Agricultural, forestry, and fishery services	4.00	0254, 07 (except 074), 085, 092
	Mining		
8	Iron and ferroalloy ores mining	5.00	101, 106
9	Copper ore mining	6.01	102
10	Nonferrous metal ores mining, except copper	6.02	10 (except 101, 102, 106)
11	Coal mining	7.00	11, 12
12	Crude petroleum and natural gas	8.00	131, 132
13	Stone and clay mining and quarrying	9.00	14 (except 147)
14	Chemical and fertilizer mineral mining	10.00	147
	Maintenance and repair construction		
15	Maintenance and repair construction	12.01-12.02	pt. 15, pt. 16, pt. 17
	Manufacturing		
16	Ordnance	13.02-13.07	348, 3795
17	Complete guided missiles and space vehicles	13.01	3761
18	Meat products	14.01	201
19	Dairy products	14.02-14.06	202
20	Canned and frozen foods	14.07-14.13	203, 2091-2092
21	Grain mill products	14.14-14.17	204
22	Bakery products	14.18	205
23	Sugar	14.19	2061-2063
24	Confectionery products	14.20	2065-2067
25	Alcoholic beverages	14.21	208 (except 2086-2087)
26	Soft drinks and flavorings	14.22-14.23	2086-2087
27	Food products, n.e.c.	14.24-14.32	207, 209 (except 2091-2092)
28	Tobacco manufacturing	15.01-15.02	21
29	Fabric, yarn, and thread mills	16.01-16.04	221-224, 226, 228
30	Floor covering mills	17.01	227
31	Textile mill products, n.e.c.	17.02-17.10	229
32	Hosiery and knit goods	18.01-18.03	225
33	Apparel	18.04	23 (except 239), 39996
34	Fabricated textile products, n.e.c.	19.01-19.03	239
35	Logging	20.01	241
36	Sawmills and planing mills	20.02-20.04	242
37	Millwork, plywood, and wood products, n.e.c.	20.05-20.09	243, 2448, 2452, 249
38	Wooden containers	21.00	244 (except 2448)
39	Household furniture	22.01-22.04	251
40	Furniture and fixtures, except household	23.01-23.07	25 (except 251)
41	Paper products	24.01-24.07	26 (except 265)
42	Paperboard containers and boxes	25.00	265
43	Newspaper printing and publishing	26.01	271
44	Periodical and book printing, publishing	26.02-26.04	272-274
45	Printing and publishing, n.e.c.	26.05-26.08	275-279
46	Industrial inorganic and organic chemicals	27.01	281 (except 28195), 2865, 2869
47	Agricultural chemicals	27.02-27.03	287
48	Chemical products, n.e.c.	27.04	2861, 289
49	Plastic materials and synthetic rubber	28.01-28.02	2821-2822
50	Synthetic fibers	28.03-28.04	2823-2824
51	Drugs	29.01	283
52	Cleaning and toilet preparations	29.02-29.03	284
53	Paints and allied products	30.00	285
54	Petroleum refining and related products	31.01-31.03	29
55	Tires and inner tubes	32.01	301
56	Rubber products except tires and tubes	32.02-32.03, 32.05	302-306
57	Plastics products, n.e.c.	32.04	307
58	Leather tanning and finishing	33.00	311
59	Leather products including footwear	34.01-34.03	31 (except 311)
60	Glass	35.01-35.02	321-323
61	Cement and concrete products	36.01, 36.10-36.14	324, 327
62	Structural clay products	36.02-36.05	325
63	Pottery and related products	36.06-36.09	326
64	Stone and other mineral products, n.e.c.	36.15-36.22	328, 329

Bureau of Labor Statistics input-output sectoring plan—Continued

Industry sector number and title		Bureau of Economic Analysis Input-Output Sector	Standard Industrial Classification (SIC) 1972
65	Blast furnaces and basic steel products	37.01	331
66	Iron and steel foundries and forgings	37.02-37.04	332, 339, 3462
67	Primary copper and copper products	38.01, 38.07, 38.10, 38.12	3331, 3351, 3357, 3362
68	Primary aluminum and aluminum products	38.04, 38.08, 38.11	3334, 28195, 3353-55, 3361
69	Primary nonferrous metals and products, n.e.c.	3802, 38.03, 38.05 38.06, 38.09, 38.13, 38.14	3332, 333,3339, 334, 3356, 3369, 3463
70	Metal cans and containers	39.01-39.02	341
71	Heating equipment and plumbing fixtures	40.01-40.03	343
72	Fabricated structural metal products	40.04-40.09	344
73	Screw machine products	41.01	345
74	Metal stampings	41.02	346 (except 3462-3463)
75	Cutlery, handtools and general hardware	42.01-42.03	342
76	Fabricated metal products, n.e.c.	42.04-42.11	347, 349
77	Engines and turbines	43.01-43.02	351
78	Farm and garden machinery	44.00	352
79	Construction, mining and oilfield machinery	45.01-45.03	3531-3533
80	Materials handling equipment	46.01-46.04	353 (except 3531-3533)
81	Metalworking machinery	47.01-47.04	354
82	Special industry machinery	48.01-48.06	355
83	General industrial machinery	49.01-49.07	356
84	Nonelectrical machinery, n.e.c.	50.00	359
85	Computers and peripheral equipment	51.01	3573-3574
86	Typewriters and other office machines	51.03-51.04	357 (except 3573 and 3574)
87	Service industry machines	52.01-52.05	358
88	Electric transmission equipment	53.01-53.03	361, 3825
89	Electrical industrial apparatus	53.04-53.08	362
90	Household appliances	54.01-54.07	363
91	Electric lighting and wiring equipment	55.01-55.03	364
92	Radio and television receiving equipment	56.01-56.02	365
93	Telephone and telegraph apparatus	56.03	3661
94	Radio and communication equipment	56.04	3662
95	Electronic components and accessories	57.01-57.03	367
96	Electrical machinery and supplies, n.e.c.	58.01-58.05	369
97	Motor vehicles	59.01-59.03	371
98	Aircraft	60.01-60.04	372, 376 (except 3761)
99	Ship and boat building and repair	61.01-61.02	373
100	Railroad equipment	61.03	374
101	Motorcycles, bicycles and parts	61.05	375
102	Transportation equipment, n.e.c.	61.06-61.07	379 (except 3795), 2451
103	Scientific and controlling instruments	62.01-62.03	381, 382 (except 3825)
104	Medical and dental instruments and supplies	62.04-62.06	384
105	Optical and ophthalmic equipment	63.01-63.02	383, 385
106	Photographic equipment and supplies	63.03	386
107	Watches, clocks, and clock-operated devices	62.07	387
108	Jewelry and silverware	64.01	391, 3961
109	Musical instruments, toys and sporting goods	64.02-64.04	393, 394
110	Manufactured products, n.e.c.	64.05-64.12	395, 396 (except 3961), 399 (except 39996)
	Transportation		
111	Railroad transportation	65.01	40, 474, pt. 4789
112	Local and interurban passenger transit	65.02	41
113	Trucking and warehousing	65.03	42, pt. 4789
114	Water transportation	65.04	44
115	Air transportation	65.05	45
116	Pipelines, except natural gas	65.06	46
117	Transportation services	65.07	47 (except 474 and pt. 4789)
	Communications		
118	Radio and television broadcasting	67.00	483
119	Communications, except radio and television	66.00	48 (except 483)
	Electric, gas, and sanitary services		
120	Electric utilities, public and private	68.01, 78.02, 79.02	491, pt. 493, and public
121	Gas utilities, excluding public	68.02	492, pt. 493
122	Water and sanitary services, excluding public	68.03	49 (except 491, 492 and pt. 493)
	Trade		
123	Wholesale trade	69.01	50, 51
124	Eating and drinking places	74.00	58
125	Retail trade, except eating and drinking places	69.02	52-57, 59, 7396, 8042

Bureau of Labor Statistics input-output sectoring plan—Continued

Industry sector number and title		Bureau of Economic Analysis Input-Output Sector	Standard Industrial Classification (SIC) 1972
	Finance, insurance, and real estate		
126	Banking	70.01	60
127	Credit agencies and financial brokers	70.02-70.03	61, 62, 67
128	Insurance	70.04-70.05	63, 64
129	Owner-occupied real estate	71.01	n.a.
130	Real estate	71.02	65, 66, pt. 1531
	Other services		
131	Hotels and lodging places	72.01, 77.08	70, 836
132	Personal and repair services	72.02	72 (except 723, 724), 76 (except 769)
133	Beauty and barber shops	72.03	723, 724
134	Business services	73.01	73 (except 731, 7396), 769
135	Advertising	73.02	731
136	Professional services, n.e.c.	73.03	81, 89 (except 892)
137	Automobile repair and services	75.00	75
138	Motion pictures	76.01	78
139	Amusements and recreation services	76.02	79
140	Doctors' and dentists' services	77.01	801-803, 8041
141	Hospitals	77.02	806
142	Medical services, n.e.c.	77.03	074, 8049, 805, 807-809
143	Educational services	77.04, 77.06-77.07	82, 833, 835
144	Noncommercial and membership organizations	77.05, 77.09	832, 839, 84, 86, 892
	Government enterprises		
145	U.S. Postal Service	78.01	43
146	Commodity Credit Corporation	78.03	n.a.
147	Federal enterprises, n.e.c.	78.04	n.a.
148	Local government passenger transit	79.01	n.a.
149	State and local enterprises, n.e.c.	79.03	n.a.
	Special industries		
150	Noncomparable imports	80.00	n.a.
151	Scrap, used and secondhand goods	81.00	n.a.
152	New construction	11.01-11.05	138, pt. 15, pt. 16, pt. 17
153	Government industry	82.00	n.a.
154	Rest of the world industry	83.00	n.a.
155	Household industry	84.00	n.a.
156	Inventory valuation adjustment	85.00	n.a.

n.e.c. = not elsewhere classified.
n.a. = not applicable.

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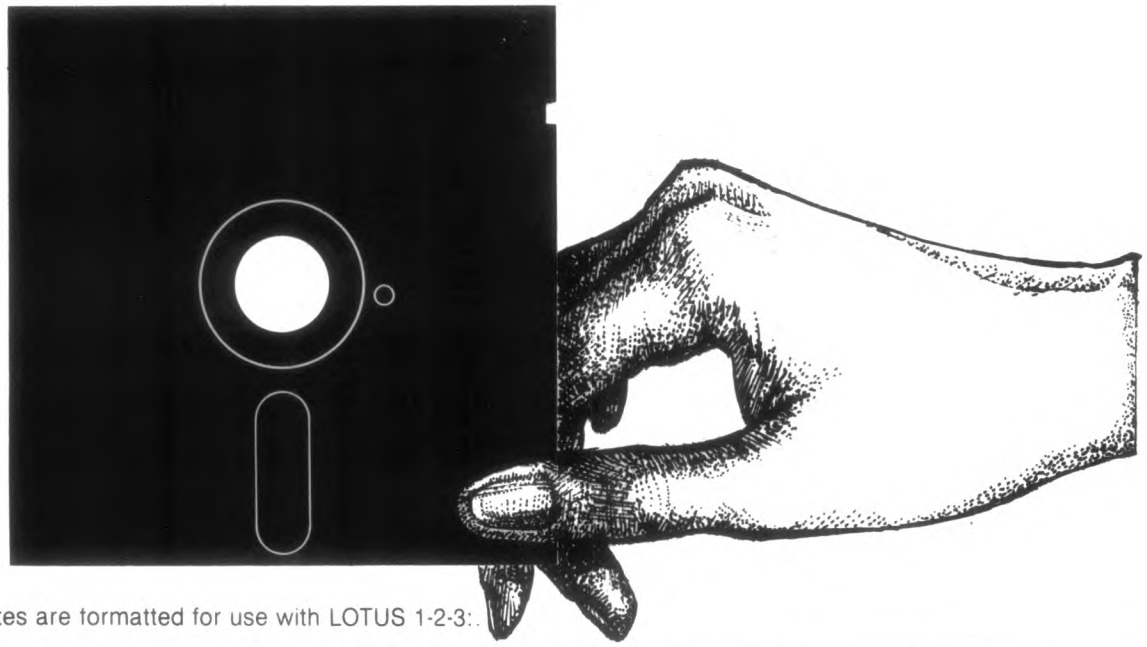

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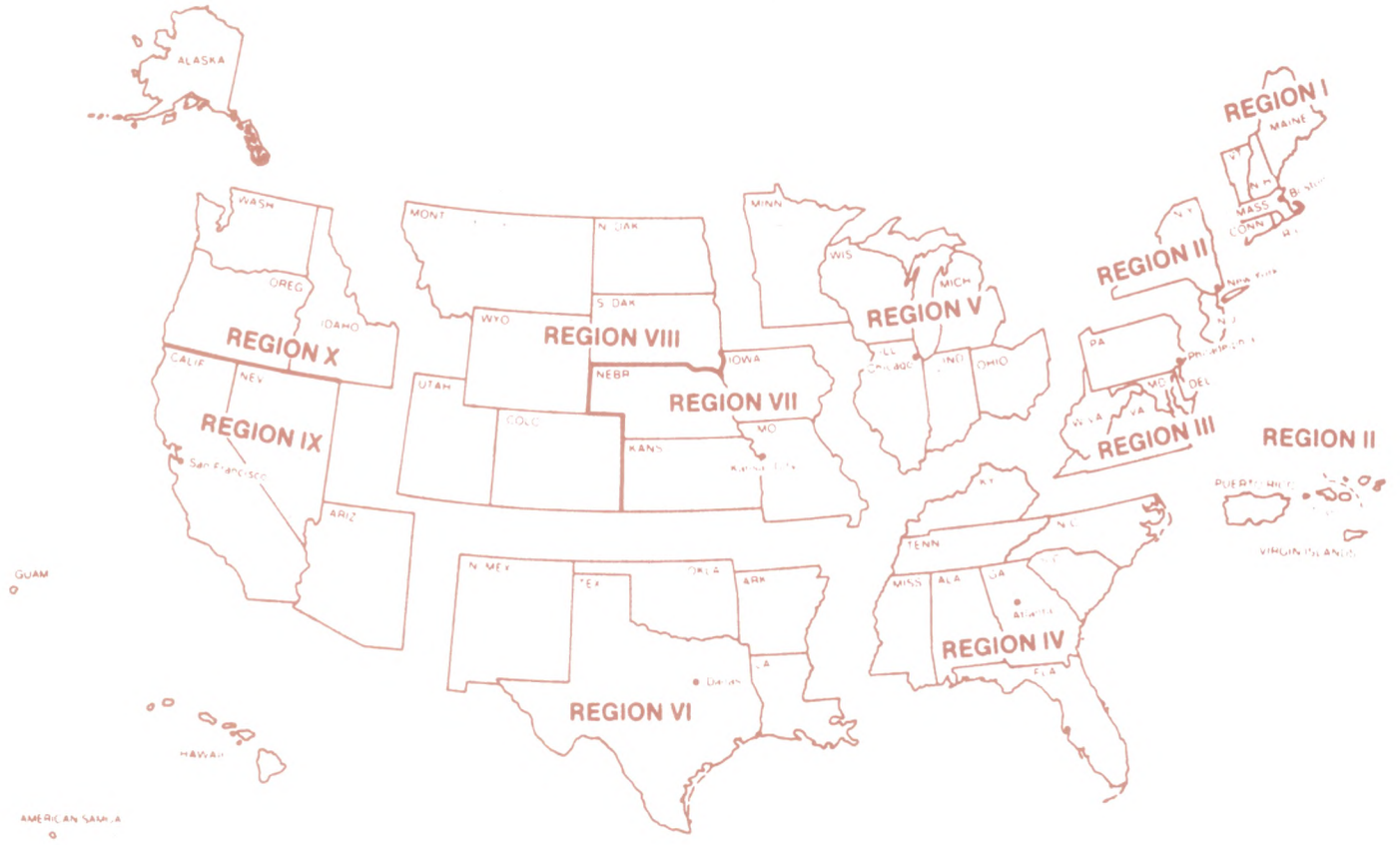

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