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OCCUPATIONAL OUTLOOK QUARTERLY
U.S. Department of Labor
Bureau of Labor Statistics
Fall 1987

Projections 2000

U.S. Department of Labor
Ann McLaughlin, Secretary

Bureau of Labor Statistics
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Bureau of Labor Statistics Regional Offices

Boston	Suite 1603 John F. Kennedy Federal Bldg. Government Center Boston, MA 02203	Phone: (617) 565-2327
New York	Room 808 201 Varick St. New York, NY 10014	Phone: (212) 337-2400
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Projections 2000

OCCUPATIONAL OUTLOOK QUARTERLY
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Melvin Fountain, *editor*
Neale Baxter, *managing editor*
Michael Stanton, *staff writer*
Richard Mathews, *art director*

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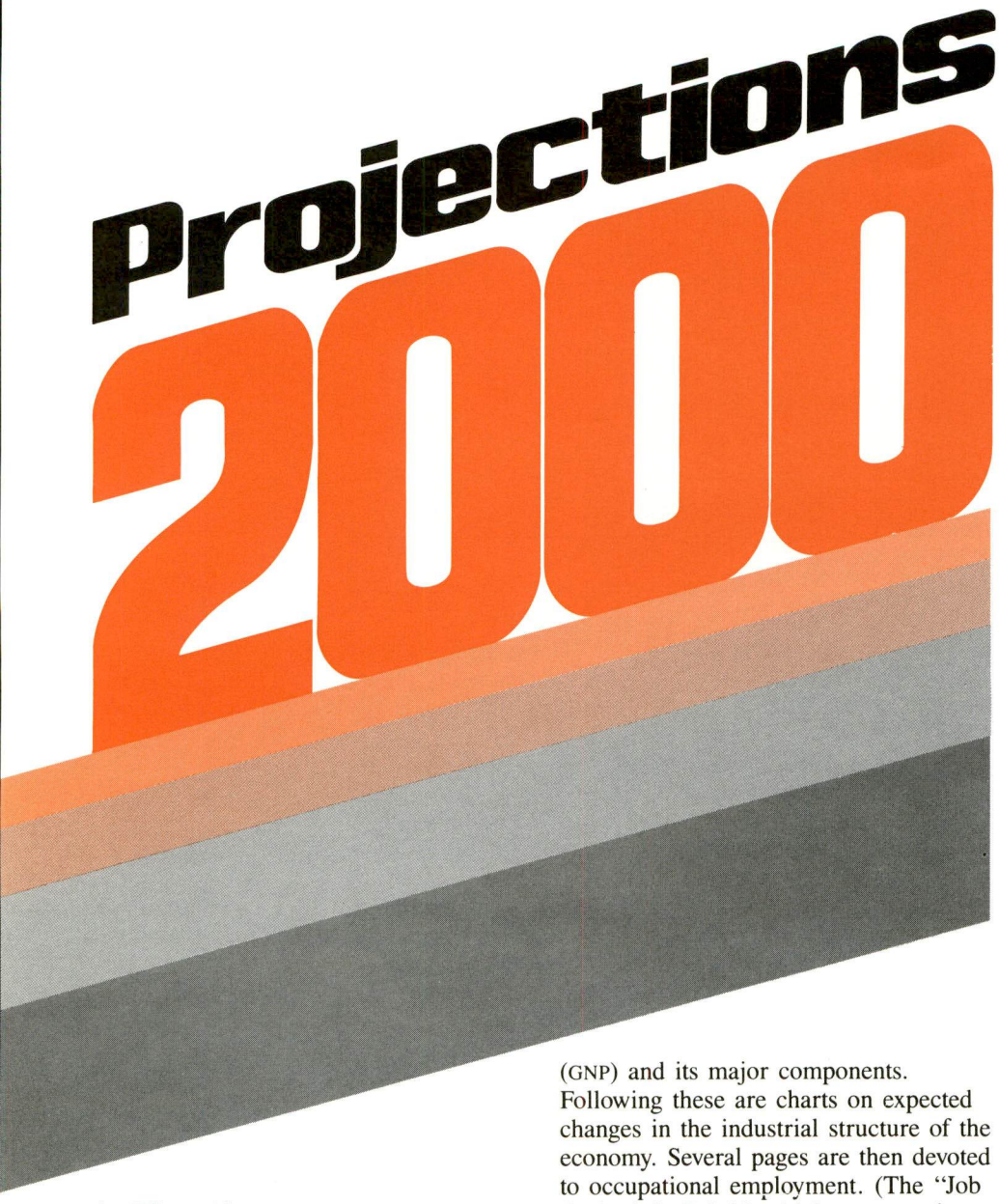


by Elinor Abramson

The year 2000 has just come into range. As readers of the *Quarterly* know, the Bureau of Labor Statistics projects occupational employment and other economic activity 10 to 15 years in the future. The newest projections have 2000 as their target.

This issue of the *Quarterly* is devoted to a graphic summary of these projections, along with historical data from 1972 and 1986. The presentation begins with a series of charts on the labor force and projected changes in its composition. Next are charts on economic growth—gross national product (GNP) and its major components. Following these are charts on expected changes in the industrial structure of the economy. Several pages are then devoted to occupational employment. (The "Job Outlook in Brief," which presents the projected change for each of the occupations covered by the *Occupational Outlook Handbook*, will appear in the Spring 1988 issue of the *Quarterly*.) The final section provides data on the educational attainment of the population and its relationship to occupational employment.

The projections have uses in many activities, including planning curriculum and program offerings in educational institutions, formulating policy by government agencies, and conducting market research and personnel planning by business organizations. However, readers of the *Quarterly* are probably most familiar with their use in career guidance because the Bureau's projections provide the basic data for discussions of job opportunities for occupations covered in the *Occupational Outlook Handbook*. The information in this issue of the *Quarterly* provides such readers a background for analyzing and discussing job opportunities in individual occupations and fields of work. In addition, counselors and others may wish to reproduce or tear out some of the more interesting charts and post them on bulletin boards or use them as wall charts to draw the interest of students and others.

The projections were developed through a series of models that estimate the growth and changing composition of the population, labor force, GNP, industry employment, and occupational employment. The models used are complex and relate economic theory and behavior to a variety of labor market and economic data. Like any projections, they incorporate specific assumptions, targets, and goals. Three alternative sets of assumptions were used by the Bureau in order to develop scenarios for high, moderate, and low growth between 1986—the base year—and 2000. The projections presented here are from the moderate alternative. Some of the assumptions and goals of this alternative are a decline in the unemployment rate from 7 percent in 1986 to 6 percent in 2000, a gradual curtailment in the rise of defense expenditures in the 1990's, an increase in the rate of growth of State and local government expenditures on education spurred by the growth of the school age population, and a decline in the value of the dollar combined with greater productivity, which will create a more favorable balance of trade than in recent years. In more general terms, the projections also assume no major war, oil embargo, or other economic shocks or catastrophes over the projection period.

The September 1987 issue of the *Monthly Labor Review* contains a series of articles on the projections and their implications, as well as additional data.

Elinor Abramson is an economist in the Division of Occupational Outlook, BLS.

Highlights of the Projections

The Changing Labor Force

The labor force—
job holders and job seekers—
will continue to grow,
rising 21 million, from 1986 to 2000.

The rate of growth—18 percent—will be slower than during the previous 14 years.

The labor force will look very different in 2000 than in 1986.

Younger and older workers will become a smaller part of the labor force.

Women will continue to increase their share of the labor force.

The proportion of whites in the labor force will decrease; the proportion of blacks and of Asians and others will increase.

Asians and others will have the fastest percentage growth between 1986 and 2000, although their numerical growth will be small.

The Hispanic labor force will grow very rapidly.

Like the labor force, employment will continue to grow, although more slowly than in the recent past.

The Changing Demand for Goods and Services

The gross national product (GNP), a measure of demand for goods and services, will exceed $5 trillion in 2000.

Every major category of GNP will grow.

A larger share of personal consumption expenditures —the largest category of GNP— will be spent on services than on goods.

Changing Employment in Industries

Goods and services are produced in industries classified by sector, division, and group.

Driven by a rising demand for services, the service-producing sector will provide 20 million new jobs.

Every industry division in the service-producing sector will continue to grow.

Four divisions in the service-producing sector will grow faster than average.

Two divisions—services and retail trade— will provide 75 percent of job growth.

In the services division, health and business services will account for more than one-half the growth.

In the retail trade division, eating and drinking places will account for about one-half the growth.

In the goods-producing sector, construction is the only division that will grow as a whole.

Changing Employment in Occupations

Occupations will grow an average of 19 percent; of the broad occupational groups, technician and service occupations will grow the fastest.

A small number of occupations will account for more than one-half of total job growth.

Twelve of the fastest growing occupations provide health services.

Changes in technology and business practices and increased use of imports will cause some occupations to decline.

The Growing Need for Education

The projected growth of the broad occupational groups shows the increasing need for education.

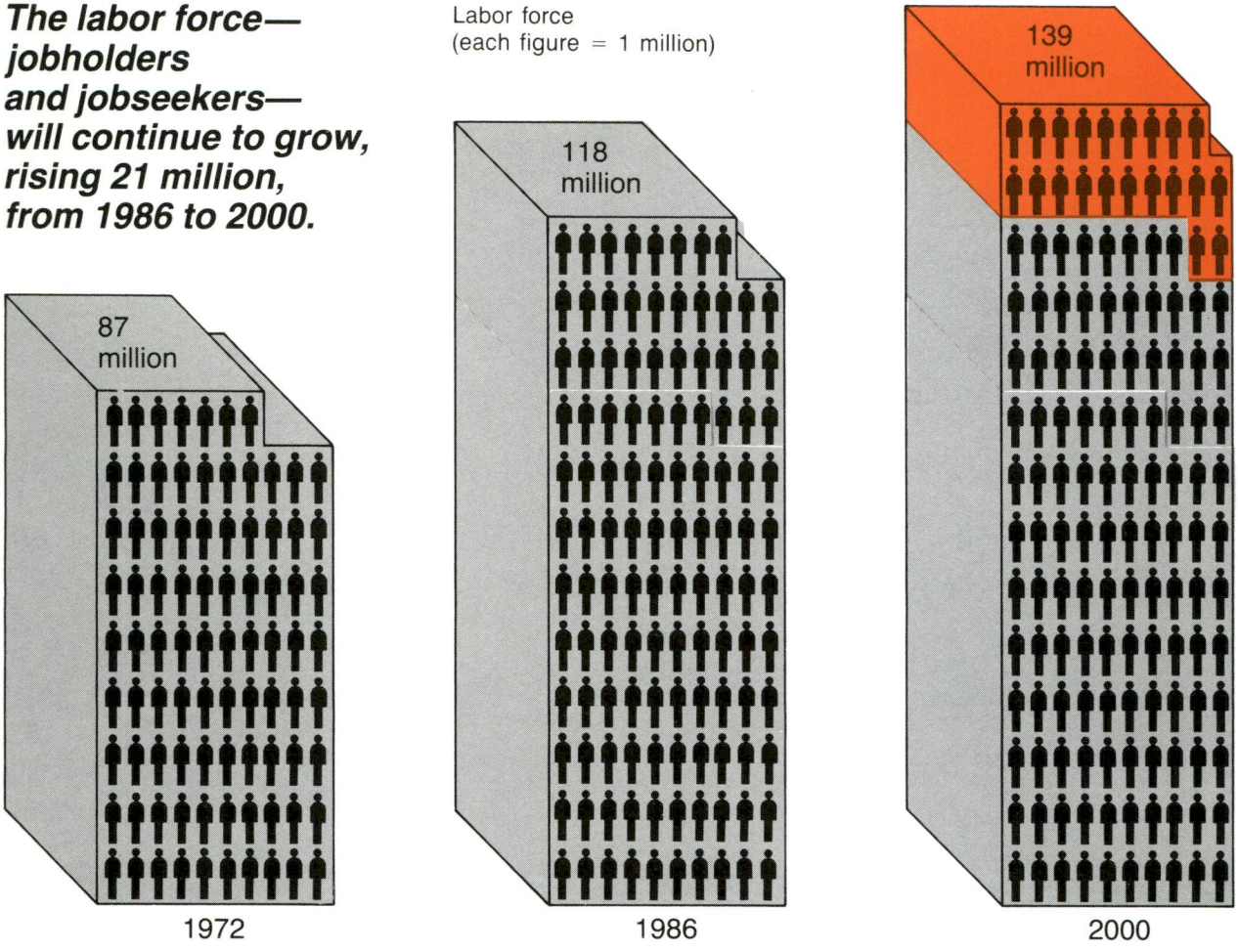
Workers with more education also earn more. . .

. . .and are less likely to be unemployed.

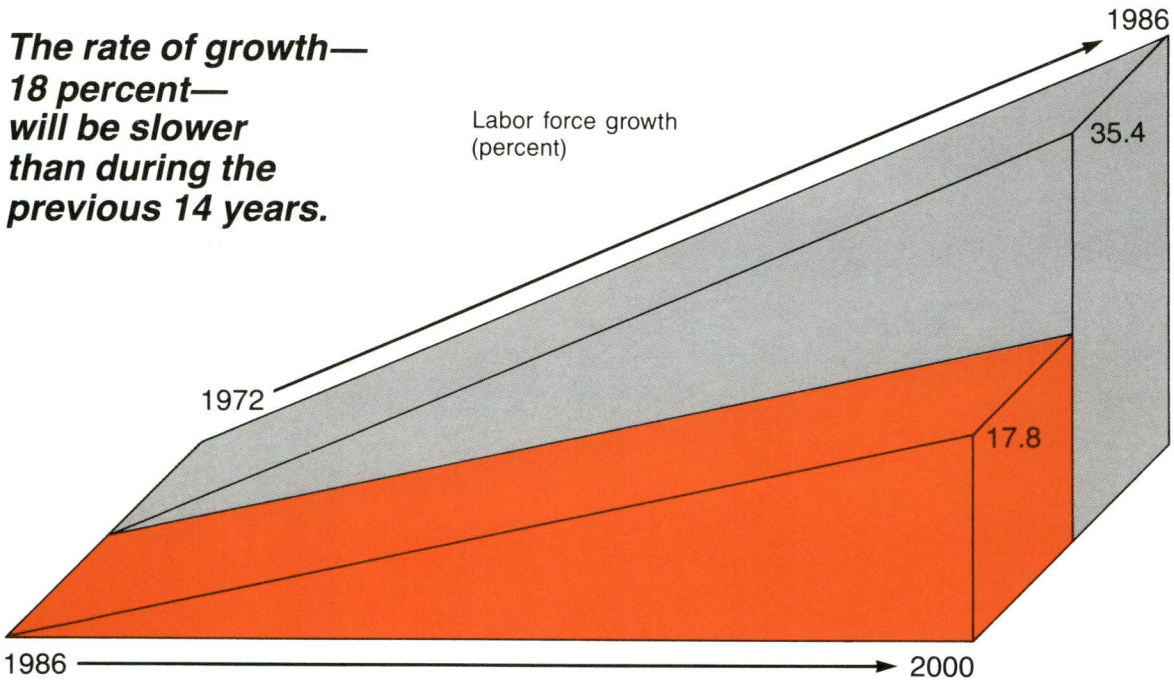
Projections 2000

The Changing Labor Force

The labor force—jobholders and jobseekers—will continue to grow, rising 21 million, from 1986 to 2000.



The rate of growth—18 percent—will be slower than during the previous 14 years.

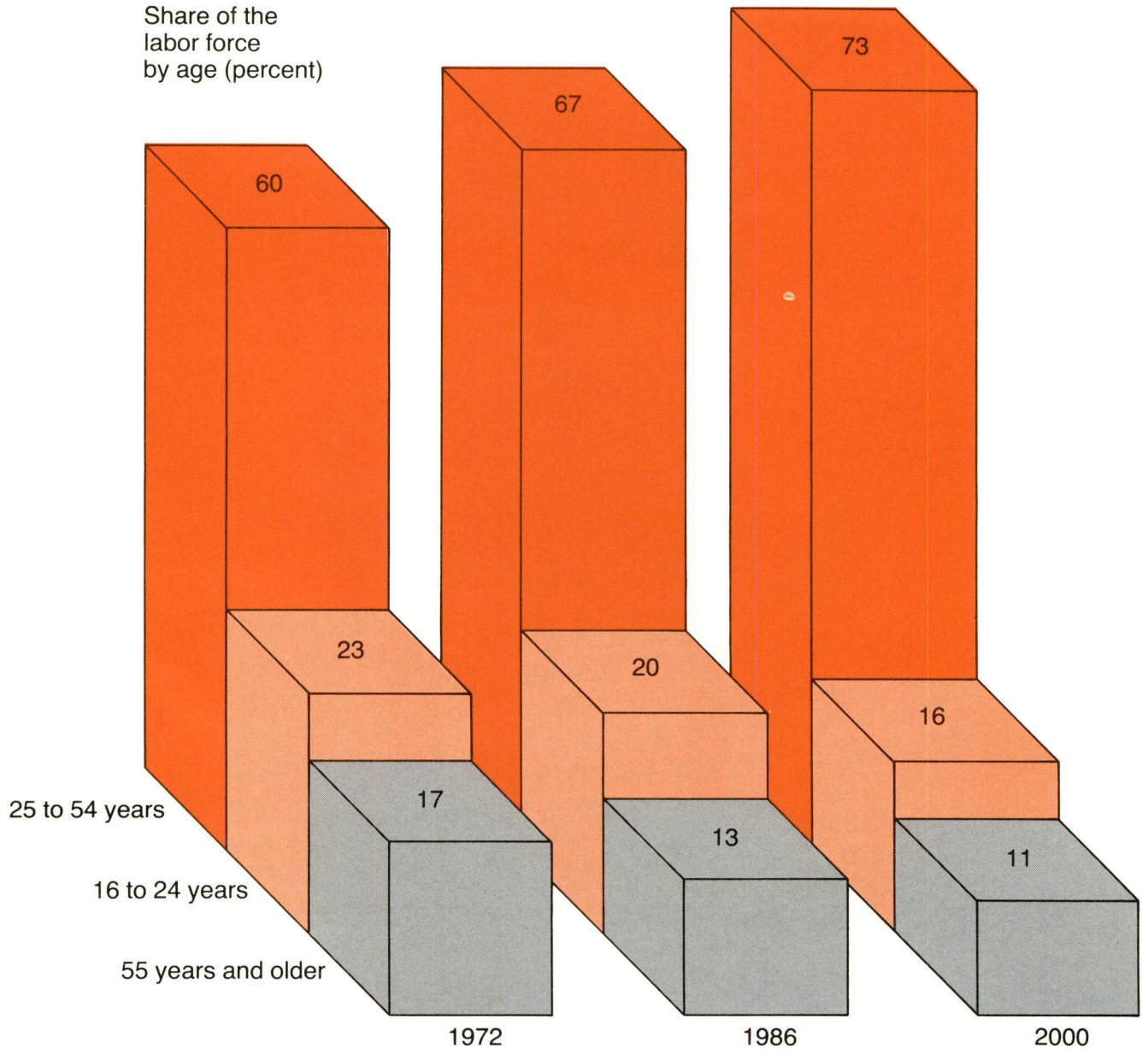


Growth will slow largely because population growth has slowed.

The labor force will look very different in 2000 than in 1986.

- *People under 25 will have a smaller share.*
- *People 55 and over will have a smaller share.*
- *Women will have a larger share.*
- *Blacks will have a larger share.*
- *Asians and others will have a larger share.*
- *Hispanics will have a larger share.*

Younger and older workers will become a smaller part of the labor force.



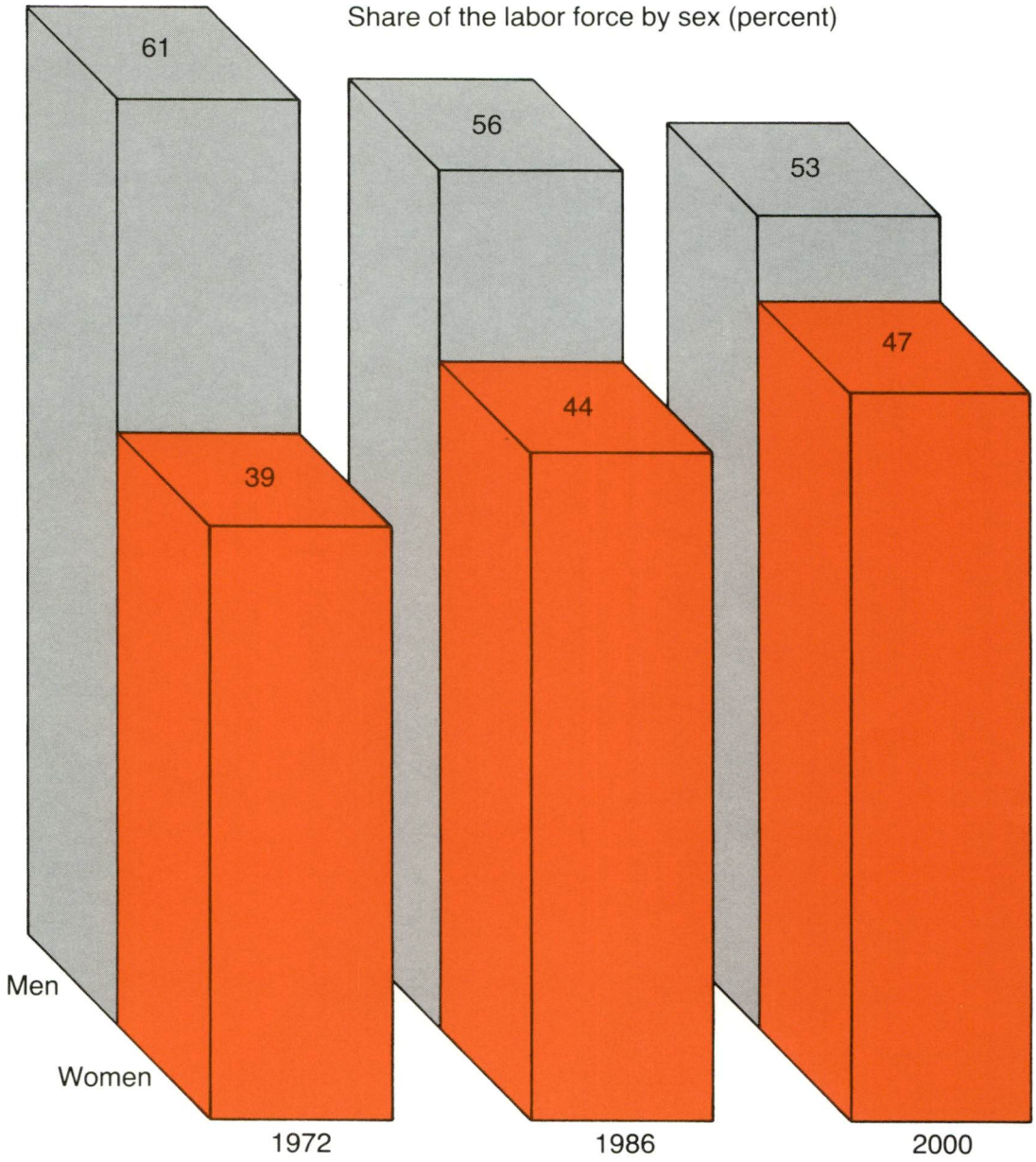
The share of workers. . .

. . .16 to 24 years of age will decline because the population of their age group will decline.

. . .25 to 54–which includes the large baby-boom generation—will increase.

. . .55 and over will decline because their labor force participation rate will continue to decline, even though the population of their age group will increase.

Women will continue to increase their share of the labor force.

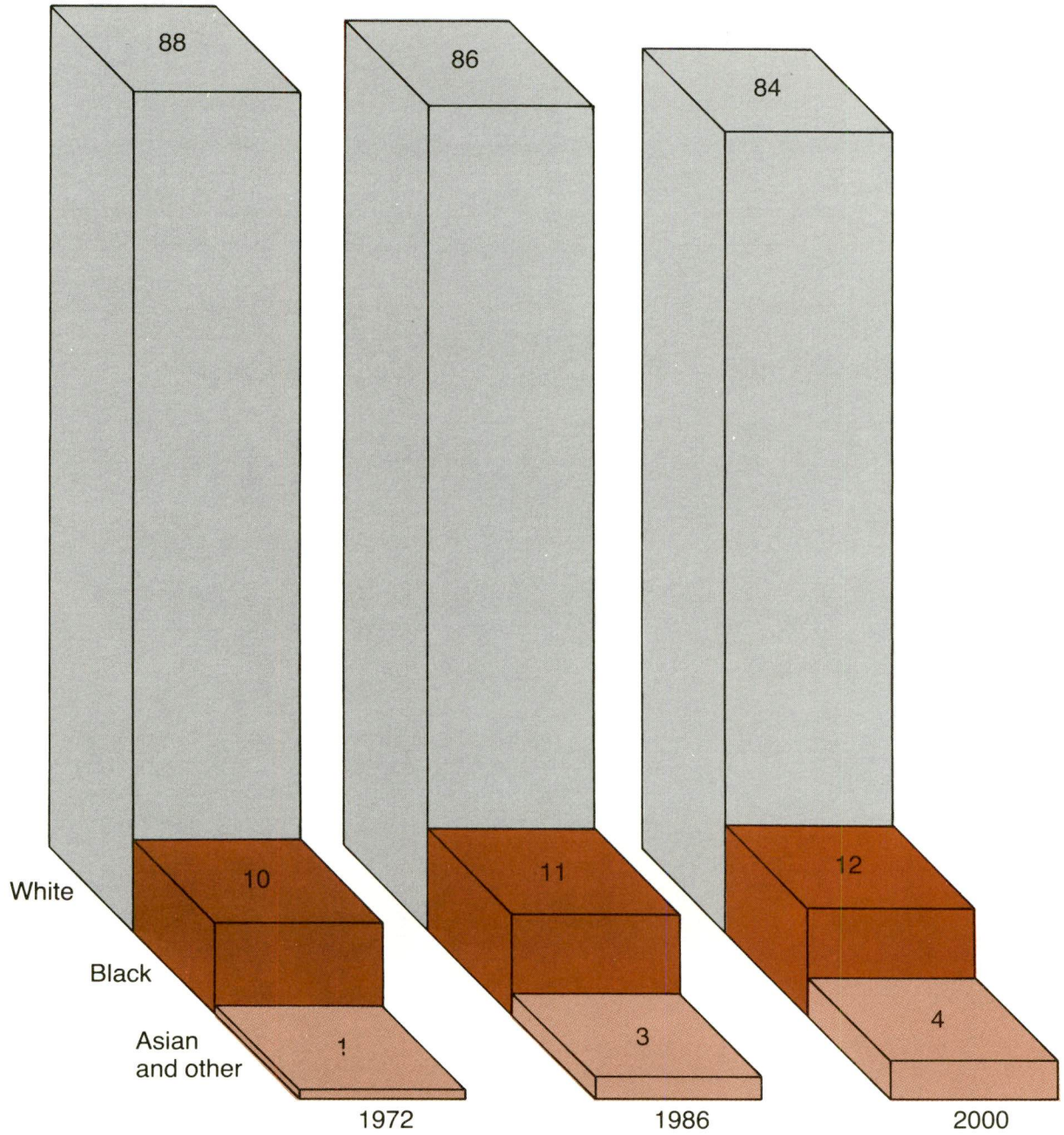


The number of women in the labor force will rise from 52 million to 66 million.

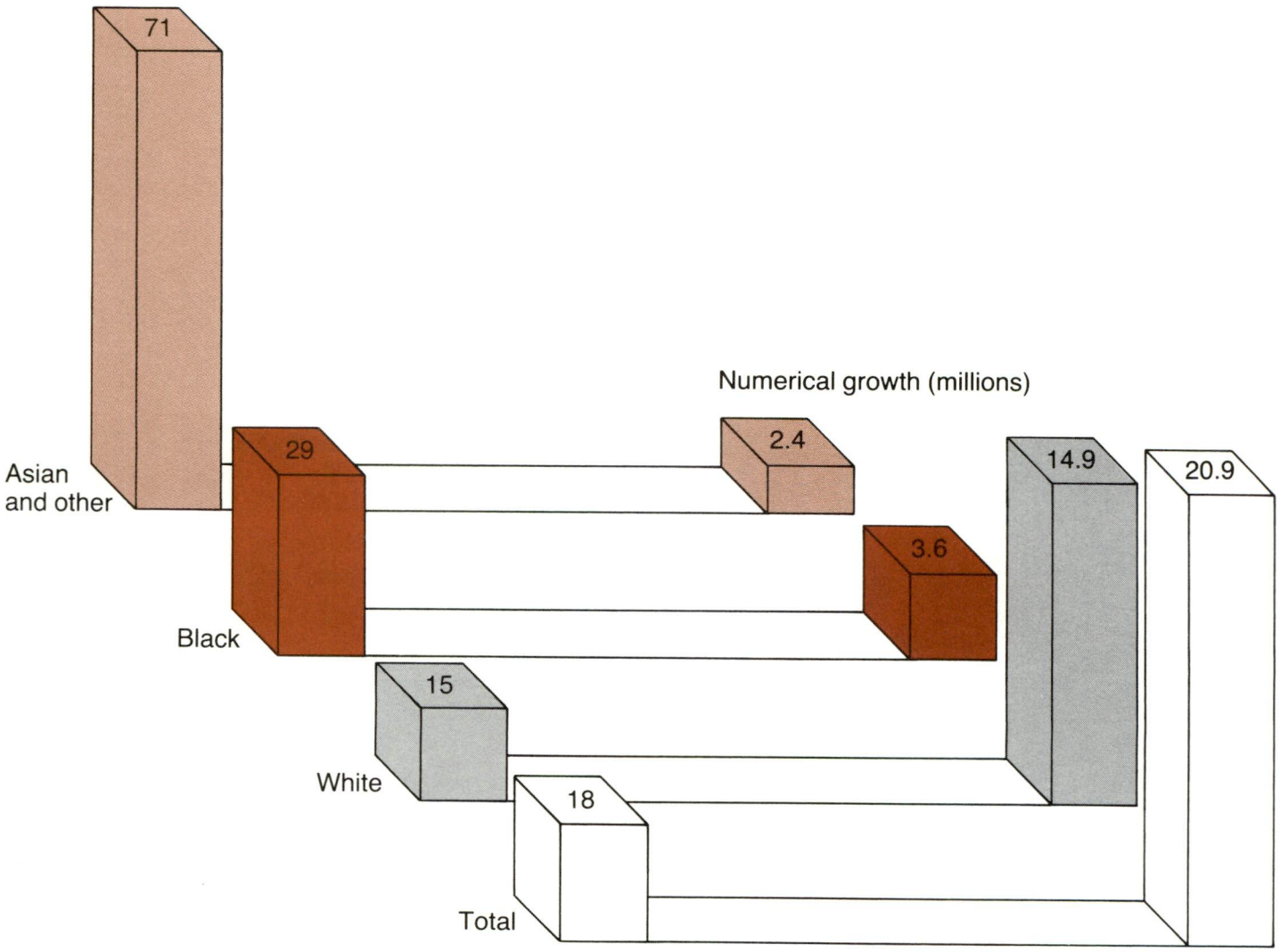
The number of women will rise twice as fast as the number of men because the proportion of women who participate in the labor force—especially women 25 to 54 years of age—will continue to rise.

The proportion of whites in the labor force will decrease; the proportion of blacks and of Asians and others will increase.

Share of the labor force by race (percent)

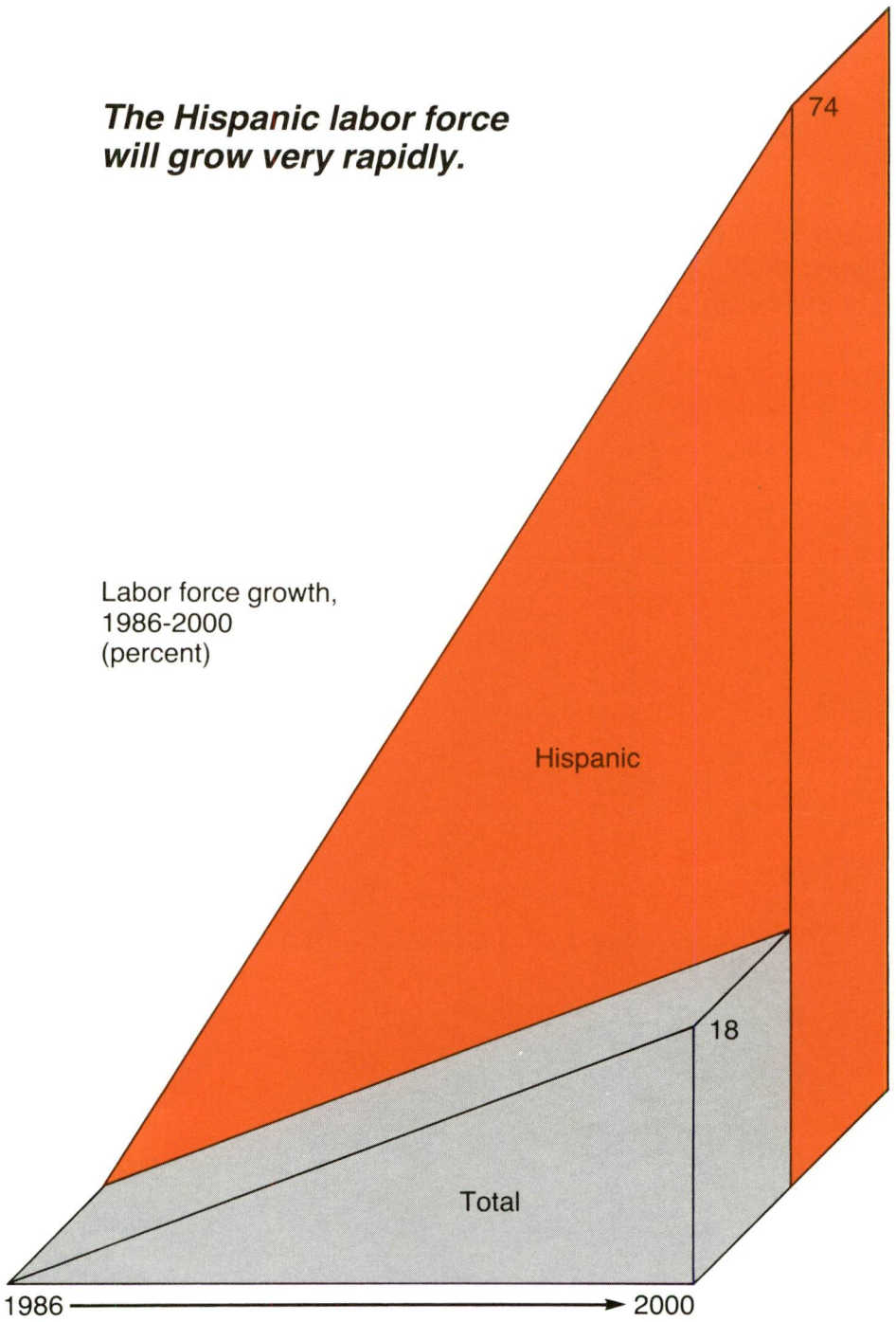


Asians and others will have the fastest percentage growth between 1986 and 2000, although their numerical growth will be small.



Blacks will grow faster than whites because of higher birth rates.

Asians and others will grow faster than whites because of immigration and higher birth rates.

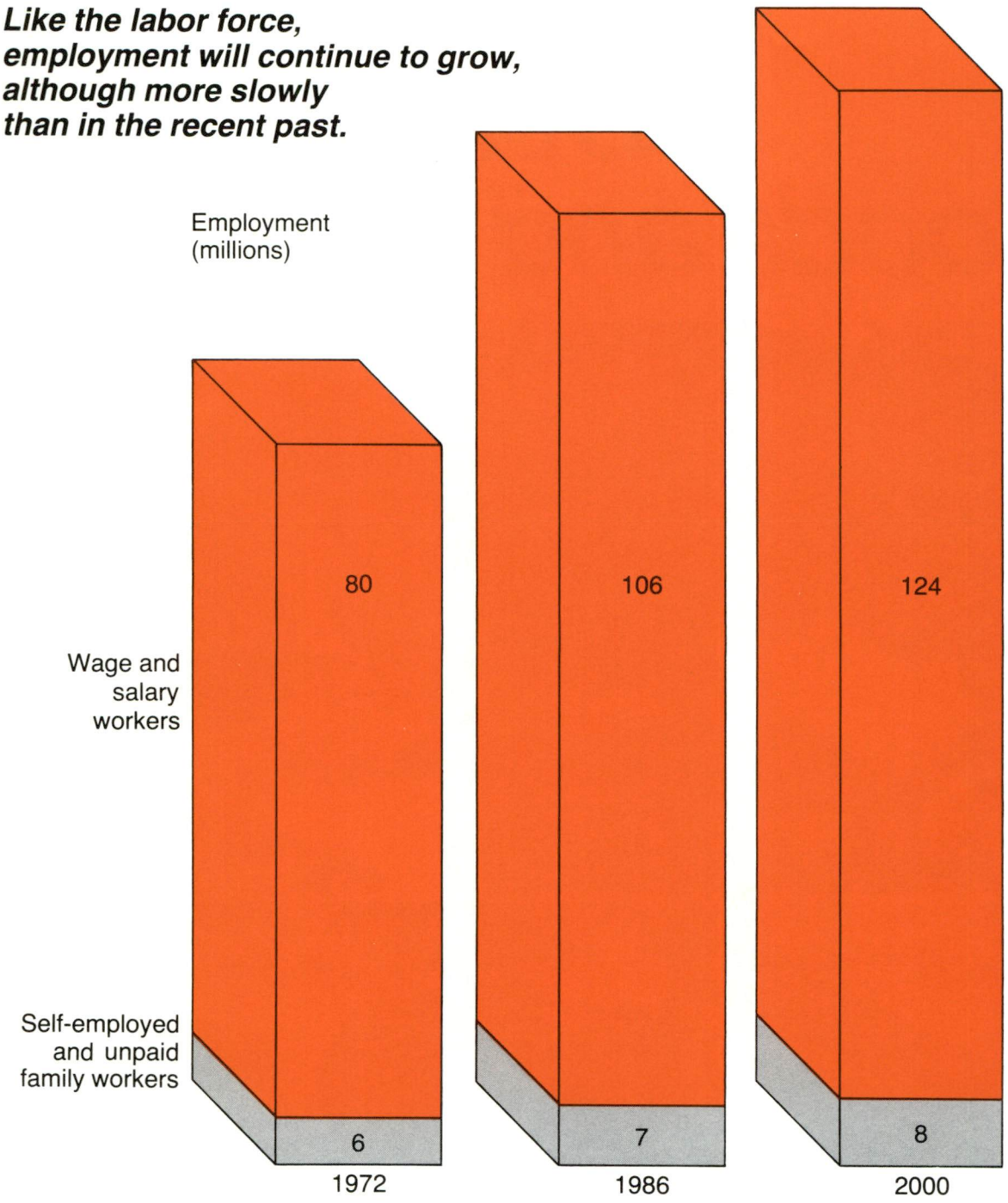


The Hispanic labor force will rise from 8 million in 1986 to 14 million in 2000.

Growth will occur because of immigration and the rise in the native-born Hispanic population.

As a result of this very rapid growth, the Hispanic share of the labor force will increase from 7 percent in 1986 to 10 percent in 2000.

Like the labor force, employment will continue to grow, although more slowly than in the recent past.



Employment will increase by 21 million, a rise of 19 percent.

Almost all of the employment growth will be in wage and salary jobs.

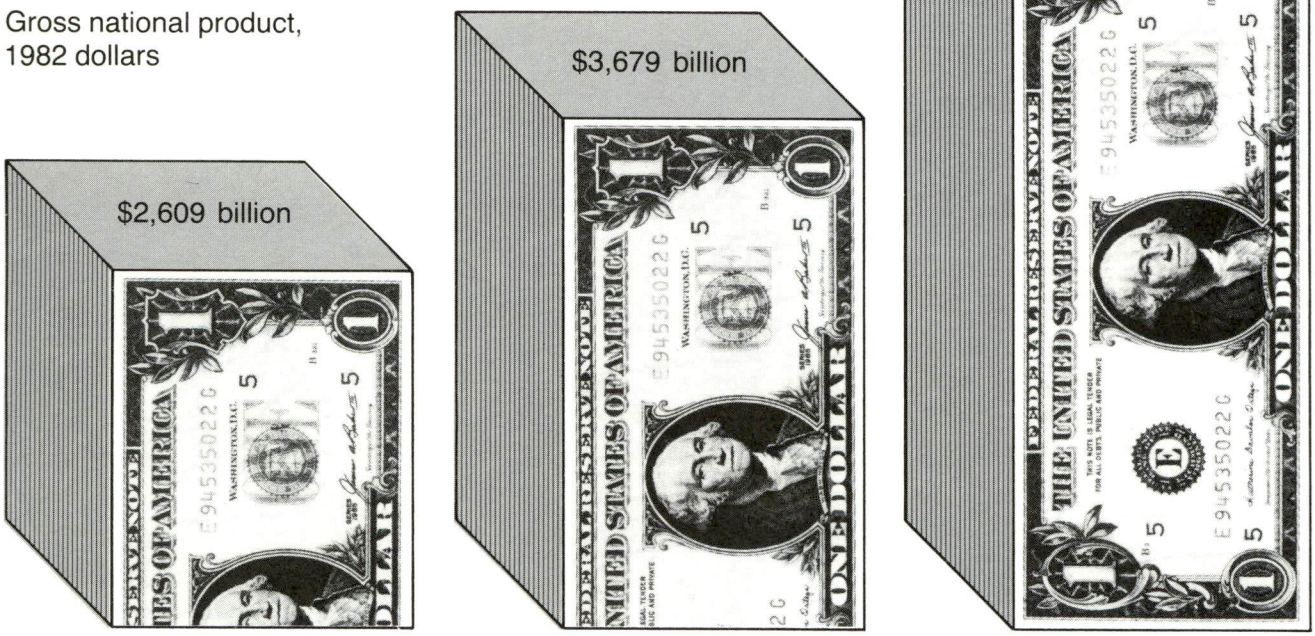
Between 1972 and 1986, employment growth was bigger numerically (27 million) and showed a larger percentage increase (32 percent) than is projected for 1986-2000.

Projections 2000

The Changing Demand for Goods and Services

The gross national product (GNP), a measure of demand for goods and services, will exceed $5 trillion in 2000.

Gross national product, 1982 dollars



Every major category of GNP will grow.

	Billions of 1982 dollars 1986	2000	Percent growth, 1986-2000
Gross national product	$3,679	$5,161	40
Personal consumption expenditures	2,419	3,429	42
Gross domestic private investment	660	932	41
Exports	371	635	71
Imports*	521	733	41
Federal, State, and local government	748	898	20

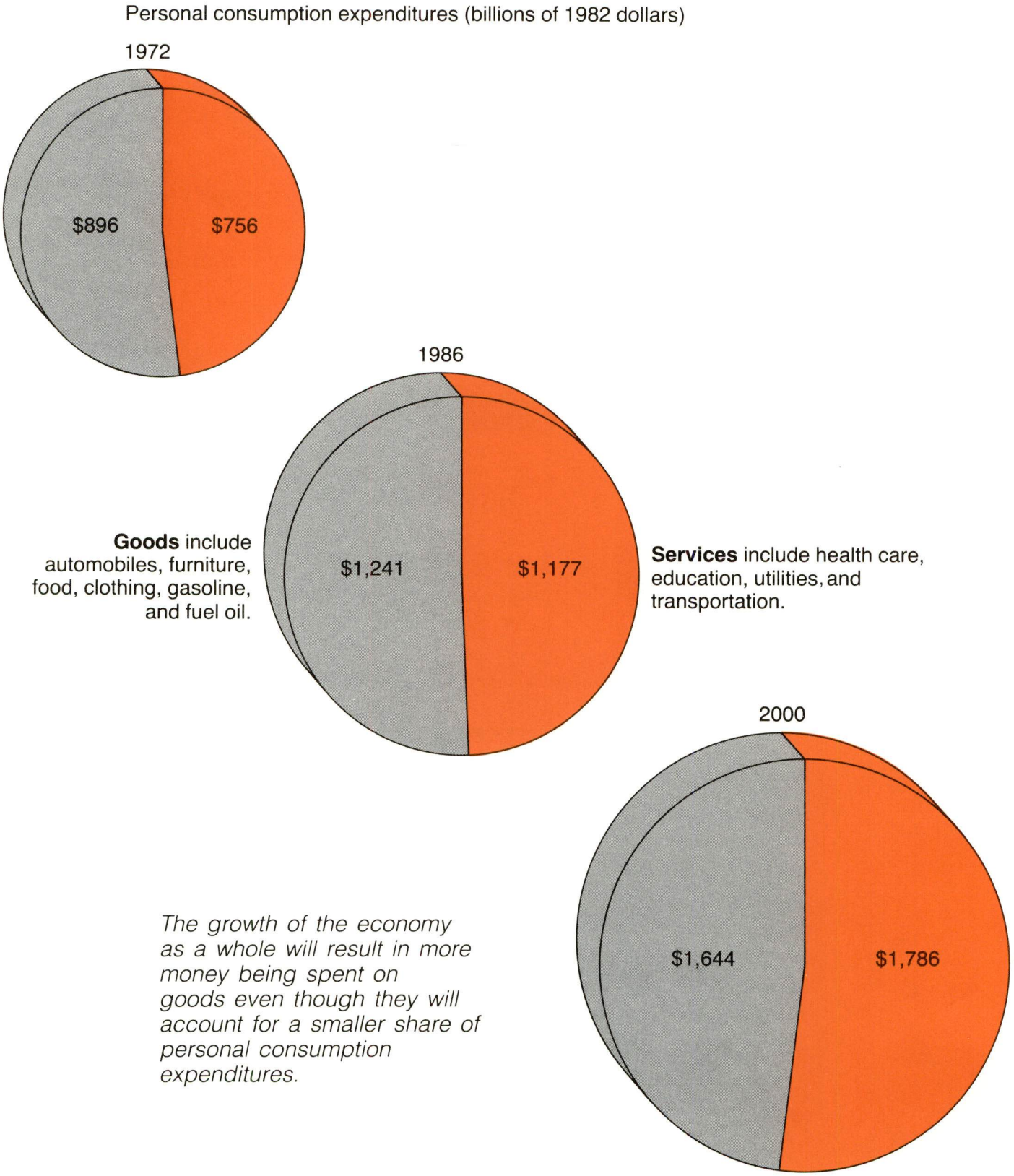
*Imports are subtracted from the other major categories.

The percentage growth of GNP between 1986 and 2000 (40 percent) is about the same as for the 1972-86 period.

Exports will increase faster than any other major category of GNP, but their value will still be less than that of imports.

Personal consumption expenditures account for two-thirds of total GNP.

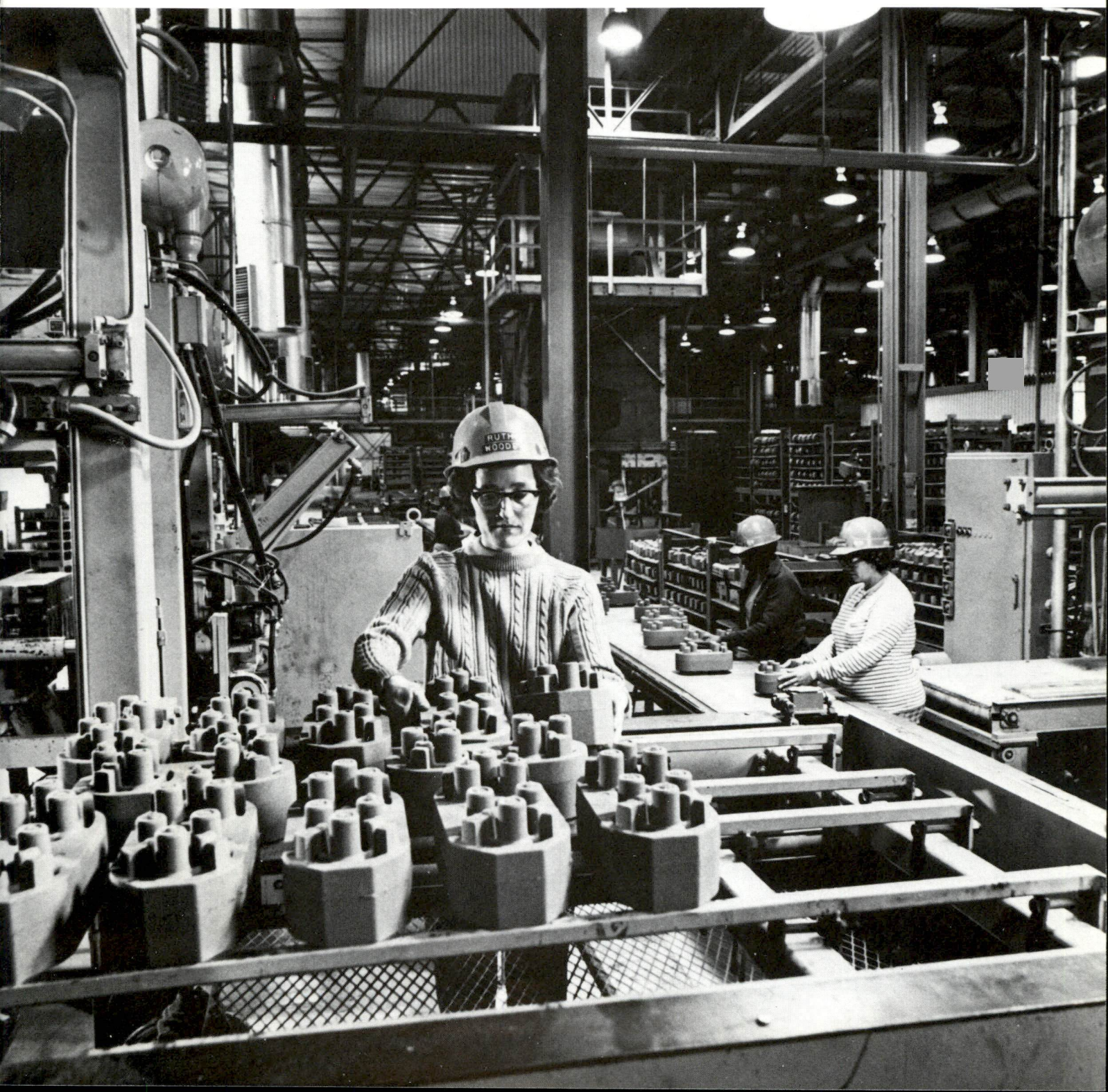
A larger share of personal consumption expenditures will be spent on services than on goods.



The growth of the economy as a whole will result in more money being spent on goods even though they will account for a smaller share of personal consumption expenditures.

Projections 2000

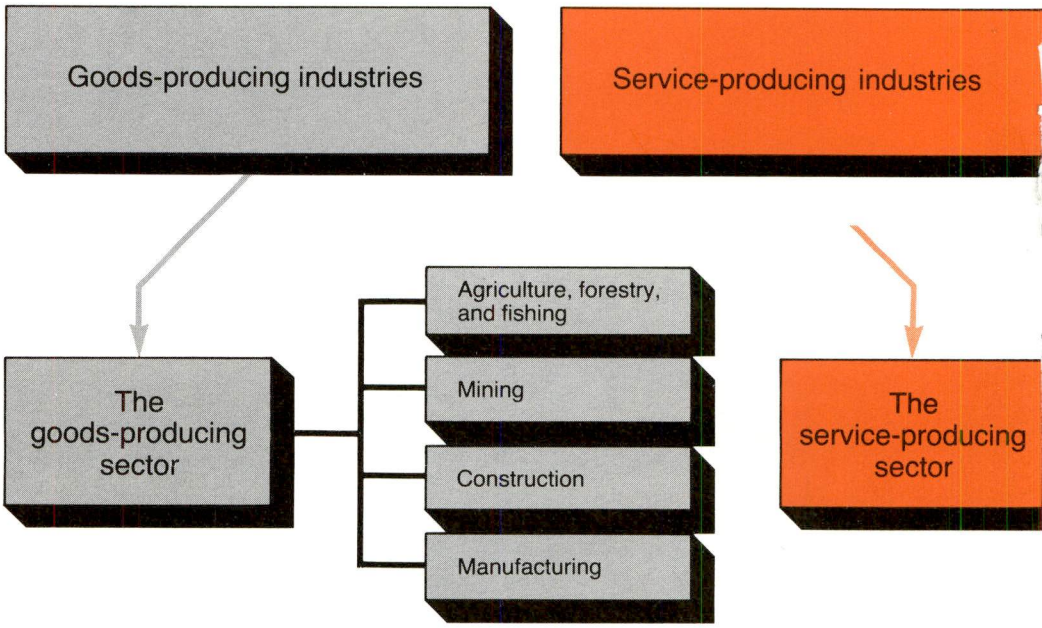
Changing Employment in Industries

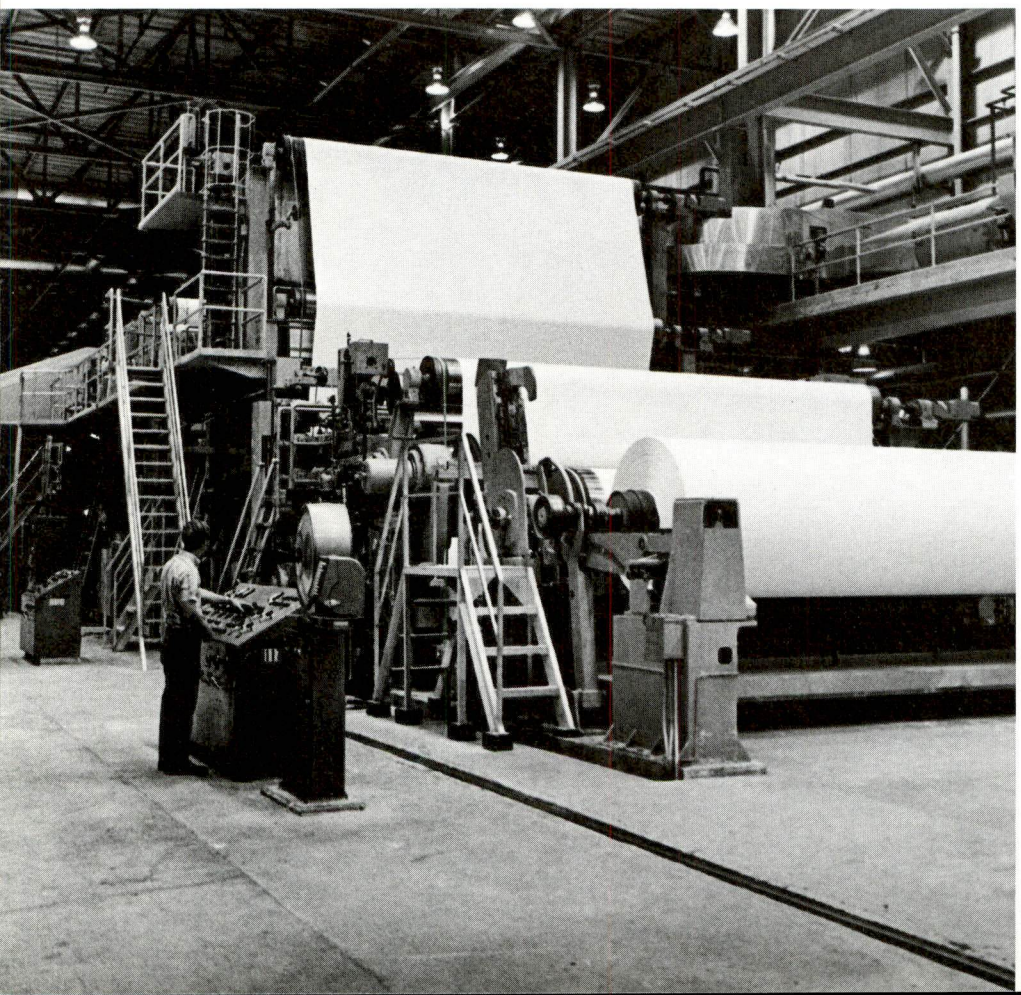


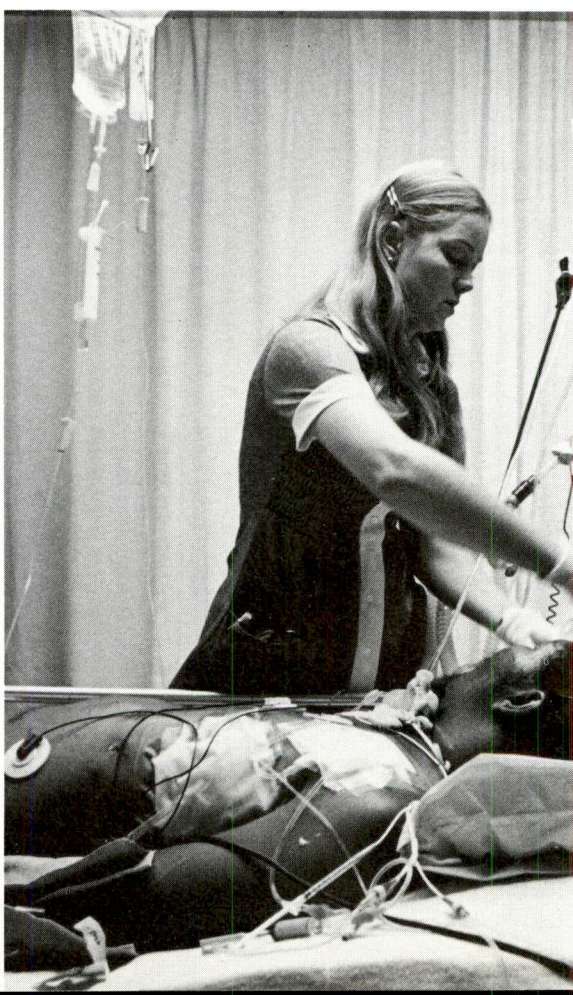
Goods and services are produced in industries classified by sector, division, and group.

All industries can be divided into two sectors, service-producing and goods-producing.

Each sector can be further split into divisions.







- Transportation, communications, and public utilities
- Wholesale trade
- Retail trade
- Finance, insurance, and real estate
- Services
- Government

Each division has several groups of industries.

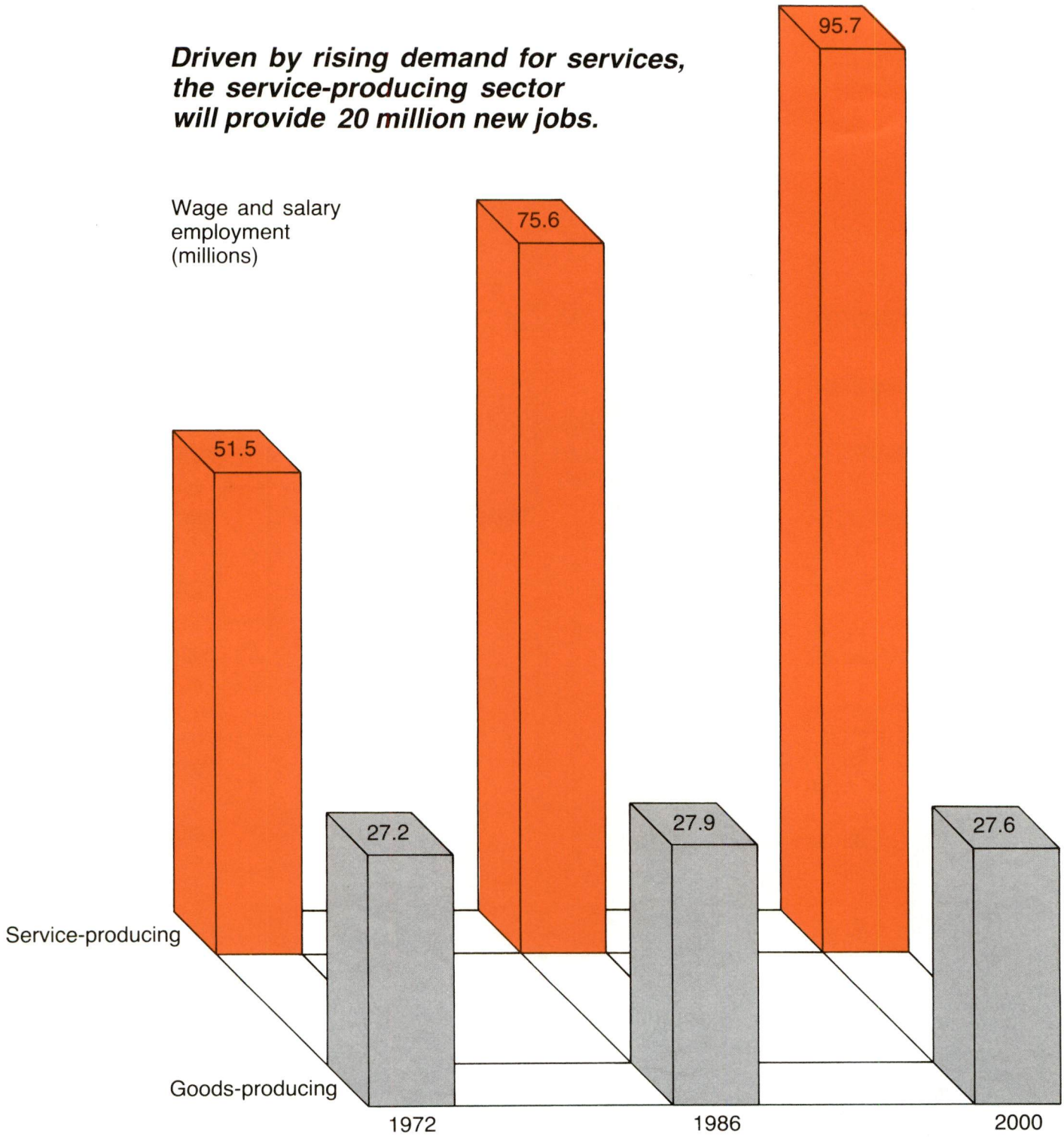
The services division

- Business services
- Personal, automotive, and other services
- Legal services
- Education services
- Social services
- Health services

And a group of industries has many individual industries.

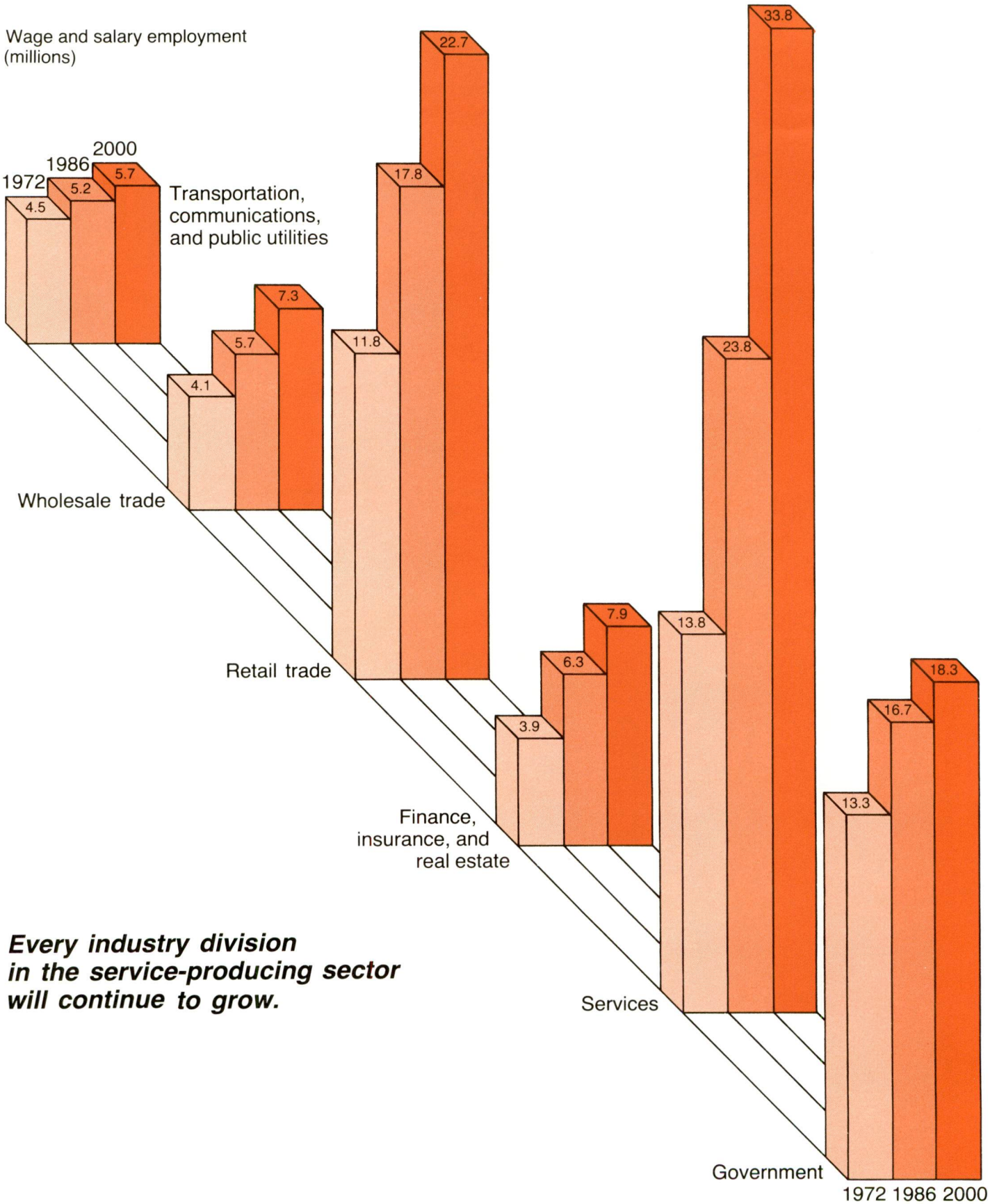
The health services industries

- Offices of physicians
- Offices of dentists
- Offices of osteopathic physicians
- Offices of other health practitioners
- Nursing and personal care facilities
- Hospitals
- Medical and dental laboratories
- Outpatient care facilities
- Health and allied services not elsewhere classified



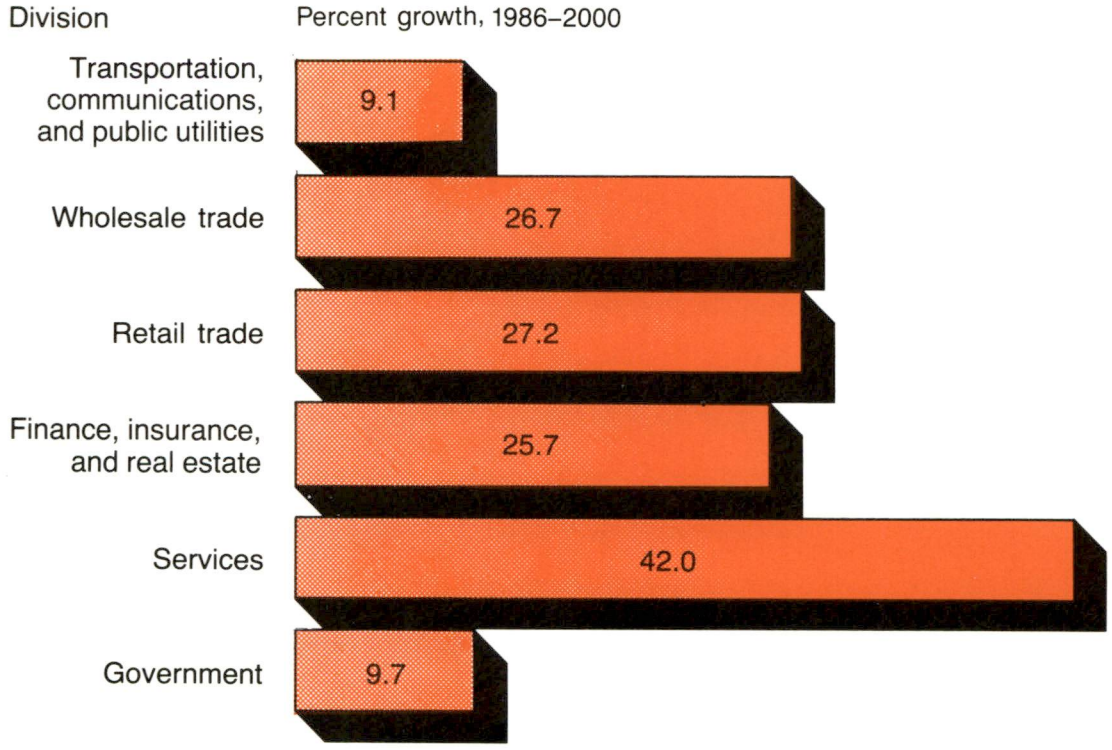
Employment trends among the industry divisions in the service-producing and goods-producing sectors will be very different, reflecting the types of goods and services purchased by individuals, businesses, and governments.

Changing Employment in Industries

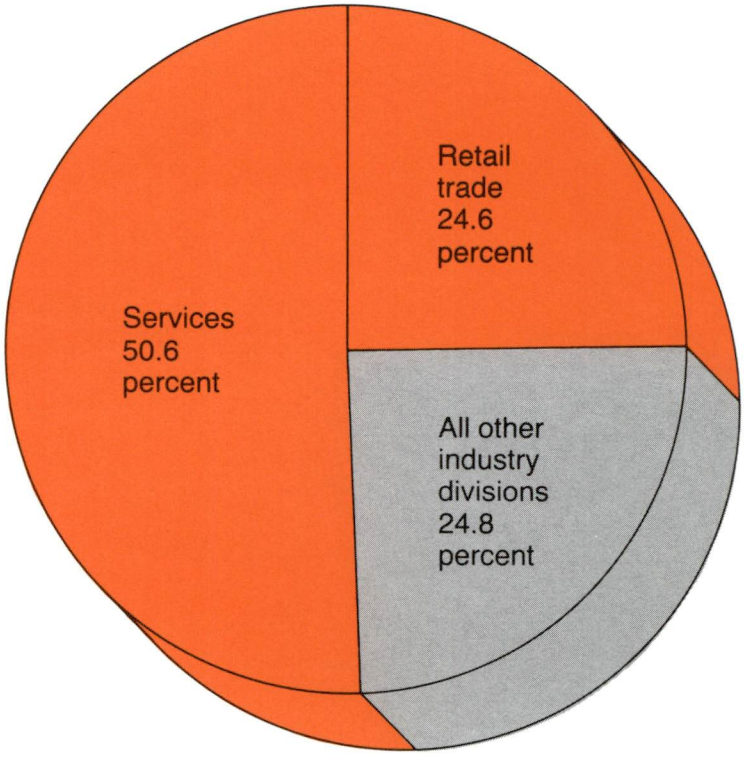


Every industry division in the service-producing sector will continue to grow.

Four divisions in the service-producing sector will grow faster than average.



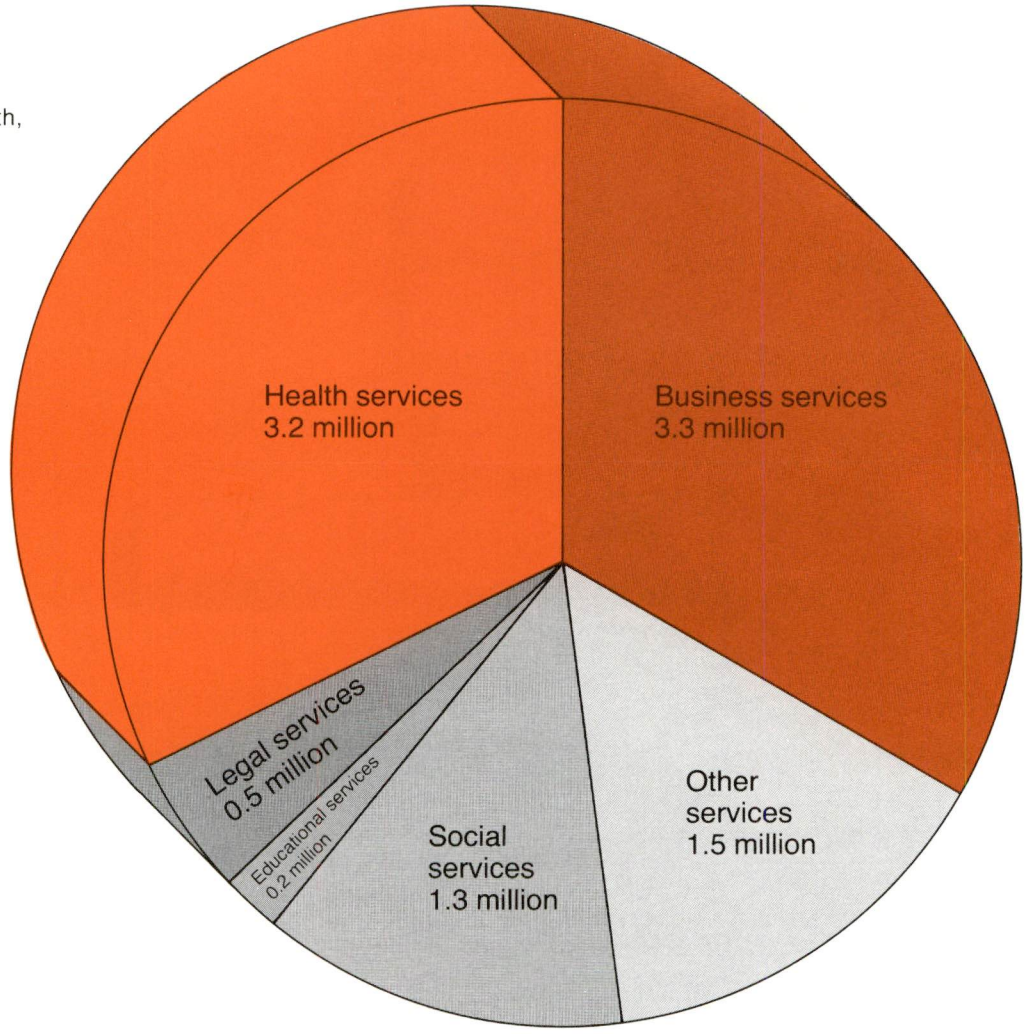
Two divisions—services and retail trade—will provide 75 percent of job growth.



Share of total job growth, 1986–2000

In the services division, health and business services will account for more than one-half the growth.

Employment growth, 1986–2000, shown as a share of total growth in the services division.



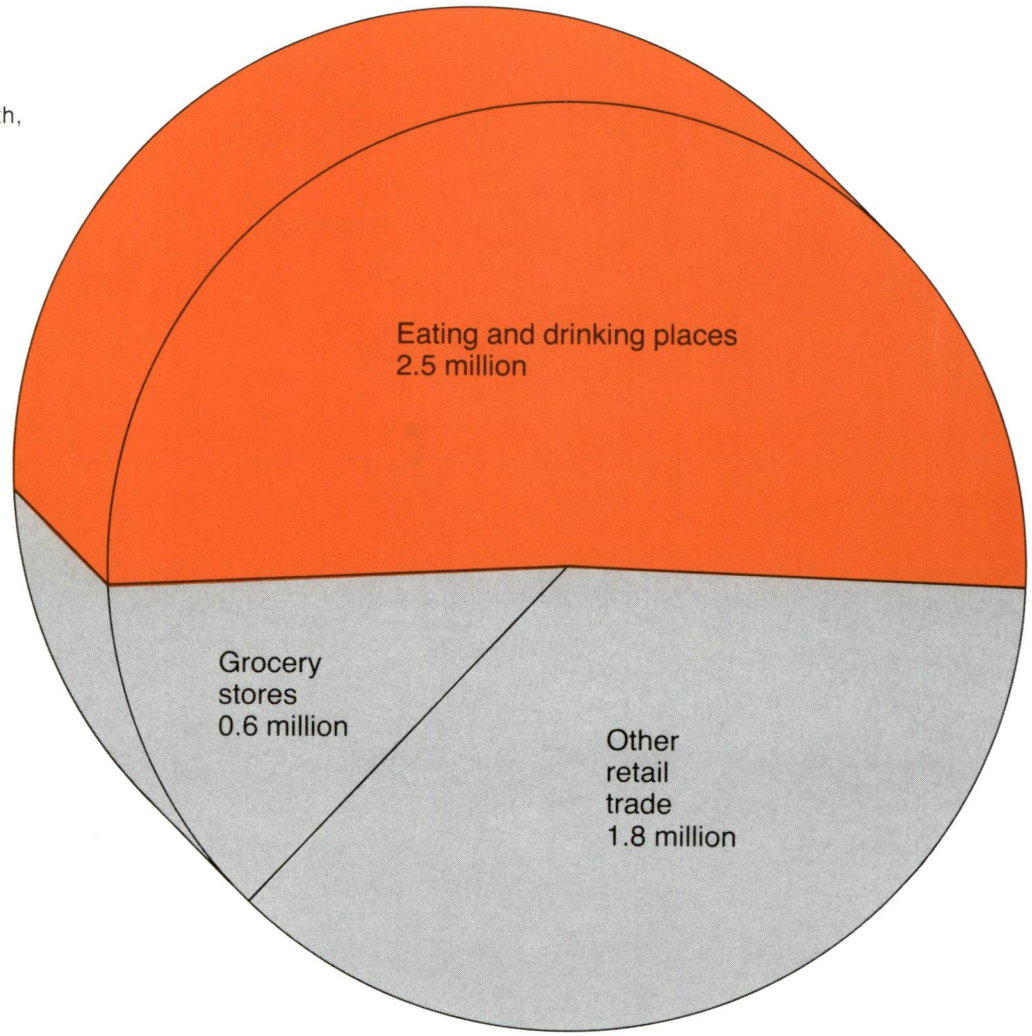
The fastest growing individual industries in the economy are in this division. Among them are the following:

- *Computer and data processing services*
- *Outpatient care facilities*
- *Offices of physicians, including osteopaths*
- *Personnel supply services, including temporary help supply services*

Each of these four industries will increase 70 percent or more in employment.

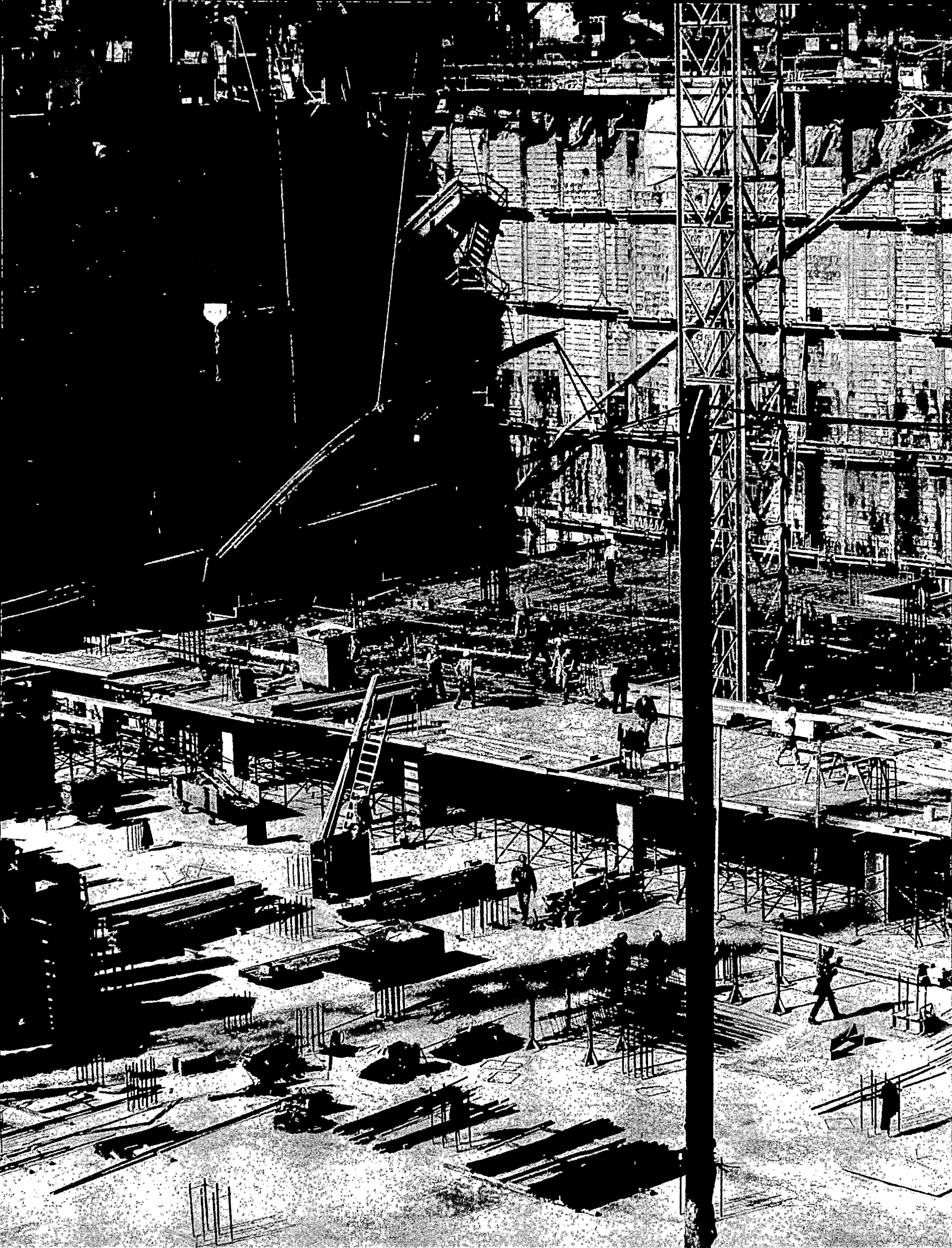
In the retail trade division, eating and drinking places will account for about one-half the growth.

Employment growth, 1986–2000, shown as a share of total growth in the retail trade division.

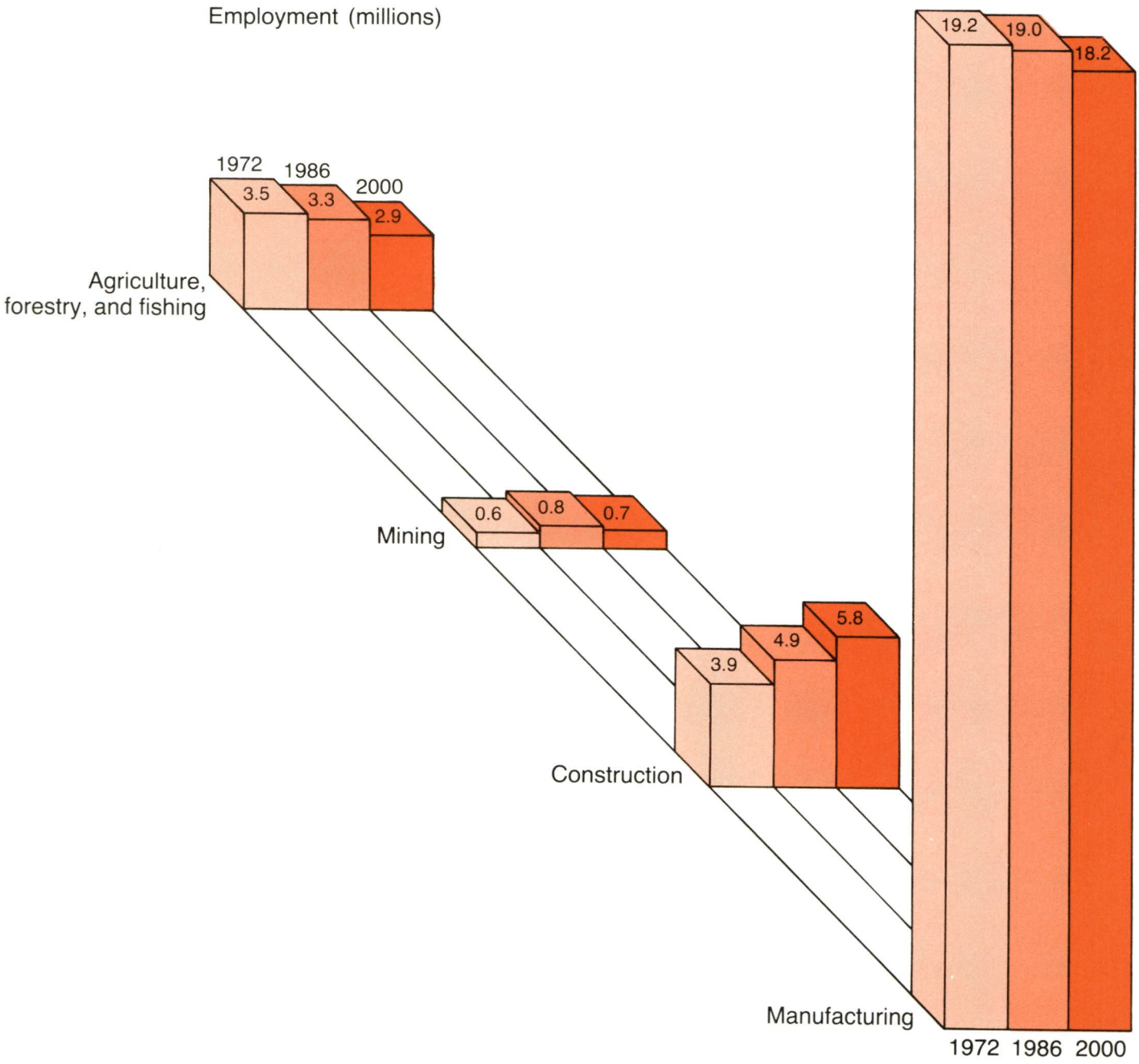


Employment in eating and drinking places will grow more than in any other industry. This industry and nine others will account for more than 50 percent of all job growth between 1986 and 2000. Here are the 10 industries and the numerical growth of each:

• *Eating and drinking places*	*2,486,000*
• *Miscellaneous business services*	*1,342,000*
• *Education, public and private*	*971,000*
• *Offices of physicians, including osteopaths*	*886,000*
• *Nursing and personal care facilities*	*847,000*
• *Personnel supply services*	*834,000*
• *Wholesale trade, machinery and equipment*	*614,000*
• *Computer and data processing services*	*612,000*
• *Grocery stores*	*598,000*
• *Legal services*	*519,000*



In the goods-producing sector, construction is the only division that will grow as a whole.

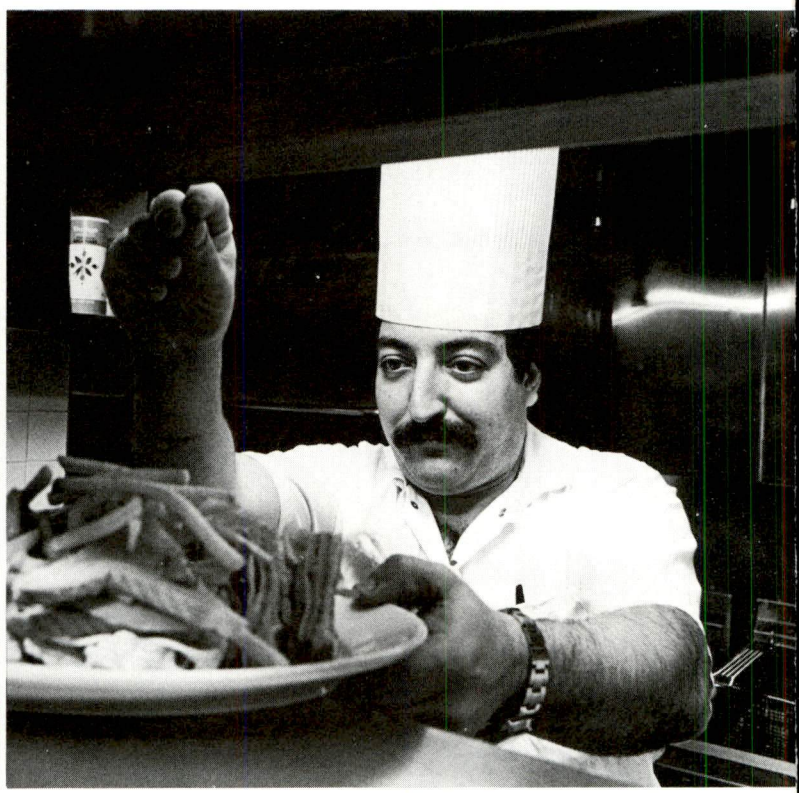


Despite the overall employment decline in manufacturing, some manufacturing industries will grow; the following will each add at least 50,000 workers:

- *Miscellaneous plastic products*
- *Office computing and accounting machines*
- *Commercial printing and business forms*
- *Newspapers*

Projections 2000

Changing Employment in Occupations



Different industries employ workers who have different occupational skills.

- *Hospitals require registered nurses, nursing aides, and workers in other occupations that provide health care.*
- *Construction requires bricklayers, carpenters, and other building trades workers.*

Consequently, industry employment growth has a significant effect on the growth of occupations.

Changes in the way an industry produces goods or services also affect occupational employment.

- *For example, the increasing use of computers to process records increases the need for computer programmers and computer systems analysts, but reduces the need for recordkeeping clerks.*

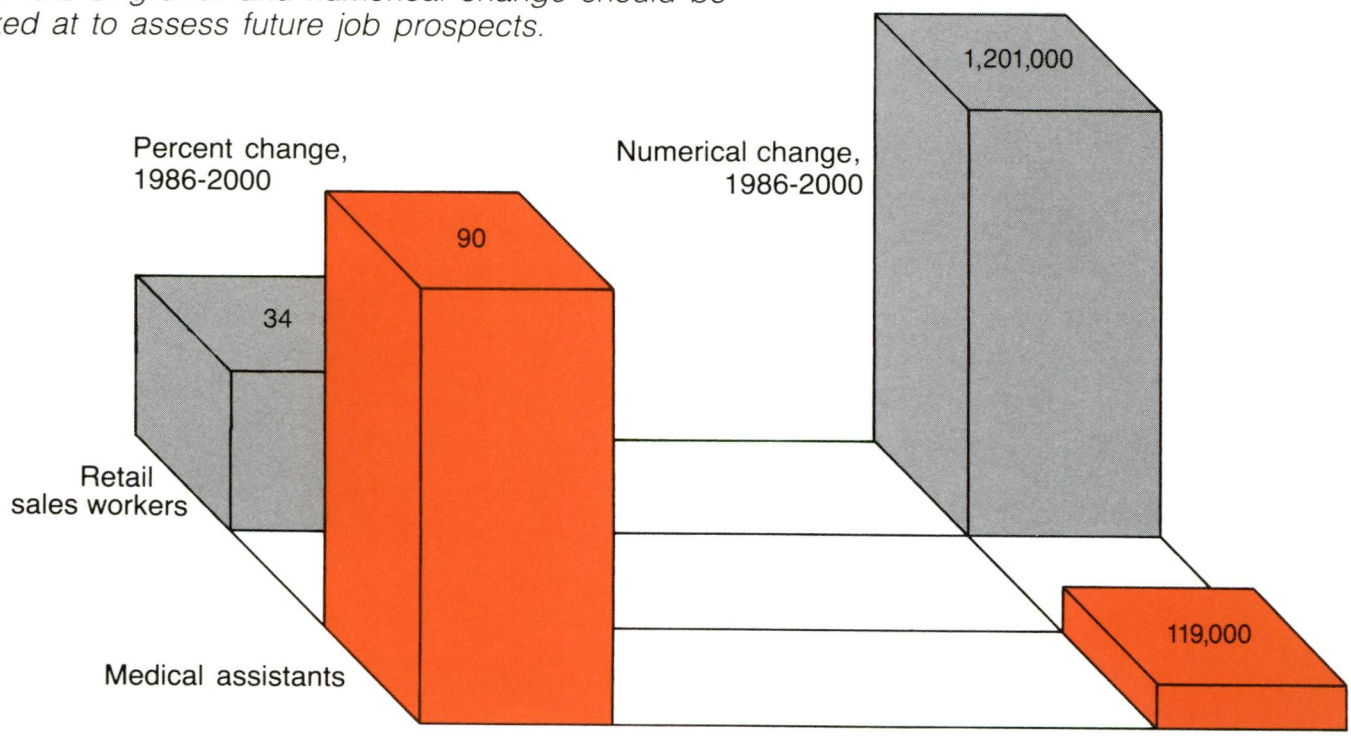
The opportunities provided by occupational employment growth can be viewed in two ways:

- *Rate of growth (percent)*
- *Numerical increase of workers.*

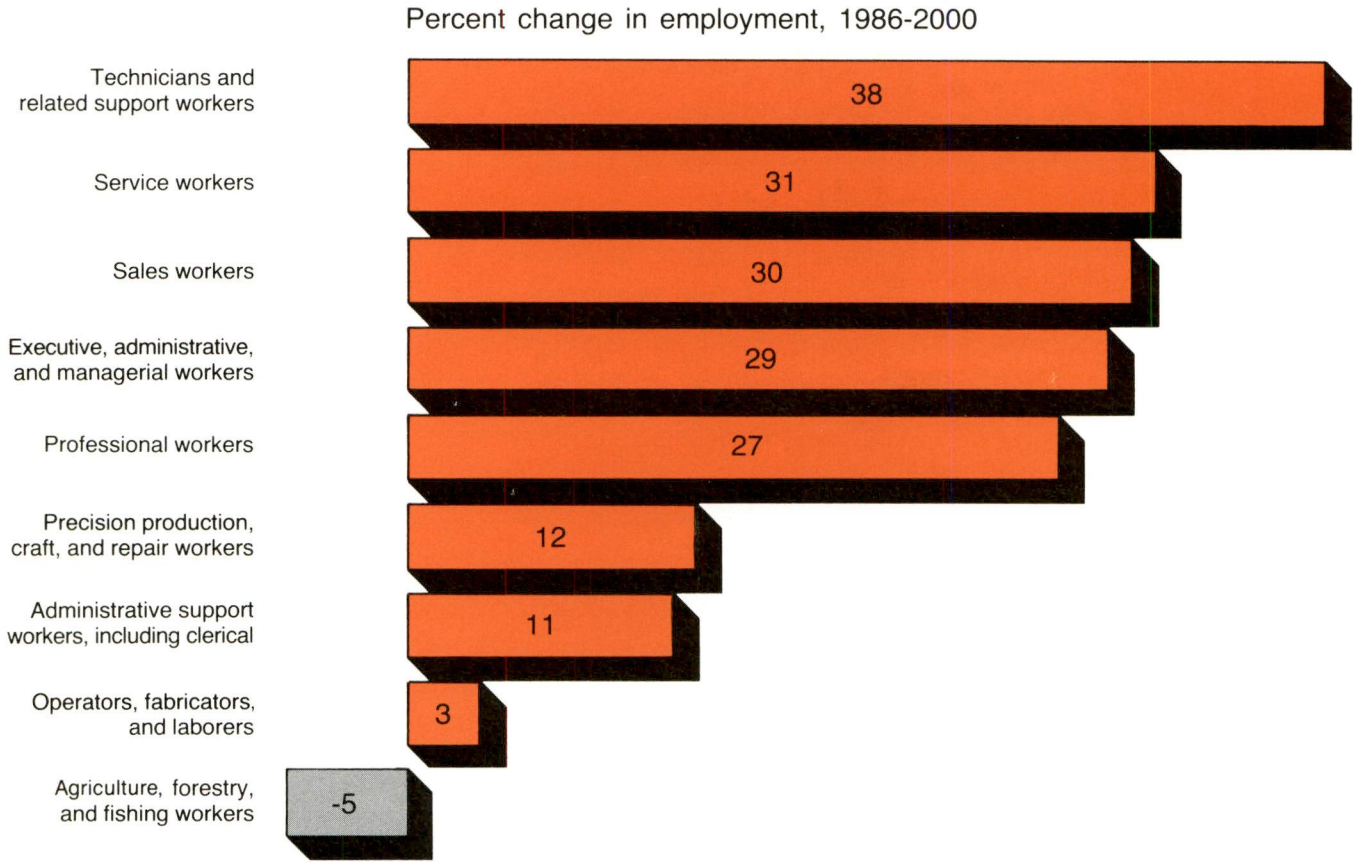
Occupations with fast growth rates generally offer good opportunities.

However, large occupations, such as retail sales worker, may offer many more jobs than a small, fast-growing occupation, such as medical assistant.

Both rate of growth and numerical change should be looked at to assess future job prospects.



Occupations will grow an average of 19 percent. Of the broad occupational groups, technician and service occupations will grow the fastest.



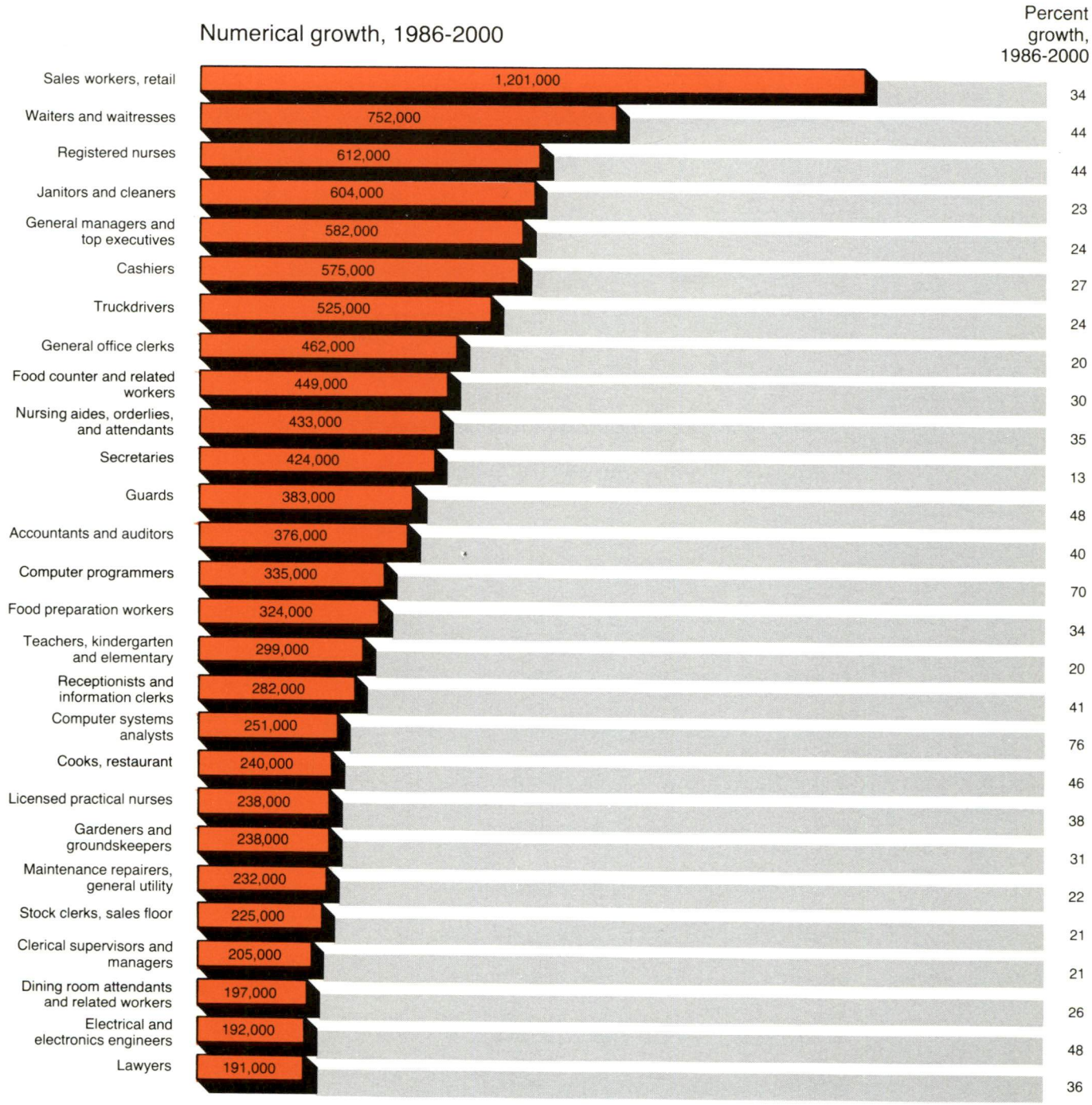
Employment will increase most, in terms of number of workers, in service and sales occupations, but professional and executive occupations will also add millions of jobs.

The following is a list of the major occupational groups and the number of jobs each will add between 1986 and 2000:

Service workers	*5,381,000*
Sales workers	*3,728,000*
Professional workers	*3,655,000*
Executive, administrative, and managerial workers	*3,033,000*
Administrative support workers, including clerical	*2,258,000*
Precision production, craft, and repair workers	*1,669,000*
Technicians and related support workers	*1,403,000*
Operators, fabricators, and laborers	*443,000*

Agriculture, forestry, and fishing workers will decline by 163,000 over the projected period.

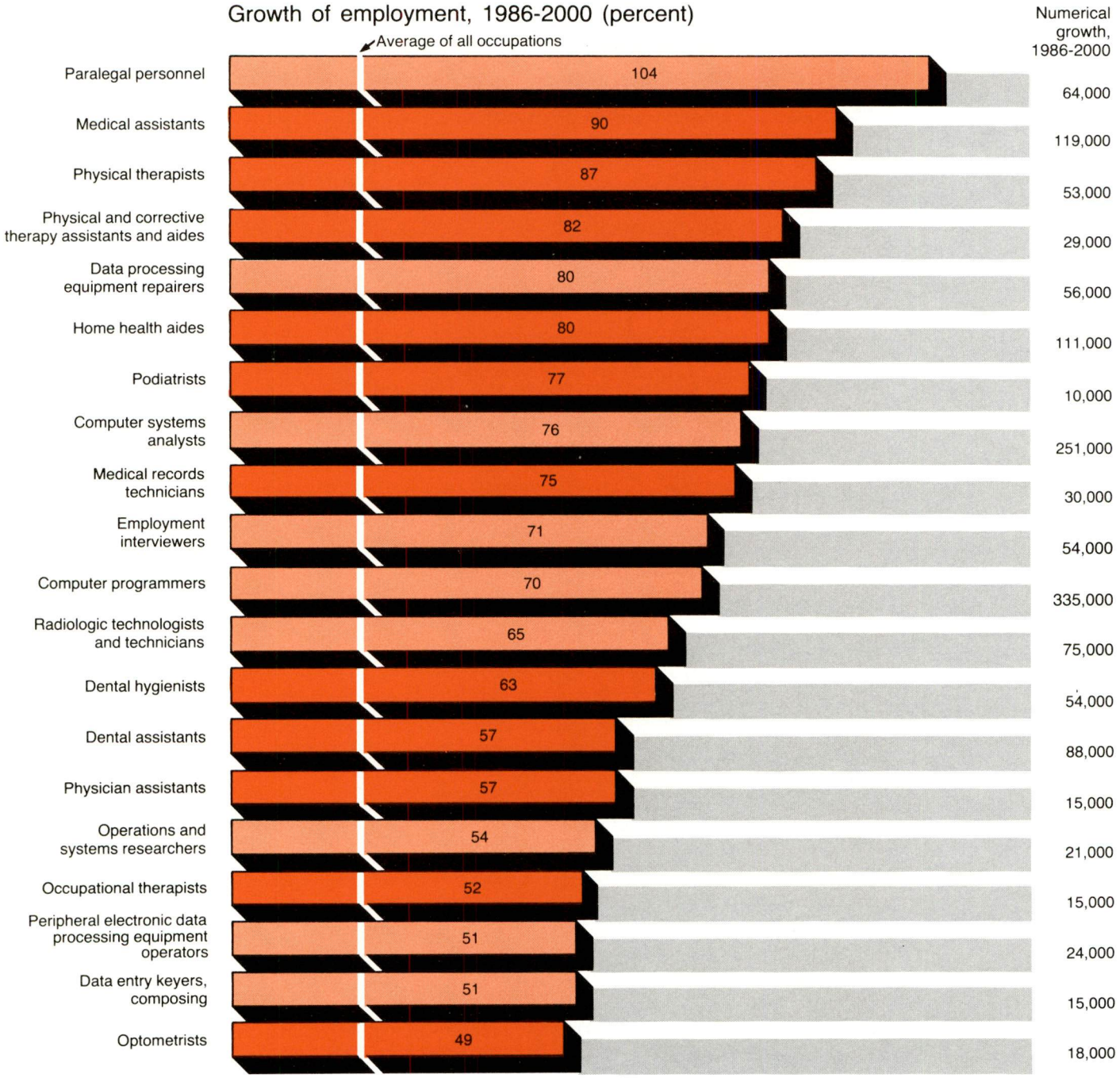
A small number of occupations will account for more than one-half of total job growth.



Most of these occupations are growing faster than the average for all occupations.

Those growing less rapidly are very large, so that the numerical increase is still great.

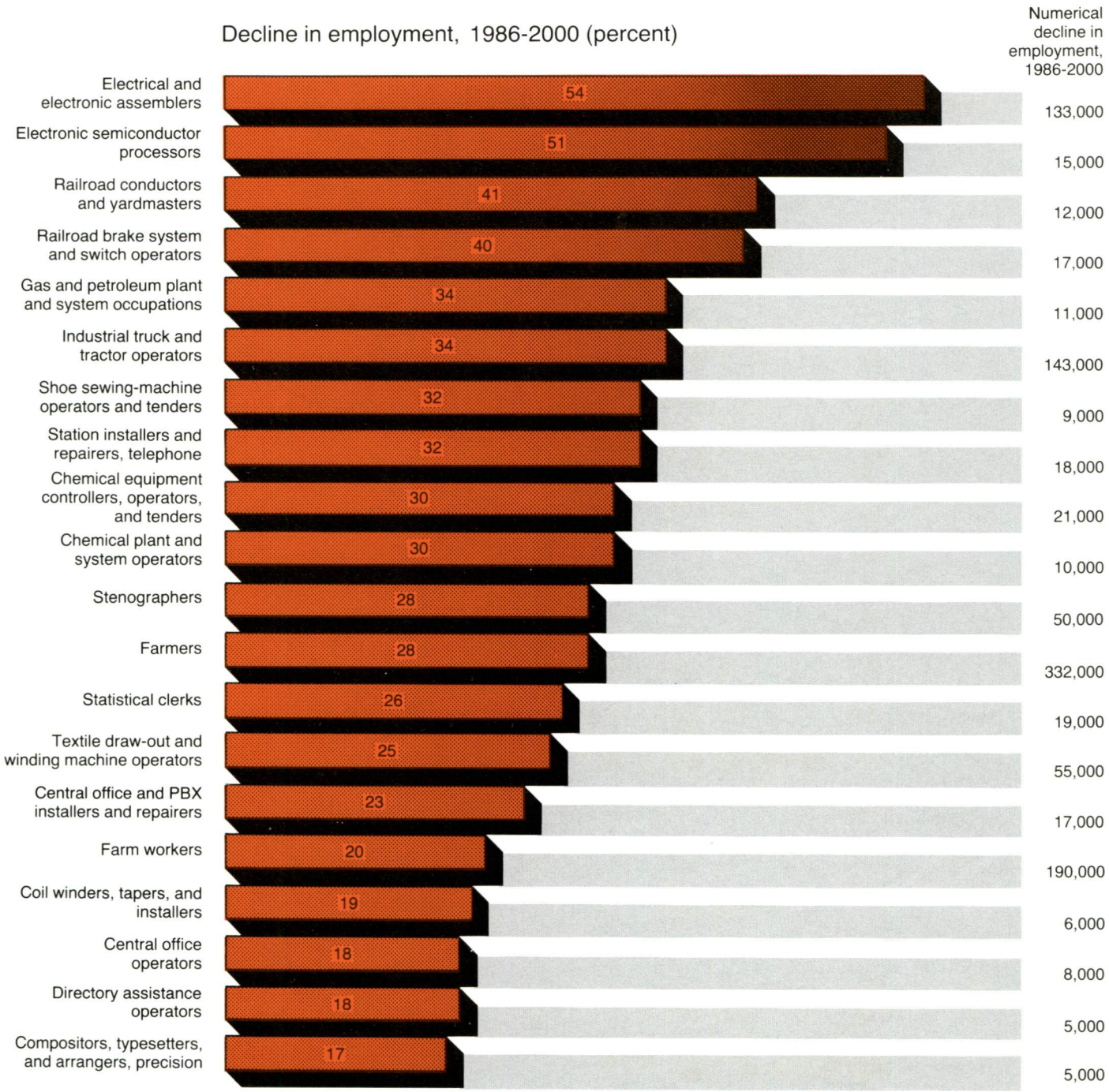
Twelve of the twenty fastest growing occupations provide health services.



The number of paralegal personnel—the fastest growing occupation—is expected to double.

Four of the twenty fastest growing occupations are in the computer field.

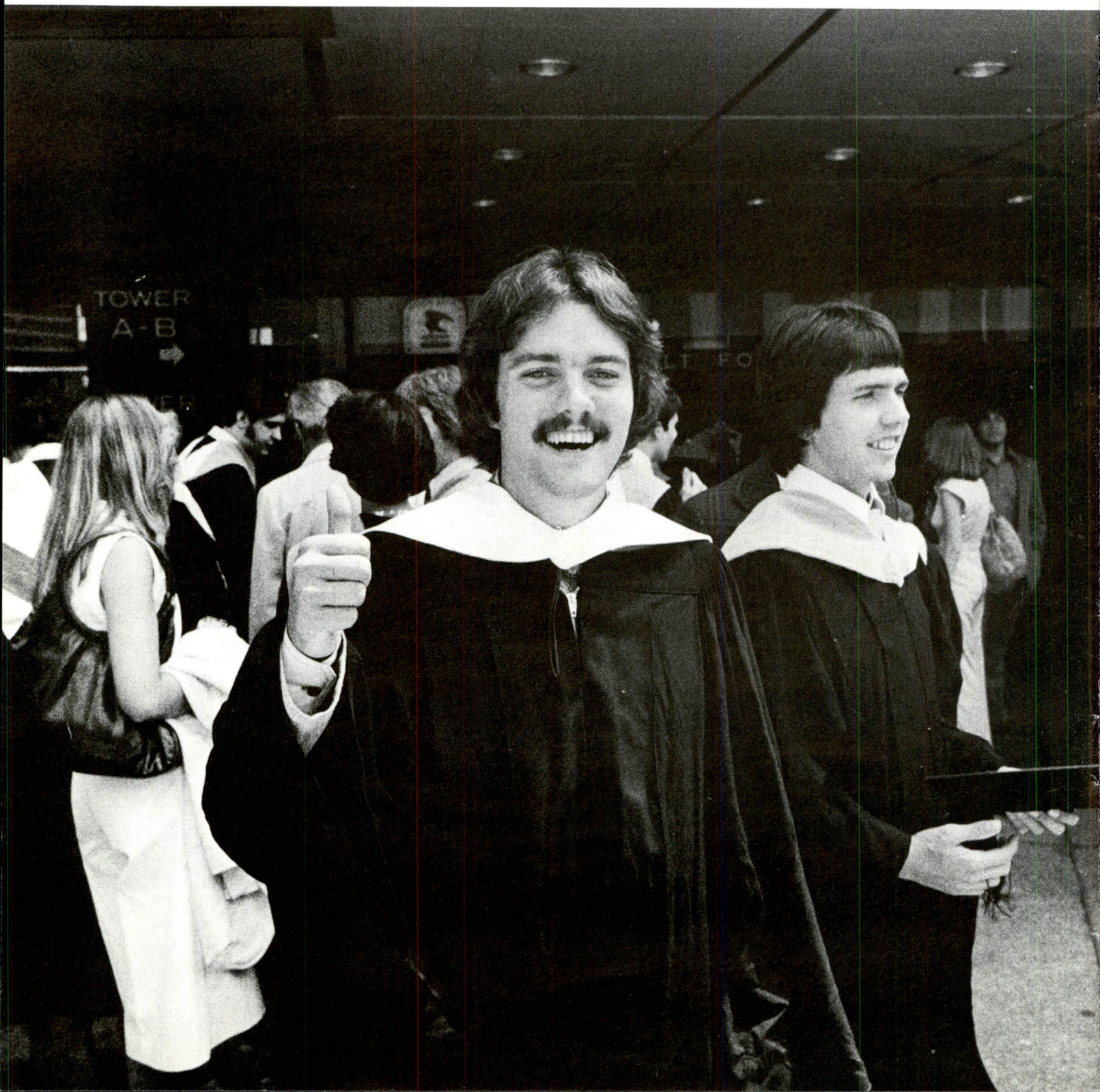
Changes in technology and business practices and increased use of imports will cause some occupations to decline.



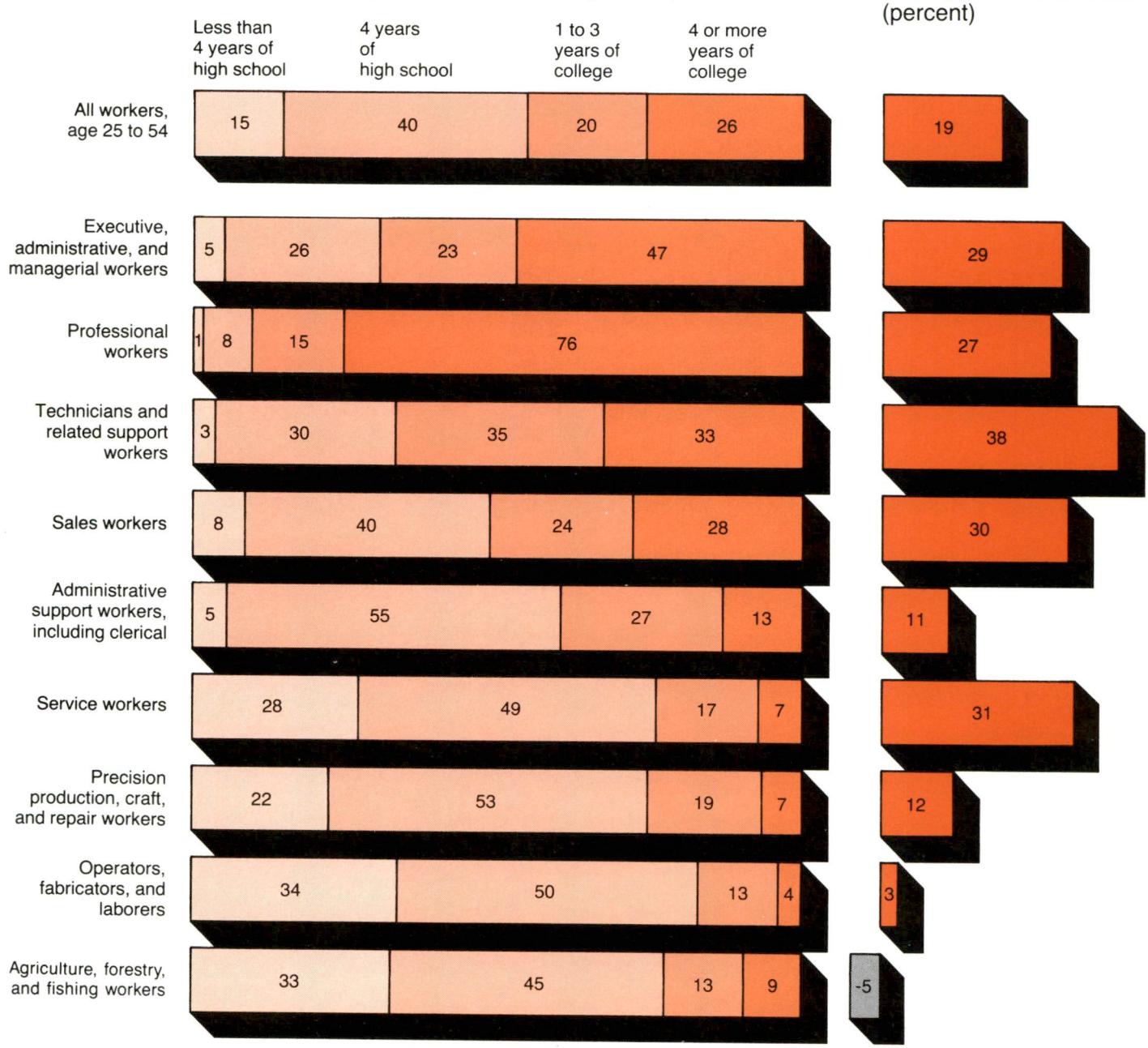
Most of these occupations have been declining for several years.

Projections 2000

The Growing Need for Education



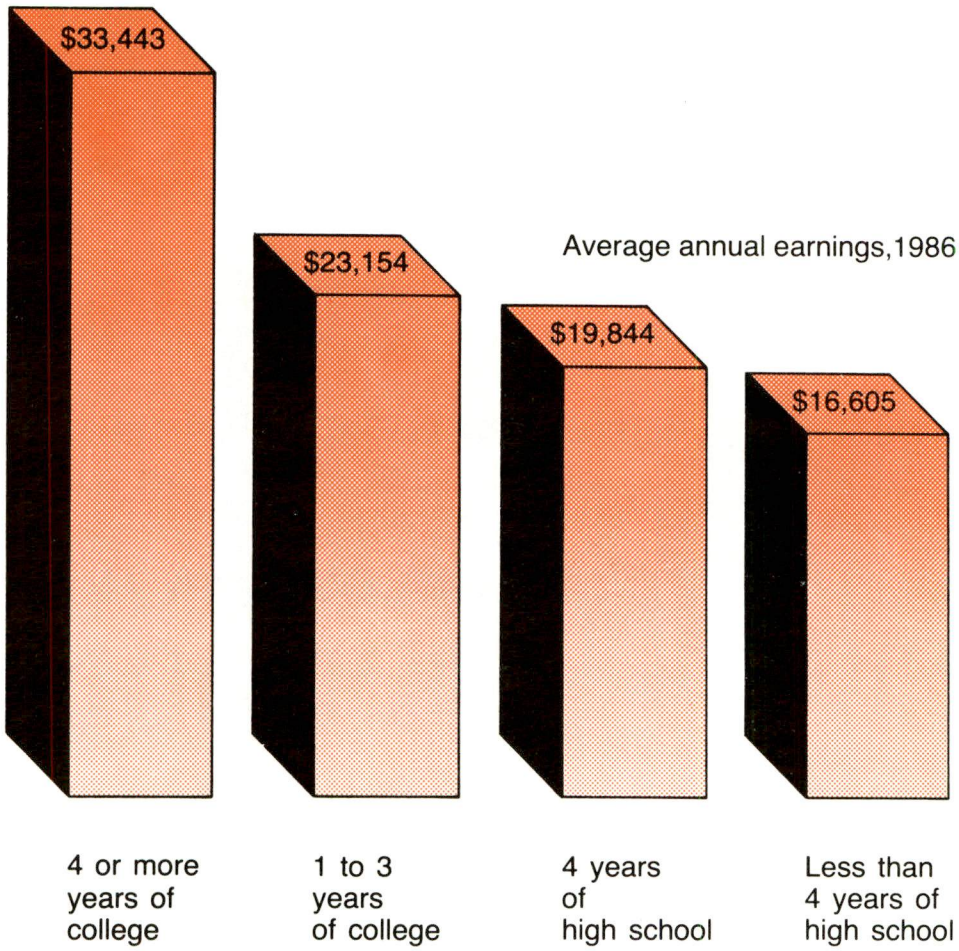
The projected growth of the broad occupational groups shows the increasing need for education.



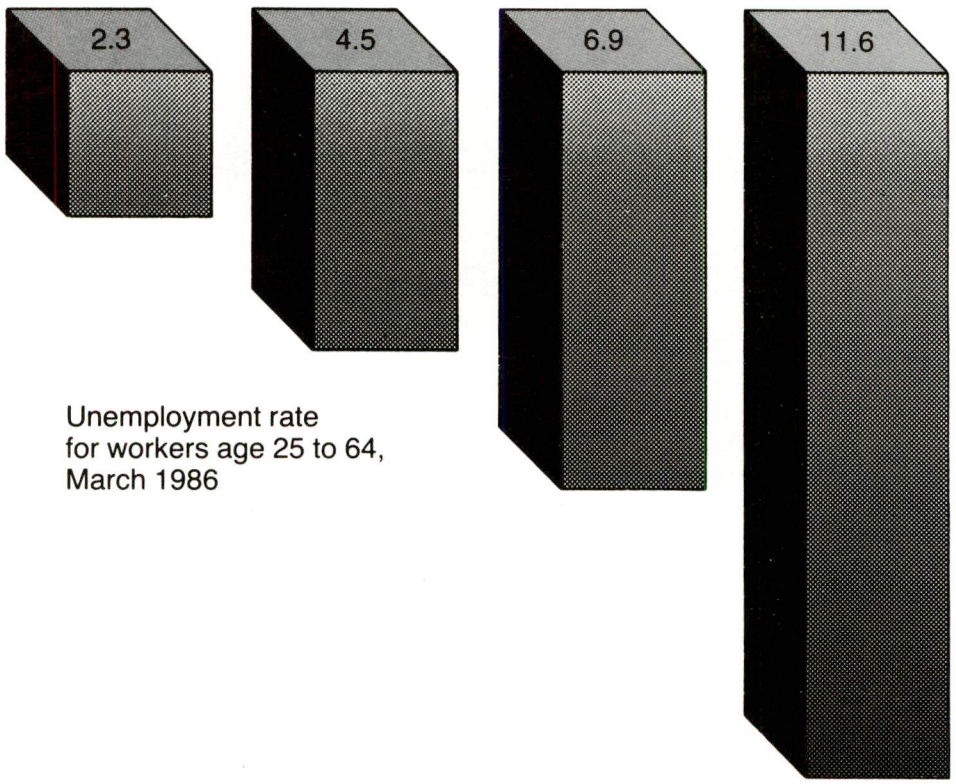
Occupations in which a large proportion of workers have college training are among the fastest growing.

Occupations in which a large proportion of workers have less than 4 years of high school are generally among the slowest growing.

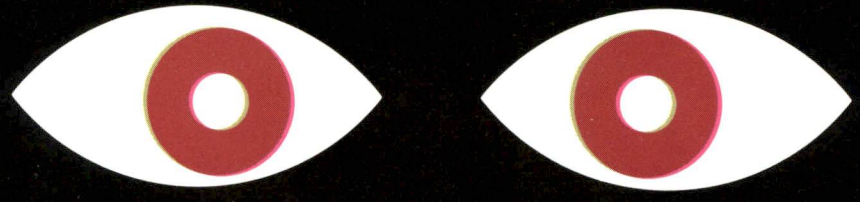
Workers with more education also earn more. . .



. . .and are less likely to be unemployed.



IT'S TIME TO GET OUT OF THE DARK.



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UNEMPLOYMENT RATES IN EIGHT COUNTRIES, CIVILIAN LABOR FORCE BASIS,
APPROXIMATING U.S. CONCEPTS, SEASONALLY ADJUSTED, 1972-1989

PERIOD	UNITED STATES	CANADA	JAPAN	FRANCE	GERMANY	ITALY (1)(2)	SWEDEN	UNITED KINGDOM
1972	5.6	6.2	1.4	2.9	0.7	3.8	2.7	4.2
1973	4.9	5.5	1.3	2.8	0.7	3.7	2.5	3.2
1974	5.6	5.3	1.4	2.9	1.6	3.1	2.0	3.1
1975	8.5	6.9	1.9	4.1	3.4	3.4	1.6	4.6
1976	7.7	7.1	2.0	4.5	3.4	3.9	1.6	5.9
1977	7.1	8.1	2.0	5.1	3.5	4.1	1.8	6.4
1978	6.1	8.3	2.3	5.3	3.3	4.1	2.2	6.3
1979	5.8	7.4	2.1	6.0	3.0	4.4	2.1	5.4
1980	7.1	7.5	2.0	6.4	2.9	4.4	2.0	7.0
1981	7.6	7.5	2.2	7.6	4.1	4.9	2.5	10.5
1982	9.7	11.0	2.4	8.3	5.8	5.4	3.1	11.3P
1983	9.6	11.8	2.7	8.5	(3)7.1	5.9	3.5	11.9P
1984	7.5	11.2	2.8	10.0	7.4	5.9	3.1	11.7P
1985	7.2	10.5	2.6	10.4	7.5	6.0	2.8	11.2P
1986	7.0	9.5	2.8	10.6	7.0	(3)7.5	2.6	11.2P
1987	6.2	8.8	2.9	10.8	7.1R,P	7.9	(3)1.9P	10.3P
1988	5.5	7.8	2.5	10.5P	7.1R,P	7.9P	1.6P	8.3P
I	5.7	7.8	2.7	10.6	7.1R	7.9	1.7	9.0
II	5.5	7.7	2.5	10.5	7.2R	7.9	1.6	8.6
III	5.5	7.8	2.6R	10.6	7.1R	8.0	1.6	8.0
IV	5.3	7.7	2.4	10.4	7.0R	7.9R	1.4	7.6
NOV	5.4	7.7	2.4	10.3	7.0R		1.4	7.6
DEC	5.3	7.6	2.3	10.5	6.8R		1.2	7.3
1989								
JAN	5.4	7.6		10.5	6.6		1.5	7.2

R = REVISED. P = PRELIMINARY.

(1) QUARTERLY RATES ARE FOR THE FIRST MONTH OF THE QUARTER. (2) MANY ITALIANS REPORTED AS UNEMPLOYED DID NOT ACTIVELY SEEK WORK IN THE PAST 30 DAYS, AND THEY HAVE BEEN EXCLUDED FOR COMPARABILITY WITH U.S. CONCEPTS. INCLUSION OF SUCH PERSONS WOULD ABOUT DOUBLE THE ITALIAN UNEMPLOYMENT RATE IN 1985 AND EARLIER YEARS AND INCREASE IT TO 11-12 PERCENT IN 1986-1988. (3) BREAK IN SERIES. BASED ON THE FORMER SERIES, THE GERMAN RATE FOR 1983 WAS 7.4 PERCENT AND THE ITALIAN RATE FOR 1986 WAS 6.3 PERCENT. FOR SWEDEN, THE 1986 RATE BASED ON THE NEW SERIES WAS 2.2 PERCENT.

NOTE: QUARTERLY AND MONTHLY FIGURES FOR FRANCE, GERMANY, AND THE UNITED KINGDOM ARE CALCULATED BY APPLYING ANNUAL ADJUSTMENT FACTORS TO CURRENT PUBLISHED DATA AND THEREFORE SHOULD BE VIEWED AS LESS PRECISE INDICATORS OF UNEMPLOYMENT UNDER U.S. CONCEPTS THAN THE ANNUAL FIGURES. FOR FURTHER QUALIFICATIONS AND HISTORICAL DATA, SEE BLS BULLETIN 1979, "INTERNATIONAL COMPARISONS OF UNEMPLOYMENT" AND ITS METHODS AND STATISTICAL SUPPLEMENTS.

SOURCE: BUREAU OF LABOR STATISTICS, U.S. DEPARTMENT OF LABOR, MARCH 1989.

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1975	8.3	6.9	1.9	4.0	3.3	3.4	1.6	4.5
1976	7.6	7.1	2.0	4.4	3.4	3.8	1.6	5.9
1977	6.9	8.0	2.0	4.9	3.4	4.0	1.8	6.3
1978	6.0	8.3	2.3	5.2	3.3	4.1	2.2	6.2
1979	5.8	7.4	2.1	5.9	2.9	4.3	2.0	5.3
1980	7.0	7.4	2.0	6.3	2.8	4.3	2.0	6.9
1981	7.5	7.5	2.2	7.4	4.0	4.8	2.5	10.4
1982	9.5	10.9	2.4	8.1	5.7	5.3	3.1	11.3P
1983	9.5	11.8	2.7	8.3	(3)7.0	5.8	3.4	11.8P
1984	7.4	11.2	2.7	9.7	7.2	5.8	3.1	11.6P
1985	7.1	10.4	2.6	10.2	7.3	5.9	2.8	11.1P
1986	6.9	9.5	2.8	10.4	6.9R	(3)7.4	2.6	11.2P
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III	5.4	7.8	2.6R	10.4	7.0R	7.8	1.6	8.0
IV	5.3	7.7	2.4	10.2	6.8R	7.8	1.4	7.5
NOV	5.3	7.7	2.4	10.1	6.9R		1.4	7.5
DEC	5.3	7.6	2.3	10.3	6.7R		1.2	7.3
1989								
JAN	5.4	7.5		10.2	6.5		1.5	7.1

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Private Sector Training

Who Gets It and What Are Its Effects?

Lee A. Lillard, Hong W. Tan

Rand

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Lee A. Lillard, Hong W. Tan

March 1986

Prepared for the
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PREFACE

This report was funded under Contract No. J-9-M-3-0170 with the Office of the Assistant Secretary for Policy, Evaluation, and Research, U.S. Department of Labor. The study uses measures of reported training from the Current Population Survey, three cohorts from the National Longitudinal Surveys, and the Employment Opportunities Pilot Projects Survey to draw a broad picture of post-school training in the United States. The research findings on who receives training, how much, and why, and on how training affects earnings and employment, should be of interest both to employers and to decisionmakers entrusted with developing training policy.

"type" we mean the nature or content of the training (such as managerial, professional and technical, skilled manual, and clerical). The CPS elicited information on the sources of training needed to get the current (or last) job, and on training to improve skills on the current job. In the NLS, repeated measures of both sources and types of training taken since the last interview are available.

We use several techniques to analyze the data. We document the amounts of training for each demographic group through simple tabular analysis. To study the determinants of training, we estimate probit models for each source and type of training, controlling for a comprehensive set of covariates such as personal attributes, labor market experience, job characteristics, the industry rate of technical change, and local labor market conditions. Finally, we use multiple regression and nonlinear methods to examine how training affects subsequent earnings and the likelihood of unemployment.

We found that post-school training is quite pervasive. Nearly 40 percent of both men and women in the CPS reported having taken training to improve skills on the current job, a proportion that rises with time on the job. When we average across job tenure, we find that training in company programs, OJT, and training in regular schools are reported 10 to 15 percent of the time as a source of job-relevant training. For a given two-year period in the NLS, the fractions of young men, career women, and mature men reporting some training were approximately 30, 24, and 10 percent, respectively. For all three populations, the employer was the single most important source of training. By comparison, only 11 percent of the disadvantaged (EOPP) sample reported some training over a similar time interval, with a relatively low proportion getting training from company sources. Their training experience resembled that of the sample of NLS women with low attachment to the labor force.

We reached the following conclusions regarding the determinants of training:

- Formal schooling is an important determinant of post-school investments in training. In fact, those sources of "training" are strongly complementary. The likelihood of getting most kinds of training rises with the level of schooling attainment,

with the exception of the most educated workers (postgraduates), a finding that holds true for both men and women. The lack of a formal education therefore limits access to post-school investments in most kinds of job training and to resulting improvements in productivity and income.

- Training propensity varies systematically over the life-cycle. The likelihood of getting most kinds of training is low in the first five years in the labor market, coinciding with an initial period of job search. In the absence of job attachment, this likelihood continues to fall with work experience but at a slower pace; however, the likelihood of training then rises with time on the job. Although some job switching is likely to be advantageous, the inability to develop enduring job attachment increasingly reduces the likelihood of getting training, especially for older workers.
- Nonwhite men, in particular, are significantly less likely to get most kinds of job training even after controlling for observable worker attributes. However, no significant racial differences are apparent among women. These relationships suggest that job training may be partly responsible for the observed earnings differentials among white and nonwhite men and the absence of race differences among women.
- Rapid technical change in the industry of employment increases the probability of getting managerial training and training from in-house sources such as company programs or OJT, especially for the most educated, but decreases the probability of getting professional, technical, and semiskilled manual training, or training from external sources such as business, technical, and traditional schools. Again, these findings are replicated for females. It thus appears that rapid rates of technical change are associated with an increased reliance on in-house training, possibly because skills specific to new technologies are not readily available outside the firm.
- The transferability of prior work skills diminishes when new jobs are created in industries with rapid technical change. Both men and women working in high-tech industries are

significantly less likely to report that previous company training and OJT were important in getting the current (or last) job. Only among postgraduates is previous OJT important.

- The likelihood of getting most kinds of training is smaller in local labor markets with persistently high unemployment or greater cyclic volatility relative to the nation as a whole. Over time, a pro-cyclical pattern of training emerges for the NLS samples of mature men and career women. Periods of high national unemployment tend to be associated with a greater likelihood of training from company sources, especially for professional and technical types of training. One possible interpretation is that employers are more likely to retrain older workers during periods of slack economic activity when the opportunity cost of their time is low.

To examine how training affects subsequent labor market outcomes, we used the CPS and the NLS Young Men surveys to examine the relationships between training, the level and growth of earnings, and the probability of experiencing an unemployment spell in the previous year. The principal findings are as follows:

- Earnings rise with the level of schooling completed, especially for highly educated people with college or advanced degrees in industries experiencing rapid technical change. This finding is consistent with, and may explain why, highly educated people are also more likely to get company training and informal OJT in "high-tech industries." This result provides empirical support for Welch's (1970) hypothesis regarding the allocative efficiency of schooling--namely, that better educated workers are more adept at responding to technical change.
- Among the sources of training, company training has the greatest effect on increasing earnings, an effect that persists for over 13 years. This is followed by training from business and technical schools. When types of training are considered, managerial training is the most important, followed closely by professional and technical training.

- The effects of training on unemployment mirror the earnings-augmenting effect of training. On average, vocational training is associated with a decline in the likelihood of unemployment lasting approximately 12 years. However, the effects of training on unemployment vary systematically by source and type of training.
- Unlike the result for earnings, the industry rate of technical change in the current job is not statistically correlated with the probability of experiencing an unemployment spell in the past year. In fact, for the sample of male youth studied, rapid technical change is typically associated with a lower probability of unemployment; and for high school graduates, this relationship is statistically significant. At least for this group of youth, the results suggest that concern over the labor-displacement effects of technical change may be misplaced. Whether or not this finding holds for other groups is a subject for future research.

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This research benefited from the contributions of a number of people. As formal reviewers, Rand colleagues Michael Murray and Elizabeth King provided careful and thoughtful comments, many of which were incorporated into the report. Mary Layne supplied expert programming assistance that was crucial in preparing the five surveys for analysis. The unenviable task of typing the reams of tables and text fell to Nora Wolverton who, as usual, did so cheerfully and competently.

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I. INTRODUCTION

In recent years, the federal government has become concerned about the productivity slowdown in the United States, about the effects of technological change on the labor market, about structural unemployment, and about labor market responses to changing demographic patterns. While these problems raise many kinds of policy questions, they raise especially challenging questions about training. Policies aimed at promoting worker training for the large baby-boom cohorts, for women returning to the labor force, for workers requiring skill upgrading or retraining, and for the disadvantaged, will strongly influence the productivity and wages of the U.S. work force in the years ahead.

Since 1965, labor productivity in the United States has risen sluggishly--1.7 percent per annum, as compared with 3 percent between 1950 and 1965. The emerging interest in training policies is rooted largely in the belief that greater investments in training will halt declines in labor productivity not only through enhancing the skills of new labor market entrants, or upgrading existing worker skills, but also through improving managerial and technical skills, which have a broader impact on the efficiency of production (Goldstein, 1980). Of interest also is whether such policies will be effective in offsetting declines in the international competitiveness of U.S. industries, which some have attributed to lower U.S. investments in equipment and in skill acquisition through education and training, relative to its major trading partners.[1]

Technological change, and its impact on the labor market, further motivate public and private interest in training. Over the last two decades, this interest has shifted from concern over the potential effects of automation on labor displacement and structural unemployment, which recent research suggests is misplaced (Ayres and Miller, 1983), to the changing skill requirements of new technologies. While public

[1]The President's Commission on American Competitiveness, and the Department of Labor's Bureau of International Labor Affairs, cited in Carnevale and Goldstein (1985).

attention has tended to focus on skill shortages in "high-tech" jobs (which account for less than 10 percent of the labor force), less dramatic but more pervasive skill shortages arise in the workplace as a consequence of technological change. As technologies evolve, job-specific training and retraining are constantly necessary to supply the technical and managerial skills required by new process and product innovations. By identifying these skill shortages, policies may be implemented to encourage greater investments in the skills required for technological change.

Several demographic trends--in particular, the postwar swings in birth rates and the increasing numbers of working women--also have implications for training policy. The future composition of the labor force will change both as the large baby-boom cohorts that entered the labor market in the 1970s mature and are replaced by smaller baby-bust entry cohorts, and as female labor-force participation rates rise. How well the labor market responds to these changes, and whether skill shortages materialize, will depend on the degree to which older workers, women, and youth are substitutable for each other (Tan and Ward, 1985). The outcome will be strongly affected by the amounts and kinds of training received by the different groups.

To address these issues, government officials will need comprehensive information about the amounts and kinds of training available for different demographic groups, the determinants of training, and its effects on labor market outcomes. Their information needs, however, already outstripped the available data. As Carnevale and Goldstein (1983, p. 31) have noted, "Sound theoretical literature is thin. Empirical analysis is thinner still. Those responsible for practical decisions on employee training face ignorance and confusion when they try to find reliable information."

This information gap is at least partly attributable to the perceived problems of using self-reported measures of training. In addition to the issue of reliability, reported training measures may suffer from a selective recall problem: namely, that only the most memorable (i.e., formal) kinds of training are reported, while potentially more important forms of on-the-job training are ignored. Thus, past research in the human capital tradition has tended to focus

on formal schooling, government sponsored training programs, time in the labor force, and firm tenure as proxies for training (for example, see Mincer, 1974). These proxies have been important in testing various theories, but their use has hampered understanding of the empirical correlates of training and its effects, which can only come from using actual measures of training taken.

We believe this report represents the first systematic attempt to exploit current data on reported training and answer several questions: who receives training, how much and why, and how does training affect future earnings and employment stability? Most of our data are drawn from several information-rich sources: the National Longitudinal Surveys (NLS), the Current Population Surveys (CPS), and the Employment Opportunities Pilot Projects survey (EOPP). Because detailed information is available on the kinds of training provided, we are able to pursue the analysis of training by source (in-house company programs, on-the-job training, business and technical schools, traditional schools) and by type of training (managerial, professional and technical, and semiskilled manual training).

Self-reported training measures are not wholly reliable; they clearly understate how much training actually goes on by failing to report more informal kinds of training. One survey, which contained a comprehensive set of training questions, found informal OJT to be as prevalent as training in formal company programs. This caveat notwithstanding, a remarkably consistent picture of training emerges when we compare the surveys. Patterns of training observed in the data--by source and by type, across demographic groups, and over the life cycle--are consistent both with theory and with our *a priori* expectations. Indeed, as the rest of the report demonstrates, analysis of reported training measures can yield important insights into behavior in areas where government policies may have their greatest impact through training.

Our study covers an extensive set of issues and brings together a number of different lines of research. It investigates how workers decide to take, and employers decide to give, training, the extent of various kinds of training, their sensitivity to technological change and labor market conditions, and the effects of training on subsequent

earnings level and growth, and on employment and employment stability. Many of the hypotheses investigated are guided by other developments in human capital theory; others, such as the relationships between training, technological change and local labor market conditions, represent tests of theories developed by the authors (Tan, 1980 and 1986; Lillard, 1981 and 1986).

Section II describes the five surveys we used and provides an overview of the magnitude and kinds of training obtained by different groups. Section III lays out the main hypotheses to explain the decisions to take (or give) training, followed by a summary of the most important empirical correlates of training in the five surveys. Our analysis of the effects of training on earnings, earnings growth, and employment stability are the subject of Section IV. Section V summarizes the main findings and their implications for training policy.

II. DATA SOURCES AND AN OVERVIEW OF TRAINING

We first describe the main features of the five surveys used in our analysis.[1] The surveys differ substantially in both the form and content of their training questions, and in the time period when they were conducted.

DATA SOURCES

The *Current Population Survey* (CPS) surveys a nationally representative sample of the non-institutional population several times a year. It implemented a special supplement in January 1983 to elicit information on occupational mobility, job tenure, and training. For this study, we merged one-half of the respondents in the supplement with the March 1983 demographic file to take advantage of the wealth of labor force information on weeks worked and previous year's earnings.

The *National Longitudinal Surveys* (NLS) included cohorts of Young Men, Women, and Mature Men. Panel data on the training and labor market experiences of these three cohorts are available (in versions that we use) for the period from 1966 to 1981, with four breaks in the panel. The Young Men and Mature Men samples comprised individuals aged 14-24 and 45-59 in 1966, respectively, and the Women sample those aged 30-44 in 1967.

The *Employment Opportunities Pilot Projects Surveys* (EOPP) were fielded primarily between May and September 1980. The EOPP was designed to evaluate the impact of participation and nonparticipation in a job-search/work-and-training program. The sample included both low-income and control households, but because the poverty group was oversampled relative to the nonpoor group, we will refer to the EOPP sample as the "economically disadvantaged" population.

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[1]A sixth potential source is the PSID (Panel Study of Income Dynamics), a family- or household oriented-longitudinal data file covering 1968 to 1981. However, the PSID includes only crude information about whether training was taken by household heads with less than a high school degree.

Each data set has several important features that make it unique. The surveys ask different but overlapping sets of training questions, with more detail on certain kinds of training in some (informal OJT in the CPS and types of training in the NLS) than in others. The relevant reference period for training also differs both within and across surveys: fixed intervals in the NLS (ranging from one to five years), and a variable interval (years on the current job) for the CPS. These are discussed here and used throughout the report.

The CPS asked what training was needed to get the current or last job and about training to improve skills on the current job. Thus, the reference job may have begun many years ago or as recently as the past month. To mitigate potential recall errors, our analysis is restricted to people who entered their current jobs in 1959 or later. The CPS questions on training to improve skills refer to the period implied by the phrase "since you obtained your present job." In the analysis of training propensity, we will want to control for this since the individual is exposed to increased training possibilities the longer the time spent on the current job. Fortunately, the survey includes information on years of job tenure. Finally, while the questions allow only two intervals, the current job and all prior jobs, it does allow multiple responses about sources of training--a response is given for each source.[2]

The NLS asked about training taken since the last interview, a fixed period of time. However, the interval may be of varying length (one, two, or five years) depending on the elapsed time since the last interview. As such, we use subsamples based on the length of the reference period, pooling data for reference periods of the same length. Furthermore, because the person may have changed jobs during the interval, been unemployed, and so forth, we will want to control for job changes or entry and exit from the labor force, when they are known. Unlike the CPS, which allows multiple responses, the NLS training questions refer only to the "longest" training event in the interval.

[2]In the analysis of the CPS data, each source of training is treated independently, i.e., we do not estimate the joint probability of getting training from multiple sources.

Therefore, only one event in an interval is known, but there is information on multiple intervals for each person in the panel. This will be an advantage for the analysis of training effects (Sec. IV). The survey points in the three NLS cohorts and their corresponding reference periods for the training questions are shown in Table 2.1.

The EOPP survey elicited information on up to four training events occurring any time between January 1, 1979, and the interview date, which fell primarily between May and September of 1980. The training data, though detailed, are limited by the short time period considered. As in the NLS, people may have changed jobs, been unemployed, or have left the labor force in between reported training events.

The substantive content of the training questions is broadly the same across surveys, with more detail in some than in others. The surveys first ascertained whether any occupational or job-related training had been taken (termed ANY). Then the CPS, NLS, and EOPP asked about the sources of training. By source, we mean where the training was obtained, whether from regular schools, company training programs, informal OJT, business and technical schools, or from "other" sources. The NLS then also asked about types of training. By type, we mean the nature or content of training, which included managerial, professional

Table 2.1

SURVEY POINTS FOR THREE NLS COHORTS

NLS Sample	Length	Survey Years (19--)
Young Men	1-year	67 68 69 70 71 76
	2-year	73 75 78 80
Mature Men	2-year	67 69 71
	5-year	76 81
Mature Women[a]	1-year	69 72
	2-year	71
	5-year	77

[a]Training questions for 1967 and 1979 were flawed and not comparable.

and technical, clerical, semiskilled manual, or "other" types of training. Unlike the other surveys, the CPS also elicited information on the sources of training that respondents felt were important in getting the current or last job. Though clearly subjective, such information may provide insights into the job-related content of training from formal schooling (Sec. III) or the extent to which prior job skills are transferable to new jobs (Sec. IV).

Table 2.2 summarizes the information on the sources and types of training that are reported in each of the different surveys.

OVERALL PATTERNS OF TRAINING

We now turn to an overview of the general level of post-school training, the various forms it takes, and differences among the demographic groups suggested by the five surveys. We examine the training patterns of men and women in each survey separately. Recall that both the CPS and EOPP samples include persons of all ages. The NLS, on the other hand, includes separate surveys for Young Men, Women, and Mature Men aged 14-24, 30-44, and 45-59, respectively, in the first interview year (1966 or 1967). It should be kept in mind that these are more formal dimensions of training and that more informal training and learning on the job are covered less adequately. However, we will see later that these forms of training have real consequences for earnings and employment.

Traditional schooling is the most widely studied source of training. In studies that have looked at post-school training, the research focus has typically been on the effects of school curriculum on labor market outcomes, standardizing for subsequent training events (Grasso and Shea, 1979; Tannen, 1984; Meyer and Wise, 1982). To date, with the exception of the study by Carnevale and Goldstein (1985), our knowledge of post-school job training remains fragmentary.[3] To get a more comprehensive picture of training, we now turn our attention to training of any source or type, in addition to traditional schooling, that various groups receive.

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[3]The Carnevale and Goldstein study uses the 1981 *Survey of Participation in Adult Education* to provide the first broad description of the size and scope of employee training in the United States.

Table 2.2

SOURCES AND TYPES OF TRAINING IN THE THREE SURVEYS

Survey	Sources and Types
	Sources of Training
NLS CPS EOPP	Company schools or courses
NLS EOPP	Business, technical and vocational schools
NLS CPS	Traditional schools, colleges and universities
CPS	Current job: informal OJT
CPS	Past jobs: informal OJT or experience needed to get current job
NLS	Other sources, such as training under Title V or the Manpower Development Act
CPS	Other sources to improve current job skills, such as Armed Forces, correspondence schools; and other sources to get job, such as friends and relatives, or other non-work-related experience
	Type of Training
NLS	Managerial
NLS	Professional and technical
NLS	Clerical--Women only
NLS	Manual, skilled and semiskilled, men only
NLS	Other types, such as nontechnical and general courses not required to obtain a certificate or degree

NOTE: CPS = Current Population Survey; NLS = National Longitudinal Surveys; EOPP = Employment Opportunities Pilot Projects Survey.

First, consider the prevalence of training necessary to get a job. More than half of all men and women in the labor force in the CPS reported that some training was necessary to get their current or last job.[4] (See Table 2.3.)

About one quarter of the CPS sample--and slightly more women than men--reported regular schooling as important, with the proportion rising dramatically with education for each.[5] This suggests that the job-related content of formal schooling rises with the level of education. Informal OJT from prior jobs is of comparable importance, but only 12 percent of men and 8 percent of women thought that previous formal

Table 2.3

PREVALENCE OF TRAINING IN THE CPS: MEN AND WOMEN

Sample	Any Training	Source of Training			
		Regular School	Company	OJT	Other
Training Prior to the Current Job Needed to Get the Current or Last Job					
Men	55.5	22.2	11.7	30.8	8.5
Women	55.0	27.9	7.5	26.0	2.7
Training to Improve Skills on the Current Job (Respondents working at the Survey)					
Men	38.0	13.6	11.6	15.1	5.4
Women	36.7	10.3	13.1	15.1	4.5

SOURCE: January 1983 CPS.

[4] Individuals could report more than one source of training, so that the sum of proportions over all sources adds to more than the proportion reporting any source. Types of training were not ascertained in the CPS survey.

[5] The fraction reporting school training as needed to get a job increases from just under 2 percent for non-high-school graduates to over 79 percent for those with graduate degrees.

company training was needed. Reporting miscellaneous other training sources were 9 percent of men and 3 percent of women. While the overall proportions were the same, women tended to cite regular school and men tended to cite company training and other forms of training.

Table 2.3 suggests that nearly 40 percent of both men and women got training to improve skills on their current job. The proportion rises steadily with tenure on the current job, since the person has been exposed to the possibility of training for a longer period. Note that the following numbers represent an average based on the tenure distribution in the CPS sample. Regular schools, company training, and OJT each are reported 10 to 15 percent of the time as a source of training to improve or upgrade job skills.[6] Clearly, the traditional school system continues to be an important source of job training for workers who have completed their formal schooling. Only about 5 percent reported training from other sources.

Now consider the prevalence of training in fixed-length intervals in the three NLS cohorts. Training information is reported for the longest training event in the interval, the length of the reference period being determined by the survey questions relating to time "since the last survey." These values are reported in Table 2.4 for young and mature men and in Table 2.5 for women with varying degrees of attachment to the labor force.

The proportions reporting any training in the NLS surveys differ among groups substantially more than in the CPS. In part, this may be attributed to age differences across the three NLS cohorts, and changes in training patterns over the life-cycle are likely to be important. Because each NLS group includes a 2 year interval, these are most directly comparable. Young men and career women (who always worked throughout the 12-year panel) have the greatest proportions receiving any training--30 percent and 24 percent, respectively--which is more than twice that of mature men (10 percent). However, a closer examination reveals differences in the kinds of training received by the

[6] 16.5 percent of men and 14.9 percent of women reported multiple sources of training to improve skills. Company training and OJT were the multiple sources most frequently reported jointly.

Table 2.4

PREVALENCE OF TRAINING AMONG NLS MEN
(In percent)

Sample and Time Interval	Any Training	Source of Training				Type of Training			
		Company	Business and Technical School	Regular School	Other	Profes-sional	Manage-rial	Skilled and Semi-Skilled	Other
Young Men									
1 year	24.3	7.6	3.7	3.6	9.4	8.6	2.7	8.2	4.8
2 year	29.7	10.4	5.2	5.2	9.0	11.4	4.0	6.8	7.5
Mature Men									
2 year	10.2	3.3	.4	--	6.4	4.2	2.0	1.7	2.2
5 year	17.2	5.6	1.0	--	10.6	8.9	2.7	2.3	3.4

Table 2.5

PREVALENCE OF TRAINING AMONG NLS WOMEN
(In percent)

Time Interval	Any Training	Source of Training			Type of Training			
		Company	Business and Tech School	Other	Profes-sional	Manage-rial	Clerical	Other
Always Work								
1 year	22.9	3.6	1.1	18.1	10.1	1.6	3.0	6.9
2 year	23.7	3.2	1.3	19.2	9.4	1.5	3.2	8.2
5 year	36.1	7.6	2.9	25.6	19.8	3.8	4.9	5.7
Works Intermittently--Working at Survey								
1 year	16.3	3.0	.8	12.6	6.0	.4	2.1	6.3
2 year	20.1	1.6	.6	17.9	5.2	.4	2.7	9.2
5 year	31.1	4.0	3.6	23.4	14.1	2.2	5.3	6.9
Works Intermittently--Not Working at Survey								
1 year	12.4	.8	.4	11.2	3.2	2.0	1.7	6.0
2 year	9.4	.5	.1	8.8	2.4	.0	1.8	3.8
5 year	18.0	2.4	1.5	14.2	6.4	.2	3.2	6.0
Never Worked								
1 year	5.6	.1	.2	5.3	.5	.1	.6	3.8
2 year	5.0	.0	.5	4.5	1.2	.0	.3	3.2
5 year	10.7	.5	1.0	9.2	2.3	.2	1.6	5.7

different groups. In particular, compared with both young and mature men, a smaller fraction of career women reported getting company or managerial training, and the prevalent source of training was from unspecified "other" sources.[7]

In general, the proportion reporting any training increases with the length of the interval, but not even close to proportionately. Moving from a 1-year to a 2-year interval, young men reported a greater increase than women; and moving from a 2-year to a 5-year interval, mature men report a greater increase (proportionately) than mature women.

Briefly consider women who are less attached to the labor force than career women. Those women who did not work at any time (except possibly once) through the panel years reported very little training. The training they did report tended to be of the miscellaneous "other" source or type. Some women work intermittently, entering and exiting the labor force frequently. These women had training patterns much like those of career women in the periods in which they worked, and reported patterns somewhat like those of women who never worked in the periods in which they (the same women) did not.

Turning to the disadvantaged (EOPP) sample, only about 11 percent of men and women reported getting training from any source. (See Table 2.6.) These proportions pertain to a reference period of approximately 17 to 21 months, and are therefore most comparable to the NLS 2-year intervals. While the proportion getting business and technical school training is roughly comparable to those in the other groups, only a small percentage report OJT. In fact, their training experience most closely resembles that of the sample of NLS women with low attachment to the labor force.

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[7]Cross-tabulations of training by source and by type (not reported here) are informative about the sources of various types of training in the NLS. Nearly half of managerial training is provided by company sources, the proportion being a bit lower for women. The remainder comes from ambiguous "other" sources, with relatively little coming from business, technical, and vocational schools. Surprisingly little professional training comes from business, technical and vocational schools. A much larger share comes from company schools, but most comes from other sources.

Table 2.6

PREVALENCE OF TRAINING AMONG DISADVANTAGED WORKERS

Sample	Any Training	Source: Business and Technical School	Source: OJT	Source: Other
Men	10.9	4.0	2.6	4.6
Women	12.0	4.4	2.3	5.7

SOURCE: EOPP.
NOTE: Interval length is between 17 and 21 months.

Let us return to the issue of the training taken over successively longer intervals of time. We have provided some insights from the NLS Young Men sample. Table 2.7 shows the probability of engaging in training other than from regular schools, over intervals several periods (years) long.[8] The period begins with the first observed period of work--either upon completion of full-time schooling (upper panel of the table) or the first period observed already working (lower panel). Reading across columns, the first row reports the proportion receiving no training. In the upper panel, this figure declines from over 86 percent in the first year of work to 33 percent after nine periods (survey years). Reading down the rows, after (say) 5 periods, the table suggests that about 54 percent receive training in at least one period; over 28 percent report at least two training episodes. These training patterns are mirrored for the sample in the lower panel.

[8]Each individual enters the calculation several times, until he either drops out of the sample or reaches the maximum length of his longest interval of continuous participation in the panel. Note that the NLS youth in the upper and lower panels are mutually exclusive and exhaustive samples.

Table 2.7

MULTIPLE TRAINING EVENTS IN THE NLS: YOUNG MEN

Number of Periods in which Received Training	Number of Potential Periods of Work								
	1	2	3	4	5	6	7	8	9
	From First Period of Full-Time Work								
None	86.2	72.5	59.7	51.6	45.9	44.0	38.5	35.2	33.0
1	13.8	21.8	25.5	26.1	25.6	23.5	26.4	18.8	17.6
2		5.7	11.2	13.5	15.1	16.2	15.4	23.2	18.5
3			3.6	7.2	8.5	9.3	9.1	8.9	12.9
4				1.6	4.3	4.3	6.1	8.3	9.9
5					0.6	5.5	3.1	2.9	5.2
6						0.3	1.2	1.6	2.6
7							0.2	1.0	0.4
8								0.3	
Sample size	1870	1540	1298	1078	867	680	519	384	233
	From First Period Observed, Already Working								
None	90.0	78.0	67.7	59.4	53.9	46.5	41.8	37.2	32.6
1	10.0	17.4	22.3	23.2	23.2	24.8	24.8	25.0	22.8
2		4.7	7.5	11.2	12.0	12.9	13.0	14.2	15.7
3			2.6	4.9	7.0	7.9	9.2	9.4	10.3
4				1.3	3.4	5.6	6.3	6.5	8.1
5					0.6	2.1	3.6	4.2	4.2
6						0.2	1.3	2.8	4.0
7								0.7	1.6
8								0.1	0.6
9									0.1
Sample size	2719	2343	2036	1874	1751	1598	1486	1343	1210

SOURCE: NLS Young Men.

What do these patterns look like when the data are disaggregated by source and type of training? Several patterns of training over time are revealed in Table 2.8. If we exclude miscellaneous sources, company training programs are the largest source of training. The upper panel indicates that the cumulative probability of receiving any company

training rises steadily, to over 27 percent by the ninth year in the labor market. Over the same interval, about 20 percent get training in business and technical schools, but most of the increase is concentrated in the first five years. Perhaps because these are skills useful to many firms, employers have few incentives to provide general training and individuals must get (and pay for) this training themselves prior to joining the firm or early in their careers (Becker, 1975).

The cumulative probabilities of getting different types of occupational training are displayed in the lower panel of Table 2.8. Professional and technical training is by far the commonest form of

Table 2.8

TRAINING OVER EXTENDED PERIODS OF TIME: PERCENT RECEIVING TRAINING OVER GIVEN INTERVALS, BY SOURCE AND TYPE OF TRAINING

Sources and Types	Number of Potential Periods of Work								
	1	2	3	4	5	6	7	8	9
Source of training									
Company	3.1	8.2	15.0	20.2	24.2	27.5	29.5	34.9	36.9
Business or technical	1.7	7.2	10.8	13.1	15.1	15.9	17.7	18.5	19.7
Miscellaneous other	5.3	3.5	21.3	26.9	31.5	32.2	36.1	39.9	44.0
Type of training									
Managerial	.5	3.2	5.9	7.3	9.0	10.0	11.2	16.4	19.7
Professional technical	2.2	17.8	27.3	32.6	38.8	38.8	40.8	43.7	46.8
Semiskilled manual	5.4	7.9	11.4	15.0	19.1	21.0	23.5	25.3	26.2
Miscellaneous other	3.2	7.8	13.4	16.8	19.0	22.4	25.6	27.3	32.3

SOURCE: NLS Young Men.

training reported, and managerial training the least common. Professional and technical training tends to be concentrated early in the career. The probability of managerial training is low initially, but rises over time, as might be expected if long promotion times are required to attain managerial rank.

SUMMARY

The surveys provide a wealth of detail on the training experiences of different demographic groups. While there are important differences in the nature and form of the training questions asked, they overlap and permit comparisons of the magnitude and sources of training across surveys. Taken together, these surveys provide a much broader perspective on the dimensions of training than is available with any one data source.

This brief overview revealed several important stylized facts about the magnitude and composition of post-school training received by the different demographic groups.

First, almost 40 percent of men and women report having taken some training to improve existing skills while on the current job.

Second, over a fixed time interval, young men and career women received more training than mature men, which is consistent with a life-cycle pattern of training predicted by human capital theory. However, a smaller fraction of career women receive company or managerial training than of either cohort of young or mature men.

Third, women with intermittent labor market experience receive little training, and when they do, much of it is from miscellaneous "other" sources.

Finally, the economically disadvantaged group is characterized by a low likelihood of training, much like the sample of women with weak attachment to the labor force.

III. THE DETERMINANTS OF TRAINING

Several patterns of training emerged from the overview in Sec. II. First, career women in the NLS appear to receive relatively less company and managerial training and more of other kinds of training than do young or mature men. These differences are not apparent in the CPS samples, at least for training sources. Second, relative to other groups, a smaller proportion of the disadvantaged (EOPP) group report getting any training, and those that do receive relatively less company training. Finally, as much as a third of the young men in the NLS get no training, even after nine survey periods, while many report getting multiple training events.

To determine the reasons for those differences, this section explores the factors that determine the probability of getting training in a fixed interval (NLS and EOPP surveys) or over a variable reference period (time on the current job in the CPS). For each sample, we estimate separate probit models for each source and type of training.[1] As suggested in Sec. II, economic forces are likely to affect individual or employer decisions to take or provide the various kinds of training.

Each probit model includes a common set of regressors on schooling, race, labor force experience, the industry rate of technical change, and local and national labor market conditions. Schooling effects are captured by separate variables for each of five levels of educational attainment: less than 12, 12, 13-15, 16, and more than 17 years of school. Ethnic origin is controlled for using an indicator variable, NONWHITE, with a value of 1 if nonwhite, 0 otherwise. Two measures of labor market experience are included: years on the current job and years of potential labor market experience, the latter being computed as age minus years of schooling minus 5.[2]

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[1]Thus, as noted earlier, we do not estimate the joint probability of training from multiple sources (CPS), or of multiple training episodes over time (NLS).

[2]As is widely known, this potential experience measure is an especially poor measure of actual work experience for women who exit and enter the labor force more frequently than do males. For the NLS Young Men sample, only years of potential work experience is included. Close

Technical change plays a central role in our analysis. The perspectives on technical change, and its relationship to training requirements, come from research by Tan (1980, 1986). The argument is that many job-relevant skills are technology-specific, and are acquired through working with particular production technologies and specialized equipment. As technological change advances, technology-specific skill requirements also grow apace. To the extent that few of these skills are readily available outside the firm, we might expect the demand for in-house company training to increase with the industry rate of technical change. Second, it has been argued that workers with more education are more adept at critically evaluating new information, and therefore respond to technical change more readily (Welch, 1970). This "allocative efficiency" of schooling hypothesis suggests that innovative firms in high-technology industries are more likely to use highly educated and technically skilled workers.

To test these hypotheses, we use the measures of technical change developed by Gollop and Jorgenson (1980) for the most recent period available at the time of this study, 1966-1973. The measures are derived from CRS (constant returns to scale) translog production functions, which include as inputs both quality-adjusted indices of capital and labor and intermediate products. They are available for 45 two- and three-digit industrial groupings. Using these indices of technical change, jobs may be characterized as being more or less "technologically progressive." We interact the technical change measures with schooling attainment. This allows us to investigate the (potentially different) relationships between technical change and the likelihood of getting training for more and less educated workers.

The role of local labor market conditions is considered in a limited way. Ideally, we would consider the separate effects of both cross-sectional and local time series labor market conditions as in Lillard (1981, 1986). However, data limitations restrict what can be done. While the CPS identifies the state in which an individual lives,

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examination of the imputed job-tenure variable (respondents were not asked job tenure directly in many years) revealed the measure to be quite deficient.

the training questions are for a variable length of time determined by the person's current job tenure. Therefore, we use only the state indices of labor market conditions developed in the Lillard study. These are the cyclic sensitivity of the state to national unemployment cycles (denoted RHAT) and the state's relative long-run unemployment level (denoted SHAT). While the NLS training variables are for a well-defined period of time, the state of residence of the individual is not available. Therefore, we use the national unemployment rate as an aggregate measure of labor market conditions.

Other demographic control variables include region of residence, and, for young men and women in the NLS, measures of job change or labor force attachment when available. For the CPS the regions include South, North East, North Central, and West (the omitted category). For the NLS the regions are simply South and Non-South (the omitted category) because that is all the locational information available.

We begin with an exploration of the determinants of training from regular school sources. As shown in Sec. II, a sizeable fraction of persons continue to get training from traditional schools even after entering the labor force. This is followed by an analysis of training from sources other than regular schools: company training programs, informal OJT (CPS), business and technical schools, and other sources. For the NLS surveys, probit estimates for types of training--managerial, professional and technical, semiskilled manual, and other types--are also reported. We then briefly examine the training experiences of the disadvantaged EOPP sample, before concluding with a summary of the main findings.

REGULAR SCHOOLS AS A TRAINING SOURCE AFTER BEGINNING WORK

Here we consider regular school training obtained after beginning work for young men in the NLS, and to improve job skills on the current job for men and women in the CPS.[3]

[3]In the other NLS surveys of women and mature men, and in the EOPP survey, no information was elicited on training from regular school sources.

Individuals may get training from regular schools for different reasons: to complete interrupted full-time schooling, to acquire additional job-related skills, or both.[4] The CPS does not distinguish between these motives. For the NLS, we exploit the panel nature of the survey to create two control variables, SCHWRK and SCHWRKT. The first is an indicator variable, with a value of 1 if the individual attains a higher level of schooling over the panel after beginning full-time work, 0 otherwise. Conditional on SCHWRK, the second variable indicates whether the reference period falls within the interval in which the person is completing school. In this schema, those who get regular school training but do not increase their level of schooling (SCHWRK = 0) are interpreted as getting training to improve job skills.[5]

Before turning to the analysis, some broad figures on the extent of regular school training are useful. First, 3.6 percent of young men reported regular schooling as a training source in a 1-year period, and 5.2 percent in a 2-year period. However, remember that these training events are for the "longest" event in the interval and may not be associated with the same employer. Second, consider regular school training to improve job skills in the CPS. Since obtaining their current jobs, 3.4 percent of both men and women reported taking training from this source. However, since the CPS training question implies a cumulative period of exposure, the probability of training (of any kind) should increase with job tenure, and it does.

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[4]Standard models of human capital investment predict that full-time schooling should occur as early as possible in the life cycle. However, as a practical matter, students must sometimes interrupt full-time schooling or finish school on a part-time basis. This is especially true of college or graduate schooling. For those young men in the NLS who completed college during the panel period 1967-1980, 35 percent found it necessary to interrupt their schooling with a period of "work as primary activity" before finishing college. For those who experienced a gap, approximately 80 percent finished college in 4 years or less, and only 2.5 percent took more than 6 years. Of college graduates, approximately 44 per cent completed some graduate schooling. Only 20 percent of this group managed to complete their formal education without interruption before starting work as their main activity.

[5]This would include those taking one or two courses without credit in a regular school as well as those failing to complete course work for a higher degree.

Tables 3.1 and 3.2 report the relationship of training from regular school sources to covariates for the CPS and NLS samples, respectively. The results are quite similar for men and women in the CPS, and between them and the young men in the NLS.

The probability of receiving regular school training increases with the level of schooling attainment, with a much higher likelihood of training for those with postgraduate degrees. These relationships are not only highly significant statistically in the CPS, but also are very similar for both men and women. Highly educated women, however, are more likely than men to obtain additional training from this source. Broadly similar results are also found in both the 1-year and 2-year NLS samples. For NLS young men, completion of interrupted schooling appears to be an important motive for training, as suggested by the positive and significant coefficient on the SCHWRK variable. This group, however, is also more likely to get other forms of training (see Appendix), which may indicate that SCHWRK is also picking up the effects of unobserved ability or motivation.

Interestingly, the probability of regular school training is diminished in industries associated with high rates of technological change. Again, this relationship is statistically significant in the CPS samples, especially for women. In the NLS, this relationship is especially pronounced at the postgraduate level. Taken at face value, this result might be interpreted as a repudiation of the "allocative efficiency" of schooling hypothesis. However, two points should be noted. First, regular schools are only one source of training; other sources exist, both within the firm and outside. Second, and more important, the hypothesized skill requirements are for more job-specific skills in rapidly changing industries, a demand not likely to be met from regular school sources. And it is not, as suggested by this result. Indeed, this is part of an overall pattern of the effects of technical change on training requirements to be discussed later.

Other job characteristics appear to affect the likelihood of training, but for reasons that are unclear. For example, union jobs are associated with more regular school training (statistically significant for the CPS samples), while the self-employed group reported less of

Table 3.1

REGULAR SCHOOLS TO IMPROVE CURRENT JOB SKILLS: CPS MEN AND WOMEN

Variable	Men	Women
Constant	-1.814 ***	-1.603 ***
	(0.082)	(0.083)
Schooling <12 years	-0.514 ***	-0.457 ***
	(0.075)	(0.090)
Schooling 13-15 years	0.464 ***	0.543 ***
	(0.043)	(0.042)
Schooling 16 years	0.618 ***	0.670 ***
	(0.047)	(0.052)
Schooling 17+ years	1.044 ***	1.288 ***
	(0.045)	(0.058)
Technical change interaction		
Schooling <12 years	-4.135	-41.748 ***
	(6.029)	(10.009)
Schooling 12 years	-9.999 ***	-28.146 ***
	(2.912)	(3.329)
Schooling 13-15 years	-11.506 ***	-15.350 ***
	(3.128)	(3.427)
Schooling 16 years	-11.356 ***	-21.970 ***
	(3.151)	(5.615)
Schooling 17+ years	-14.588 ***	-37.254 ***
	(3.766)	(7.932)
Nonwhite	-0.192 ***	-0.200 ***
	(0.061)	(0.054)
South region	-0.107 **	-0.082 *
	(0.045)	(0.047)
North East region	-0.190 ***	-0.199 ***
	(0.054)	(0.057)
North Central region	-0.014	-0.033
	(0.045)	(0.049)
Union member	0.151 **	0.344 ***
	(0.059)	(0.067)
Union missing	-0.008	0.029
	(0.035)	(0.036)
First 5 years of work	0.100 **	-0.100 *
	(0.045)	(0.051)
Potential work experience	-0.002	-0.006 **
	(0.002)	(0.002)
Years of job tenure	0.034 ***	0.046 ***
	(0.003)	(0.003)
Self-employed	-0.170 ***	-0.077
	(0.053)	(0.069)
SHAT (long-run state unemployment rate)	-1.104	2.033
	(2.882)	(2.829)
RHAT (cyclical sensitivity of state unemployment)	0.089 *	-0.003
	(0.047)	(0.050)

SOURCE: January 1983 CPS.
NOTE: Probit specification, standard errors in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Table 3.2

TRAINING FROM REGULAR SCHOOL SOURCES--NLS YOUNG MEN

Variable	Interval length	
	1-Year	2-Year
Constant	-2.236 *** (0.111)	-1.904 *** (0.134)
Schooling <12 years	-0.146 ** (0.075)	-0.371 *** (0.094)
Schooling 13-15 years	0.298 *** (0.061)	0.189 *** (0.063)
Schooling 16 years	0.308 *** (0.081)	0.374 *** (0.069)
Schooling 17+ years	0.704 *** (0.070)	0.567 *** (0.066)
Technical change interaction		
Schooling <12 years	1.675 (5.703)	-0.547 (5.925)
Schooling 12 years	-8.712 ** (3.490)	-3.683 (3.340)
Schooling 13-15 years	-5.186 (3.426)	-4.057 (3.674)
Schooling 16 years	-3.107 (7.266)	-4.520 (4.706)
Schooling 17+ years	-17.455 *** (5.869)	-12.277 *** (4.417)
Nonwhite	-0.138 ** (0.056)	-0.046 (0.056)
South region	-0.101 ** (0.047)	-0.107 ** (0.045)
Union member	0.041 (0.071)	0.007 (0.075)
Union missing	-0.144 ** (0.068)	-0.077 (0.068)
First 5 years of work	0.181 *** (0.066)	0.039 (0.067)
Potential work experience	0.005 (0.008)	-0.008 (0.006)
Changed job in interval	-0.049 (0.050)	-0.059 (0.048)
Job change missing	-0.036 (0.063)	0.128 ** (0.060)
SCHWK (school completion)	0.200 *** (0.054)	0.150 *** (0.050)
SCHWKT (period in school completion interval)	-0.036 (0.062)	0.159 ** (0.066)
NUR (national unemployment rate)	0.042 ** (0.016)	0.021 (0.013)

SOURCE: NLS Young Men.
NOTE: Probit specification, standard errors in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

this source of training. For the latter, one might speculate that to the extent that employers use formal schooling as a screening device, the self-employed would have few incentives to invest in such credentials.

Consistent with the prediction of standard human capital models, most training from regular schools is concentrated early in the work career. Workers who were in their first five years in the labor force when they first got the current job (CPS), or who are currently in the first five years (NLS), are more likely to report regular school training. This probability declines with potential work experience, namely, as these times occur later in the work career. As time in the current job increases, the probability rises but that is to be expected since the person is exposed to training possibilities for a longer period of time. In the NLS, the coefficient of potential work experience is positive but not significant, possibly reflecting the net (and opposite) effects of labor market experience and unmeasured job tenure.

Three other determinants of regular school training are noteworthy. First, nonwhite workers (NONWHITE) are significantly less likely to get training, by about 20 percent for both men and women in the CPS, and by a smaller amount among youth in the NLS. As we shall see, this race effect persists as well for other sources and types of training. Second, important regional variations in training are found: lower in the South, and greatest in the West. Finally, NLS young men are more likely to report getting school training in years of high national unemployment rates (NUR). One possible interpretation is that the incentives for training (or retraining) are greater when the opportunity cost of time is low, i.e., in times of slack economic activity. No significant effects of local labor market conditions (SHAT and RHAT) on training are found for the CPS samples.

TRAINING FROM SOURCES OTHER THAN REGULAR SCHOOL

Training from sources other than regular schools include training from company programs, informal OJT (reported in the CPS), business and technical schools, and other sources. In the NLS, we also distinguish between sources and types of training, the latter including managerial, professional and technical, semiskilled manual, and other training types.

As noted in Sec. II, the bulk of training reported after beginning work comes from these sources. Beneath these aggregate figures, however, important differences in the composition of training are found across the various demographic groups, and across surveys. For example, NLS young men are more likely than career women to get company training, and the disadvantaged EOPP sample report informal OJT less frequently than other groups in the CPS. Our objective here is to gain insights into the causes for these differences, focusing in particular on the role of schooling, technical change, race, and local and national economic conditions. The effects of other control variables are broadly similar to those reported earlier for regular school sources, and are not elaborated on here.

As before, we estimate probit models of the likelihood of getting training from each source, and, for the NLS, an additional set of estimates for training by type. In addition, we distinguish between the CPS questions on training needed to get the current job and training to improve job skills. For each population, a comprehensive set of regressors are included to control for worker characteristics, the industry rate of technical change, and local labor market or national economic conditions. In the discussion that follows, we summarize the effects of the most important regressors on the likelihood of getting training. The probit estimates on which these figures are based are reported in full in the Appendix.

Schooling

The effects of schooling on training probability are reported in Tables 3.3 and 3.4 for the CPS and NLS samples, respectively.

As before, formal schooling emerges as an important determinant of most post-school investments in training. In fact, both sources of "training" are strongly complementary. Compared with high school graduates (the omitted group), the probability of getting most kinds of training rises with education to a peak at 16 years or less of schooling. The only exception, training from "other" sources, rises steadily with schooling much like the earlier result for regular school training. These results are qualitatively quite similar for men and women in the CPS (Table 3.3), and between them and the three NLS populations (Table 3.4). One implication of this complementarity is that people with limited formal schooling also face limited training opportunities in the workplace, and lower future productivity and income growth.

Table 3.3

EFFECTS OF EDUCATIONAL ATTAINMENT ON THE PROBABILITY OF TRAINING, BY SOURCE: CPS MEN AND WOMEN

	CPS MEN			CPS WOMEN		
Educational Attainment	Company Training	Informal OJT	Other Sources	Company Training	Informal OJT	Other Sources
Schooling <12 years	-0.483 *** (0.059)	-0.076 * (0.046)	-0.392 *** (0.090)	-0.414 *** (0.076)	-0.095 * (0.055)	-0.568 *** (0.129)
Schooling 13-15 years	0.229 *** (0.040)	0.102 *** (0.038)	0.317 *** (0.059)	0.242 *** (0.041)	0.081 ** (0.037)	0.103 * (0.056)
Schooling 16 years	0.478 *** (0.043)	0.116 *** (0.043)	0.552 *** (0.062)	0.373 *** (0.051)	0.099 ** (0.047)	0.410 *** (0.063)
Schooling 17+ years	0.308 *** (0.045)	-0.051 (0.046)	0.832 *** (0.057)	0.301 *** (0.061)	-0.116 * (0.062)	0.265 *** (0.098)

NOTES: In the CPS, training refers to training to improve skills in current firm of employment. The omitted group are high school graduates with 12 years of schooling. Standard errors of probit estimates in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Table 3.4

EFFECTS OF EDUCATIONAL ATTAINMENT ON THE PROBABILITY OF TRAINING, BY SOURCE: NLS YOUNG MEN, MATURE MEN, AND CAREER WOMEN

	Young Men			Mature Men			Career Women		
Educational Attainment	Company Training	Business and Technical Schools	Other Sources	Company Training	Business and Technical Schools	Other Sources	Company Training	Business and Technical Schools	Other Sources
Schooling <12 years	-0.437 *** (0.068)	-0.522 *** (0.084)	-0.385 *** (0.068)	-0.331 *** (0.070)	-0.154 (0.172)	-0.285 *** (0.056)	-0.232 (0.179)	0.418 (0.378)	-0.270 ** (0.106)
Schooling 13-15 years	0.301 *** (0.046)	0.047 (0.054)	0.186 *** (0.047)	0.190 ** (0.079)	0.177 (0.191)	0.279 *** (0.069)	0.236 * (0.135)	0.248 (0.369)	0.376 *** (0.091)
Schooling 16 years	0.454 *** (0.054)	-0.229 *** (0.072)	0.203 *** (0.057)	0.106 (0.113)	0.547 *** (0.191)	0.401 *** (0.087)	0.058 (0.209)	0.312 (0.622)	0.893 *** (0.140)
Schooling 17+ years	0.261 *** (0.054)	-0.066 (0.062)	0.360 *** (0.052)	-0.076 (0.108)	0.047 (0.285)	0.625 *** (0.079)	-0.067 (0.245)	-0.224 (7.612)	1.105 *** (0.265)

NOTES: Probit estimates for 2-year intervals in the case of young and mature men, and for 1-year intervals for career women. Standard errors are enclosed in parentheses. The omitted group are high school graduates with 12 years of schooling.

* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Increases in the level of schooling also have quantitatively different effects on training likelihood, varying by source of training and across various subgroups. We discuss each of these in turn.

First, compared with men, higher schooling among CPS women is associated with smaller increases in the probability of training from any source except, as noted earlier, additional training from regular school sources. For example, relative to high school graduates (the omitted group), female college graduates are only .37 percent more likely to get company training as compared with .48 percent for their male counterparts. Unlike their male counterparts, women graduates report training from "other" sources as the only statistically important source across education groups, the one exception being a greater likelihood of company training for college graduates.

A comparison of NLS young and mature men also points to important life-cycle training patterns among various educational groups, especially with regard to company training. The likelihood of company training is significantly higher for more educated young men in the NLS, differences not apparent among NLS mature men. This training pattern is consistent with, and may explain, observed wage profile differences among schooling groups reported in the literature in which the more educated experience higher rates of wage growth (Mincer 1974).

Finally, mature college graduates in the NLS get more training from business and technical schools than do their younger counterparts. Plausibly, this may reflect a greater demand among older workers for retraining and skill-upgrading.

Technological Change

How does technological change affect skill requirements? Earlier, it was noted that the likelihood of regular school training was lower in jobs characterized by rapid technological change, especially for the most educated. We pursue this line of questioning for each source and type of training, using the same specification of technological change interacted with level of schooling attainment. In addition, using the CPS we examine the issue of how transferable prior job skills are across jobs, and whether this relationship (if any) is affected by the rate of technological change in the current job.

Tables 3.5, 3.6, and 3.7 summarize the effects of technological change for the CPS and NLS samples. Table 3.5 reports the results for the CPS of two kinds of training questions: training needed for or important to getting the current job, and training to improve current job skills. Tables 3.6 and 3.7 include both source and type of training for the three NLS groups.

A strikingly similar pattern of technological change effects on skill requirements is found in all five samples of men and women in the CPS and NLS. First, note that company training to improve skills is significantly more prevalent for the most highly educated in high-tech industries: postgraduates among CPS males (Panel A of Table 3.5) and NLS mature men (Panel B, Table 3.6), and NLS youth with 16 or more years of schooling (Panel A). We adopt the term "high-tech" for brevity even though it is not strictly correct. With variations, the result holds as well for female workers. In high-tech industries, CPS women with 17 or more years of schooling are more likely to get company training, while those with a high school education or less are significantly less likely to do so (Panel B, Table 3.5). This pattern of company training is repeated among NLS career women (Table 3.7).

Surprisingly, less formal kinds of company training in the CPS are not related to the rate of technical change. Only male high school graduates are significantly more likely to get informal OJT in high-tech industries; no systematic pattern of informal OJT is found for other schooling groups or for women. It appears that informal OJT is poorly recalled and reported, except perhaps when the respondent perceives it to be important (see below).

In contrast, training (taken to improve skills, in the CPS) from sources other than the employer is less prevalent in high-tech industries. In the CPS samples, four out of five technical-change/schooling interactions for training from "other" sources are negative, several significantly so. Similarly, in the NLS the likelihood of training from business and technical schools or "other" sources is generally diminished in high-tech industries, with the more educated being less likely to get such training.

Table 3.5

EFFECTS OF TECHNOLOGICAL CHANGE ON THE PROBABILITY OF TRAINING, BY SOURCE: MEN AND WOMEN IN THE CPS

Educational Attainment	Training Needed to Get Current Job			Training to Improve Job Skills		
	Company Training	Informal OJT	Other Sources	Company Training	Informal OJT	Other Sources
			A. CPS Men			
Schooling <12 years	-5.106 (4.469)	-4.213 (2.695)	-9.854 *** (3.798)	1.925 (4.539)	-1.200 (3.131)	2.822 (7.712)
Schooling 12 years	-4.980 ** (1.955)	-7.058 *** (1.725)	-3.202 (2.347)	0.408 (2.323)	5.525 *** (2.124)	-9.097 ** (3.800)
Schooling 13-15 years	-5.512 ** (2.738)	-2.596 (2.337)	-7.850 ** (3.124)	2.878 (2.736)	-0.809 (2.823)	-0.306 (4.151)
Schooling 16 years	-6.472 ** (2.981)	0.520 (2.874)	3.005 (4.067)	3.561 (2.984)	-0.561 (3.358)	-3.261 (4.311)
Schooling 17+ years	-0.311 (4.894)	14.338 *** (3.632)	-2.083 (5.734)	15.322 *** (3.951)	6.632 (4.487)	-8.307 (5.411)
			B. CPS Women			
Schooling <12 years	-24.843 *** (6.595)	6.782 * (3.853)	-3.786 (8.168)	-23.692 *** (8.936)	2.337 (4.620)	-46.897 ** (20.172)
Schooling 12 years	-16.008 *** (3.140)	-3.469 * (2.055)	-4.424 (4.149)	-14.787 *** (2.824)	-2.191 (2.487)	-23.260 *** (4.239)
Schooling 13-15 years	-9.553 ** (3.875)	-5.639 * (3.132)	-0.331 (5.649)	-5.505 (3.628)	-2.988 (3.636)	-13.579 *** (4.838)
Schooling 16 years	6.569 (5.558)	6.514 (4.920)	7.717 (8.901)	0.091 (4.900)	2.282 (5.283)	4.687 (6.625)
Schooling 17+ years	-4.699 (10.039)	25.745 ** * (7.046)	13.223 (11.348)	18.435 ** (8.170)	7.627 (9.927)	-27.000 (18.085)

NOTE: Standard errors of probit estimates in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Table 3.6

EFFECTS OF TECHNOLOGICAL CHANGE ON THE PROBABILITY OF TRAINING, BY SOURCE AND TYPE: MALES IN THE NLS

Educational Attainment	Source of Training			Type of Training		
	Company Training	Business and Technical Schools	Other Sources	Managerial	Professional and Technical	Skilled and Semiskilled
A. NLS Young Men						
Schooling <12 years	4.250 (4.621)	18.005 *** (5.364)	7.035 (5.431)	9.938 (10.018)	9.914 (7.361)	15.638 *** (4.486)
Schooling 12 years	1.250 (2.465)	-4.796 * (2.715)	-5.062 * (2.620)	-1.498 (4.524)	-2.545 (2.699)	-4.675 ** (2.221)
Schooling 13-15 years	0.283 (2.583)	-3.219 (3.124)	-7.542 ** (2.956)	5.064 (3.709)	-3.153 (2.746)	-9.867 *** (2.909)
Schooling 16 years	9.866 *** (3.351)	-6.554 (4.820)	-8.612 * (4.624)	10.435 ** (4.931)	-6.851 ** (3.353)	4.132 (4.850)
Schooling 17+ years	16.877 *** (3.462)	0.302 (4.550)	-13.354 *** (4.305)	20.738 *** (4.235)	-10.974 *** (3.428)	-0.018 (6.630)
B. NLS Mature Men						
Schooling <12 years	0.767 (3.720)	6.104 (11.073)	-0.554 (2.941)	6.618 (4.901)	-6.983 (5.385)	n.a.
Schooling 12 years	-5.976 (4.752)	8.708 (9.873)	-3.273 (4.136)	-1.184 (5.989)	-11.809 ** (4.931)	n.a.
Schooling 13-15 years	-1.232 (4.967)	-6.039 (11.804)	-17.600 *** (5.263)	-3.662 (8.691)	-11.630 ** (4.544)	n.a.
Schooling 16 years	-4.346 (8.660)	-17.591 (24.302)	-15.266 ** (7.075)	-3.528 (11.015)	-16.202 ** (6.962)	n.a.
Schooling 17+ years	32.111 *** (7.226)	-16.564 (25.753)	-5.786 (6.792)	34.462 *** (8.138)	-11.501 (7.520)	n.a.

NOTES: Probit estimates are for 2-year intervals. Standard errors in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Table 3.7

EFFECTS OF TECHNOLOGICAL CHANGE ON THE PROBABILITY OF TRAINING, BY SOURCE AND TYPE: CAREER WOMEN IN THE NLS

	Source of Training			Type of Training		
Educational Attainment	Company Training	Business and Technical Schools	Other Sources	Managerial	Professional and Technical	Clerical Training
Schooling <12 years	-15.968 (12.218)	-14.184 (34.298)	-16.084 ** (7.314)	-4.090 (231.742)	-31.436 ** (15.366)	-1.266 (19.064)
Schooling 12 years	-26.475 ** (10.210)	32.934 ** (15.941)	-17.349 *** (5.726)	-52.363 *** (14.528)	-30.165 *** (8.128)	1.996 (7.970)
Schooling 13-15 years	12.051 (11.649)	11.019 (57.907)	-11.984 (8.478)	28.358 * (17.170)	-5.956 (9.096)	5.296 (14.461)
Schooling 16 years	60.916 ** (30.968)	-0.144 (117.136)	-27.543 (21.719)	76.039 (56.766)	-19.942 (21.828)	-5.134 (90.961)
Schooling 17+ years	80.704 *** (26.109)	-66.865 (1682.919)	-97.568 * (55.354)	175.313 *** (14.685)	-51.023 (43.448)	94.234 (76.023)

NOTES: Standard errors in parentheses. Probit estimates are for 1-year intervals.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Together, both these and previous results for regular school training provide important insights into the skill requirements that are associated with technological change. They make two points: first, that industries experiencing rapid technological change rely significantly more on training from in-house sources than on outside training, possibly because skills specific to new technologies are not readily available outside the firm; and second, that company training is especially prevalent among the most educated workers in high-tech firms, and training from outside sources the least common. Both results lend strong empirical support for Tan's (1980, 1986) model of technology-specific skills and Welch's (1970) hypothesis of the allocative efficiency of schooling.

Additional information about types of training are reported in the NLS surveys (see Tables 3.6 and 3.7). Two points stand out in comparing the likelihood of managerial and of professional and technical training across samples. First, high-tech firms are associated with a greater probability of managerial training, especially for the most educated workers. Second, professional and technical types of training are generally less prevalent in high-tech industries, but the relationship varies across different schooling groups in the three samples; it is significantly negative for the most educated youth and for the least educated women.

To what may we attribute these results? One intuitive explanation is suggested by the sources of these types of training. Employers provide just under half of all reported managerial training and only 15 to 30 percent of all professional and technical types of training.[6] Not implausibly, one may characterize managerial training as being more firm-specific, and professional and technical skills as being more general in nature, i.e., equally useful to a number of different employers. As technological change grows apace, requirements for more firm-specific

[6]Among young men, about 52 percent of managerial training and 30 percent of professional/technical training come from company sources. The corresponding proportions for mature men and career women are 48 and 30 percent, and 45 and 15 percent, respectively. Thus, between 50 and 85 percent of professional/technical training is provided by sources other than the employer.

(or technology-specific) managerial skills are also likely to rise relative to the demand for other general types of skills.

Other insights into the relationship between skill-specificity and technical change may be gleaned from questions in the CPS on the sources of training thought to be important (or needed) to get the current job. How transferable is training from prior jobs? Table 3.5 suggests that with a few exceptions, transferability of training from most sources is diminished when new jobs are found in industries characterized by high rates of technical change. In sharp contrast to the earlier finding, both men and women working in high-tech industries are significantly less likely to report that previous company training and informal OJT was important. Only among postgraduates--presumably the group most involved in R&D--is previous OJT important, i.e., transferable.

Clearly, the kinds of training information that we have explored here are capable of yielding important insights into the skill requirements needed for technological change.

Race

How likely are nonwhites to get training as compared with whites? We address this question in a limited way by including an indicator (0,1) variable, NONWHITE, in each probit estimate of training by source and type. Thus, for example, we do not explore race difference in training by schooling attainment or across high-tech and low-tech firms. That analysis would require estimating separate probit models for each ethnic group, a task beyond the scope of this study. Table 3.8 summarizes the net effects of race on the likelihood of training in the five surveys.

With few exceptions, nonwhite males are significantly less likely than white to get most kinds of post-school training, even after controlling for a comprehensive set of observable worker attributes, labor market experience, and job characteristics. This result is especially striking, and statistically significant, for company training and "other" training sources, and for managerial and professional/technical types of training. Interestingly, the race difference in training probability is quantitatively less pronounced for young men than for mature men in the NLS or, for that matter, males of all ages in the CPS.

Table 3.8

EFFECTS OF NONWHITE RACE ON THE PROBABILITY OF TRAINING, BY SOURCE AND TYPE

A. Source of Training

Group	Company Training	Informal OJT	Business and Technical Schools	Other Sources
CPS males	-0.250 ***	-0.012	n.a.	-0.226 ***
	(0.056)	(0.048)		(0.085)
CPS females	-0.142 ***	0.017	n.a.	-0.270 ***
	(0.054)	(0.045)		(0.081)
NLS young men	-0.168 ***	n.a.	0.041	-0.136***
	(0.044)		(0.051)	(0.046)
NLS men	-0.223 ***	n.a.	0.054	-0.029
	(0.069)		(0.183)	(0.052)
NLS career women	0.155	n.a.	0.250	0.138 *
	(0.132)		(0.347)	(0.080)

B. Type of Training

Group	Managerial	Professional and Technical	Semiskilled Manual	Clerical
NLS young men	-0.218 ***	-0.120 ***	0.037	n.a.
	(0.068)	(0.046)	(0.046)	
NLS men	-0.177 **	-0.181 **	n.a.	n.a.
	(0.087)	(0.073)		
NLS career women	0.205	-0.024	n.a.	-0.059
	(0.191)	(0.107)		(0.159)

NOTE: Standard error of probit estimates in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Race differences are less apparent for females. Among CPS women, nonwhites get significantly less company training, but the race differential is smaller than that for CPS men or for NLS youth. Among NLS career women, race is not an important factor in training. In fact, nonwhite women are more likely to get more training from both the employer and business and technical schools, as well as managerial training. However, only training from "other" sources is statistically significant at the 5 percent level.

These results should be of interest to researchers studying race differences in earnings. Numerous studies--for example, Smith and Welch (1984) and Smith (1978)--have documented the existence of earnings differentials among white and nonwhite males, and the absence of similar differences among females. Differences in training propensity of nonwhite males and females (relative to whites) highlighted by this analysis suggest one possible explanation for these empirical regularities.

Local and National Economic Conditions

A final issue is how local and national economic conditions affect the likelihood of post-school training. As noted earlier, we control for economic conditions in two ways. For the CPS, we use the state indices of labor market conditions developed by Lillard (1986). These include the state's long-run level of unemployment (SHAT), and the cyclic sensitivity of the state relative to national unemployment cycles (RHAT), both measured at the time a person joins the firm. For the NLS, no state information is available, so we use the national unemployment rate (NUR) as an aggregate measure of labor market conditions. Table 3.9 summarizes the effects of these variables on training probability.

The likelihood of getting training drops in local labor markets characterized by persistently high unemployment rates or greater cyclical volatility relative to the nation as a whole. These effects are generally significant for training from in-house sources, informal OJT in particular, but never for training outside the current firm. These results are what one might expect if employment in states with high values of SHAT and RHAT is concentrated in declining industries, or

Table 3.9

EFFECTS OF ECONOMIC CONDITIONS ON THE PROBABILITY OF TRAINING, BY SOURCE AND TYPE

A. Source of Training

Unemployment Variable	Company Training	Informal OJT	Business and Technical Schools	Other Sources
CPS males				
SHAT	-2.615	-5.977 **	n.a.	-4.001
	(2.488)	(2.447)		(3.352)
RHAT	-0.234 ***	-0.136 ***	n.a.	-0.083
	(0.042)	(0.039)		(0.059)
CPS females				
SHAT	-0.629	-9.384 ***	n.a.	-4.183
	(2.746)	(2.659)		(3.675)
RHAT	-0.199 ***	-0.089 **	n.a.	-0.067
	(0.048)	(0.043)		(0.059)
NLS young men				
NUR	-0.002	n.a.	0.011	0.007
	(0.012)		(0.013)	(0.012)
NLS men				
NUR	0.014 ***	n.a.	0.014	0.013 ***
	(0.005)		(0.015)	(0.004)
NLS career women				
NUR	0.111 *	n.a.	0.040	-0.083 **
	(0.058)		(0.154)	(0.035)

B. Type of Training

Unemployment Variable	Managerial	Professional and Technical Training	Semiskilled Manual	Clerical
NLS young men				
NUR	-0.013	0.015	0.010	n.a.
	(0.017)	(0.010)	0.013)	
NLS men				
NUR	0.008	0.023 ***	n.a.	n.a.
	(0.006)	(0.005)		
NLS career women				
NUR	-0.231 ***	0.148 ***	n.a.	-0.078
	(0.088)	(0.045)		(0.065)

NOTE: See text for definitions of SHAT, RHAT, and NUR.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

in firms with cyclically sensitive product demand. If layoff rates are high as a consequence, both employers and workers have few incentives to either provide or take company training in job-specific skills, since there is little probability of recouping training costs.

In the NLS, where the national unemployment rate (NUR) is used, a different pattern of training effects is observed. For mature men and career women, periods of high national unemployment are associated with a greater likelihood of training from company sources, especially professional and technical types of training, while no significant effects are found for young men. One possible interpretation is that employers are more likely to retrain older workers during periods of slack economic activity when the opportunity cost of their time is low. The apparent contradiction between the two kinds of training effects is more apparent than real. They measure different phenomena: SHAT and RHAT, the effects of persistent local labor market conditions; NUR, the marginal effects of changing economic condition on training, given persistent differences in local labor market conditions.

TRAINING AMONG THE DISADVANTAGED

Up to now, we have focused on training taken by nationally representative samples of the population (CPS men and women) and by several distinct demographic groups (the three NLS cohorts). We now turn to the analysis of training among the economically disadvantaged EOPP sample.

We noted earlier that a significantly smaller proportion of the EOPP sample reported getting training, especially OJT, as compared with other groups in the CPS and NLS. Moreover, their training patterns resembled that of women with intermittent labor force participation. These observations suggest several relationships that may explain the low likelihood of training among the economically disadvantaged: low levels of schooling, racial discrimination, and weak labor force attachment.

To address some of these hypotheses, we estimated separate probit models for training from three sources: OJT, business and vocational schools, and miscellaneous other sources including participation in

government sponsored programs. In each, we related the probability of training to a set of covariates that included educational attainment, years of work experience, time not working, and number of jobs held since January 1979 (over an interval of about 18 months). In addition, we included an indicator (0,1) variable to distinguish individuals belonging to "low-income" households from the nonpoor control group, as well as a race (NONWHITE) dummy variable.[7] Finally, we controlled for union membership when it was known. These probit estimates are reported in Table 3.10.

Several results are suggested by the probit estimates. First, they confirm what was revealed by simple tabular analysis, namely, that members of the low-income group are significantly less likely to get OJT from employers than people in the control population. No differences are found in the prevalence of training from other sources. Second, in striking contrast to the results for other samples (see Table 3.8), the coefficient of the nonwhite variable is not statistically significant. Thus, being black *per se* is not associated with a lower likelihood of training; being a member of the low-income group, and having traits associated with a high incidence of unemployment or low income, is. Finally, whatever these (unobserved) factors are, they also appear to diminish the positive effects of schooling on training. Though the likelihood of training rises with educational attainment, these effects are very small as compared with other groups in the CPS and NLS.

Several other relationships between training and labor market experience are suggested in Table 3.10. The likelihood of training declines with years in the labor force, and with time not working since January 1979 for OJT and training from other sources. The latter is likely to be particularly important for the low-income group (and presumably for women as well), who are more likely to experience spells of unemployment or to exit and enter the labor market frequently. Contrary to our priors, the number of job changes was associated not with a lower likelihood of training, as might be expected if it

[7]Participation in the EOPP was not random; to be eligible, individuals had to meet the eligibility requirements of being unemployed and being either below a given family income (twice the poverty level for a given family size) or on AFDC or SSI.

Table 3.10

PREVALENCE OF TRAINING BY SOURCE AMONG DISADVANTAGED WORKERS EOPP SAMPLE

Variable	Source of Training		
	OJT	Business and Vocational Schools	Other Sources
Intercept	0.037 (0.005)	0.071 (0.006)	0.054 (0.007)
Low-income group	-0.007 ** (0.003)	-0.005 (0.004)	-0.002 (0.005)
Nonwhite	0.0001 (0.004)	-0.004 (0.005)	-0.0010 (0.005)
Schooling <12 years	-0.009 ** (0.004)	-0.026 *** (0.005)	-0.005 (0.005)
Schooling 13-15 years	0.017 *** (0.005)	0.016 ** (0.006)	0.024 *** (0.006)
Schooling 16 years	0.023 *** (0.006)	-0.015 * (0.008)	0.036 *** (0.008)
Schooling >17 years	-0.0003 (0.007)	-0.037 *** (0.008)	0.057 *** (0.009)
Years of work experience	-0.0005*** (0.0001)	-0.001 *** (0.0002)	-0.0009*** (0.0002)
Time not working	-0.001 ** (0.0005)	-0.0003 (0.0006)	-0.002 ** (0.0007)
Missing time	-0.010 (0.010)	-0.012 (0.012)	-0.025 * (0.013)
Union member	0.008 ** (0.003)	-0.006 (0.004)	-0.0005 (0.005)
Missing union	-0.012 * (0.006)	-0.016 * (0.008)	0.010 (0.008)
No. jobs since 1/1/79	0.003 (0.002)	0.009 *** (0.002)	0.008 *** (0.002)

NOTE: Probit specification. Standard errors reported in parentheses.

* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

accurately proxied weak job attachment, but rather with significantly higher training from business/vocational schools and from other sources. In part, this may simply reflect quits or voluntary job changes not associated with an unemployment spell (since we are controlling for time not working) to pursue training from sources outside the firm.

SUMMARY

In this section, we investigated several determinants of training to shed light on the reasons for observed differences in the amounts and kinds of training received by various demographic groups. We identified four important factors.

First, a higher level of educational attainment increases the likelihood of training, though the quantitative effects on training vary considerably across demographic groups and, within groups, across different kinds of training. These schooling effects are smaller for women than for men, and especially so for the disadvantaged group as a whole.

Second, schooling is also related to training through its interaction with the rate of technological change in the current job. The likelihood of getting company and informal OJT is greater in industries experiencing rapid technological change, especially for the most educated workers. This result holds equally for both men and women. Moreover, the demand for in-house and managerial training increases relative to general types of training from external sources when the pace of technological change is high.

Third, nonwhite males are significantly less likely than whites to get most kinds of training. Interestingly, however, these racial differences in training are not apparent among females, or among the disadvantaged sample.

Finally, the evidence suggests that training is diminished in states characterized by persistently high levels of unemployment or by greater cyclical volatility in unemployment relative to the nation as a whole.

IV. THE ECONOMIC CONSEQUENCES OF TRAINING

Up to now, we have painted a broad picture of the overall patterns and determinants of training among various groups in the population. We now turn to an empirical analysis of the effects of training on earnings, earnings growth, and employment stability. In particular, we are interested in identifying the sources and types of training that are importantly related to the outcomes of interest, and in estimating the duration of such effects.

While we are critically aware that the decision to offer or to receive training may be endogenous and thus subject to "self-selection" problems,[1] we do not treat the issue here econometrically, simply because the issue is more difficult than the scope of this research project permits us to consider. Many of the issues are discussed in Lillard and Kumbhakar (1986). The primary difficulty is the treatment of multiple occurrences of multiple training sources and types, and of their locations in time. These issues have not been raised in the literature, much less solved. The availability of panel data from the NLS makes the empirical relevance of these issues obvious. Our approach in this section is to document the importance of dynamic patterns in training for use in the development of future econometric models, and to treat these training sequences as if they were exogenous for the current specifications.

In the analysis, we focus on men and women in the 1983 CPS and in the NLS Young Men cohort. Of the surveys considered so far, these two have the most complete information on previous training history, but even they have limitations.[2] The CPS is a cross-sectional survey with current annual and weekly earnings data and retrospective data on

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[1]For example, see Willis and Rosen (1979), Keifer (1979), and Ashenfelter (1978).

[2]For both women and mature men in the NLS, the analysis of training effects is severely limited by the absence of information on training taken prior to the first survey in 1966. The problem of incomplete training histories is particularly acute for mature men, all of whom had been in the labor force for at least 25 years prior to the time when we first observe them.

multiple sources of training both to get the current job and to improve current job skills, but without any information on either the number of such events or their timing. On the other hand, the NLS Young Men data contain annual earnings most years of the panel, but information on weekly earnings only in some selected years. Training information is available for every survey period, but multiple sources or types of training within a period are not known, only the longest is. These caveats, and those pertinent to endogenous training choices noted above, should be kept in mind in the analyses that follow.

We begin with an examination of the effects of training on earnings of men and women in the CPS. Next, we estimate earnings models for the NLS sample of young men, including dynamic training effects, which we treat as predetermined. This is followed, again for the NLS sample, by an analysis of the impact of training on the likelihood of unemployment and, conditional on unemployment, on weeks unemployed. We conclude with a summary of the main findings.

THE 1983 CURRENT POPULATION SURVEY (CPS)

The analysis of training outcomes is based on earnings and weeks worked over the previous year reported in the March 1983 CPS. We are able to do this by merging the January and March CPS files. The sample is restricted to males who report positive earnings and weeks worked the previous year. We exclude the self-employed, those currently unemployed during the survey week (they are included in the subsequent analysis of unemployment as a training outcome), and those with such low earnings (weekly wages less than $10) that we presume their earnings are incorrectly recorded. Finally, we exclude individuals who entered the firm of current employment prior to 1960. This was motivated by our concern over possible recall error regarding training taken some 23 or more years earlier. This resulted in a sample with 11,202 observations.

Two specifications of a wage model are used to study the effects of training on earnings. The first is the conventional wage model typically estimated in the human capital literature, where the logarithm of annual earnings is related to educational attainment, potential work experience, job tenure, and controls for a variety of demographic and locational variables and job and local labor market characteristics. In

the second specification, we include additional variables for reported training. These wage models are estimated by ordinary least squares (OLS), and the results reported in Table 4.1.[3]

Column one of Table 4.1 presents the estimates for the first model specification. The results are broadly similar to those reported elsewhere in the literature and will be summarized only briefly here. The returns to schooling are on the order of about 11 percent.[4] The effect of experience prior to joining the firm of current employment, while significantly positive, is small (0.7 percent) compared with that of job tenure (which has a linear effect of about 15 percent). The control for low work experience is significantly negative, indicating that the earnings profile rises quite steeply in the first five years in the labor market. Nonwhites, people living outside the western United States (the omitted region), and those working in nonunionized firms receive lower earnings.

The results also indicate that the returns to schooling are higher if the individual worked in a high-technology industry. This result is indicated by the positive interactions between schooling categories and the measure of industry rates of technical change. The parameters of these interactions are larger and more statistically significant for the higher schooling categories. To illustrate, note that the effect is two to three times larger for those with advanced degrees than for high school graduates. This finding provides support for the allocative efficiency hypothesis that better educated workers are more adept at responding to technological change (Welch, 1970; Tan, 1980).

The results of the second model specification suggest that several reported measures of training are associated with higher earnings. In

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[3]A similar set of estimates for weekly earnings is reported in the Appendix tables. Differences between the annual and weekly earnings estimates reflect labor supply effects, that is, the effects of variations in weeks worked last year. Because the results appear to be broadly similar, the following discussion focuses on the annual earnings figures.

[4]A continuous measure of educational attainment is used because years of schooling appeared to have a linear effect on earnings in an alternative specification where schooling was entered as categorical variables.

Table 4.1

THE EARNINGS AND TRAINING EQUATIONS FOR CPS MEN

Variable	Model specification (1)	(2)	(3)
Constant	7.598 (.062)	7.871 (0.065)	7.858 (0.067)
Years of schooling	0.111 *** (0.003)	0.083 *** (0.003)	0.079 *** (0.004)
Nonwhite	-0.239 *** (0.026)	-0.219 *** (0:026)	-0.200 *** (0.025)
South region	-0.022) (0.021)	-0.023 (0.021)	-0.010 (0.021)
North East region	-0.142 *** (0.025)	-0.133 *** (0.024)	-0.117 *** (0.024)
North Central region	-0.091 *** (0.022)	-0.086 *** (0.021)	-0.077 *** (0.021)
SHAT (long-run state unemployment rate)	-0.138 (1.571)	0.375 (1.550)	0.766 (0.534)
RHAT (cyclical sensitivity of state unemployment)	0.126 *** (0.029)	0.138 *** (0.029)	0.127 *** (0.028)
Union member	0.160 *** (0.026)	0.184 *** (0.026)	0.181 *** (0.025)
Union missing	-0.003 (0.019)	0.008 (0.016)	0.006 (0.015)
First 5 years of work	-0.458 *** (0.021)	-0.457 *** (0.020)	-0.436 *** (0.020)
Prior work experience	0.007 *** (0.001)	0.007 *** (0.001)	0.006 *** (0.001)
Years of job tenure	0.152 *** (0.004)	0.144 *** (0.004)	0.142 *** (0.004)
Tenure squared	-0.005 *** (0.0002)	-0.005 *** (0.000)	-0.005 *** (0.0002)
Technological change interaction Schooling <12 years	-0.377 (1.558)	-0.942 (1.536)	-0.705 (1.522)

Table 4.1--continued

Variable	Model specification (1)	(2)	(3)
Schooling 12 years	3.635 ***	4.363 ***	4.746 ***
	(1.088)	(1.074)	(1.063)
Schooling 13-15 years	2.352 *	3.035 **	3.131 **
	(1.469)	(1.451)	(1.439)
Schooling 16 years	6.883 ***	6.411 ***	6.364 ***
	(1.808)	(1.784)	(1.767)
Schooling 17+ years	9.161 ***	8.808 ***	8.164 ***
	(2.332)	(2.304)	(2.281)
Training to improve skills			
Regular school		0.021	0.014
		(0.024)	(0.024)
Company		0.270 ***	0.224 ***
		(0.021)	(0.021)
On-the-Job		0.056 ***	0.044 **
		(0.020)	(0.020)
Other		0.135 ***	0.112 ***
		(0.035)	(0.035)
Training to get job			
Regular school * years of schooling		0.014 ***	0.021 ***
		(0.001)	(0.008)
Regular school			-0.099
			(0.123)
Company			0.176 ***
			(0.023)
On-the-Job			0.198 ***
			(0.016)
Other			-0.012
			(0.027)
R-square	.362	.380	.3934

SOURCE: 1983 CPS.
NOTE: Standard errors in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

column two, which includes training to improve job skills from each of the sources, company training has the largest effect on earning (27 percent), followed by training from "other" sources (13 percent). Oddly, informal OJT has only a small (though significant) earnings effect of about 5 percent. The effect of regular school training is statistically insignificant. However, schooling returns are higher if the individual reported that regular school training was important in getting the current job. The coefficient of the interaction between these two variables varies between 1.5 and 2.0 percent, or about one-sixth to one-quarter the estimated returns to schooling.

When measures of training to get the current job are included (column three), the estimated effects of training to improve fall, but only marginally. Of the training reported as needed, several training sources proved to be important: company training and OJT from previous jobs had a statistically significant effect on earnings in the current job. It thus appears that many respondents accurately perceive that some of their prior skills are transferable to other jobs, and report accordingly. For these individuals, at least, the results indicate that previous company training and informal OJT are quite portable: Their effects on earnings in the current job (between 17 and 20 percent) are not too different from the returns to company training on the current job.

The CPS results, while informative, nonetheless are limited by the cross-sectional nature of the data and the kinds of training questions asked. The reporting of only two training events in the CPS (when our earlier results indicate that multiple training events are common), and the lack of information on when training to improve skills was taken, limits our ability to estimate appropriately the effects of training on earnings. In particular, we are unable to identify the time path of these effects on earnings. Do the earnings effects of training persist or are they dissipated over time? Are there variations in these effects among the different kinds of training?

THE NATIONAL LONGITUDINAL SURVEY OF YOUNG MEN (NLS)

The panel nature of the NLS Young Men data allows us to investigate the effect of training in greater depth. In what follows we describe the econometric specification of the earnings equation, including dynamic training effects--treated as predetermined. We also describe in detail the construction of the measured training variables which follow from the econometric specification. Then we report the main findings.

First, consider the earnings and training information available for the NLS Young Men. We created a data set that pooled data across five years: 1969, 1973, 1975, 1978, and 1980. These survey years were selected because (relatively) clean data were available on both wage and salary income and weeks worked in the past year, from which the dependent variables--the logarithm of annual earnings and weekly wages--can be calculated.[5]

The samples for each survey year included those who worked sometime in the past year and reported positive earnings. Those currently unemployed at the time of the survey were also excluded (they are included in the next section, where training effects on weeks unemployed are investigated). This yielded the following sample sizes for each of the survey years:

1969 = 2663	1973 = 3067	1975 = 2978
1978 = 2693	1980 = 2605	

for a total pooled sample of just over 14,000 observations.

The Earnings Equation

We begin with a fairly standard specification of the earnings equation in the absence of training. It is similar to the equation used for the CPS data in terms of the vector of explanatory variables, X. However, we now introduce panel data in which individuals are observed repeatedly over time. Denote annual earnings (log) or the weekly wage

[5]The computed weeks-worked variable in the other years was not considered reliable: The algorithm produced a large number of respondents who worked more than 52 weeks in the past year.

(log) of individual i in period t by Y(i,t), and similarly the vector of regressors, X(i,t). Implicitly, the regression function Y(i,t) = X(i,t)*b + U(i,t) involves individual life-cycle earning or wage paths, including potential experience and tenure on the job, which depend on X. For a fuller treatment of these notions, see Lillard (1985), and Lillard and Willis (1978).

The point of departure here is that earnings in the current period may be affected in a number of ways by training. First, training in the current period may actually reduce earnings through reduced productivity during the learning period if the training occurs on the job or requires leaving the job, as in the case of going to school or training classes. Even if training does not directly reduce earnings, earnings may be less in the current period if the training is completed in the middle of the earnings interval and only increases earnings upon completion.

Second, the occurrence of the event of current and past training may simply shift the earnings function up (presumably) by some proportion. We assume for simplicity that each occurrence of training enhances earnings by the same amount. Each source or type of training may have a different effect on earnings.

Third, the occurrence of training may alter the wage or earnings growth rate of the worker permanently. In this case the effect of a training event will depend on how long ago it occurred, the duration since training, since at that point in the past the growth path was changed. Again each source or type of training may have a different effect. One may presume that training will enhance the growth of earnings or wages.

An alternative model of the effect of training may be couched in these same terms. That is, training may enhance earnings only temporarily, with an initial increase that deteriorates over time. Then the effect on earnings growth would be negative in the immediate period after the initial increase. This may be an appropriate interpretation if the work environment is rapidly changing or if the worker is more and more likely over time to change jobs, either within or between firms, so that the training becomes less valuable.

In accordance with these notions, we define three training variables for their effect on earnings in the current period: (1) whether training was taken since the previous interview, termed "current"; (2) the accumulated sum of all training events taken since 1967 or whenever the individual first began work as a major activity, termed "events"; and (3) the duration of time between getting training and the current period, accumulated over all training events, termed "duration." These three measures provide a parsimonious way of characterizing the effects of multiple episodes of training on earnings. Separate training measures are calculated for each source and type of training.

We provide below summary descriptions of these training measures for the first and last years in the pooled sample: 1969 and 1980. To read these tables, consider the three measures of training in Panel A of Table 4.2. The first row--for current training--shows that 19.3 percent of the 1969 sample got some kind of training in the previous year. The second row--the cumulated number of training events--shows that 68.9 percent had not received any training by 1969, 22.2 percent reported one training event, and almost 9 percent got two or more training events. The third row shows the total duration of time since training. Since a total of three events may be reported, one for each of the years 1967 to 1969, the maximum duration summed across all events is 6 years. In Panels B and C, these measures are reported by source and type for selected kinds of training.

The second set of training measures is for 1980, the last year of the pooled sample. Compared with the first year, individuals in this sample may report an additional 7 training events, for a maximum of 10. From Panel A, note that the proportion without any training falls (from 69 percent in 1969) to about 27 percent by 1980. Almost half have between 2 and 5 training events, and over 6 percent have 6 or more. For these latter groups, the duration of time since training can be in excess of 11 years (exceeding 50 years for some). When cumulated training is disaggregated by source and type, repeated training (2 to 5 events) is most common from company training programs and other school sources, and for professional, technical and semiskilled training types.

Table 4.2

SUMMARY MEASURES OF TRAINING TAKEN BY NLS YOUNG MEN BY 1969 AND 1980; SELECTED SOURCES AND TYPES OF TRAINING

Training Measures	By 1969 Distribution of Years (%) 0	1	2-3	4-5	6	By 1980 Distribution of Years (%) 0	1	2-5	6-10	11+
A. Any training										
Current	80.7	19.3				68.5	31.5			
Events	68.9	22.2	8.9			26.9	21.0	46.0	6.1	
Duration	68.9	12.0	14.9	2.1	2.1	26.9	4.5	9.6	13.3	45.7
B. Source of training										
Company Training										
Current	93.9	6.1				86.2	13.8			
Events	88.6	9.4	2.0			63.7	19.9	15.5	0.9	
Duration	88.6	4.5	6.0	0.6	0.3	63.7	5.5	7.8	8.2	14.8
Business and technical										
Current	97.1	2.9				95.7	4.3			
Events	95.1	3.8	1.1			78.3	15.1	6.5	0.1	
Duration	95.1	2.1	2.4	0.3	0.1	78.3	2.4	4.1	8.4	6.8
C. Type of training										
Managerial										
Current	98.1	1.9				94.4	5.6			
Events	96.6	2.9	0.5			83.4	11.3	5.1	0.2	
Duration	96.6	1.6	1.6	0.1	0.1	83.4	3.1	4.5	3.3	5.7
Professional-technical										
Current	93.0	7.0				85.5	14.5			
Events	89.5	8.8	1.7			60.0	20.7	18.7	0.6	
Duration	89.5	5.7	4.3	0.4	0.1	60.0	5.3	4.9	11.7	18.1

Note: Training from regular schools and "other" sources excluded, as are semi-skilled manual, clerical and "other" types of training.

This characterization of training forms the basis of our analyses of the effects of training on earnings. In the following section, we estimate wage models, where we relate annual earnings and weekly wages to the three training measures, controlling for personal and firm attributes, location, and labor market conditions. In addition, we include year dummy variables to capture shifts in earnings over time relative to 1980, the omitted year. We also report the findings of separate analyses of the effects of training by source and by type of training. The variables used, their definition, and summary statistics are reported in the Appendix.

Earnings Results for NLS Young Men

Table 4.3 presents the results of estimating two variants of the model: column one for the conventional wage model, column two for the specification with the training variables.

Many of the results are familiar and consistent with findings reported elsewhere in the extensive human capital literature on earnings. Earnings exhibit the familiar quadratic shape, rising rapidly with both years of work experience and job tenure, but at a slower pace at higher levels of experience. Because this quadratic form may not capture the steep rise in initial earnings, we included an indicator variable for being in the first 5 years in the labor force. Its effect, however, is negative only for the weekly wage variant, and is never statistically significant. Those in the South earn 9 to 12 percent less than in other regions, as do blacks whose earnings are between 19 and 24 percent less than those of other racial groups.

Like the results for the CPS sample, schooling and its interactions with technical change have the expected effects on earnings. Earnings rise with level of schooling completed, especially for the most educated individuals with college or advance degrees in industries experiencing rapid technological change.

The estimates including the training variables are reported in the second column of Table 4.3. The training variables have the postulated effects on earnings. Training taken in the current period is associated with an initial (and one-time) drop in earnings of 2.4 percent. In

Table 4.3

EARNINGS AND ANY-TRAINING EQUATIONS

Variable	(1)	(2)
Constant	8.735	8.708
	(0.047)	(0.047)
1969 year dummy	-1.040	-1.012
	(0.022)	(0.023)
1973 year dummy	-0.601	-0.592
	(0.020)	(0.020)
1975 year dummy	-0.439	-0.429
	(0.019)	(0.019)
1978 year dummy	-0.168	-0.173
	(0.018)	(0.018)
Nonwhite	-0.245	-0.230
	(0.014)	(0.014)
Schooling <12 years	-0.199	-0.159
	(0.019)	(0.019)
Schooling 13-15 years	0.099	0.077
	(0.016)	(0.016)
Schooling 16 years	0.296	0.273
	(0.020)	(0.020)
Schooling 17+ years	0.392	0.369
	(0.019)	(0.019)
Prior work experience	0.110	0.100
	(0.006)	(0.006)
Experience squared	-0.004	-0.003
	(0.000)	(0.000)
First 5 years of work	0.005	0.006
	(0.024)	(0.024)
Years of job tenure	0.096	0.092
	(0.004)	(0.004)
Tenure squared	-0.005	-0.004
	(0.001)	(0.000)
Tenure missing	0.233	0.234
	(0.038)	(0.033)

Table 4.3--continued

Variable	(1)	(2)
South dummy variable	-0.099	-0.095
	(0.012)	(0.012)
Local unemployment rate	-0.002	-0.002
	(0.003)	(0.003)
Unemployment rate missing	-0.047	-0.052
	(0.022)	(0.022)
Technical change interaction		
Schooling <12 years	-1.833	-2.092
	(1.163)	(1.153)
Schooling 12 years	-0.817	-0.390
	(0.843)	(0.836)
Schooling 13-15 years	-0.139	0.399
	(1.023)	(1.015)
Schooling 16 years	6.382	6.352
	(1.481)	(1.468)
Schooling 17+ years	8.414	8.277
	(1.554)	(1.541)
Any training		
Current		-0.024
		(0.019)
Events		0.119
		(0.012)
Duration		-0.011)
		(0.002)

SOURCE: NLS Young Men.
NOTE: Standard errors in parentheses.

every subsequent year, however, training has two effects on earnings: an 11.9 percent increase in earnings level (the coefficient of the cumulated training variable), and a 1.1 percent decline with each year since training (the duration coefficient). Thus, the net effect of

training is an increase of 9.5 percent (11.9 - 2.4) in the first year, 10.8 percent (11.9 - 1.1) in the second year, and a decline to zero by the 11th year after training.

How do these time effects of training vary across training from different sources? Panel A of Table 4.4 summarizes the earnings effects of training, disaggregated by training taken in a company program, in business and vocational schools, in regular schools, and from other sources. The regression results on which these estimates are based are reported in the Appendix. Several striking differences become apparent in comparing the effects of the different kinds of training in the earnings regressions. First, company training has the largest effect on earnings (16 percent), followed by training from business and vocational schools (11 percent), and over 8 percent from regular schools and other sources. Second, company training is characterized by almost no decline in initial period earnings as compared with a 10 percent fall for those getting training in business and vocational schools. Finally, the rate of decay in training effects on earnings is very similar across kinds of training, varying between 1 and 1.3 percent per year.[6]

Panel B of Table 4.4 reports the results of estimating the wage models including type of training. Similar kinds of training effects are found here. Taking training in the current period has negligible effects on earnings for managerial and for professional and technical training, and somewhat larger negative effects on semiskilled manual training. The initial effects of the former types of training are larger (14 to 16 percent) than the 9.5 percent for semiskilled training. However, because the rate of decay of semiskilled training is lower, the earnings effects of this type of training persist over a longer period (15 years) as compared to 12 and 11 years for managerial and professional/technical training, respectively. The earnings effects of other types of training are short-lived, lasting no more than 7 years.

The time paths of the earnings effects of different sources and types of training are summarized in Table 4.5. Because of the points noted above, the positive effects of company training on earnings

[6]A similar, but more pronounced, pattern of training effects is found in the weekly wage set of estimates. (See Appendix.)

Table 4.4

EFFECTS OF TRAINING ON ANNUAL EARNINGS OF NLS YOUNG MEN BY SOURCE AND TYPE OF TRAINING

A. Source of Training

Training Variable	Regular School	Business and Technical School	Company Training	Other Sources
Current	-0.046 (0.039)	-0.109 ** (0.038)	0.000 (0.029)	-0.008 (0.028)
Events	0.082 ** (0.031)	0.119 *** (0.029)	0.169 *** (0.020)	0.088 *** (0.020)
Duration	-0.010 ** (0.004)	-0.013 *** (0.004)	-0.013 *** (0.003)	-0.009 *** (0.003)

B. Type of Training

Training Variable	Managerial	Professional and Technical	Semi-skilled	Other Types
Current	0.016 (0.046)	-0.011 (0.028)	-0.061 * (0.031)	-0.025 (0.033)
Events	0.166 *** (0.035)	0.142 *** (0.021)	0.096 *** (0.020)	0.101 *** (0.026)
Duration	-0.014 *** (0.005)	-0.013 *** (0.003)	-0.007 ** (0.003)	-0.015 *** (0.004)

SOURCE: The estimates are reported in full in the Appendix.
NOTE: Standard errors in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Table 4.5

TIME PATH OF TRAINING EFFECTS ON ANNUAL EARNINGS OF NLS YOUNG MEN

A. Source of Training and Percent Increase in Earnings

Years Since Taking Training	Company Training	Business and Technical	Regular School	Other Sources
Current period	16.8	1.1	3.5	8.0
1 year	15.5	10.6	7.1	7.8
3 years	12.8	7.9	5.0	6.0
6 years	8.8	3.9	1.9	3.2
9 years	4.8			0.5
12 years	0.8			
Duration of positive training effects	13 yrs	9 yrs	8 yrs	10 yrs

B. Type of Training and Percent Increase in Earnings

Years Since Taking Training	Managerial	Professional and Technical	Semiskilled Manual	Other Types
Current period	18.2	13.1	3.5	7.6
1 year	15.2	12.9	8.9	8.6
3 years	12.4	10.3	7.5	5.6
6 years	8.2	6.4	5.4	1.1
9 years	4.0	2.5	3.3	
12 years			1.2	
Duration of positive training effects	12 yrs	11 yrs	15 yrs	7 yrs

SOURCE: Table 4.4.

persist for 13 years, as compared with 8 to 10 years for the other sources of training. Also note the markedly lower initial earnings when training is taken from regular schools or business and vocational schools. This may simply reflect earnings forgone in diverting work time to attending school. However, these results hold even when we control for weeks worked in the past year. Are employers providing workers with these external sources of general training, and having them

pay for it through lower weekly wages? If so, then this view also suggests that employers pay for training taken within the company, which (presumably) is firm-specific.

THE EFFECTS OF TRAINING ON UNEMPLOYMENT

Here we investigate a second training outcome, employment stability, using the NLS Young Men sample. The issue is whether training reduces the likelihood of unemployment. Several other research questions are also of interest here. Are some kinds of training, such as company training, more effective than others in cementing worker-firm job attachment, as suggested by the literature on firm-specific human capital? Just as trained workers earn more, are they also persistently less likely to be unemployed, or do training effects change over time? Finally, how important are the labor displacement effects of technological change?

For the analysis, we use the 1969 and 1980 NLS surveys, in which NLS respondents are asked directly about weeks unemployed in the previous year. In other years, this variable was thought to be less reliable, because it was constructed from information on previous work history (a similar problem was encountered in the earnings analyses). For the analysis of unemployment probability, only individuals without missing data on the weeks-unemployed question were included in the analysis samples. This selection criterion resulted in a total pooled sample of 6114 observations: 2954 in 1969 and 3160 in 1980.

The Probability of Unemployment

The effects of training on unemployment are investigated using a probit model. The dependent variable is a dichotomous variable with a value of 1 if an individual is either currently unemployed or has been unemployed sometime over the past year, and 0 otherwise. This variable is related to the vector of explanatory variables used in the previous analysis of earnings. As before, these include the three measures of training: training in the "current" period, accumulated training "events," and "duration" since training.

Table 4.6 presents the maximum likelihood probit estimates of the determinants of unemployment propensity. The first column, which reports the estimates for the basic model, provides a benchmark for comparison with the other models which include training variables. Column two reports the results for having taken any vocational training.

Several results suggested by Table 4.6 resemble findings reported by other research on the determinants of unemployment. First, the likelihood of unemployment is lower for the more educated, and for whites than for other racial groups. Second, those with less than five years of labor market experience are more likely to experience unemployment, but this declines with increasing years of job tenure (see Mincer and Jovanovic, 1981). Third, as might be expected, individual probabilities of unemployment rise with the national unemployment rate.

A final result, which is novel, is the absence of any relationship between technological change and the likelihood of unemployment. Unlike the previous results for earnings, the interactions between technological change and schooling are not statistically significant except for the negative interaction for high school graduates. We interpret this finding to mean that a higher industry rate of technological change in the current or last job is not associated with a greater incidence of unemployment, or, in other words, that concerns over the labor displacement effects of technical change are not warranted.

The effects of training on the probability of unemployment mirror the effects of training on annual earnings. The estimates in column two suggest that vocational training is associated with a decline in the likelihood of unemployment, an effect that persists for approximately 12 years. As before, the period over which training effects attenuate can be calculated from the parameters of the cumulated training and training duration variables, i.e., -0.240/0.019.

The unemployment effects of training vary systematically by source (Panel A) and type of training (Panel B), as is evident in Table 4.7. The probit results on which these estimates are based are reported in full in the Appendix. They suggest that of all the different sources of training, company training has the most enduring effect on reducing the

Table 4.6

EFFECTS OF ANY TRAINING ON UNEMPLOYMENT PROBABILITY: NLS YOUNG MEN SAMPLE

Variable	(1)	(2)
Constant	-1.119 ***	-1.097 ***
	(0.099)	(0.102)
Schooling <12 years	0.176 ***	0.137 **
	(0.065)	(0.066)
Schooling 13-15 years	-0.126 **	-0.097 *
	(0.058)	(0.058)
Schooling 16 years	-0.506 ***	-0.479 ***
	(0.088)	(0.089)
Schooling 17+ years	-0.601 ***	-0.581 ***
	(0.078)	(0.079)
Technological change interaction		
Schooling <12 years	-1.496	-1.264
	(4.167)	(4.186)
Schooling 12 years	-6.084 *	-6.065 *
	(3.141)	(3.142)
Schooling 13-15 years	-3.674	-4.920
	(4.081)	(4.052)
Schooling 16 years	2.322	1.720
	(7.838)	(7.943)
Schooling 17+ years	-10.098	-10.145
	(7.066)	(7.238)
Nonwhite	0.328 ***	0.318 ***
	(0.051)	(0.051)
South region dummy	-0.201 ***	-0.210 ***
	(0.047)	(0.048)
Prior work experience	-0.001	-0.002
	(0.006)	(0.006)
First 5 years of work	0.207 ***	0.148 **
	(0.066)	(0.068)
Years of job tenure	-0.117 ***	-0.116 ***
	(0.006)	(0.006)

Table 4.6--continued

Variable	(1)	(2)
Tenure missing	1.575 ***	1.563 ***
	(0.081)	(0.081)
National unemployment rate	0.079 ***	0.099 ***
	(0.017)	(0.018)
Any training		
Current		0.198 **
		(0.082)
Events		-0.240 ***
		(0.056)
Duration		0.019 ***
		(0.007)

SOURCE: NLS Young Men 1969, 1980.
NOTE: Probit Specification. Standard errors in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

likelihood of unemployment (12.8 years), followed closely by training from "other" sources (12.3 years). In contrast, the effects of training from regular school sources disappear within 7 years. Training from business and vocational schools was not significant in inhibiting unemployment. The effects of training on unemployment also vary by type of training (Panel B). Professional and technical training reduces the likelihood of unemployment the most, but because this effect attenuates rapidly over time, training effects only persist over 11.8 years. The effects of semiskilled manual and other types of training last between 12.2 and 10.7 years, respectively. Managerial training did not have a significant effect in reducing the likelihood of unemployment.

Table 4.7

EFFECTS OF TRAINING ON UNEMPLOYMENT PROBABILITY:
NLS YOUNG MEN SAMPLE

A. Source of Training

Training Variable	Regular School	Business and Technical School	Company Training	Other Sources
Current	-0.203	-0.056	0.256 **	0.412 ***
	(0.200)	(0.178)	(0.129)	(0.123)
Events	-0.128	0.071	-0.332 ***	-0.357 ***
	(0.149)	(0.124)	(0.099)	(0.087)
Duration	0.018	-0.011	0.026 **	0.029 ***
	(0.019)	(0.016)	(0.012)	(0.010)

B. Type of Training

Training Variable	Managerial	Professional and Technical	Semi-skilled Manual	Other Types
Current	-0.133	0.226	0.305 **	0.252 *
	(0.247)	(0.154)	(0.127)	(0.147)
Events	-0.120	-0.459 ***	-0.159 *	-0.224 **
	(0.208)	(0.124)	(0.081)	(0.106)
Duration	0.001	0.039 ***	0.013	0.021
	(0.029)	(0.013)	(0.009)	(0.014)

SOURCE: NLS Young Men 1969, 1980.

NOTE: The probit results on which this table is based are reported in full in the appendix. Standard Errors of probit estimates in parentheses.

* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

We also analyzed the effects of training on the duration of unemployment for those currently unemployed or who had experienced a spell of unemployment over the past year. These results, reported in the Appendix, suggest that weeks unemployed are longer for those unemployed workers with less than a high school degree, are shorter for workers in the South, are shorter for workers with more job tenure, and are longer when the national monthly unemployment rate (averaged over 12 months) is high. However, the effects of training are very imprecisely estimated, largely because of the small sample of unemployed workers in any given period, so that any statements of relationships would be correspondingly tentative. Therefore, we simply conclude that we cannot find any significant effect.

V. SUMMARY AND CONCLUSIONS

We have used reported training measures taken from five surveys--the CPS, three cohorts from the NLS, and the EOPP--to paint a broad picture of post-school training in the United States. We have sought to answer the question of who gets training, how much, and why, and the effect of training on earnings and employment. In this section, we summarize the main findings on the determinants of training and its effects, highlight questions they raise, and discuss areas where future research will be most useful in guiding training policy.

Our use of reported training measures represents an important departure from the traditional reliance in the literature on alternative proxies for training, such as work experience and job tenure. The focus on these latter proxy variables, though important in testing different theories, has nonetheless precluded a better understanding of the empirical correlates of training and its effects, which can come only from actual measures of training received. Our report confirms that only the more formal kinds of training tend to be reported, but that they appear to be reported consistently. In fact, our results using these measures are remarkably consistent, despite the different types of information covered by the data sources, the different time intervals that they reflect, and the different groups of workers that they include.

What they reveal about training deserves special emphasis. On the most general level, they suggest that highly aggregated descriptions of training miss important differences among various sources and types of training, their determinants, and their consequences for earnings and employment. There is not one kind of training, but various kinds for different purposes. Some kinds of training are relevant in the context of technological change, and some are not. Some actively complement formal schooling, and some do not. The various kinds of training also have different effects on earnings and the likelihood of unemployment, and some effects persist longer than others.

The gross data in Sec. II revealed several aggregate differences across the various groups in the amounts and kinds of training received. First, both young men and career women in the NLS get more training than mature men, but women receive proportionately less company training than either of the other two male cohorts. In contrast, employed men and women in the CPS report get roughly similar amounts and kinds of training. The absence of any sex differences here may simply reflect sample selection (employed individuals), the age composition of the different samples, or other variables that we have not controlled for. Finally, compared with these populations, the economically disadvantaged EOPP sample get the least training, especially from company sources. Their training experience most closely resembles that of women with weak attachment to the labor force.

In Sec. III, we inquired into these differences by analyzing the determinants of training in each group. We estimated probit models relating training by source and by type to a comprehensive set of covariates. These included controls for variables such as educational attainment, worker characteristics, labor market experience, the industry rate of technical change, and local and national labor market conditions.

This analysis confirmed the importance of formal schooling as a determinant of post-school training. For both men and women, and for the economically disadvantaged group as well, the likelihood of getting most kinds of training rises with the level of educational attainment, except for the most highly educated group (those with postgraduate degrees). This suggests that both sources of "training" are strongly complementary. However, the quantitative importance of schooling varies. Compared with men, increased schooling among women is associated with a relatively smaller increase in company training and a larger increase in training from other sources. For the disadvantaged sample, the effects of schooling on the likelihood of training is smaller in all cases when compared with other groups in the population.

Formal schooling also plays an important role in getting the current job. The postgraduate group, in particular, is significantly more likely to report formal schooling as important over other

alternative sources of training. Possibly because the job-related content of their schooling is already high, postgraduates tend to get less of other kinds of training while working. The exceptions are those employed in high-tech industries, where formal school training may be less pertinent to the requirements of new technologies. In those firms, this group receives significantly more company and informal training, and are more likely to report OJT from prior jobs as being needed to get the current job.

These results are part of an overall pattern of skill requirements accompanying technological change found throughout the report. As the rate of technological change quickens, the probability increases of getting managerial training and training from in-house sources such as company programs or informal on-the-job training (OJT), especially for employees with more education. In contrast, the likelihood of getting professional, technical, and semiskilled manual training, or training from external sources such as business, technical, and traditional schools, falls as the rate of technological change quickens. These results confirm what has hitherto only been speculation, namely, that rapid technological change leads to increased reliance on in-house training, possibly because technology-specific skills are not readily available elsewhere, and to greater demand for highly skilled and educated employees, who may adapt more readily to new technologies.

These results provide insights into a related issue of how transferable skills are across jobs. We find that prior work skills are less important when new jobs are found in industries characterized by high rates of technological change. In contrast to the earlier finding, both men and women working in high-tech industries are significantly less likely to report that previous company training and OJT was important in getting the current (or last) job. An exception, as we have already noted, is postgraduates, for whom previous informal OJT is important. Their OJT may embody many noncodified kinds of technical and managerial skills not taught in traditional schools but important, nonetheless, for technological progress in new jobs.

The probability of getting training is affected by economic conditions, but in ways that differ depending upon whether cross-sectional or panel data are used. First, in the cross-section, the

likelihood of getting most kinds of training is depressed in local labor markets characterized by persistently high unemployment rates or greater cyclical volatility relative to the nation as a whole. We suspect that layoffs are more common in such states, possibly because employment is overrepresented in declining industries or in firms with volatile product demand. Employers and workers therefore have few incentives to provide or get training, since the likelihood of recouping training costs is low. Second, using time-series data, we find that periods of high national unemployment are associated with a greater likelihood of training from company sources, especially professional and technical types of training, for career women and mature men but not for youth. One possible interpretation is that employers retrain older workers during periods of slack economic activity when the opportunity cost of their time is low.

Training propensity might be expected to vary over the life-cycle, and it does. The likelihood of getting most kinds of training is low in the first five years in the labor market, coinciding with an initial period of job search. In the absence of job attachment, this likelihood continues to fall over time but at a lower pace; however, the likelihood of training rises with time on the job. The implication of these results is that those who work intermittently or change jobs frequently receive less training over the life-cycle.

Interestingly, when we control for observable worker attributes, nonwhite males are significantly less likely to get most kinds of post-school training, while race differences are not apparent among females. In fact, nonwhite females tend to get more training, though the differences are generally not statistically significant. These differences in training offer one possible explanation for observed earnings differentials among white and nonwhite males, and the absence of race differences among females noted in the literature.

In Sec. IV we investigated the effects of training on subsequent labor market outcomes of men. We estimated earnings models both with and without measures of reported training, and probit specifications for the likelihood of unemployment. Large differences in the effects of training on earnings, earnings growth, and unemployment were found, depending upon the source or type of training. Many of these results

are consistent with, and may explain, the determinants of training found earlier to be important.

For example, earnings are observed to rise with the level of schooling completed in industries experiencing rapid technical change, especially for people with bachelor or postgraduate degrees. Earlier, we had hypothesized that better educated workers are more adept at responding to technical change, and therefore are more productive in high-tech firms. Supporting evidence for this "allocative efficiency of schooling" hypothesis was found in the greater likelihood of in-house training among the most educated workers in high-tech industries and, here, in their higher productivity and earnings.

The effects of training on earnings and earnings growth vary by source and by type. Among the different sources of training, company training has the greatest quantitative effect on increasing earnings, persisting for over 13 years. The effects of training from other sources are much smaller and persist for 8 to 10 years. When types of training are considered, managerial training increases earnings the most, but its effects are less enduring (12 years) than the effects of semiskilled manual training (15 years).

The effects of training on reducing the likelihood of unemployment mirror the earnings-augmenting effect of training. On average, training is associated with a subsequent decline in the likelihood of unemployment lasting approximately 12 years. Of all the sources of training, company training is most enduring (12.8 years), while the effects of training from regular school sources disappear within 7 years. Variations in these effects are also found across training types. Professional and technical training reduces the likelihood of unemployment the most, but because this attenuates rapidly over time, its effects persist only over 11.8 years. In contrast, managerial training did not have a significant effect on unemployment. The absence of any effect may simply reflect different (and offsetting) influences of training on increasing the trained manager's value both to the firm and to other employers, but this is speculation.

Finally, unlike the previous result for earnings, the industry rate of technological change in the current (or last) job is not statistically correlated with the probability of experiencing an

unemployment spell in the past year. In fact, for the sample of male youth studied, a higher rate of technological change is typically associated with a lower probability of unemployment, and for high school graduates, this relationship is statistically significant. At least for this group of youth, the results suggest that concern over the labor displacement effects of technological change may be misplaced. Whether or not this finding holds for other groups is a subject for future research.

In this report, we have developed rough estimates of the amounts of training received by different groups, and taken an important first step in identifying the major determinants of training and its effects on labor market outcomes. However, many important questions are raised by several research findings:

- The complementarity between formal schooling and post-school training. What kinds of training acquired in traditional schools are most likely to be useful in subsequent work? Do school curricula--vocational versus college preparatory coursework--matter for the kinds of training received on the job?
- The relationships between technological change, schooling, and skill requirements. What are the training needs (skill shortages) of different industries, and can policies be developed to encourage greater investments by employers and other providers in skills required for technological change?
- The relationship between training and local labor market conditions. Which states have persistently high unemployment rates or high cyclic volatility in unemployment relative to the nation, and why?
- Race differences in training propensity among males, and the absence of any differences between males and females. What factors account for these differences? To what extent has increased training contributed to the narrowing of the earnings gap between the ethnic groups, and between white and nonwhite women? How have trends over time in the training received by racial minorities changed?

- The relationship between training and labor force attachment. To what extent do women's skills obsolesce when they withdraw from the labor force? What kinds of training or retraining would facilitate their reentry?

APPENDIX

Table A.1

DETERMINANTS OF TRAINING TO GET CURRENT JOB AND IMPROVE SKILLS: CPS MEN

Variable	Training to Get Current Job			Training to Improve Job Skills		
	Company	OJT	Other	Company	OJT	Other
CONSTANT	-0.722 *** (0.089)	-0.167 ** (0.074)	-1.052 *** (0.099)	-0.969 *** (0.071)	-0.863 *** (0.067)	-2.193 *** (0.113)
SCHLT12	-0.447 *** (0.053)	-0.239 *** (0.037)	-0.304 *** (0.053)	-0.483 *** (0.059)	-0.076 * (0.046)	-0.392 *** (0.090)
SCH1315	0.186 *** (0.038)	0.143 *** (0.032)	0.105 ** (0.041)	0.229 *** (0.040)	0.102 *** (0.038)	0.317 *** (0.059)
SCH16	0.245 *** (0.044)	0.134 *** (0.037)	-0.120 ** (0.052)	0.478 *** (0.043)	0.116 *** (0.043)	0.552 *** (0.062)
SCH17P	-0.095 * (0.049)	-0.123 *** (0.038)	-0.291 *** (0.058)	0.308 *** (0.045)	-0.051 (0.046)	0.832 *** (0.057)
TCHLT12	-5.106 (4.469)	-4.213 (2.695)	-9.854 *** (3.798)	1.925 (4.539)	-1.200 (3.131)	2.822 (7.712)
TCH12	-4.980 ** (1.955)	-7.058 *** (1.725)	-3.202 (2.347)	0.408 (2.323)	5.525 *** (2.124)	-9.097 ** (3.800)
TCH1315	-5.512 ** (2.738)	-2.596 (2.337)	-7.850 ** (3.124)	2.878 (2.736)	-0.809 (2.823)	-0.306 (4.151)
TCH16	-6.472 ** (2.981)	0.520 (2.874)	3.005 (4.067)	3.561 (2.984)	-0.561 (3.358)	-3.261 (4.311)
TCH17P	-0.311 (4.894)	14.338 *** (3.632)	-2.083 (5.734)	15.322 *** (3.951)	6.632 (4.487)	-8.307 (5.411)
NONWHT	-0.103 ** (0.053)	-0.266 *** (0.041)	-0.203 *** (0.062)	-0.250 *** (0.056)	-0.012 (0.048)	-0.226 *** (0.085)
SOUTH	-0.041 (0.041)	-0.171 *** (0.033)	-0.118 *** (0.045)	-0.018 (0.042)	-0.074 * (0.039)	0.021 (0.058)
NE	-0.149 *** (0.048)	-0.181 *** (0.038)	-0.180 *** (0.055)	-0.127 ** (0.049)	-0.123 *** (0.047)	0.019 (0.066)
NC	-0.047 (0.042)	-0.180 *** (0.034)	-0.090 ** (0.045)	-0.054 (0.042)	-0.072 * (0.040)	0.182 *** (0.056)
UNION	0.235 *** (0.050)	-0.061 (0.044)	-0.041 (0.062)	-0.090 * (0.053)	-0.022 (0.050)	-0.243 *** (0.088)
E1ST5	-0.153 *** (0.041)	-0.290 *** (0.033)	-0.236 *** (0.046)	-0.132 *** (0.041)	0.016 (0.039)	-0.094 * (0.056)
POTEXP	0.000 (0.002)	0.001 (0.001)	0.003 (0.002)	-0.008 *** (0.002)	-0.010 *** (0.002)	0.002 (0.003)
TENURE				0.034 *** (0.003)	0.011 *** (0.002)	0.026 *** (0.003)
SELFEMP	-0.108 ** (0.049)	0.108 *** (0.038)	0.238 *** (0.047)	-0.296 *** (0.052)	-0.288 *** (0.050)	0.208 *** (0.056)
SHAT	3.417 (2.567)	-1.039 (2.067)	-3.249 (2.599)	-2.615 (2.488)	-5.977 ** (2.447)	-4.001 (3.352)
RHAT	0.030 (0.042)	-0.022 (0.034)	-0.147 *** (0.047)	-0.234 *** (0.042)	-0.136 *** (0.039)	-0.083 (0.059)
NUR	-0.055 *** (0.008)	-0.011 * (0.006)	-0.008 (0.009)			

* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Table A.2

DETERMINANTS OF TRAINING TO GET CURRENT JOB AND IMPROVE SKILLS: CPS WOMEN

Variable	Training to Get Current Job			Training to Improve Job Skills		
	Company	OJT	Other	Company	OJT	Other
CONSTANT	-1.114 *** (0.110)	-0.447 *** (0.080)	-2.075 *** (0.160)	-1.086 *** (0.080)	-0.961 *** (0.073)	-1.698 *** (0.105)
SCHLT12	-0.228 *** (0.070)	-0.287 *** (0.048)	-0.092 (0.096)	-0.414 *** (0.076)	-0.095 * (0.055)	-0.568 *** (0.129)
SCH1315	0.119 *** (0.043)	0.131 *** (0.032)	0.236 *** (0.062)	0.242 *** (0.041)	0.081 ** (0.037)	0.103 * (0.056)
SCH16	0.055 (0.057)	0.057 (0.042)	0.252 *** (0.078)	0.373 *** (0.051)	0.099 ** (0.047)	0.410 *** (0.063)
SCH17P	-0.119 (0.074)	-0.020 (0.051)	0.174 * (0.096)	0.301 *** (0.061)	-0.116 * (0.062)	0.265 *** (0.098)
TCHLT12	-24.843 *** (6.595)	6.782 * (3.853)	-3.786 (8.168)	-23.692 *** (8.936)	2.337 (4.620)	-46.897 ** (20.172)
TCH12	-16.008 *** (3.140)	-3.469 * (2.055)	-4.424 (4.149)	-14.787 *** (2.824)	-2.191 (2.487)	-23.260 *** (4.239)
TCH1315	-9.553 ** (3.875)	-5.639 * (3.132)	-0.331 (5.649)	-5.505 (3.628)	-2.988 (3.636)	-13.579 *** (4.838)
TCH16	6.569 (5.558)	6.514 (4.920)	7.717 (8.901)	0.091 (4.900)	2.282 (5.283)	4.687 (6.625)
TCH17P	-4.699 (10.039)	25.745 *** (7.046)	13.223 (11.348)	18.435 ** (8.170)	7.627 (9.927)	-27.000 (18.085)
NONWHT	-0.088 (0.058)	-0.076 * (0.040)	-0.080 (0.084)	-0.142 *** (0.054)	0.017 (0.045)	-0.270 *** (0.081)
SOUTH	0.007 (0.050)	-0.189 *** (0.036)	-0.048 (0.070)	-0.073 (0.046)	-0.076 * (0.041)	-0.173 *** (0.062)
NE	-0.156 *** (0.058)	-0.190 *** (0.042)	0.099 (0.083)	-0.176 *** (0.056)	-0.073 (0.050)	-0.300 *** (0.072)
NC	-0.102 ** (0.052)	-0.166 *** (0.037)	-0.105 (0.075)	-0.217 *** (0.048)	-0.047 (0.043)	-0.019 (0.058)
UNION	0.030 (0.075)	-0.110 ** (0.054)	0.012 (0.113)	-0.053 (0.068)	0.095 (0.060)	-0.175 * (0.100)
E1ST5	-0.122 ** (0.053)	-0.235 *** (0.038)	-0.074 (0.081)	-0.110 ** (0.050)	-0.081 * (0.044)	-0.181 *** (0.064)
POTEXP	-0.007 *** (0.002)	-0.000 (0.002)	0.006 * (0.003)	-0.004 (0.002)	-0.008 *** (0.002)	-0.003 (0.003)
TENURE				0.032 *** (0.003)	0.012 *** (0.003)	0.025 *** (0.004)
SELFEMP	0.225 *** (0.070)	-0.091 (0.056)	0.420 *** (0.081)	-0.176 ** (0.073)	-0.212 *** (0.069)	0.295 *** (0.075)
SHAT	3.533 (3.054)	-3.773 * (2.235)	-6.226 (4.045)	-0.629 (2.746)	-9.384 *** (2.659)	-4.183 (3.675)
RHAT	0.114 ** (0.050)	-0.018 (0.037)	-0.324 *** (0.066)	-0.199 *** (0.048)	-0.089 ** (0.043)	-0.067 (0.059)
NUR	-0.027 ** (0.010)	0.010 (0.007)	0.020 (0.013)			

* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Table A.3

DETERMINANTS OF TRAINING FOR NLS YOUNG MEN, BY SOURCE AND TYPE

Variable	Source of Training			Type of Training			
	Company	Business/ Technical	Other	Managerial	Professional/ Technical	Semiskilled	Other
CONSTANT	-1.410 *** (0.108)	-1.468 *** (0.210)	-1.323 *** (0.107)	-2.059 *** (0.157)	-1.470 *** (0.103)	-1.132 *** (0.114)	-1.599 *** (0.121)
SCHLT12	-0.437 *** (0.068)	-0.522 *** (0.084)	-0.385 *** (0.068)	-0.449 *** (0.122)	-0.697 *** (0.095)	-0.451 *** (0.064)	-0.245 *** (0.069)
SCH1315	0.301 *** (0.046)	0.047 (0.054)	0.186 *** (0.047)	0.344 *** (0.069)	0.380 *** (0.049)	-0.114 ** (0.047)	0.272 *** (0.050)
SCH16	0.454 *** (0.054)	-0.229 *** (0.072)	0.203 *** (0.057)	0.620 *** (0.076)	0.705 *** (0.054)	-0.776 *** (0.077)	0.237 *** (0.061)
SCH17P	0.261 *** (0.054)	-0.066 (0.062)	0.360 *** (0.052)	0.501 *** (0.074)	0.952 *** (0.051)	-1.047 *** (0.085)	0.211 *** (0.059)
TCHLT12	4.250 (4.621)	18.005 *** (5.364)	7.035 (5.431)	9.938 (10.018)	9.914 (7.361)	15.638 *** (4.486)	-3.021 (4.267)
TCH12	1.250 (2.465)	-4.796 * (2.715)	-5.062 * (2.620)	-1.498 (4.524)	-2.545 (2.699)	-4.675 ** (2.221)	-0.987 (2.843)
TCH1315	0.283 (2.583)	-3.219 (3.124)	-7.542 ** (2.956)	5.064 (3.709)	-3.153 (2.746)	-9.867 *** (2.909)	-1.972 (2.807)
TCH16	9.866 *** (3.351)	-6.554 (4.820)	-8.612 * (4.624)	10.435 ** (4.931)	-6.851 ** (3.353)	4.132 (4.850)	-0.867 (4.424)
TCH17P	16.877 *** (3.462)	0.302 (4.550)	-13.354 *** (4.305)	20.738 *** (4.235)	-10.974 *** (3.428)	-0.018 (6.630)	-4.315 (4.121)
NONWHT	-0.168 *** (0.044)	0.041 (0.051)	-0.136 *** (0.046)	-0.218 *** (0.068)	-0.120 *** (0.046)	0.037 (0.046)	-0.176 *** (0.048)
SOUTH	-0.002 (0.034)	-0.003 (0.043)	-0.049 (0.036)	-0.012 (0.046)	-0.051 (0.035)	-0.052 (0.040)	-0.014 (0.037)
UNION	-0.064 (0.056)	-0.125 * (0.071)	-0.049 (0.058)	-0.224 *** (0.085)	-0.120 ** (0.061)	0.030 (0.059)	-0.030 (0.061)
POTEXP	0.009 ** (0.004)	-0.018 *** (0.005)	-0.005 (0.004)	-0.013 (0.077)	-0.003 (0.005)	-0.019 *** (0.005)	-0.000 (0.005)
E1ST5	0.002 (0.055)	0.023 (0.067)	-0.045 (0.056)	0.021 *** (0.006)	0.021 (0.054)	0.067 (0.064)	-0.003 (0.059)
CHGJOB	-0.184 *** (0.037)	0.155 *** (0.044)	0.023 (0.037)	-0.196 *** (0.051)	-0.022 (0.037)	0.029 (0.042)	-0.020 (0.039)
SCHWK	0.089 ** (0.039)	0.056 (0.050)	-0.048 (0.040)	-0.013 (0.017)	0.021 (0.040)	0.062 (0.044)	0.071 * (0.042)
SCHWKT	-0.044 (0.060)	0.139 ** (0.068)	0.141 ** (0.058)	0.072 (0.056)	0.155 *** (0.055)	0.115 * (0.068)	0.057 (0.062)
NUR	-0.002 (0.012)	0.011 (0.013)	0.007 (0.012)	0.042 (0.081)	0.015 (0.010)	0.010 (0.013)	0.007 (0.013)

SOURCE: NLS Young Men, 2-year intervals.
NOTE: Standard errors of probit specifications in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Table A.4

DETERMINANTS OF TRAINING FOR NLS MATURE MEN, BY SOURCE AND TYPE

Variable	Source of Training			Type of Training		
	Company	Business/ Technical	Other	Manager	Professional/ Technical	Other
CONSTANT	-0.599 ** (0.260)	-1.499 *** (0.497)	-0.229 (0.229)	-1.371 *** (0.512)	-0.595 ** (0.262)	-0.884 *** (0.301)
SCHLT12	-0.331 *** (0.070)	-0.154 (0.172)	-0.285 *** (0.056)	-0.363 *** (0.091)	-0.409 *** (0.070)	-0.289 *** (0.076)
SCH1315	0.190 ** (0.079)	0.177 (0.191)	0.279 *** (0.069)	0.136 (0.100)	0.373 *** (0.078)	0.174 * (0.090)
SCH16	0.106 (0.113)	0.547 *** (0.191)	0.401 *** (0.087)	0.242 * (0.125)	0.565 *** (0.094)	0.057 (0.127)
SCH17P	-0.076 (0.108)	0.047 (0.285)	0.625 *** (0.079)	0.038 (0.126)	0.808 *** (0.086)	-0.088 (0.126)
TCHLT12	0.767 (3.720)	6.104 (11.073)	-0.554 (2.941)	6.618 (4.901)	-6.983 (5.385)	-4.835 (3.877)
TCH12	-5.976 (4.752)	8.708 (9.873)	-3.273 (4.136)	-1.184 (5.989)	-11.809 ** (4.931)	-5.161 (5.592)
TCH1315	-1.232 (4.967)	-6.039 (11.804)	-17.600 *** (5.263)	-3.662 (8.691)	-11.630 ** (4.544)	-20.667 ** (9.378)
TCH16	-4.346 (8.660)	-17.591 (24.302)	-15.266 ** (7.075)	-3.528 (11.015)	-16.202 ** (6.962)	-6.894 (10.507)
TCH17P	32.111 *** (7.226)	-16.564 (25.753)	-5.786 (6.792)	34.462 *** (8.138)	-11.501 (7.520)	9.319 (10.053)
NONWHT	-0.223 *** (0.069)	0.054 (0.183)	-0.029 (0.052)	-0.177 ** (0.087)	-0.181 ** (0.073)	0.022 (0.073)
SOUTH	-0.031 (0.055)	-0.007 (0.147)	0.036 (0.045)	0.069 (0.065)	0.044 (0.053)	-0.094 (0.066)
UNION	-0.589 *** (0.168)	-0.178 (0.195)	-0.239 (0.160)	0.216 (0.431)	-0.367 ** (0.173)	-0.506 ** (0.208)
POTEXP	-0.016 *** (0.005)	-0.027 ** (0.013)	-0.025 *** (0.004)	-0.028 *** (0.007)	-0.021 *** (0.005)	-0.013 ** (0.006)
NUR	0.014 *** (0.005)	0.014 (0.015)	0.013 *** (0.004)	0.008 (0.006)	0.023 *** (0.005)	-0.001 (0.006)
TENURE	0.004 * (0.002)	-0.015 *** (0.006)	-0.007 *** (0.002)	0.007 ** (0.003)	-0.005 ** (0.002)	-0.006 *** (0.002)

SOURCE: NLS Mature Men, 2-year intervals.
NOTE: Standard errors of probit specification in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Table A.5

DETERMINANTS OF TRAINING FOR NLS CAREER WOMEN, BY SOURCE AND TYPE

Variable	Source of Training			Type of Training			
	Company	Business/ Technical	Other	Managerial	Professional/ Technical	Clerical	Other
CONSTANT	-1.794 *** (0.354)	-1.974 *** (0.701)	-0.921 *** (0.213)	-2.423 *** (0.509)	-1.628 *** (0.276)	-1.181 *** (0.374)	-1.428 *** (0.272)
SCHLT12	-0.232 (0.179)	0.418 (0.378)	-0.270 ** (0.106)	-2.510 (285.02)	-0.233 (0.167)	-0.628 *** (0.205)	-0.052 (0.135)
SCH1315	0.236 * (0.135)	0.248 (0.369)	0.376 *** (0.091)	0.086 (0.188)	0.654 *** (0.110)	-0.186 (0.151)	0.238 * (0.125)
SCH16	0.058 (0.209)	0.312 (0.622)	0.893 *** (0.140)	0.211 (0.273)	1.053 *** (0.156)	-0.383 (0.383)	0.595 *** (0.173)
SCH17P	-0.067 (0.245)	-0.224 (7.612)	1.105 *** (0.265)	0.631 ** (0.252)	1.227 *** (0.231)	-0.973 (1.400)	-0.693 (1.261)
TCHLT12	-15.968 (12.218)	-14.184 (34.298)	-16.084 ** (7.314)	-4.090 (231.742)	-31.436 ** (15.366)	-2.038 (17.723)	-10.864 (8.241)
TCH12	-26.475 ** (10.210)	32.934 ** (15.941)	-17.349 *** (5.726)	-52.363 *** (14.528)	-30.165 *** (8.128)	1.921 (7.677)	-19.201 * (9.976)
TCH1315	12.051 (11.649)	11.019 (57.907)	-11.984 (8.478)	28.358 * (17.170)	-5.956 (9.096)	5.806 (14.017)	-9.776 (12.378)
TCH16	60.916 ** (30.968)	-0.144 117.136)	-27.543 (21.719)	76.039 (56.766)	-19.942 (21.828)	-0.569 (92.703)	12.956 (28.447)
TCH17P	80.704 *** (26.109)	-66.865 (682.919)	-97.568 * (55.354)	175.313 *** (14.685)	-51.023 (43.448)	103.240 (81.936)	-332.356 278.987)
NONWHT	0.155 (0.132)	0.250 (0.347)	0.138 * (0.080)	0.205 (0.191)	-0.024 (0.107)	-0.040 (0.147)	0.394 *** (0.102)
SOUTH	-0.059 (0.115)	0.197 (0.253)	-0.075 (0.078)	-0.215 (0.171)	-0.183 * (0.101)	-0.001 (0.124)	0.095 (0.102)
UNION	0.044 (0.213)	-0.014 (0.593)	-0.170 (0.135)	0.299 (0.268)	0.086 (0.149)	-0.206 (0.273)	-0.498 ** (0.223)
POTEXP	-0.029 ** (0.013)	-0.042 (0.033)	0.008 (0.008)	0.060 *** (0.021)	-0.028 *** (0.010)	-0.008 (0.013)	0.013 (0.011)
TENURE	0.024 ** (0.009)	0.002 (0.016)	-0.005 (0.006)	-0.006 (0.014)	-0.001 (0.007)	0.001 (0.010)	0.007 (0.007)
NUR	0.111 * (0.058)	0.040 (0.154)	-0.083 ** (0.035)	-0.231 *** (0.088)	0.148 *** (0.045)	-0.069 (0.061)	-0.163 *** (0.047)

SOURCE: NLS Mature Women, 1-year intervals.
NOTE: Standard errors of probit specification in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent level.

Table A.6

SUMMARY STATISTICS FOR THE NLS YOUNG MEN SAMPLE

Variable	Variable Description	Mean	Std. Dev.
LOGY	Logarithm annual earnings	9.0628	0.8858
LOGWW	Logarithm of weekly wages	5.2166	0.7753
YR69	Year dummy 1969	0.1901	0.3924
YR73	Year dummy 1973	0.2189	0.4135
YR75	Year dummy 1975	0.2126	0.4091
YR78	Year dummy 1978	0.1922	0.3941
NONWHT	Black	0.2324	0.4223
SCHLT12	Schooling < 12 years	0.1587	0.3654
SCH1315	Schooling 13-15 years	0.2479	0.4318
SCH16	Schooling 16 years	0.1200	0.3249
SCH17P	Schooling > 16 years	0.1550	0.3619
POTEXP	Potential work experience	9.6115	5.5028
EXPSQ	Experience squared	122.6614	125.1492
E1ST5	First 5 years in labor market	0.2688	0.4433
TENURE	Years of job tenure	3.4448	3.8712
TENSQ	Tenure squared	26.8520	50.1881
TENMISS	Tenure missing	0.0312	0.1740
SOUTH	South	0.3980	0.4895
UNRATE	Local unemployment rate	5.1896	3.4692
URMISS	Unemployment rate missing	0.1735	0.3787
	Technical change interactions		
TCHLT12	Schooling < 12 years	0.0004	0.0047
TCH12	Schooling 12 years	0.0013	0.0067
TCH1315	schooling 13-15 years	0.0008	0.0055
TCH16	Schooling 16 years	0.0003	0.0037
TCH17P	Schooling > 16 years	0.0000	0.0035
OCCTRN	Any training current period	0.2903	0.4539
SOCCTR	Cumulated any training	1.3015	1.5799
DOCCTR	Duration any training	6.4756	10.4335
	Current period training		
COTRN	Company training	0.1038	0.3051
BTVTRN	Business/vocational	0.0478	0.2134
RSTRN	Regular school	0.0464	0.2103
OTHSCH	Other sources	0.0891	0.2850
MANTRN	Managerial	0.0378	0.1908
PROTRN	Professional/technical	0.1053	0.3069
SSMTRN	Semiskilled manual	0.0667	0.2496
OTHTYP	Other types	0.0657	0.2478
	Cumulated training		
SCOTR	Company training	0.4309	0.9299
SBVTR	Business/vocational	0.2099	0.5750
SRSTR	Regular school	0.2041	0.5342
SOTHS	Other sources.	0.4461	0.8150
SMAN	Managerial	0.1497	0.5225
SPROTR	Professional/technical	0.4664	0.9033
SSSMTR	Semiskilled manual	0.3782	0.8602
SOTYP	Other types	0.2746	0.6081
	Duration of training		
DCOTR	Company training	2.0987	5.7908
DBVTR	Business/vocational	1.0430	3.6320
DRSTR	Regular school	0.9826	3.2163
DOTHS	Other sources	2.3098	5.3080
DMAN	Managerial	0.6967	3.0628
DPROTR	Professional/technical	2.3177	5.6222
DSMTR	Semiskilled manual	2.0423	5.7468
DOTYP	Other types	1.3379	3.7549

Table A.7

RESULTS FOR EARNINGS AND TRAINING
BY SOURCE AND TYPE: NLS
YOUNG MEN SAMPLE

	Source of Training		Type of Training	
Variable	Annual Earnings	Weekly Wages	Annual Earnings	Weekly Wages
INTERCEPT	8.728 (0.047)	5.146 (.042)	8.730 (0.047)	5.142 (0.042)
YR69	-1.022 *** (0.023)	-0.975 *** (0.020)	-1.021 *** (0.023)	-0.974 *** (0.020)
YR73	-0.594 *** (0.020)	-0.593 *** (0.018)	-0.599 *** (0.020)	-0.598 *** (0.018)
YR75	-0.429 *** (0.019)	-0.417 *** (0.017)	-0.437 *** (0.019)	-0.424 *** (0.017)
YR78	-0.172 *** (0.018)	-0.179 *** (0.016)	-0.170 *** (0.018)	-0.178 *** (0.016)
NONWHT	-0.228 *** (0.014)	-0.175 *** (0.012)	-0.228 *** (0.014)	-0.176 *** (0.012)
SCHLT12	-0.166 *** (0.019)	-0.167 *** (0.017)	-0.161 *** (0.019)	-0.161 *** (0.017)
SCH1315	0.074 *** (0.016)	0.055 *** (0.014)	0.076 *** (0.016)	0.058 *** (0.014)
SCH16	0.259 *** (0.020)	0.218 *** (0.018)	0.255 *** (0.021)	0.217 *** (0.018)
SCH17P	0.373 *** (0.019)	0.333 *** (0.017)	0.349 *** (0.020)	0.314 *** (0.017)
POTEXP	0.100 *** (0.006)	0.067 *** (0.005)	0.099 *** (0.006)	0.066 *** (0.005)
EXPSQ	-0.003 *** (0.000)	-0.002 *** (0.0002)	-0.003 *** (0.0002)	-0.002 *** (0.0002)
E1ST5	0.003 (0.024)	-0.027 (0.021)	0.005 (0.024)	-0.025 (0.021)
TENURE	0.091 *** (0.004)	0.052 *** (0.003)	0.092 *** (0.004)	0.053 *** (0.003)
TENSQ	-0.004 *** (0.000)	-0.002 *** (0.0003)	-0.004 *** (0.0003)	-0.002 *** (0.0003)
TENMISS	0.232 *** (0.032)	0.115 *** (0.029)	0.230 *** (0.032)	0.113 *** (0.029)
SOUTH	-0.096 *** (0.012)	-0.117 *** (0.011)	-0.096 *** (0.012)	-0.117 *** (0.011)
UNRATE	-0.002 (0.003)	0.0007 (0.002)	-0.002 (0.003)	0.001 (0.002)
URMISS	-0.054 ** (0.022)	-0.041 ** (0.020)	-0.052 ** (0.022)	-0.039 * (0.020)
TCHLT12	-1.970 (1.150)	-2.114 * (1.016)	-1.978 (1.152)	-2.124 * (1.018)
TCH12	-0.803 (0.836)	-2.143 *** (0.739)	-0.456 (0.835)	-1.803 ** (0.738)

Table A.7--continued

Variable	Source of Training: Annual Earnings	Source of Training: Weekly Wages	Type of Training: Annual Earnings	Type of Training: Weekly Wages
TCH1315	0.018	-0.945	0.178	-0.792
	(1.013)	(0.895)	(1.014)	(0.896)
TCH16	5.762 ***	4.648 ***	6.234 ***	5.088 ***
	(1.466)	(1.295)	(1.468)	(1.297)
TCH17P	7.118 ***	6.135 ***	7.967 ***	6.895 ***
	(1.543)	(1.364)	(1.542)	(1.362)
Regular School			Managerial	
Current	-0.046	-0.032	0.016	-0.006
	(0.039)	(0.034)	(0.046)	(0.040)
Events	0.082 **	0.061 **	0.166 ***	0.151 ***
	(0.031)	(0.027)	(0.035)	(0.031)
Duration	-0.010 **	-0.007 *	-0.014 **	-0.012 ***
	(0.004)	(0.004)	(0.005)	(0.004)
Company Training			Prof/Technical	
Current	0.000	-0.006	-0.011	-0.010
	(0.029)	(0.025)	(0.028)	(0.025)
Events	0.169 ***	0.147 ***	0.142 ***	0.110 ***
	(0.020)	(0.018)	(0.021)	(0.018)
Duration	-0.013 ***	-0.011 ***	-0.013 ***	-0.008 **
	(0.003)	(0.003)	(0.003)	(0.003)
Business/Vocational			Semiskilled Manual	
Current	-0.109 **	-0.089 **	-0.061 *	-0.040 *
	(0.038)	(0.034)	(0.031)	(0.028)
Events	0.119 ***	0.080 ***	0.096 ***	0.071 ***
	(0.029)	(0.025)	(0.020)	(0.018)
Duration	-0.013 ***	-0.008 **	-0.007 **	-0.003
	(0.004)	(0.004)	(0.003)	(0.002)
Other Sources			Other Types	
Current	-0.008	0.0008	-0.025	-0.010
	(0.028)	(0.025)	(0.033)	(0.029)
Events	0.088 ***	0.059 ***	0.101 ***	0.069 ***
	(0.020)	(0.017)	(0.026)	(0.023)
Duration	-0.009 ***	-0.005 **	-0.015 ***	-0.012 ***
	(0.003)	(0.002)	(0.004)	(0.003)

SOURCE: NLS Young Men.
NOTE: Standard errors in parentheses.
* Significant, from zero, at 10 percent level.
** Significant, from zero, at 5 percent level.
*** Significant, from zero, at 1 percent leve.

Table A.8

PROBABILITY OF UNEMPLOYMENT AND WEEKS UNEMPLOYED EQUATIONS BY SOURCE AND TYPE OF NLS YOUNG MEN

Variable	Unemployment Probability		Weeks Unemployed	
	Source	Type	Source	Type
INTERCEPT	-1.088 *** (0.103)	-1.122 *** (0.103)	-0.124 (0.193)	-0.085 (0.192)
SCHLT12	0.143 ** (0.067)	0.141 ** (0.067)	0.209 * (0.113)	0.211 * (0.112)
SCH1315	-0.101 * (0.059)	-0.081 (0.059)	0.017 (0.117)	0.028 (0.116)
SCH16	-0.469 *** (0.091)	-0.423 *** (0.092)	-0.261 (0.187)	-0.236 (0.189)
SCH17P	-0.578 *** (0.081)	-0.500 *** (0.083)	-0.163 (0.164)	-0.171 (0.164)
TCHLT12	-1.461 (4.191)	-1.370 (4.187)	3.329 (6.778)	2.306 (6.749)
TCH12	-6.085 * (3.220)	-5.517 * (3.189)	-7.241 (5.924)	-8.710 (5.881)
TCH1315	-4.400 (4.152)	-4.726 (4.180)	-9.799 (8.188)	-10.255 (8.308)
TCH16	2.093 (7.981)	1.741 (7.934)	11.576 (20.413)	14.005 (21.088)
TCH17P	-9.958 (7.375)	-11.152 (7.492)	-14.486 (19.221)	-11.644 (19.275)
NONWHT	0.312 *** (0.051)	0.312 *** (0.051)	0.159 * (0.093)	0.145 (0.094)
SOUTH	-0.211 *** (0.048)	-0.207 *** (0.048)	-0.280 *** (0.093)	-0.266 *** (0.093)
POTEXP	-0.002 (0.007)	-0.002 (0.007)	-0.005 (0.012)	-0.007 (0.011)
E1ST5	0.147 ** (0.069)	0.151 ** (0.068)	0.082 (0.134)	0.053 (0.133)
TENURE	-0.117 *** (0.007)	-0.116 *** (0.007)	-0.030 * (0.016)	-0.031 * (0.016)
TENMISS	1.580 *** (0.081)	1.563 *** (0.081)	1.775 *** (0.124)	1.749 *** (0.123)
NUR	0.096 *** (0.018)	0.099 *** (0.018)	0.193 *** (0.033)	0.193 *** (0.033)

Table A.8--continued

Variable	Unemployment Probability		Weeks Unemployed	
	Source	Type	Source	Type
	Reg. School	Managerial	Reg. School	Managerial
Current	-0.203	-0.133	-1.027 **	0.072
	(0.200)	(0.247)	(0.402)	(0.778)
Events	-0.128	-0.120	0.473	-0.535
	(0.149)	(0.208)	(0.322)	(0.701)
Duration	0.018	0.001	-0.051	0.092
	(0.019)	(0.029)	(0.038)	(0.114)
	Reg. School	Managerial	Reg. School	Managerial
Current	-0.056	0.226	-0.170	-0.395
	(0.178)	(0.154)	(0.365)	(0.367)
Events	0.071	-0.459 ***	0.221	0.335
	(0.124)	(0.124)	(0.258)	(0.344)
Duration	-0.011	0.039 ***	-0.056 *	-0.046
	(0.016)	(0.013)	(0.031)	(0.040)
	Reg. School	Managerial	Reg. School	Managerial
Current	0.256 **	0.305 **	-0.090	-0.258
	(0.129)	(0.127)	(0.285)	(0.221)
Events	-0.332 ***	-0.159 *	0.035	0.213
	(0.099)	(0.081)	(0.239)	(0.161)
Duration	0.026 **	0.013	-0.007	-0.033 *
	(0.012)	(0.009)	(0.026)	(0.018)
	Reg. School	Managerial	Reg. School	Managerial
Current	0.412 ***	0.252 *	-0.405 *	-0.250
	(0.123)	(0.147)	(0.245)	(0.352)
Events	-0.357 ***	-0.224 **	0.253	-0.028
	(0.087)	(0.106)	(0.207)	(0.296)
Duration	0.029 ***	0.021	-0.028	0.006
	(0.010)	(0.014)	(0.026)	(0.041)
TAU 2			0.593 ***	0.590 ***
			(0.045)	(0.045)
TAU 3			1.093 ***	1.088 ***
			(0.056)	(0.055)
TAU 4			1.558 ***	1.554 ***
			(0.065)	(0.065)
TAU 5			1.952 ***	1.949 ***
			(0.076)	(0.075)

SOURCE: NLS Young Men 1969, 1980

NOTE: Binomial or multinomial probit specifications. Standard errors in parentheses.

* Significant, from zero, at 10 percent level.

** Significant, from zero, at 5 percent level.

*** Significant, from zero, at 1 percent level.

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Bureau of Labor Statistics Washington, D.C. 20212

Technical Information: (202) 272-5381

Media Contact : (202) 523-1913

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BLS PREVIEWS THE ECONOMY OF THE YEAR 2000

The U.S. Department of Labor's Bureau of Labor Statistics today provided a preview of its economic and employment projections to the year 2000. The projections, the Bureau's 16th since 1957, are widely used in studying long-range economic growth and are the basis for the Bureau's occupational outlook program.

The projections offer three alternative scenarios of the labor force, economic growth, and employment by industry and occupation to the year 2000 in the United States.

All three scenarios project substantial employment increases between 1986 and 2000 ranging from 15 million for the low growth scenario, 21 million for the moderate, and 26 million for the high growth scenario.

Here are highlights of the moderate growth projections:

- The labor force will grow more slowly than in the past and will reach 139 million in the year 2000. The workforce of the future will be older and made up of more women and minority workers than in the past. (See table 1.)
- Productivity growth will contribute more to future economic growth than it has during the previous 14 years. The rate of economic growth will be similar to that experienced since 1972, despite slower labor force growth. (See table 2.)
- Service-producing industries will add nearly 21 million jobs. (See table 3.)
- Employment in manufacturing will decline as manufacturing's share of total employment goes to 14 percent in 2000. The output share of the nation's factories, however, is projected to hold steady.
- Some industries will grow very rapidly, including most business services--especially computer and data processing and personnel supply--and health services--in particular, offices of health practitioners, nursing and personal care facilities, and outpatient care and other health services. (See table 4.)
- Employment in the broad occupational groups that require the most educational preparation--such as executive, administrative, and managerial workers; professional workers; and technicians and related support workers--will grow faster than the average. The occupational groups requiring the least educational preparation are expected to grow slowly or decline, except for the rapidly growing service workers. (See table 5.)

In developing the projections, BLS worked with a series of models used in the Economic Growth and Employment Projections program, which produces a comprehensive set of alternative projections every other year. Each projection scenario employs a specific set of assumptions, including factors such as fiscal policy, monetary policy, demographic changes in the population, exchange rates, and unemployment.

Following is a summary of the projections and some of their more significant implications. More detail will be published in a series of articles in the September 1987 issue of the Monthly Labor Review.

Table 1. Civilian labor force by sex, age, race, and origin, 1972, 1986 and projected 2000 low, moderate, and high alternatives

Group	Labor force (in thousands)				
			Projected 2000 alternatives		
	1972	1986	Low	Moderate	High
Total, 16 and over	87,037	117,837	134,517	138,775	141,107
Men, 16 and over	53,556	65,423	71,729	73,136	74,464
16 to 24 years	11,243	12,251	11,261	11,506	11,811
25 to 54 years	33,133	44,406	52,043	53,024	54,009
55 years and over	9,180	8,766	8,425	8,606	8,644
Women, 16 and over	33,481	52,414	62,788	65,639	66,643
16 to 24 years	8,943	11,117	10,898	11,125	11,365
25 to 54 years	19,192	35,159	45,007	47,756	48,487
55 years and over	5,346	6,138	6,883	6,758	6,791
White	77,275	101,801	112,918	116,701	118,474
Black	8,748	12,684	16,031	16,334	16,518
Asian and other 1/	N.A.	3,352	5,568	5,740	6,115
Hispanic 2/	N.A.	8,076	12,675	14,086	14,122

Group	Changes, 1972-86 and 1986-2000 moderate alternative					
	Number (in thousands)		Percent change		Annual rate of change	
	1972-86	1986-2000	1972-86	1986-2000	1972-86	1986-2000
Total, 16 and over	30,800	20,938	21.6	17.8	2.2	1.2
Men, 16 and over	11,867	7,713	18.1	11.8	1.4	.8
16 to 24 years	1,008	-745	8.2	-6.1	.6	-.4
25 to 54 years	11,273	8,618	25.4	19.4	2.1	1.3
55 years and over	-414	-160	-4.7	-1.8	-.3	-.1
Women, 16 and over	18,933	13,225	36.1	25.2	3.3	1.6
16 to 24 years	2,174	8	19.6	0.1	1.6	.0
25 to 54 years	15,967	12,597	45.4	35.8	4.4	2.2
55 years and over	792	620	12.9	10.1	1.0	.7
White	24,526	14,900	24.1	14.6	2.0	1.0
Black	3,936	3,650	31.1	28.8	2.7	1.8
Asian and other 1/	--	2,388	--	71.2	--	3.9
Hispanic 2/	--	6,010	--	74.4	--	4.1

1/ The "Asian and other" group includes American Indians, Alaskan Natives, Asians, and Pacific Islanders. Labor force data for Asians and other are not available for 1972.

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

Table 2. Selected major aggregate economic variables, 1972, 1986, and projected 2000 low, moderate, and high alternatives

Economic variable	1972	1986	Projected 2000 alternatives			Annual rate of change			
						1972-86	1986-2000		
			Low	Moderate	High		Low	Moderate	High
Demand GNP, billions in 1982 dollars									
Gross National Product	2,608.5	3,678.5	4,617.5	5,161.4	5,552.4	2.5	1.6	2.4	3.0
Personal consumption	1,621.9	2,418.7	3,101.2	3,429.4	3,659.7	2.9	1.8	2.5	3.0
Durables	200.4	368.9	472.9	527.2	589.0	4.5	1.8	2.6	3.4
Nondurables	665.5	872.4	1,038.3	1,116.4	1,204.6	2.0	1.2	1.8	2.3
Services	756.0	1,177.4	1,590.0	1,785.9	1,866.1	3.2	2.2	3.0	3.3
Gross investment	465.4	659.7	767.8	932.1	1,103.2	2.5	1.1	2.5	3.7
Equipment	167.5	320.3	424.8	504.2	560.8	4.7	2.0	3.3	4.1
Structures	109.5	134.7	146.5	198.8	224.6	1.5	0.6	2.8	3.7
Residential	166.5	193.9	190.9	202.1	279.6	1.3	-0.1	0.4	2.6
Exports	195.2	371.3	516.8	634.5	712.0	4.7	2.4	3.9	4.8
Imports	244.6	521.0	555.9	733.0	862.2	5.5	0.5	2.5	3.7
Federal government	246.0	333.4	319.8	354.4	371.2	2.2	-0.3	0.4	0.8
Defense	185.3	251.0	222.5	251.0	263.0	2.2	-0.9	0.0	0.3
Nondefense	60.7	82.4	97.3	103.4	108.2	2.2	1.2	1.6	2.0
State and Local government	324.7	414.5	467.8	544.0	568.6	1.8	0.9	2.0	2.3
Labor force and GNP									
Civilian labor force, millions	87.0	117.8	134.5	138.8	141.1	2.2	1.0	1.2	1.3
Unemployment rate	5.6	7.0	7.7	6.0	4.5	---	---	---	---
GNP per employee, in 1982 dollars	30.25	33.55	37.20	39.57	41.20	0.7	0.7	1.2	1.5
Income									
Gross National Product, in billions	1,212.8	4,208.5	7,312.4	9,455.0	12,637.5	9.3	4.0	5.9	8.1
Personal Income, billions	981.6	3,487.0	6,384.0	7,752.1	10,433.3	9.5	3.8	5.8	8.1
Disposable Personal Income (DPI), billions	839.6	2,973.7	5,601.7	6,705.6	8,908.2	9.5	4.0	5.9	8.1
DPI, billions in 1982 dollars	1,794.4	2,603.7	3,481.6	3,626.1	3,938.1	2.7	1.5	2.4	3.0
DPI per capita, in 1982 dollars	8,562	10,780	12,886	13,421	14,050	1.7	0.7	1.6	1.9

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

Table 3. Employment by major sector and selected industries, 1972, 1986, and projected 2000 low, moderate, and high alternatives

Industry	Employment (in thousands)				
	1972	1986	Projected 2000 alternatives		
			Low	Moderate	High
Total	84,549	111,623	126,432	133,030	137,533
Nonfarm wage and salary 1/	73,514	99,044	113,554	119,156	123,013
Goods-producing	23,668	24,681	23,148	24,678	25,906
Mining	628	783	672	724	779
Construction	3,889	4,904	5,643	5,794	6,077
Manufacturing	19,151	18,994	16,833	18,160	19,050
Durable goods	11,050	11,244	9,654	10,731	11,193
Primary metal industries	1,173	753	489	574	646
Fabricated metal products	1,547	1,431	1,172	1,313	1,361
Machinery, except electrical	1,889	2,060	1,951	2,129	2,171
Electronic computing equipment	182	418	466	503	510
Electrical and electronic equipment	1,813	2,123	1,927	2,128	2,222
Radio and TV communication equipment	299	505	472	542	585
Electronic components and accessories	354	630	649	675	666
Transportation equipment	1,790	2,015	1,516	1,697	1,742
Motor vehicles	875	865	679	749	770
Nondurable goods	8,101	7,750	7,179	7,429	7,857
Food and kindred products	1,745	1,617	1,421	1,456	1,512
Apparel and other textile products	1,382	1,106	903	924	965
Printing and publishing	1,094	1,457	1,643	1,706	1,798
Chemicals and allied products	1,009	1,023	912	950	1,017
Rubber and plastics	631	790	825	861	913
Service-producing 1/	49,846	74,363	90,406	94,478	97,107
Transportation and public utilities	4,541	5,244	5,410	5,719	5,903
Transportation	2,678	3,041	3,315	3,500	3,568
Communications	1,152	1,279	1,130	1,222	1,320
Public utilities	711	924	965	998	1,015
Wholesale trade	4,113	5,735	7,015	7,266	7,361
Retail trade	11,835	17,845	21,795	22,702	23,079
Eating and drinking places	2,860	5,879	8,084	8,365	8,501
Finance, insurance, and real estate	3,907	6,297	7,508	7,917	8,159
Services 1/	12,117	22,531	30,778	32,545	33,708
Hotels	813	1,401	1,848	1,971	2,061
Personal services	912	1,104	1,298	1,357	1,391
Business services	1,790	4,781	7,593	8,121	8,533
Services to dwellings	336	681	995	1,020	1,046
Personnel supply	221	1,017	1,730	1,851	1,908
Computer and data processing	107	591	1,090	1,203	1,281
Research, management, and public relations	NA	788	1,186	1,301	1,394
Health services	3,412	6,551	9,369	9,774	10,039
Offices of health practitioners	694	1,672	2,901	3,061	3,137
Nursing and personal care facilities	591	1,250	1,992	2,097	2,124
Hospitals	1,980	3,038	3,438	3,513	3,611
Outpatient care and other health services	146	591	1,038	1,103	1,167
Educational services	958	1,428	1,532	1,620	1,666
Government	13,333	16,711	17,900	18,329	18,897
Federal	2,684	2,899	2,900	3,000	3,093
State and local	10,649	13,812	15,000	15,329	15,804
Agriculture	3,523	3,252	2,784	2,917	3,009
Private households	1,693	1,241	1,122	1,215	1,234
Nonfarm self-employed and unpaid family workers	5,819	8,086	8,972	9,742	10,277

1/ Excludes SIC 074,5,8, (agricultural services) and 99 (nonclassifiable establishments), therefore not exactly comparable with data from the Current Employment Survey.

NA = Not available.

Table 4. Employment change for major sectors and selected industries, 1972-86 and projected 1986-2000

Industry	Change, 1972-86 and 1986-2000 moderate alternative					
	Number (In thousands)		Percent change		Annual rate of change	
	1972-86	1986-2000	1972-86	1986-2000	1972-86	1986-2000
Total	27,074	21,407	32.0	19.2	2.0	1.3
Nonfarm wage and salary 1/	25,530	20,112	34.7	20.3	2.2	1.3
Goods-producing	1,013	-3	4.2	0.0	0.3	0.0
Mining	155	-59	24.7	-7.5	1.6	-0.6
Construction	1,015	890	26.1	18.1	1.7	1.2
Manufacturing	-157	-834	-0.8	-4.4	-0.1	-0.3
Durable goods	194	-513	1.8	-4.6	0.1	-0.3
Primary metal industries	-420	-179	-35.8	-23.8	-3.1	-1.9
Fabricated metal products	-116	-118	-7.5	-8.2	-0.5	-0.6
Machinery, except electrical	171	69	9.1	3.3	0.6	0.2
Electronic computing equipment	236	85	129.7	20.3	6.1	1.3
Electrical and electronic equipment	310	5	17.1	0.2	1.1	0.0
Radio and TV communication equipment	206	37	68.9	7.4	3.8	0.5
Electronic components and accessories	276	45	78.0	7.1	4.2	0.5
Transportation equipment	225	-318	12.6	-15.8	0.9	-1.2
Motor vehicles	-10	-116	-1.1	-13.4	-0.1	-1.0
Nondurable goods	-351	-321	-4.3	-4.1	-0.3	-0.3
Food and kindred products	-128	-161	-7.3	-9.9	-0.5	-0.7
Apparel and other textile products	-276	-182	-20.0	-16.5	-1.6	-1.3
Printing and publishing	363	249	33.2	17.1	2.1	1.1
Chemicals and allied products	14	-73	1.4	-7.1	0.1	-0.5
Rubber and plastics	159	71	25.2	9.0	1.6	0.6
Service-producing 1/	24,517	20,115	49.2	27.0	2.9	1.7
Transportation and public utilities	703	475	15.5	9.1	1.0	0.6
Transportation	363	459	13.6	15.1	0.9	1.0
Communications	127	-57	11.0	-4.5	0.7	-0.3
Public utilities	213	74	30.0	8.0	1.9	0.6
Wholesale trade	1,622	1,531	39.4	26.7	2.4	1.7
Retail trade	6,010	4,857	50.8	27.2	3.0	1.7
Eating and drinking places	3,019	2,486	105.6	42.3	5.3	2.6
Finance, insurance, and real estate	2,390	1,620	61.2	25.7	3.5	1.7
Services 1/	10,414	10,014	85.9	44.4	4.5	2.7
Hotels	588	570	72.3	40.7	4.0	2.5
Personal services	192	253	21.1	22.9	1.4	1.5
Business services	2,991	3,340	167.1	69.9	7.3	3.9
Services to dwellings	345	339	102.7	49.8	5.2	2.9
Personnel supply	796	834	360.2	82.0	11.5	4.4
Computer and data processing	484	612	452.3	103.5	13.0	5.2
Research, management, and public relations	NA	513	NA	65.1	NA	3.6
Health services	3,139	3,223	92.0	49.2	4.8	2.9
Offices of health practitioners	978	1,389	140.9	83.1	6.5	4.4
Nursing and personal care facilities	659	847	111.5	67.8	5.5	3.8
Hospitals	1,058	475	53.4	15.6	3.1	1.0
Outpatient care and other health services	445	512	304.8	86.6	10.5	4.6
Educational services	470	192	49.1	13.4	2.9	0.9
Government	3,378	1,618	25.3	9.7	1.6	0.7
Federal	215	101	8.0	3.5	0.6	0.2
State and local	3,163	1,517	29.7	11.0	1.9	0.7
Agriculture	-271	-335	-7.7	-10.3	-0.6	-0.8
Private households	-452	-26	-26.7	-2.1	-2.2	-0.1
Nonfarm self-employed and unpaid family workers	2,267	1,656	39.0	20.5	2.4	1.3

1/ Excludes SIC 074,5,8, (agricultural services) and 99 (nonclassifiable establishments), therefore not exactly comparable with data from the Current Employment Survey.

NA = Not available.

Table 5. Employment by broad occupational group and selected occupations, 1986 and projected 2000 low, moderate, and high alternatives
(Numbers in thousands)

Occupation	1986	Projected 2000 alternatives			Change, 1986-2000 moderate alternative		
		Low	Moderate	High	Number change	Percent change	Annual rate of change
Total employment	111,623	126,432	133,030	137,533	21,407	19.2	1.3
Executive, administrative, and managerial workers	10,583	12,900	13,616	14,105	3,033	28.7	1.8
Education administrators	288	316	325	336	37	12.9	0.9
Financial managers	638	747	792	824	154	24.1	1.6
General managers and top executives	2,383	2,820	2,965	3,052	582	24.4	1.6
Marketing, advertising, and public relations managers	323	402	427	444	105	32.5	2.0
Accountants and auditors	945	1,251	1,322	1,371	376	39.8	2.4
Personnel, training, and labor relations specialists	230	264	278	288	49	21.2	1.4
Professional workers	13,538	16,438	17,192	17,793	3,654	27.0	1.7
Electrical and electronics engineers	401	544	592	616	192	47.8	2.8
Computer systems analysts	331	544	582	607	251	75.6	4.1
Lawyers	527	676	718	748	191	36.3	2.2
Teachers, preschool	176	233	240	248	64	36.3	2.2
Teachers, kindergarten and elementary	1,527	1,778	1,826	1,883	299	19.6	1.3
Teachers, secondary school	1,128	1,246	1,280	1,320	152	13.4	0.9
College and university faculty	754	703	722	745	-32	-4.2	-0.3
Dentists	151	184	196	203	45	29.6	1.9
Physicians and surgeons	491	645	679	700	188	38.2	2.3
Registered nurses	1,406	1,951	2,018	2,077	612	43.6	2.6
Technicians and related support workers	3,726	4,884	5,151	5,325	1,424	38.2	2.3
Licensed practical nurses	631	835	869	891	238	37.7	2.3
Drafters	348	331	354	366	5	1.6	0.1
Computer programmers	479	758	813	850	335	69.9	3.9
Sales workers	12,606	15,522	16,334	16,760	3,728	29.6	1.9
Cashiers	2,165	2,616	2,740	2,798	575	26.5	1.7
Sales agents, real estate	313	422	451	468	138	43.9	2.6
Salespersons, retail	3,579	4,563	4,780	4,871	1,201	33.5	2.1
Administrative support workers, including clerical	19,851	21,028	22,109	22,885	2,258	11.4	0.8
Switchboard operators	279	313	330	343	51	18.3	1.2
Computer operators, except peripheral equipment operators	263	364	387	403	124	47.2	2.8
Bookkeeping, accounting, and auditing clerks	2,116	2,085	2,208	2,291	92	4.3	0.3
Payroll and timekeeping clerks	204	171	180	186	-25	-12.0	-0.9
General office clerks	2,361	2,688	2,824	2,916	462	19.6	1.3
Receptionists and information clerks	682	913	964	997	282	41.4	2.5
Secretaries	3,234	3,470	3,658	3,789	424	13.1	0.9
Typists and word processors	1,002	820	862	892	-140	-13.9	-1.1
Private household workers	981	883	955	970	-26	-2.6	-0.2
Service workers, except private household workers	16,555	21,051	21,962	22,562	5,407	32.7	2.0
Janitors and cleaners, including maids/housekeepers	2,676	3,144	3,280	3,382	604	22.6	1.5
Waiters and waitresses	1,702	2,360	2,454	2,503	752	44.2	2.6
Nursing aides, orderlies, and attendants	1,224	1,584	1,658	1,691	433	35.4	2.2
Hairdressers, hairstylists, and cosmetologists	562	627	662	683	99	17.7	1.2
Police patrol officers	349	400	409	422	61	17.4	1.2
Guards	794	1,104	1,177	1,241	383	48.3	2.9
Precision production, craft, and repair workers	13,923	14,722	15,590	16,225	1,666	12.0	0.8
Carpenters	1,010	1,134	1,192	1,252	182	18.1	1.2
Electricians	556	617	644	676	89	15.9	1.1
Painters and paperhangers, construction and maintenance	412	475	502	526	90	21.9	1.4
Plumbers, pipefitters, and steamfitters	402	452	471	493	69	17.2	1.1
Aircraft mechanics and engine specialists	107	122	129	130	22	20.1	1.3
Automotive mechanics	748	758	808	830	60	8.0	0.6
Machinists	378	345	373	385	-5	-1.5	-0.1
Operators, fabricators, and laborers	16,300	15,774	16,724	17,411	424	2.6	0.2
Sewing machine operators, garment	633	526	541	567	-92	-14.5	-1.1
Electrical and electronics assemblers	249	105	116	119	-134	-53.7	-5.3
Welders and cutters	287	284	307	320	19	6.7	0.5
Bus drivers	478	541	555	572	77	16.2	1.1
Truck drivers	2,463	2,821	2,968	3,050	505	20.5	1.3
Industrial truck and tractor operators	426	265	283	296	-143	-33.6	-2.9
Farming, forestry, and fishing workers	3,556	3,229	3,393	3,497	-163	-4.6	-0.3
Gardeners and groundskeepers, except farming	767	964	1,005	1,033	238	31.1	2.0
Farm workers	940	705	750	779	-190	-20.3	-1.6
Farm operators and managers	1,336	1,001	1,051	1,078	-285	-21.3	-1.7

Note: Data do not add to totals because of rounding.

Projections 2000: SUMMARY

This report summarizes the Bureau of Labor Statistics' projections of labor force, economic growth, and industry and occupational employment between 1986 and 2000 and their implications for the future of the U.S. economy. Five articles presenting changes projected over the period in more detail will be published in the September issue of the Monthly Labor Review.

OVERVIEW

Labor force. The labor force is projected to expand by nearly 21 million over the 1986-2000 period based on the moderate projections scenario. This projected increase--nearly 18 percent--represents a slowing both in the number to be added to the labor force and in the rate of labor force growth compared with the previous 14 years. For example, the labor force increased by almost 31 million between 1972 and 1986--a 35 percent expansion. The slower labor force growth projected for the 1986-2000 period continues a trend that started in the late 1970s. Slower growth will result primarily from fewer births 1960-76, the age group entering the labor force at least through the mid-1990s. The labor force projections are based on forthcoming national population projections from the U.S. Bureau of the Census which incorporate revised fertility, mortality, and immigration assumptions.

The labor force also is expected to become increasingly minority and female. Blacks, Hispanics, and the Asian and other race groups combined will account for roughly 57 percent[1] of labor force growth 1986-2000. If non-Hispanic white women are included, the minority and female share of labor force growth exceeds 90 percent.

White labor force expansion is projected at less than 15 percent, 1986-2000, while black labor force growth, nearly 29 percent, accounts for 3.6 million of the total increase--over 17 percent of total labor force growth. The Asian and other races group (American Indians, Alaskan Natives, Asians, and Pacific Islanders) is projected to grow by nearly 2.4 million and to account for over 11 percent of labor force growth. Hispanics, growing by about 6 million 1986-2000, will constitute nearly 29 percent of labor force growth over this period. Women will account for 63 percent of net labor force expansion--slightly greater than their share of the 1972-86 growth. Consequently, women, who have increased their share of the labor force from 38.5 percent in 1972 to 44.5 percent in 1986, are projected to continue to expand that share to over 47 percent by 2000.

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[1] Nonwhite Hispanics are double counted in this total (the sum of black, 17 percent; Asians and other races, 11 percent; and Hispanics, 29 percent). However, data indicates that less than 1 percent of the growth of the Hispanic labor force will be nonwhite.

The age composition of the projected work force also is expected to change. Current trends in age of the labor force are projected to continue through the mid-1990s, when some trend reversal will begin. After the baby boom generation (usually defined as those born between 1946-early 1960s) a period of significantly lower births prevailed until the late 1970s. Births increased 1978 to date (even while the birth rate was stable or declining), as women of the baby boom generation began having children. Because of the smaller numbers born during the 1965-78 period, the number of 16 year olds in the population and the labor force began to decline about 1976, a decline expected to continue fairly steadily until about 1992. This pattern will continue in consecutive years.

Differing birth cohorts moving into older age groups has two important consequences for the age composition of the labor force:

1. By the year 2000, the share of the labor force who are 16-34 years old is projected to decline; and the share of the labor force 35-54 years old is expected to increase.

2. For some age groups, sharp changes in direction are projected to occur during the 1986-2000 period. For example:

   - 16 to 24 year olds are projected to decline into the mid-1990s and then begin to increase.

   - 25 to 34 year olds are projected to increase through the early 1990s and then decline sharply.

   - The number of 55 to 64 year olds is projected to decline through the mid-1990s and then increase very rapidly.

Economic growth. BLS has developed three alternative projections of the U.S. economy. In the moderate alternative, the rate of economic growth as measured by real gross national product (GNP) is projected to increase by 40 percent--an annual rate of 2.4 percent 1986-2000. While this growth is only slightly slower than the 2.5 percent yearly rate in growth of real GNP 1972-86, it represents a slightly faster rate of growth than the economy achieved 1979-86--a period marked by two recessions. The faster rate of economic growth projected through the year 2000 results from a projected acceleration in productivity even as the rate of labor force growth slows.

Changes also are projected in the demand structure of GNP. Among the most important of these changes are: (1) The share of consumer durables, which increased considerably 1972-86, is not expected to change from 1986-2000; (2) an increase is projected in the share of GNP devoted to exports--a reversal in the trend of the 1979-86 period;

(3) the share of GNP going to imports will not change 1986-2000, even though the import share of GNP has increased by nearly 5 percentage points 1972-86; and (4) the share of GNP devoted to defense expenditures will decline--again a reversal of the 1979-86 trend when defense expenditures took an increasing share of GNP.

Employment. The U.S. economy is projected to add more than 21 million jobs during the 1986-2000 period. Of this increase, 20.1 million are projected to be nonagricultural wage and salary jobs and 1.7 million to be nonagricultural, self-employed and unpaid family workers. These gains will be somewhat offset by a projected decline in agricultural employment. The projected employment increase--over 19 percent for the period and 1.3 percent a year--represents a slowing of employment growth due in large part to the slowing of labor force growth. In absolute terms, nonagricultural wage and salary workers increased by nearly 26 million 1972-86--an expansion of nearly 35 percent or 2.2 percent a year. When compared with the more recent period, 1979-86, the projected slowdown in employment growth is not quite as dramatic; over that time span, nonagricultural wage and salary jobs grew only 1.5 percent a year.

Goods-producing industries will show almost no aggregate employment change over the projections' period. Service-producing industries will, therefore, account for nearly all of the projected growth. Only construction is expected to increase among the goods-producing industries, adding almost 900,000 jobs. Although agriculture will show growth in wage and salary jobs, that increase should be more than offset by a decline in selfemployed. Manufacturing employment is projected to fall by over 800,000 jobs over the period, although output growth in that sector is projected to grow 2.4 percent annually. But productivity growth in manufacturing is expected to be even faster.

Within manufacturing, many industries are projected to experience employment growth--some quite rapid. The sector will provide over 18 million wage and salary jobs--employment for 15 percent of the wage and salaried workforce. In general, the manufacturing industries expected to decline in employment are those that have experienced job loss for years, such as basic steel, leather goods, shoes, tobacco, some of the textile and basic metal processing industries, and many of the food processing industries. Projected employment gains in manufacturing are in printing and publishing, drugs and pharmaceutical products, computers, and the instruments industries.

Large growth in jobs is projected for wholesale and retail trade. The expected expansion of over 6 million wage and salary jobs is in line with the long-term trend of these industries, which are growing at the same or a slightly faster pace than the economy. Finance, insurance and real estate also is projected to grow, adding

over 1.6 million jobs over the projection period. Over 10 million jobs are projected to be added to service industries, with health and business services important contributors. Government is expected to expand by about 1.6 million jobs, with virtually all of the increase at the State and local level.

Occupations. The projected growth in employment can be viewed not only by industry but also by occupation. Five occupational groups are projected to exceed the average growth in employment (technicians and related support; service except private household; professional; sales; and executive, administrative, and managerial workers).

Only two occupational groups are projected to show absolute declines over the period--farming, forestry, and fishing workers and private household workers. In addition, below-average growth is projected for administrative support workers, including clerical, and precision production, craft, and repair workers. Virtually no change is projected for operators, fabricators, and laborers.

When employment by major occupational group is distributed in 1986 and in 2000 by the most prevalent 1986 educational level, the projections show growth in the share of jobs requiring most workers to have at least one year of college. There is a slight decline in the share of jobs where high school completion is the predominant education level. However, there is a sharp decline in the share of jobs from 1986 to 2000 where less than a high school education is currently the prevalent pattern.

Comparing projected employment growth by major occupational group with those jobs currently held by blacks and Hispanics shows that neither group is well represented in the fast-growing occupations; both are over-represented in slow-growing or declining occupations. A similar analysis for women yields comparable results, although the disparities are not nearly as great as for blacks and Hispanics.

Alternatives. The high and low alternatives show a relatively broad band around the moderate. The high labor force alternative is 2.3 million more than the moderate; the low, 4.3 million less than the moderate. The annual growth rate of overall real GNP ranges from 1.6 percent in the low alternative to 3.0 percent in the high. The unemployment rate in the low is 7.7 percent in 2000; 6.0 percent in the moderate; and 4.5 percent in the high growth alternative. The level of employment in 2000 is projected to be 6.6 million lower in the low alternative than in the moderate. The high alternative, on the other hand, is 4.5 million higher than the moderate.

IMPLICATIONS

Labor force. The projected continued decline of job seekers 16-19 years old through the early 1990s offers an opportunity to lower the unemployment rate for a labor force group that historically has had a high rate. This is particularly true because the projections show large job increases in eating and drinking places, retail sales, and in service industries--slots typically filled by first-time job seekers. As noted, the share of labor force growth among blacks and Hispanics also is projected to increase. These groups traditionally have had higher unemployment rates than whites, which may make lowering the overall unemployment rate more difficult, unless past problems of jobs for minorities can be dealt with, including education and geographic location of work.

Other important implications can be drawn from declines projected for 20 to 24 year olds, whose numbers will shrink until the late 1990s. Many who have a primary interest in this age group--for example, community and 4-year colleges and the military--will see the population from whom they seek students and recruits shrink throughout most of the 1986-2000 period. Also, producers of goods or services focused chiefly on 16 to 24 year olds can expect their market base to continue to decline.

Considerable attention has been focused on a potential shortage of workers. Often this reflects not an overall lack of workers, but the declining numbers in the younger age groups in the labor force. This has caused employers to turn their attention to alternative sources of workers, such as immigrants or the recently retired.

Several important considerations with regard to the large projected immigrant share of labor force growth are: (1) To the extent immigrants are not English speaking, their integration into the workforce is more difficult, (2) given the skill shifts implied by the occupational projections, many immigrants may not possess the job skills which are in high demand in the U.S. economy, and (3) the geographic distribution of immigrants is more concentrated than that for the total labor force, a factor that may complicate immigrants' search for jobs.

The baby-boom generation has been written about extensively, and the implications of this large population group for society have been widely discussed. Less well-known and, consequently, less written about is the younger so-called "birth dearth" group, i.e., those born between about 1960 to 1978. That population group already has caused a decline, first in 16 to 19 year olds in the population and in the labor force and then among 20 to 24 year olds. In the late 1980s, that decline will extend to older groups, and other implications are likely to result.

The growing labor force share of blacks and Hispanics projected over the remainder of this century poses two important considerations. First, both groups historically have had higher unemployment rates than whites. Thus, the opportunity for a lower overall unemployment rate with the decline in the youth cohort could be negated if inroads cannot be made into the historically high unemployment rate among blacks and Hispanics. The second factor raised by the faster labor force growth for blacks and Hispanics is the disparity between their current employment by occupation and the projected growth in occupational employment. Increased attention will need to be focused on insuring that all youth, and particularly minorities, have sufficient education to insure their entry into the job market and to provide the education and labor market skills needed for advancement to better jobs. While education alone is not the solution to all labor market problems, clearly it is an important or core element in any solution.

The increasingly larger role that women are projected to play in the labor force of the future also has some important implications. For unemployment, however, the gap between male and female unemployment rates has narrowed considerably--more from an increase in the male rate than from any significant lowering of the female unemployment rate. While in the 1960s and 1970s women's unemployment rates were typically 1 to 2 percentage points higher than men's, that difference has narrowed in the 1980s. For 1984-86, women's unemployment rates have ranged from only 0.2 to 0.4 percentage points higher than men's. The distribution of men's and women's jobs by major occupational group shows some disparities despite progress in narrowing the differences over the last decade. An opportunity exists for further improvement in that a key source of job growth, 1986-2000, is professional, technical, and managerial jobs, and women are projected to constitute over three-fifth of net additions to the labor force.

Economic. Several implications can be drawn from the projected overall economic growth and the changes expected in the structure of demand, 1986-2000. These projections show an increase in the rate of productivity growth. Because greater uncertainty is attached to projected productivity growth than to projected labor force growth, the projected rate of economic growth can be viewed as having a higher degree of uncertainty. Consequently, users should examine the alternative projections and their implications carefully. As an example, the low projection alternative, which has a rate of real GNP growth of 1.6 percent per year, 1986-2000, results from a rate of productivity growth consistent with the 1972-86 trend. One important implication of this is that real disposable income per capita (one measure of well-being in the economy) only increases under the low

alternative by 0.7 percent per year, or much slower than the 1.7 percent growth, 1972-86, and at less than one-half the rate of increase projected in the moderate alternative. If a faster rate of productivity increase should prevail, it would be more favorable for the economy, since that is the primary factor leading to gains in future living standards of the population.

Perhaps the most significant trend change projected in the composition of demand for the 1986-2000 period is in foreign trade. As a result of changes in the exchange rates, exports are projected to increase at a faster rate than imports. This is important both to many exporting industries and to other industries which have been pressed by the very rapid growth of imports over the last decade. However, the extent of the slowdown in the growth of imports and the increase in the growth of exports varies considerably from industry to industry. World conditions make the projections of exports and imports uncertain, with trends more volatile than most other demand categories. Another difficulty in developing projections of foreign trade is estimating the capacity of some U.S. industries to recover their export markets once they have been lost--even though a significant turnaround in the value of the dollar has taken place.

Several other important implications follow from the projected shifts in the structure of demand. The projected slowing of the younger age groups in the population and the resulting slowdown in household and family formation are expected to impact expenditure patterns. This is most noticable in consumer durables, particularly in automobile purchases and in new housing construction. Another demand impact related to demographic changes in the population is health care expenditures for the older age groups, particularly the very rapid growth expected in the over 85 population between now and 2000. Not only is this older age group expected to keep health care expenditures among the most rapidly growing demand categories, but coupled with cost pressures the distribution of health care purchases also is projected to be shifting toward nursing homes and home health care.

Industry employment. Most of the projected employment growth is found among the service-producing industries of the economy. Further declines in employment are projected for many industries, including agriculture, many of the mining industries, a significant number of manufacturing industries, and a few service industries. Consequently, despite the projected overall employment growth, workers will continue to be displaced as employment in these industries declines. Because of the geographic concentration of many of the declining industries, some localities will be harder hit from these displacements. Although some displaced workers should be able to obtain related jobs and maintain their standard of living, others may require further training and/or education or may have to relocate geographically.

Some of those displaced from their jobs may not find employment of a like nature given the occupational shifts that are projected to occur between now and 2000, particularly if they lack the education and training required for the emerging jobs. Jobs for displaced workers are a nettlesome problem. While much geographic and occupational mobility exists in our economy, it is heavily concentrated among the young. While it is important that entry level workers be provided with as high a level of education as possible, this doesn't help displaced workers who are past 40 and have relatively low educational attainment.[2]

The expected continuation of the movement of employment to the service-producing industries has several important implications. Firms in some of these industries are more likely to be small. Because small firms generally have a higher turnover rate, they may be less likely to provide workers a life-time employment opportunity. Consequently, workers will need to be prepared through education and training for more frequent changes of employers and occupations. This is best accomplished by a broad-based education at least through the secondary school level. Many smaller firms also are less able than larger employers to provide other benefits such as health care.[3]

Another trend is developing that will in all likelihood require adjustments in the future. As younger age groups in the work force decline and women increasingly seek full-time work, there is conflict between those industries which traditionally demand a high proportion of part-time workers and the economy's ability to supply those workers. Resolution of this conflict could take the form of a movement back toward providing a larger share of full-time jobs in these industries, expansion of self-service stores, or drawing into the work force some older workers who currently are not employed. The alternative is that some seekers of full-time work might be able to find only part-time employment. Another implication is a slowing, or possibly a reversal, in the decline of average hours in the economy. This seems likely since the increase in part-time employment was the primary factor behind past declines in average hours.

Occupations. Industry employment shifts and changes in staffing patterns are expected to alter the occupational structure of employment. In general, occupations in which current participants have the most education are projected to grow the most rapidly --although many jobs should continue to be available for those with

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2 Displaced Workers, 1979-83 Bureau of Labor Statistics, July 1985 BLS Bulletin 2240; also June 1987 Monthly Labor Reivew for 1986 survey.

3 See Employee Benefit Research Institute tabulations of the May 1983 Current Population Survey.

only a high school education despite their relatively slower growth. However, those with less than a high school education face increasing difficulty in their job search and less opportunity for good pay and advancement. These labor market problems frequently stem from a lack of education or training needed to adapt to the employment effects of changes in technology and the structure of demand. The continuing large number of high school dropouts clearly signals that an important problem remains.[4] Given that blacks and Hispanics are disproportionately represented among those with less education, and are projected to account for an increasing share of workers, the recent decline in college enrollment of blacks reported in a Department of Education release is unfortunate.[5]

Despite the faster than average growth in employment for occupations requiring a bachelor's or higher degree, the surplus of college graduates that began in the early 1970s is expected to continue through the end of the century. However, the gap between supply and demand for new college graduates is expected to narrow considerably as we move into the 1990s, in part because of the decline in number of college graduates stemming from the population decline of individuals of college age. [6]

Occupations generally filled by young workers, such as food service, retail sales, and construction labor, are projected to continue to generate many jobs; and the declining numbers of young workers could improve the youth labor market situation. At the same time, given the expected sharp decline in the number of youth, employment opportunities may arise for others seldom employed in those jobs, such as the recently retired who desire some work. This development also could increase the labor market participation of some groups, such as black males, who currently have much lower participation rates than white males of the same age.

Women, blacks, and Hispanics have traditionally been highly concentrated by occupation. Although this occupational segregation has lessened in the past decade, the future offers a chance for further improvement due to rapid growth in many occupations not traditionally filled by Hispanics, blacks, women.

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[4] Elementary and Secondary Education Indicators in Brief, Office of Educational Research and Improvement 1987.
[5] Ibid.
[6] Trends in Education 1975-76--1995-96, U.S. Department of Education, Center for Education Statistics.

News
United States Department of Labor
Bureau of Labor Statistics
Washington, D.C. 20212

Technical information: (202) 523-1371
523-1944
523-1959
Media contact: 523-1913

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THE EMPLOYMENT SITUATION: APRIL 1989

Unemployment rose in April and payroll employment showed little growth, the Bureau of Labor Statistics of the U.S. Department of Labor reported today. The overall jobless rate was 5.2 percent and the civilian worker rate was 5.3 percent, each three-tenths of a point above March levels.

Nonagricultural payroll employment, as measured by the survey of business establishments, rose by 115,000 in April, the second straight month that the payroll survey has shown relatively small job gains. Total civilian employment, as measured by the survey of households, was about unchanged over the month.

Unemployment (Household Survey Data)

Both the number of unemployed persons and the civilian worker unemployment rate increased in April, after seasonal adjustment, offsetting much of the improvement that had occurred in February and March. The number of unemployed persons increased by 420,000 to a seasonally adjusted level of 6.5 million, and the civilian worker unemployment rate rose by 0.3 percentage point to 5.3 percent. The increase returned both figures to the levels that prevailed in the last quarter of 1988. (See table A-2.)

The unemployment rate for adult men rose four-tenths of a percentage point in April to 4.6 percent. The rate for whites also rose to 4.6 percent; the rate for Hispanics was up sharply over the month to 8.3 percent, reversing a decline of a similar magnitude in February. Jobless rates for adult women (4.7 percent), teenagers (14.4 percent), and blacks (10.8 percent) were little changed in April. (See tables A-2 and A-3.)

The median duration of unemployment, at 5.4 weeks, was unchanged from the previous month. The number of persons working part time for economic reasons--often referred to as the partially unemployed--edged up by 175,000 over the month to a seasonally adjusted level of 5.1 million. (See tables A-7 and A-4.)

Civilian Employment and the Labor Force (Household Survey Data)

Total civilian employment was unchanged in April, after seasonal adjustment, at 117.1 million, and the employment-population ratio--the proportion of the population that is employed--held steady at 63.0 percent, the record high reached in March. (See table A-2.)

The civilian labor force rose by 400,000 over the month to 123.7 million. The labor force participation rate rose to 66.5 percent, returning to the high reached in January. Over the year, the civilian labor force has grown by 2.3 million, three-fifths of which occurred among adult women. (See table A-2.)

Table A. Major indicators of labor market activity, seasonally adjusted

Category	Quarterly averages		Monthly data			Mar.-Apr. change
	1988	1989	1989			
	IV	I	Feb.	Mar.	Apr.	
HOUSEHOLD DATA						
	Thousands of persons					
Labor force 1/.....	124,084	124,979	124,865	124,948	125,343	395
Total employment 1/.	117,539	118,588	118,537	118,820	118,797	-23
Civilian labor force..	122,388	123,291	123,181	123,264	123,659	395
Civilian employment.	115,843	116,900	116,853	117,136	117,113	-23
Unemployment.....	6,545	6,391	6,328	6,128	6,546	418
Not in labor force....	62,865	62,482	62,596	62,633	62,365	-268
Discouraged workers.	951	855	N.A.	N.A.	N.A.	N.A.
	Percent of labor force					
Unemployment rates:						
All workers 1/.....	5.3	5.1	5.1	4.9	5.2	0.3
All civilian workers	5.3	5.2	5.1	5.0	5.3	.3
Adult men.....	4.7	4.5	4.5	4.2	4.6	.4
Adult women.....	4.7	4.6	4.5	4.6	4.7	.1
Teenagers.....	14.6	15.0	14.8	13.7	14.4	.7
White.....	4.6	4.4	4.3	4.2	4.6	.4
Black.....	11.3	11.6	11.9	10.9	10.8	-.1
Hispanic origin...	7.8	7.2	6.8	6.5	8.3	1.8
ESTABLISHMENT DATA						
	Thousands of jobs					
Nonfarm employment....	107,344	p108,306	108,341	p108,512	p108,629	p117
Goods-producing.....	25,827	p26,015	26,011	p25,986	p25,991	p5
Service-producing...	81,517	p82,291	82,330	p82,526	p82,638	p112
	Hours of work					
Average weekly hours:						
Total private.....	34.8	p34.7	34.6	p34.6	p35.0	p0.4
Manufacturing.....	41.1	p41.1	41.1	p41.0	p41.3	p.3
Overtime.....	3.9	p3.9	3.9	p3.9	p4.0	p.1

1/ Includes the resident Armed Forces. N.A.=not available.
p=preliminary

Industry Payroll Employment (Establishment Survey Data)

Employment growth in nonagricultural establishments continued to slow, as payroll jobs increased by 115,000 in April to a seasonally adjusted level of 108.6 million. Payroll employment gains have averaged only 145,000 for the last 2 months, compared to 300,000 per month in the prior 12 months. In addition to being relatively weak, employment growth in April was very narrowly concentrated; the services industry alone accounted for 100,000 of the over-the-month gain.

The number of jobs in the goods-producing sector was unchanged in April, following 2 months of decline. Manufacturing employment was flat for the third consecutive month, in contrast to the October-to-January period when it added some 250,000 jobs. Employment in machinery, which has accounted for a quarter of manufacturing's growth in the last 2 years, has shown little change over the last 2 months. The number of jobs in electrical equipment has fallen by 25,000 in the last 5 months. The lumber and wood products industry has also declined recently, as employment was down by about 15,000 since January, largely a reflection of recent weakness in the construction industry.

Construction employment was unchanged in April, seasonally adjusted, following back-to-back declines in February and March. Employment in mining rose for the second consecutive month, as oil and gas extraction added 10,000 jobs in the last 3 months, following 7 months of job losses.

In the service-producing sector, the only significant employment growth took place in the services industry. Employment in that industry grew by 100,000 in April, even though health services was not as strong as usual (up 35,000) and business services, following an erratic pattern recently, was also weak (up about 15,000). Above-average growth was reported in several other services industries. After rising rapidly in the first quarter, employment in retail trade was unchanged over the month. Wholesale trade added 10,000 jobs in April, much less than its average pace of more than 25,000 per month since the end of 1987. Except for a slight decline in the real estate component, employment in the finance, insurance, and real estate industry was about unchanged.

Weekly Hours (Establishment Survey Data)

The average workweek for production or nonsupervisory workers on private nonagricultural payrolls showed an increase of 0.4 hour in April, seasonally adjusted, to 35.0 hours. Similarly, the manufacturing workweek increased 0.3 hour to 41.3 hours, while manufacturing overtime edged up 0.1 hour to 4.0 hours. These seasonally adjusted gains in weekly hours are overstated, however, because of the way the seasonal adjustment process is affected by the timing of the Easter week; historically, large April movements in hours (both increases and decreases) have been reversed in May. (See table B-2.)

The index of aggregate weekly hours of production or nonsupervisory workers on private nonagricultural payrolls, at 129.5 (1977=100), climbed 1.1 percent in April, after seasonal adjustment. The manufacturing index rose 0.6 percent to 97.7. These increases were also affected by the overstatement in hours discussed above. (See table B-5.)

Hourly and Weekly Earnings (Establishment Survey Data)

Average hourly earnings of private production or nonsupervisory workers increased 0.7 percent in April, seasonally adjusted, following increases totaling only 0.3 percent over the prior 2 months. Average weekly earnings climbed by 1.9 percent, largely reflecting the movement in the hours series. Before seasonal adjustment, average hourly earnings rose by 5 cents to $9.60, and average weekly earnings jumped $5.56 to $334.08. Over the past year, hourly earnings have risen by 4.0 percent and weekly earnings were up 4.3 percent. (See tables B-3 and B-4.)

Revisions in the Establishment Survey Data

The Employment Situation news release of data for May will introduce revisions in the establishment-based series on nonagricultural payroll employment, hours, and earnings to reflect the regular annual benchmark adjustments and updated seasonal adjustment factors.

The Employment Situation for May 1989 will be released on Friday, June 2, at 8:30 A.M. (EDT).

Explanatory Note

This news release presents statistics from two major surveys, the Current Population Survey (household survey) and the Current Employment Statistics Survey (establishment survey). The household survey provides the information on the labor force, total employment, and unemployment that appears in the A tables, marked HOUSEHOLD DATA. It is a sample survey of about 55,800 households that is conducted by the Bureau of the Census with most of the findings analyzed and published by the Bureau of Labor Statistics (BLS).

The establishment survey provides the information on the employment, hours, and earnings of workers on nonagricultural payrolls that appears in the B tables, marked ESTABLISHMENT DATA. This information is collected from payroll records by BLS in cooperation with State agencies. The sample includes over 300,000 establishments employing over 38 million people.

For both surveys, the data for a given month are actually collected for and relate to a particular week. In the household survey, unless otherwise indicated, it is the calendar week that contains the 12th day of the month, which is called the survey week. In the establishment survey, the reference week is the pay period including the 12th, which may or may not correspond directly to the calendar week.

The data in this release are affected by a number of technical factors, including definitions, survey differences, seasonal adjustments, and the inevitable variance in results between a survey of a sample and a census of the entire population. Each of these factors is explained below.

Coverage, definitions, and differences between surveys

The sample households in the household survey are selected so as to reflect the entire civilian noninstitutional population 16 years of age and older. Each person in a household is classified as employed, unemployed, or not in the labor force. Those who hold more than one job are classified according to the job at which they worked the most hours.

People are classified as *employed* if they did any work at all as paid civilians; worked in their own business or profession or on their own farm; or worked 15 hours or more in an enterprise operated by a member of their family, whether they were paid or not. People are also counted as employed if they were on unpaid leave because of illness, bad weather, disputes between labor and management, or personal reasons. Members of the Armed Forces stationed in the United States are also included in the employed total.

People are classified as *unemployed,* regardless of their eligibility for unemployment benefits or public assistance, if they meet all of the following criteria: They had no employment during the survey week; they were available for work at that time; and they made specific efforts to find employment sometime during the prior 4 weeks. Persons laid off from their former jobs and awaiting recall and those expecting to report to a job within 30 days need not be looking for work to be counted as unemployed.

The *labor force* equals the sum of the number employed and the number unemployed. The *unemployment rate* is the percentage of unemployed people in the labor force (civilian plus the resident Armed Forces). Table A-5 presents a special grouping of seven measures of unemployment based on varying definitions of unemployment and the labor force. The definitions are provided in the table. The most restrictive definition yields U-1 and the most comprehensive yields U-7. The overall unemployment rate is U-5a, while U-5b represents the same measure with a civilian labor force base.

Unlike the household survey, the establishment survey only counts wage and salary employees whose names appear on the payroll records of nonagricultural firms. As a result, there are many differences between the two surveys, among which are the following:

— The household survey, although based on a smaller sample, reflects a larger segment of the population; the establishment survey excludes agriculture, the self-employed, unpaid family workers, private household workers, and members of the resident Armed Forces;

— The household survey includes people on unpaid leave among the employed; the establishment survey does not;

— The household survey is limited to those 16 years of age and older; the establishment survey is not limited by age;

— The household survey has no duplication of individuals, because each individual is counted only once; in the establishment survey, employees working at more than one job or otherwise appearing on more than one payroll would be counted separately for each appearance.

Other differences between the two surveys are described in "Comparing Employment Estimates from Household and Payroll Surveys," which may be obtained from the BLS upon request.

Seasonal adjustment

Over the course of a year, the size of the Nation's labor force and the levels of employment and unemployment undergo sharp fluctuations due to such seasonal events as changes in weather, reduced or expanded production, harvests, major holidays, and the opening and closing of schools. For example, the labor force increases by a large number each June, when schools close and many young people enter the job market. The effect of such seasonal variation can be very large; over the course of a year, for example, seasonality may account for as much as 95 percent of the month-to-month changes in unemployment.

Because these seasonal events follow a more or less regular pattern each year, their influence on statistical trends can be eliminated by adjusting the statistics from month to month. These adjustments make nonseasonal developments, such as declines in economic activity or increases in the participation of women in the labor force, easier to spot. To return to the school's-out example, the large number of people entering the labor force each June is likely to obscure any other changes that have taken place since May, making it difficult to determine if the level of economic activity has risen or declined. However, because the effect of students finishing school in previous years is known, the statistics for the current year can be adjusted to allow for a comparable change. Insofar as the seasonal adjustment is made correctly, the adjusted figure provides a more useful tool with which to analyze changes in economic activity.

Measures of labor force, employment, and unemployment contain components such as age and sex. Statistics for all employees, production workers, average weekly hours, and average hourly earnings include components based on the employer's industry. All these statistics can be seasonally adjusted either by adjusting the total or by adjusting each of the components and combining them. The second procedure usually yields more accurate information and is therefore followed by BLS. For example, the seasonally adjusted figure for the labor force is the sum of eight seasonally adjusted civilian employment components, plus the resident Armed Forces total (not adjusted for seasonality), and four seasonally adjusted unemployment components; the total for unemployment is the sum of the four unemployment components; and the overall unemployment rate is derived by dividing the resulting estimate of total unemployment by the estimate of the labor force.

The numerical factors used to make the seasonal adjustments are recalculated regularly. For the household survey, the factors are calculated for the January-June period and again for the July-December period. The January revision is applied to data that have been published over the previous 5 years. For the establishment survey, updated factors for seasonal adjustment are calculated only once a year, along with the introduction of new benchmarks which are discussed at the end of the next section.

Sampling variability

Statistics based on the household and establishment surveys are subject to sampling error, that is, the estimate of the number of people employed and the other estimates drawn from these surveys probably differ from the figures that would be obtained from a complete census, even if the same questionnaires and procedures were used. In the household survey, the amount of the differences can be expressed in terms of standard errors. The numerical value of a standard error depends upon the size of the sample, the results of the survey, and other factors. However, the numerical value is always such that the chances are approximately 68 out of 100 that an estimate based on the sample will differ by no more than the standard error from the results of a complete census. The chances are approximately 90 out of 100 that an estimate based on the sample will differ by no more than 1.6 times the standard error from the results of a complete census. At approximately the 90-percent level of confidence—the confidence limits used by BLS in its analyses—the error for the monthly change in total employment is on the order of plus or minus 358,000; for total unemployment it is 224,000; and, for the overall unemployment rate, it is 0.19 percentage point. These figures do not mean that the sample results are off by these magnitudes but, rather, that the chances are approximately 90 out of 100 that the "true" level or rate would not be expected to differ from the estimates by more than these amounts.

Sampling errors for monthly surveys are reduced when the data are cumulated for several months, such as quarterly or annually. Also, as a general rule, the smaller the estimate, the larger the sampling error. Therefore, relatively speaking, the estimate of the size of the labor force is subject to less error than is the estimate of the number unemployed. And, among the unemployed, the sampling error for the jobless rate of adult men, for example, is much smaller than is the error for the jobless rate of teenagers. Specifically, the error on monthly change in the jobless rate for men is .25 percentage point; for teenagers, it is 1.29 percentage points.

In the establishment survey, estimates for the 2 most current months are based on incomplete returns; for this reason, these estimates are labeled preliminary in the tables. When all the returns in the sample have been received, the estimates are revised. In other words, data for the month of September are published in preliminary form in October and November and in final form in December. To remove errors that build up over time, a comprehensive count of the employed is conducted each year. The results of this survey are used to establish new benchmarks—comprehensive counts of employment—against which month-to-month changes can be measured. The new benchmarks also incorporate changes in the classification of industries and allow for the formation of new establishments.

Additional statistics and other information

In order to provide a broad view of the Nation's employment situation, BLS regularly publishes a wide variety of data in this news release. More comprehensive statistics are contained in *Employment and Earnings,* published each month by BLS. It is available for $8.50 per issue or $25.00 per year from the U.S. Government Printing Office, Washington, DC 20204. A check or money order made out to the Superintendent of Documents must accompany all orders.

Employment and Earnings also provides approximations of the standard errors for the household survey data published in this release. For unemployment and other labor force categories, the standard errors appear in tables B through J of its "Explanatory Notes." Measures of the reliability of the data drawn from the establishment survey and the actual amounts of revision due to benchmark adjustments are provided in tables M, O, P, and Q of that publication.

Table A-1. Employment status of the population, including Armed Forces in the United States, by sex

(Numbers in thousands)

Employment status and sex	Not seasonally adjusted			Seasonally adjusted[1]					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
TOTAL									
Noninstitutional population[2]	185,964	187,581	187,708	185,964	187,098	187,340	187,461	187,581	187,708
Labor force[2]	121,996	123,907	124,260	123,060	124,259	125,124	124,865	124,948	125,343
Participation rate[3]	65.6	66.1	66.2	66.2	66.4	66.8	66.6	66.6	66.8
Total employed[2]	115,637	117,528	118,031	116,392	117,705	118,407	118,537	118,820	118,797
Employment-population ratio[4]	62.2	62.7	62.9	62.6	62.9	63.2	63.2	63.3	63.3
Resident Armed Forces	1,732	1,684	1,684	1,732	1,696	1,696	1,684	1,684	1,684
Civilian employed	113,905	115,844	116,347	114,660	116,009	116,711	116,853	117,136	117,113
Agriculture	3,193	2,934	3,116	3,187	3,193	3,300	3,223	3,206	3,104
Nonagricultural industries	110,712	112,911	113,231	111,473	112,816	113,411	113,630	113,930	114,009
Unemployed	6,359	6,378	6,229	6,668	6,554	6,716	6,328	6,128	6,546
Unemployment rate[5]	5.2	5.1	5.0	5.4	5.3	5.4	5.1	4.9	5.2
Not in labor force	63,968	63,674	63,448	62,904	62,839	62,216	62,596	62,633	62,365
Men, 16 years and over									
Noninstitutional population[2]	89,225	90,032	90,094	89,225	89,792	89,914	89,973	90,032	90,094
Labor force[2]	67,798	68,472	68,684	68,462	68,638	69,032	69,113	69,190	69,360
Participation rate[3]	76.0	76.1	76.2	76.7	76.4	76.8	76.8	76.9	77.0
Total employed[2]	64,288	64,875	65,185	64,866	65,055	65,322	65,572	65,920	65,767
Employment-population ratio[4]	72.1	72.1	72.4	72.7	72.5	72.6	72.9	73.2	73.0
Resident Armed Forces	1,569	1,521	1,521	1,569	1,534	1,532	1,521	1,521	1,521
Civilian employed	62,719	63,354	63,664	63,297	63,521	63,790	64,051	64,399	64,246
Unemployed	3,510	3,597	3,499	3,596	3,583	3,710	3,540	3,270	3,593
Unemployment rate[5]	5.2	5.3	5.1	5.3	5.2	5.4	5.1	4.7	5.2
Women, 16 years and over									
Noninstitutional population[2]	96,739	97,550	97,614	96,739	97,306	97,427	97,488	97,550	97,614
Labor force[2]	54,198	55,435	55,576	54,598	55,621	56,091	55,752	55,758	55,983
Participation rate[3]	56.0	56.8	56.9	56.4	57.2	57.6	57.2	57.2	57.4
Total employed[2]	51,349	52,654	52,846	51,526	52,650	53,085	52,965	52,900	53,029
Employment-population ratio[4]	53.1	54.0	54.1	53.3	54.1	54.5	54.3	54.2	54.3
Resident Armed Forces	163	163	163	163	162	164	163	163	163
Civilian employed	51,186	52,491	52,683	51,363	52,488	52,921	52,802	52,737	52,866
Unemployed	2,849	2,781	2,730	3,072	2,971	3,006	2,787	2,858	2,953
Unemployment rate[5]	5.3	5.0	4.9	5.6	5.3	5.4	5.0	5.1	5.3

[1] The population and Armed Forces figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and seasonally adjusted columns.

[2] Includes members of the Armed Forces stationed in the United States.

[3] Labor force as a percent of the noninstitutional population.

[4] Total employment as a percent of the noninstitutional population.

[5] Unemployment as a percent of the labor force (including the resident Armed Forces).

Table A-2. Employment status of the civilian population by sex and age

(Numbers in thousands)

Employment status, sex, and age	Not seasonally adjusted			Seasonally adjusted[1]					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
TOTAL									
Civilian noninstitutional population	184,232	185,897	186,024	184,232	185,402	185,644	185,777	185,897	186,024
Civilian labor force	120,264	122,223	122,576	121,328	122,563	123,428	123,181	123,264	123,659
Participation rate	65.3	65.7	65.9	65.9	66.1	66.5	66.3	66.3	66.5
Employed	113,905	115,844	116,347	114,660	116,009	116,711	116,853	117,136	117,113
Employment-population ratio[2]	61.8	62.3	62.5	62.2	62.6	62.9	62.9	63.0	63.0
Unemployed	6,359	6,378	6,229	6,668	6,554	6,716	6,328	6,128	6,546
Unemployment rate	5.3	5.2	5.1	5.5	5.3	5.4	5.1	5.0	5.3
Men, 20 years and over									
Civilian noninstitutional population	80,326	81,333	81,413	80,326	81,001	81,162	81,256	81,333	81,413
Civilian labor force	62,442	63,210	63,370	62,774	63,002	63,358	63,490	63,557	63,709
Participation rate	77.7	77.7	77.8	78.1	77.8	78.1	78.1	78.1	78.3
Employed	59,504	60,191	60,430	59,833	60,049	60,420	60,636	60,869	60,757
Employment-population ratio[2]	74.1	74.0	74.2	74.5	74.1	74.4	74.6	74.8	74.6
Agriculture	2,280	2,166	2,277	2,259	2,292	2,277	2,320	2,317	2,252
Nonagricultural industries	57,224	58,025	58,154	57,574	57,757	58,143	58,316	58,552	58,505
Unemployed	2,938	3,019	2,940	2,941	2,953	2,938	2,853	2,688	2,952
Unemployment rate	4.7	4.8	4.6	4.7	4.7	4.6	4.5	4.2	4.6
Women, 20 years and over									
Civilian noninstitutional population	89,307	90,242	90,318	89,307	89,954	90,072	90,153	90,242	90,318
Civilian labor force	50,465	51,803	51,855	50,591	51,587	51,998	51,821	51,851	51,992
Participation rate	56.5	57.4	57.4	56.6	57.3	57.7	57.5	57.5	57.6
Employed	48,162	49,462	49,578	48,120	49,165	49,543	49,514	49,484	49,544
Employment-population ratio[2]	53.9	54.8	54.9	53.9	54.7	55.0	54.9	54.8	54.9
Agriculture	637	594	600	653	646	715	666	664	615
Nonagricultural industries	47,525	48,868	48,978	47,467	48,519	48,827	48,849	48,819	48,929
Unemployed	2,303	2,341	2,277	2,471	2,422	2,455	2,306	2,367	2,448
Unemployment rate	4.6	4.5	4.4	4.9	4.7	4.7	4.5	4.6	4.7
Both sexes, 16 to 19 years									
Civilian noninstitutional population	14,598	14,323	14,293	14,598	14,447	14,410	14,367	14,323	14,293
Civilian labor force	7,357	7,210	7,350	7,963	7,974	8,071	7,871	7,856	7,958
Participation rate	50.4	50.3	51.4	54.5	55.2	56.0	54.8	54.9	55.7
Employed	6,239	6,192	6,338	6,707	6,795	6,748	6,703	6,783	6,812
Employment-population ratio[2]	42.7	43.2	44.3	45.9	47.0	46.8	46.7	47.4	47.7
Agriculture	276	174	240	275	255	307	237	224	237
Nonagricultural industries	5,962	6,018	6,098	6,432	6,540	6,441	6,466	6,559	6,575
Unemployed	1,118	1,018	1,012	1,256	1,179	1,323	1,168	1,073	1,146
Unemployment rate	15.2	14.1	13.8	15.8	14.8	16.4	14.8	13.7	14.4

[1] The population figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and seasonally adjusted columns.

[2] Civilian employment as a percent of the civilian noninstitutional population.

HOUSEHOLD DATA

Table A-3. Employment status of the civilian population by race, sex, age, and Hispanic origin

(Numbers in thousands)

Employment status, race, sex, age, and Hispanic origin	Not seasonally adjusted			Seasonally adjusted[1]					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
WHITE									
Civilian noninstitutional population	157,943	159,020	159,098	157,943	158,705	158,865	158,947	159,020	159,098
Civilian labor force	103,758	105,100	105,542	104,517	105,411	106,106	105,798	105,988	106,312
Participation rate	65.7	66.1	66.3	66.2	66.4	66.8	66.6	66.7	66.8
Employed	99,141	100,435	100,941	99,663	100,567	101,183	101,278	101,554	101,458
Employment-population ratio[2]	62.8	63.2	63.4	63.1	63.4	63.7	63.7	63.9	63.8
Unemployed	4,617	4,664	4,601	4,854	4,844	4,923	4,521	4,434	4,854
Unemployment rate	4.5	4.4	4.4	4.6	4.6	4.6	4.3	4.2	4.6
Men, 20 years and over									
Civilian labor force	54,430	55,070	55,207	54,653	54,898	55,213	55,308	55,382	55,448
Participation rate	78.1	78.2	78.3	78.4	78.2	78.5	78.6	78.6	78.7
Employed	52,275	52,800	53,033	52,478	52,636	53,007	53,197	53,387	53,246
Employment-population ratio[2]	75.0	75.0	75.2	75.3	75.0	75.4	75.6	75.8	75.5
Unemployed	2,155	2,270	2,173	2,175	2,262	2,205	2,111	1,995	2,202
Unemployment rate	4.0	4.1	3.9	4.0	4.1	4.0	3.8	3.6	4.0
Women, 20 years and over									
Civilian labor force	42,882	43,767	43,954	42,955	43,644	43,936	43,770	43,780	44,016
Participation rate	56.2	56.9	57.1	56.3	56.9	57.2	56.9	56.9	57.2
Employed	41,297	42,115	42,291	41,233	41,930	42,201	42,177	42,115	42,207
Employment-population ratio[2]	54.1	54.7	54.9	54.0	54.6	54.9	54.8	54.7	54.8
Unemployed	1,586	1,652	1,663	1,722	1,714	1,734	1,593	1,665	1,810
Unemployment rate	3.7	3.8	3.8	4.0	3.9	3.9	3.6	3.8	4.1
Both sexes, 16 to 19 years									
Civilian labor force	6,445	6,262	6,382	6,909	6,869	6,958	6,720	6,826	6,848
Participation rate	54.2	53.9	55.0	58.1	58.6	59.6	57.7	58.7	59.0
Employed	5,569	5,520	5,617	5,952	6,001	5,975	5,904	6,052	6,005
Employment-population ratio[2]	46.9	47.5	48.4	50.1	51.2	51.1	50.7	52.1	51.8
Unemployed	876	742	765	957	868	983	816	774	843
Unemployment rate	13.6	11.9	12.0	13.9	12.6	14.1	12.1	11.3	12.3
Men	14.1	13.8	12.7	14.4	13.4	16.4	14.0	12.3	13.1
Women	13.1	9.8	11.2	13.3	11.8	11.7	10.2	10.2	11.5
BLACK									
Civilian noninstitutional population	20,622	20,930	20,956	20,622	20,842	20,877	20,905	20,930	20,956
Civilian labor force	12,941	13,243	13,121	13,101	13,405	13,477	13,476	13,425	13,287
Participation rate	62.8	63.3	62.6	63.5	64.3	64.6	64.5	64.1	63.4
Employed	11,394	11,761	11,699	11,534	11,856	11,860	11,873	11,961	11,846
Employment-population ratio[2]	55.3	56.2	55.8	55.9	56.9	56.8	56.8	57.1	56.5
Unemployed	1,547	1,483	1,422	1,567	1,549	1,617	1,603	1,464	1,442
Unemployment rate	12.0	11.2	10.8	12.0	11.6	12.0	11.9	10.9	10.8
Men, 20 years and over									
Civilian labor force	6,142	6,187	6,165	6,151	6,179	6,226	6,199	6,230	6,171
Participation rate	75.1	74.3	73.9	75.2	74.6	75.0	74.6	74.8	74.0
Employed	5,467	5,541	5,515	5,510	5,561	5,576	5,549	5,620	5,554
Employment-population ratio[2]	66.8	66.6	66.1	67.3	67.1	67.2	66.7	67.5	66.6
Unemployed	675	646	650	641	618	650	650	611	617
Unemployment rate	11.0	10.4	10.5	10.4	10.0	10.4	10.5	9.8	10.0
Women, 20 years and over									
Civilian labor force	6,062	6,281	6,174	6,112	6,316	6,369	6,349	6,315	6,227
Participation rate	59.1	60.2	59.1	59.6	60.9	61.2	61.0	60.5	59.6
Employed	5,412	5,699	5,637	5,444	5,654	5,706	5,697	5,739	5,677
Employment-population ratio[2]	52.7	54.6	54.0	53.1	54.5	54.9	54.7	55.0	54.3
Unemployed	650	582	536	668	662	663	651	576	550
Unemployment rate	10.7	9.3	8.7	10.9	10.5	10.4	10.3	9.1	8.8
Both sexes, 16 to 19 years									
Civilian labor force	737	775	783	838	910	881	928	880	889
Participation rate	33.8	35.6	36.0	38.5	41.7	40.5	42.7	40.5	40.9
Employed	516	521	546	580	641	577	627	602	615
Employment-population ratio[2]	23.7	24.0	25.1	26.6	29.4	26.5	28.8	27.7	28.3
Unemployed	221	255	236	258	269	304	301	278	274
Unemployment rate	30.0	32.8	30.2	30.8	29.6	34.5	32.4	31.6	30.8
Men	24.8	29.3	33.6	27.9	29.8	36.7	33.1	28.6	35.5
Women	35.8	36.4	26.8	33.9	29.3	32.0	31.6	34.8	26.2

See footnotes at end of table.

Table A-3. Employment status of the civilian population by race, sex, age, and Hispanic origin—Continued

(Numbers in thousands)

Employment status, race, sex, age, and Hispanic origin	Not seasonally adjusted			Seasonally adjusted[1]					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
HISPANIC ORIGIN									
Civilian noninstitutional population	13,230	13,649	13,690	13,230	13,533	13,564	13,606	13,649	13,690
Civilian labor force	8,773	9,109	9,210	8,823	9,133	9,205	9,219	9,210	9,262
Participation rate	66.3	66.7	67.3	66.7	67.5	67.9	67.8	67.5	67.7
Employed	8,002	8,504	8,461	8,030	8,441	8,434	8,596	8,607	8,495
Employment-population ratio[2]	60.5	62.3	61.8	60.7	62.4	62.2	63.2	63.1	62.1
Unemployed	771	605	749	793	692	771	624	603	767
Unemployment rate	8.8	6.6	8.1	9.0	7.6	8.4	6.8	6.5	8.3

[1] The population figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and seasonally adjusted columns.

[2] Civilian employment as a percent of the civilian noninstitutional population.

NOTE: Detail for the above race and Hispanic-origin groups will not sum to totals because data for the "other races" group are not presented and Hispanics are included in both the white and black population groups.

Table A-4. Selected employment indicators

(In thousands)

Category	Not seasonally adjusted			Seasonally adjusted					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
CHARACTERISTIC									
Civilian employed, 16 years and over	113,905	115,844	116,347	114,660	116,009	116,711	116,853	117,136	117,113
Married men, spouse present	40,338	40,754	40,726	40,494	40,483	40,925	40,928	41,083	40,890
Married women, spouse present	28,888	29,628	29,804	28,772	29,053	29,589	29,412	29,569	29,656
Women who maintain families	6,109	6,275	6,255	6,091	6,399	6,416	6,385	6,256	6,243
MAJOR INDUSTRY AND CLASS OF WORKER									
Agriculture:									
Wage and salary workers	1,688	1,517	1,608	1,632	1,698	1,684	1,645	1,656	1,554
Self-employed workers	1,356	1,298	1,385	1,390	1,349	1,387	1,419	1,403	1,419
Unpaid family workers	149	119	123	152	149	189	150	138	124
Nonagricultural industries:									
Wage and salary workers	101,897	104,143	104,301	102,562	103,904	104,510	104,797	104,982	104,985
Government	17,236	17,625	17,403	17,012	17,423	17,393	17,311	17,382	17,180
Private industries	84,660	86,518	86,898	85,550	86,481	87,117	87,486	87,600	87,806
Private households	1,087	1,084	1,091	1,114	1,210	1,196	1,135	1,163	1,117
Other industries	83,573	85,434	85,807	84,436	85,271	85,921	86,350	86,437	86,689
Self-employed workers	8,533	8,420	8,636	8,567	8,602	8,718	8,517	8,645	8,671
Unpaid family workers	283	347	293	272	266	298	285	332	281
PERSONS AT WORK PART TIME[1]									
All industries:									
Part time for economic reasons	4,851	4,784	4,783	5,212	5,321	5,097	4,981	4,968	5,143
Slack work	2,167	2,306	2,266	2,264	2,549	2,302	2,303	2,232	2,373
Could only find part-time work	2,287	2,204	2,204	2,519	2,410	2,352	2,333	2,393	2,425
Voluntary part time	16,082	16,510	16,676	14,949	15,363	15,401	15,126	15,561	15,498
Nonagricultural industries:									
Part time for economic reasons	4,624	4,572	4,600	4,953	5,033	4,837	4,697	4,709	4,930
Slack work	2,053	2,148	2,158	2,131	2,377	2,144	2,105	2,048	2,243
Could only find part-time work	2,196	2,155	2,146	2,426	2,307	2,283	2,272	2,317	2,369
Voluntary part time	15,540	16,095	16,205	14,441	14,928	14,970	14,688	15,127	15,060

[1] Excludes persons "with a job but not at work" during the survey period for such reasons as vacation, illness, or industrial dispute.

Table A-5. Range of unemployment measures based on varying definitions of unemployment and the labor force, seasonally adjusted

(Percent)

Measure	Quarterly averages					Monthly data		
	1988				1989	1989		
	I	II	III	IV	I	Feb.	Mar.	Apr.
U-1 Persons unemployed 15 weeks or longer as a percent of the civilian labor force	1.4	1.3	1.3	1.2	1.1	1.1	1.1	1.2
U-2 Job losers as a percent of the civilian labor force	2.6	2.5	2.5	2.5	2.4	2.3	2.3	2.4
U-3 Unemployed persons 25 years and over as a percent of the civilian labor force	4.4	4.2	4.2	4.1	4.0	4.0	3.9	4.1
U-4 Unemployed full-time jobseekers as a percent of the full-time civilian labor force	5.3	5.1	5.1	5.0	4.9	4.8	4.8	5.0
U-5a Total unemployed as a percent of the labor force, including the resident Armed Forces	5.6	5.4	5.4	5.3	5.1	5.1	4.9	5.2
U-5b Total unemployed as a percent of the civilian labor force	5.7	5.5	5.5	5.3	5.2	5.1	5.0	5.3
U-6 Total full-time jobseekers plus 1/2 part-time jobseekers plus 1/2 total on part time for economic reasons as a percent of the civilian labor force less 1/2 of the part-time labor force	7.9	7.6	7.6	7.5	7.2	7.2	7.1	7.4
U-7 Total full-time jobseekers plus 1/2 part-time jobseekers plus 1/2 total on part time for economic reasons plus discouraged workers as a percent of the civilian labor force plus discouraged workers less 1/2 of the part-time labor force	8.7	8.3	8.4	8.2	7.9	N.A.	N.A.	N.A.

N.A. = not available.

Table A-6. Selected unemployment indicators, seasonally adjusted

Category	Number of unemployed persons (in thousands)			Unemployment rates[1]					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
CHARACTERISTIC									
Total, 16 years and over	6,668	6,128	6,546	5.5	5.3	5.4	5.1	5.0	5.3
Men, 16 years and over	3,596	3,270	3,593	5.4	5.3	5.5	5.2	4.8	5.3
Men, 20 years and over	2,941	2,688	2,952	4.7	4.7	4.6	4.5	4.2	4.6
Women, 16 years and over	3,072	2,858	2,953	5.6	5.4	5.4	5.0	5.1	5.3
Women, 20 years and over	2,471	2,367	2,448	4.9	4.7	4.7	4.5	4.6	4.7
Both sexes, 16 to 19 years	1,256	1,073	1,146	15.8	14.8	16.4	14.8	13.7	14.4
Married men, spouse present	1,294	1,209	1,347	3.1	3.1	3.1	3.1	2.9	3.2
Married women, spouse present	1,143	1,074	1,247	3.8	3.7	3.6	3.4	3.5	4.0
Women who maintain families	566	533	513	8.5	8.2	8.0	8.0	7.9	7.6
Full-time workers	5,338	5,028	5,247	5.1	5.1	5.0	4.8	4.8	5.0
Part-time workers	1,311	1,120	1,295	7.5	7.0	7.9	7.3	6.2	7.2
Labor force time lost[2]	—	—	—	6.2	6.3	6.2	5.9	5.8	6.0
INDUSTRY									
Nonagricultural private wage and salary workers	4,848	4,636	5,003	5.4	5.4	5.6	5.1	5.0	5.4
Goods-producing industries	1,895	1,718	1,753	6.5	6.4	6.4	6.1	5.8	6.0
Mining	67	51	42	8.1	7.7	6.1	8.0	7.0	5.6
Construction	674	610	616	10.6	10.4	10.4	10.0	9.4	9.7
Manufacturing	1,154	1,058	1,095	5.3	5.2	5.3	4.9	4.8	4.9
Durable goods	628	608	614	4.8	5.0	5.0	4.4	4.7	4.7
Nondurable goods	526	450	481	5.9	5.5	5.7	5.5	4.9	5.2
Service-producing industries	2,953	2,918	3,250	4.8	4.9	5.2	4.7	4.6	5.1
Transportation and public utilities	246	254	265	3.8	3.8	3.8	3.9	3.9	4.0
Wholesale and retail trade	1,335	1,294	1,381	5.9	6.3	6.3	5.6	5.6	5.9
Finance and service industries	1,372	1,371	1,604	4.3	4.1	4.7	4.3	4.1	4.8
Government workers	521	466	485	3.0	2.7	2.7	2.7	2.6	2.7
Agricultural wage and salary workers	202	161	183	11.0	8.8	9.5	8.9	8.9	10.5

[1] Unemployment as a percent of the civilian labor force.

[2] Aggregate hours lost by the unemployed and persons on part time for economic reasons as a percent of potentially available labor force hours.

Table A-7. Duration of unemployment

(Numbers in thousands)

Weeks of unemployment	Not seasonally adjusted			Seasonally adjusted					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
DURATION									
Less than 5 weeks	2,781	2,756	2,778	3,099	3,020	3,181	3,247	3,055	3,090
5 to 14 weeks	1,751	2,072	1,804	1,969	2,039	2,081	1,865	1,821	2,034
15 weeks and over	1,827	1,850	1,847	1,882	1,485	1,512	1,304	1,310	1,426
15 to 26 weeks	963	851	978	756	758	757	665	648	669
27 weeks and over	864	899	769	826	737	755	639	663	737
Average (mean) duration, in weeks	14.4	12.9	13.5	13.5	12.8	12.7	12.1	12.4	12.7
Median duration, in weeks	6.8	6.8	6.3	5.8	5.8	5.7	5.3	5.4	5.4
PERCENT DISTRIBUTION									
Total unemployed	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 5 weeks	43.7	43.2	44.6	46.6	46.2	47.0	50.6	49.4	47.2
5 to 14 weeks	27.5	32.5	29.0	29.6	31.1	30.7	29.1	29.4	31.1
15 weeks and over	28.7	24.3	26.4	23.8	22.8	22.3	20.3	21.2	21.8
15 to 26 weeks	15.1	13.3	14.1	11.4	11.5	11.2	10.4	10.5	10.5
27 weeks and over	13.6	11.0	12.3	12.4	11.2	11.1	10.0	10.7	11.3

Table A-8. Reason for unemployment

(Numbers in thousands)

Reasons	Not seasonally adjusted			Seasonally adjusted					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
NUMBER OF UNEMPLOYED									
Job losers	2,977	3,176	2,990	2,968	3,066	3,121	2,876	2,831	2,984
On layoff	785	996	787	844	819	827	774	808	847
Other job losers	2,192	2,180	2,203	2,124	2,247	2,294	2,102	2,023	2,137
Job leavers	895	850	889	985	998	985	985	885	978
Reentrants	1,643	1,721	1,720	1,804	1,725	1,835	1,740	1,730	1,894
New entrants	843	631	630	886	799	780	765	713	671
PERCENT DISTRIBUTION									
Total unemployed	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Job losers	46.8	49.8	48.0	44.7	46.5	46.4	45.2	46.0	45.7
On layoff	12.3	15.6	12.6	12.7	12.4	12.3	12.2	13.1	13.0
Other job losers	34.5	34.2	35.4	32.0	34.1	34.1	33.0	32.8	32.7
Job leavers	14.1	13.3	14.3	14.8	15.1	14.7	15.5	14.4	15.0
Reentrants	25.8	27.0	27.6	27.2	26.2	27.3	27.3	28.1	29.0
New entrants	13.3	9.9	10.1	13.3	12.1	11.6	12.0	11.6	10.3
UNEMPLOYED AS A PERCENT OF THE CIVILIAN LABOR FORCE									
Job losers	2.5	2.6	2.4	2.4	2.5	2.5	2.3	2.3	2.4
Job leavers	.7	.7	.7	.8	.8	.8	.8	.7	.8
Reentrants	1.4	1.4	1.4	1.5	1.4	1.5	1.4	1.4	1.5
New entrants	.7	.5	.5	.7	.7	.6	.6	.6	.5

Table A-9. Unemployed persons by sex and age, seasonally adjusted

Sex and age	Number of unemployed persons (in thousands)			Unemployment rates[1]					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
Total, 16 years and over	6,668	6,128	6,546	5.5	5.3	5.4	5.1	5.0	5.3
16 to 24 years	2,518	2,182	2,344	11.2	10.9	11.9	10.5	9.8	10.5
16 to 19 years	1,256	1,073	1,146	15.8	14.8	16.4	14.8	13.7	14.4
16 to 17 years	580	477	463	17.7	16.6	18.3	18.2	15.3	14.9
18 to 19 years	658	597	667	14.1	13.3	15.4	12.7	12.5	13.8
20 to 24 years	1,262	1,109	1,198	8.7	8.7	9.3	8.1	7.7	8.4
25 years and over	4,144	3,921	4,191	4.2	4.1	4.1	4.0	3.9	4.1
25 to 54 years	3,696	3,542	3,761	4.4	4.3	4.2	4.2	4.1	4.4
55 years and over	460	396	451	3.0	3.0	3.1	3.1	2.6	2.9
Men, 16 years and over	3,596	3,270	3,593	5.4	5.3	5.5	5.2	4.8	5.3
16 to 24 years	1,321	1,128	1,238	11.2	11.1	12.8	11.1	9.7	10.7
16 to 19 years	655	582	641	15.9	15.4	18.6	16.7	14.2	15.5
16 to 17 years	300	258	274	17.6	17.3	20.6	19.6	15.8	17.0
18 to 19 years	355	330	368	14.7	13.5	17.9	15.1	13.2	14.6
20 to 24 years	666	546	597	8.7	8.7	9.6	8.1	7.2	8.0
25 years and over	2,270	2,136	2,344	4.1	4.1	4.0	4.0	3.8	4.2
25 to 54 years	1,994	1,890	2,076	4.3	4.3	4.2	4.1	4.0	4.4
55 years and over	281	246	283	3.2	3.3	3.0	3.4	2.8	3.2
Women, 16 years and over	3,072	2,858	2,953	5.6	5.4	5.4	5.0	5.1	5.3
16 to 24 years	1,197	1,054	1,106	11.1	10.7	10.9	9.7	10.0	10.4
16 to 19 years	601	491	505	15.6	14.2	14.0	12.8	13.1	13.2
16 to 17 years	280	219	189	17.7	15.8	15.9	16.8	14.8	12.7
18 to 19 years	303	267	299	13.5	13.1	12.7	10.0	11.7	12.8
20 to 24 years	596	563	601	8.6	8.7	9.1	8.0	8.3	8.9
25 years and over	1,874	1,784	1,847	4.3	4.1	4.1	3.9	4.0	4.1
25 to 54 years	1,702	1,652	1,685	4.6	4.4	4.3	4.2	4.3	4.4
55 years and over	179	151	169	2.8	2.6	3.1	2.5	2.3	2.6

[1] Unemployment as a percent of the civilian labor force.

Table A-10. Employment status of black and other workers

(Numbers in thousands)

Employment status	Not seasonally adjusted			Seasonally adjusted[1]					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
Civilian noninstitutional population	26,289	26,877	26,926	26,289	26,697	26,779	26,830	26,877	26,926
Civilian labor force	16,506	17,123	17,034	16,777	17,172	17,283	17,386	17,347	17,319
Participation rate	62.8	63.7	63.3	63.8	64.3	64.5	64.8	64.5	64.3
Employed	14,764	15,409	15,406	14,998	15,457	15,449	15,540	15,651	15,656
Employment-population ratio[2]	56.2	57.3	57.2	57.1	57.9	57.7	57.9	58.2	58.1
Unemployed	1,742	1,714	1,628	1,779	1,715	1,833	1,846	1,696	1,664
Unemployment rate	10.6	10.0	9.6	10.6	10.0	10.6	10.6	9.8	9.6
Not in labor force	9,783	9,754	9,892	9,512	9,525	9,496	9,444	9,530	9,607

[1] The population figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and seasonally adjusted columns.

[2] Civilian employment as a percent of the civilian noninstitutional population.

Table A-11. Occupational status of the employed and unemployed, not seasonally adjusted

(Numbers in thousands)

Occupation	Civilian employed		Unemployed		Unemployment rate	
	Apr. 1988	Apr. 1989	Apr. 1988	Apr. 1989	Apr. 1988	Apr. 1989
Total, 16 years and over[1]	113,905	116,347	6,359	6,229	5.3	5.1
Managerial and professional specialty	29,238	30,568	511	556	1.7	1.8
Executive, administrative, and managerial	14,152	14,777	278	296	1.9	2.0
Professional specialty	15,086	15,791	233	259	1.5	1.6
Technical, sales, and administrative support	35,401	35,837	1,301	1,347	3.5	3.6
Technicians and related support	3,476	3,575	94	86	2.6	2.3
Sales occupations	13,617	13,820	586	600	4.1	4.2
Administrative support, including clerical	18,308	18,441	620	661	3.3	3.5
Service occupations	15,114	15,204	1,032	1,149	6.4	7.0
Private household	832	840	56	66	6.3	7.3
Protective service	1,838	1,918	64	80	3.4	4.0
Service, except private household and protective	12,444	12,446	911	1,003	6.8	7.5
Precision production, craft, and repair	13,552	13,560	762	797	5.3	5.6
Mechanics and repairers	4,522	4,555	153	205	3.3	4.3
Construction trades	4,972	4,905	416	439	7.7	8.2
Other precision production, craft, and repair	4,058	4,099	193	153	4.5	3.6
Operators, fabricators, and laborers	17,196	17,886	1,621	1,503	8.6	7.8
Machine operators, assemblers, and inspectors	7,855	8,257	678	650	7.9	7.3
Transportation and material moving occupations	4,627	4,770	283	302	5.8	5.9
Handlers, equipment cleaners, helpers, and laborers	4,714	4,859	659	552	12.3	10.2
Construction laborers	739	755	208	157	22.0	17.2
Other handlers, equipment cleaners, helpers, and laborers	3,975	4,104	451	394	10.2	8.8
Farming, forestry, and fishing	3,404	3,292	230	221	6.3	6.3

[1] Persons with no previous work experience and those whose last job was in the Armed Forces are included in the unemployed total.

Table A-12. Employment status of male Vietnam-era veterans and nonveterans by age, not seasonally adjusted

(Numbers in thousands)

Veteran status and age	Civilian noninstitutional population		Civilian labor force							
			Total		Employed		Unemployed			
							Number		Percent of labor force	
	Apr. 1988	Apr. 1989	Apr. 1988	Apr. 1989	Apr. 1988	Apr. 1989	Apr. 1988	Apr. 1989	Apr. 1988	Apr. 1989
VIETNAM-ERA VETERANS										
Total, 30 years and over	7,891	7,918	7,290	7,212	6,981	6,939	309	273	4.2	3.8
30 to 44 years	5,984	5,590	5,712	5,270	5,452	5,048	260	222	4.6	4.2
30 to 34 years	750	529	707	482	648	448	59	34	8.3	7.1
35 to 39 years	2,256	1,840	2,152	1,731	2,071	1,639	81	92	3.8	5.3
40 to 44 years	2,978	3,221	2,853	3,057	2,733	2,961	120	96	4.2	3.1
45 years and over	1,907	2,328	1,578	1,942	1,529	1,891	49	51	3.1	2.6
NONVETERANS										
Total, 30 to 44 years	20,206	21,259	19,025	20,100	18,221	19,239	804	861	4.2	4.3
30 to 34 years	8,993	9,303	8,495	8,840	8,114	8,438	381	402	4.5	4.5
35 to 39 years	6,718	7,302	6,351	6,924	6,114	6,624	237	300	3.7	4.3
40 to 44 years	4,495	4,654	4,179	4,336	3,993	4,177	186	159	4.5	3.7

NOTE: Male Vietnam-era veterans are men who served in the Armed Forces between August 5, 1964 and May 7, 1975. Nonveterans are men who have never served in the Armed Forces; published data are limited to those 30 to 44 years of age, the group that most closely corresponds to the bulk of the Vietnam-era veteran population.

Table A-13. Employment status of the civilian population for eleven large States

(Numbers in thousands)

State and employment status	Not seasonally adjusted[1]			Seasonally adjusted[2]					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
California									
Civilian noninstitutional population	20,777	21,037	21,059	20,777	20,973	20,994	21,016	21,037	21,059
Civilian labor force	13,959	14,092	14,051	14,002	14,198	14,220	14,117	14,120	14,096
Employed	13,263	13,434	13,328	13,278	13,524	13,505	13,405	13,480	13,339
Unemployed	695	657	724	724	674	715	712	640	757
Unemployment rate	5.0	4.7	5.1	5.2	4.7	5.0	5.0	4.5	5.4
Florida									
Civilian noninstitutional population	9,643	9,881	9,902	9,643	9,819	9,839	9,860	9,881	9,902
Civilian labor force	6,045	6,161	6,197	6,095	6,085	6,155	6,086	6,179	6,245
Employed	5,740	5,871	5,880	5,782	5,755	5,793	5,762	5,880	5,922
Unemployed	304	290	316	313	330	362	324	299	323
Unemployment rate	5.0	4.7	5.1	5.1	5.4	5.9	5.3	4.8	5.2
Illinois									
Civilian noninstitutional population	8,729	8,702	8,699	8,729	8,712	8,709	8,706	8,702	8,699
Civilian labor force	5,656	5,894	5,880	5,731	5,817	5,837	5,976	5,983	5,960
Employed	5,237	5,531	5,544	5,327	5,429	5,491	5,663	5,648	5,640
Unemployed	419	363	337	404	388	346	313	335	320
Unemployment rate	7.4	6.2	5.7	7.0	6.7	5.9	5.2	5.6	5.4
Massachusetts									
Civilian noninstitutional population	4,595	4,598	4,598	4,595	4,598	4,598	4,598	4,598	4,598
Civilian labor force	3,133	3,156	3,178	3,151	3,150	3,166	3,205	3,160	3,197
Employed	3,041	3,028	3,061	3,058	3,043	3,063	3,094	3,051	3,077
Unemployed	91	128	118	93	107	103	111	109	120
Unemployment rate	2.9	4.1	3.7	3.0	3.4	3.3	3.5	3.4	3.8
Michigan									
Civilian noninstitutional population	7,007	7,081	7,087	7,007	7,063	7,069	7,075	7,081	7,087
Civilian labor force	4,528	4,568	4,537	4,561	4,648	4,687	4,668	4,620	4,573
Employed	4,187	4,243	4,259	4,221	4,306	4,364	4,382	4,316	4,296
Unemployed	341	324	278	340	342	323	286	304	277
Unemployment rate	7.5	7.1	6.1	7.5	7.4	6.9	6.1	6.6	6.1
New Jersey									
Civilian noninstitutional population	6,031	6,055	6,057	6,031	6,050	6,051	6,053	6,055	6,057
Civilian labor force	3,953	4,003	3,960	3,969	4,043	4,046	4,043	4,010	3,977
Employed	3,828	3,867	3,818	3,826	3,875	3,888	3,884	3,890	3,816
Unemployed	125	136	142	143	168	158	159	120	161
Unemployment rate	3.2	3.4	3.6	3.6	4.2	3.9	3.9	3.0	4.0
New York									
Civilian noninstitutional population	13,792	13,806	13,807	13,792	13,807	13,806	13,807	13,806	13,807
Civilian labor force	8,238	8,491	8,647	8,426	8,580	8,621	8,701	8,540	8,841
Employed	7,955	8,099	8,166	8,113	8,177	8,198	8,258	8,173	8,328
Unemployed	283	392	480	313	403	423	443	367	513
Unemployment rate	3.4	4.6	5.6	3.7	4.7	4.9	5.1	4.3	5.8
North Carolina									
Civilian noninstitutional population	4,890	4,983	4,991	4,890	4,959	4,967	4,975	4,983	4,991
Civilian labor force	3,266	3,379	3,424	3,320	3,371	3,435	3,390	3,415	3,478
Employed	3,156	3,269	3,288	3,197	3,254	3,302	3,283	3,311	3,330
Unemployed	110	110	136	123	117	133	107	104	148
Unemployment rate	3.4	3.2	4.0	3.7	3.5	3.9	3.2	3.0	4.3
Ohio									
Civilian noninstitutional population	8,228	8,298	8,303	8,228	8,281	8,286	8,292	8,298	8,303
Civilian labor force	5,281	5,375	5,357	5,301	5,355	5,426	5,432	5,428	5,381
Employed	4,964	5,068	5,085	4,970	5,060	5,094	5,152	5,144	5,093
Unemployed	317	307	273	331	295	332	280	284	288
Unemployment rate	6.0	5.7	5.1	6.2	5.5	6.1	5.2	5.2	5.4

See footnotes at end of table.

Table A-13. Employment status of the civilian population for eleven large States—Continued

(Numbers in thousands)

State and employment status	Not seasonally adjusted[1]			Seasonally adjusted[2]					
	Apr. 1988	Mar. 1989	Apr. 1989	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989	Apr. 1989
Pennsylvania									
Civilian noninstitutional population	9,355	9,413	9,418	9,355	9,400	9,404	9,409	9,413	9,418
Civilian labor force	5,680	5,892	5,840	5,778	5,816	5,947	5,932	6,012	5,940
Employed	5,419	5,642	5,606	5,490	5,543	5,689	5,679	5,778	5,677
Unemployed	261	250	234	288	273	258	253	234	263
Unemployment rate	4.6	4.2	4.0	5.0	4.7	4.3	4.3	3.9	4.4
Texas									
Civilian noninstitutional population	12,013	11,991	11,988	12,013	12,000	11,997	11,994	11,991	11,988
Civilian labor force	8,204	8,160	8,242	8,305	8,284	8,303	8,254	8,283	8,350
Employed	7,629	7,642	7,666	7,686	7,693	7,713	7,703	7,788	7,729
Unemployed	575	518	576	619	591	590	551	495	621
Unemployment rate	7.0	6.3	7.0	7.5	7.1	7.1	6.7	6.0	7.4

[1] These are the official Bureau of Labor Statistics' estimates used in the administration of Federal fund allocation programs.

[2] The population figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and the seasonally adjusted columns.

Table B-1. Employees on nonagricultural payrolls by industry

(In thousands)

Industry	Not seasonally adjusted				Seasonally adjusted					
	Apr. 1988	Feb. 1989	Mar. 1989p/	Apr. 1989p/	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989p/	Apr. 1989p/
Total	105,159	106,937	107,606	108,496	105,281	107,641	108,065	108,341	108,512	108,629
Total private	87,505	89,041	89,635	90,544	87,973	90,100	90,506	90,725	90,898	91,029
Goods_producing industries	25,180	25,314	25,444	25,726	25,435	25,889	26,048	26,011	25,986	25,991
Mining	729	705	711	720	737	719	718	716	720	728
Oil and gas extraction	414.9	400.2	401.8	404.3	421	402	400	401	406	410
Construction	5,081	4,957	5,052	5,320	5,238	5,430	5,537	5,514	5,479	5,485
General building contractors	1,348.0	1,317.8	1,321.1	1,354.6	1,400	1,414	1,444	1,437	1,414	1,407
Manufacturing	19,370	19,652	19,681	19,686	19,460	19,740	19,793	19,781	19,787	19,778
Production workers	13,213	13,398	13,425	13,431	13,280	13,481	13,518	13,510	13,512	13,501
Durable goods	11,433	11,610	11,619	11,619	11,459	11,651	11,686	11,667	11,653	11,646
Production workers	7,618	7,734	7,744	7,746	7,632	7,778	7,799	7,781	7,766	7,760
Lumber and wood products	743.7	744.0	744.5	744.3	758	771	775	769	765	759
Furniture and fixtures	534.4	542.6	543.0	544.9	535	540	540	542	544	545
Stone, clay, and glass products	583.8	569.6	576.8	587.4	587	592	593	593	591	590
Primary metal industries	775.7	795.6	798.4	798.3	773	794	796	794	795	796
Blast furnaces and basic steel products	280.9	280.6	281.2	280.7	281	280	281	281	281	281
Fabricated metal products	1,439.2	1,479.1	1,479.3	1,477.2	1,444	1,479	1,487	1,487	1,485	1,482
Machinery, except electrical	2,115.1	2,206.0	2,210.9	2,210.1	2,111	2,190	2,198	2,204	2,204	2,206
Electrical and electronic equipment	2,108.4	2,109.5	2,102.4	2,095.3	2,117	2,123	2,118	2,114	2,109	2,104
Transportation equipment	2,044.8	2,053.9	2,048.6	2,045.5	2,045	2,051	2,066	2,048	2,042	2,046
Motor vehicles and equipment	848.4	859.3	854.0	853.1	848	858	872	858	849	852
Instruments and related products	705.7	727.7	729.9	730.2	706	726	727	728	731	731
Miscellaneous manufacturing	381.9	381.6	384.9	385.7	383	385	386	388	387	387
Nondurable goods	7,937	8,042	8,062	8,067	8,001	8,089	8,107	8,114	8,134	8,132
Production workers	5,595	5,664	5,681	5,685	5,648	5,705	5,719	5,729	5,746	5,741
Food and kindred products	1,590.8	1,605.0	1,604.4	1,608.0	1,648	1,656	1,663	1,660	1,663	1,666
Tobacco manufactures	50.5	52.9	51.3	48.2	54	53	52	53	53	51
Textile mill products	726.5	723.8	724.3	725.2	727	722	727	726	726	726
Apparel and other textile products	1,101.8	1,101.5	1,107.2	1,105.3	1,100	1,096	1,097	1,103	1,108	1,103
Paper and allied products	684.0	687.1	688.4	688.1	687	692	692	691	692	692
Printing and publishing	1,555.5	1,596.4	1,600.7	1,604.3	1,554	1,592	1,598	1,596	1,601	1,603
Chemicals and allied products	1,052.7	1,077.0	1,080.9	1,082.5	1,056	1,076	1,080	1,082	1,083	1,086
Petroleum and coal products	164.1	163.5	164.8	167.4	165	168	166	167	167	168
Rubber and misc. plastics products	865.6	891.2	895.7	894.8	864	890	887	891	895	893
Leather and leather products	145.1	143.8	144.2	143.4	146	144	145	145	146	144
Service-producing industries	79,979	81,623	82,162	82,770	79,846	81,752	82,017	82,330	82,526	82,638
Transportation and public utilities	5,511	5,635	5,642	5,685	5,543	5,670	5,692	5,705	5,701	5,718
Transportation	3,275	3,396	3,401	3,439	3,298	3,422	3,441	3,455	3,449	3,463
Communication and public utilities	2,236	2,239	2,241	2,246	2,245	2,248	2,251	2,250	2,252	2,255
Wholesale trade	6,065	6,305	6,337	6,373	6,089	6,301	6,332	6,361	6,388	6,399
Durable goods	3,603	3,794	3,815	3,828	3,610	3,779	3,796	3,817	3,838	3,836
Nondurable goods	2,462	2,511	2,522	2,545	2,479	2,522	2,536	2,544	2,550	2,563
Retail trade	18,883	19,089	19,236	19,477	19,093	19,429	19,556	19,619	19,689	19,694
General merchandise stores	2,448.9	2,487.5	2,483.3	2,500.0	2,546	2,544	2,563	2,570	2,592	2,599
Food stores	3,015.1	3,166.9	3,178.5	3,185.8	3,049	3,177	3,195	3,202	3,224	3,221
Automotive dealers and service stations	2,055.4	2,085.2	2,094.5	2,112.0	2,064	2,106	2,109	2,115	2,116	2,120
Eating and drinking places	6,313.3	6,213.5	6,338.0	6,514.6	6,326	6,449	6,466	6,493	6,514	6,528
Finance, insurance, and real estate	6,628	6,689	6,708	6,732	6,650	6,741	6,733	6,757	6,761	6,755
Finance	3,292	3,312	3,318	3,320	3,302	3,325	3,320	3,329	3,331	3,330
Insurance	2,063	2,101	2,101	2,101	2,065	2,101	2,096	2,103	2,103	2,103
Real estate	1,273	1,276	1,289	1,311	1,283	1,315	1,317	1,325	1,327	1,322
Services	25,238	26,009	26,268	26,551	25,163	26,070	26,145	26,272	26,373	26,472
Business services	5,381.9	5,519.5	5,554.8	5,590.6	5,420	5,605	5,583	5,621	5,617	5,630
Health services	7,112.1	7,524.8	7,580.3	7,614.3	7,126	7,466	7,494	7,547	7,596	7,630
Government	17,654	17,896	17,971	17,952	17,308	17,541	17,559	17,616	17,614	17,600
Federal	2,963	2,969	2,973	2,974	2,963	2,990	2,981	2,987	2,979	2,974
State	4,150	4,177	4,194	4,197	4,041	4,071	4,063	4,079	4,084	4,087
Local	10,541	10,750	10,804	10,781	10,304	10,480	10,515	10,550	10,551	10,539

p = preliminary.

ESTABLISHMENT DATA

Table B-2. Average weekly hours of production or nonsupervisory workers[1] on private nonagricultural payrolls by industry

Industry	Not seasonally adjusted				Seasonally adjusted					
	Apr. 1988	Feb. 1989	Mar. 1989p	Apr. 1989p	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989p	Apr. 1989p
Total private	34.7	34.3	34.4	34.8	34.9	34.7	34.8	34.6	34.6	35.0
Mining	42.8	41.7	41.9	43.0	(2)	(2)	(2)	(2)	(2)	(2)
Construction	37.9	36.1	37.3	37.7	(2)	(2)	(2)	(2)	(2)	(2)
Manufacturing	41.0	40.8	40.9	41.0	41.2	40.8	41.1	41.1	41.0	41.3
Overtime hours	3.7	3.8	3.8	3.7	3.9	3.9	3.9	3.9	3.9	4.0
Durable goods	41.7	41.5	41.7	41.7	42.0	41.5	41.8	41.7	41.6	42.0
Overtime hours	4.0	4.0	4.0	3.9	4.2	4.1	4.1	4.1	4.0	4.1
Lumber and wood products	40.6	39.0	39.8	40.3	40.6	40.3	40.3	39.5	40.0	40.3
Furniture and fixtures	39.1	39.1	39.6	39.4	39.5	39.2	40.1	39.7	39.9	39.8
Stone, clay, and glass products	42.5	41.1	42.0	42.8	42.5	42.4	42.6	42.1	42.3	42.8
Primary metal industries	43.5	43.4	43.5	43.4	43.5	43.4	43.6	43.3	43.4	43.4
Blast furnaces and basic steel products	44.0	43.7	44.0	44.2	43.8	43.7	44.0	43.7	44.1	44.0
Fabricated metal products	41.7	41.5	41.6	41.6	42.0	41.7	41.9	41.8	41.6	41.9
Machinery, except electrical	42.6	42.4	42.5	42.4	42.8	42.3	42.5	42.5	42.3	42.6
Electrical and electronic equipment	40.8	40.6	40.5	40.8	41.2	40.7	40.8	40.9	40.5	41.2
Transportation equipment	42.9	43.0	43.3	43.2	43.0	42.4	42.6	43.0	42.9	43.3
Motor vehicles and equipment	44.1	43.8	44.2	44.0	44.1	43.0	43.3	43.7	43.5	44.0
Instruments and related products	41.5	41.5	41.1	41.1	41.8	41.0	41.6	41.6	40.9	41.4
Miscellaneous manufacturing	39.1	39.1	39.3	39.5	39.4	38.9	39.4	39.5	39.3	39.8
Nondurable goods	39.9	39.8	39.9	39.9	40.3	39.9	40.1	40.2	40.1	40.3
Overtime hours	3.4	3.5	3.6	3.5	3.6	3.6	3.6	3.7	3.8	3.8
Food and kindred products	39.5	39.6	39.9	39.9	40.1	40.3	40.1	40.3	40.4	40.5
Tobacco manufactures	38.5	37.8	36.3	39.1	(2)	(2)	(2)	(2)	(2)	(2)
Textile mill products	41.0	40.5	41.0	41.0	41.6	40.5	40.9	40.7	41.2	41.6
Apparel and other textile products	36.8	36.8	36.9	36.9	37.4	36.6	37.0	37.1	36.9	37.5
Paper and allied products	43.0	42.9	43.0	43.0	43.3	43.1	43.1	43.2	43.3	43.3
Printing and publishing	38.0	37.7	37.9	37.7	38.2	37.7	38.0	38.0	37.9	37.9
Chemicals and allied products	42.1	42.4	42.3	42.4	42.1	42.3	42.4	42.5	42.3	42.4
Petroleum and coal products	44.4	44.0	43.0	43.5	(2)	(2)	(2)	(2)	(2)	(2)
Rubber and misc. plastics products	41.8	41.5	41.5	41.4	42.0	41.2	41.7	41.7	41.5	41.6
Leather and leather products	37.0	37.8	37.4	37.7	37.3	37.7	38.3	38.8	37.9	38.0
Transportation and public utilities	39.2	39.1	39.3	39.5	39.5	39.4	39.7	39.3	39.5	39.8
Wholesale trade	38.2	37.7	37.8	38.1	38.3	38.0	38.1	38.0	38.0	38.2
Retail trade	28.9	28.3	28.5	28.9	29.2	29.2	29.1	28.9	28.9	29.2
Finance, insurance, and real estate	36.2	35.8	35.8	36.4	(2)	(2)	(2)	(2)	(2)	(2)
Services	32.6	32.4	32.4	32.8	32.7	32.6	32.8	32.5	32.5	32.9

1/ Data relate to production workers in mining and manufacturing; construction workers in construction; and nonsupervisory workers in transportation and public utilities; wholesale and retail trade; finance; insurance, and real estate; and services. These groups account for approximatly four-fifths of the total employees on private nonagricultural payrolls.

2/ These series are not published seasonally adjusted since the seasonal component is small relative to the trend-cycle and/or irregular components and consequently cannot be separated with sufficent precision.
p = preliminary.

Table B-3. Average hourly and weekly earnings of production or nonsupervisory workers1/ on private nonagricultural payrolls by industry

Industry	Average hourly earnings				Average weekly earnings			
	Apr. 1988	Feb. 1989	Mar. 1989p/	Apr. 1989p/	Apr. 1988	Feb. 1989	Mar. 1989p/	Apr. 1989p/
Total private	$9.23	$9.54	$9.55	$9.60	$320.28	$327.22	$328.52	$334.08
Seasonally adjusted	9.23	9.50	9.52	9.59	322.13	328.70	329.39	335.65
Mining	12.60	13.16	13.09	13.05	539.28	548.77	548.47	561.15
Construction	12.88	13.17	13.22	13.29	488.15	475.44	493.11	501.03
Manufacturing	10.12	10.37	10.39	10.40	414.92	423.10	424.95	426.40
Durable goods	10.65	10.90	10.92	10.94	444.11	452.35	455.36	456.20
Lumber and wood products	8.50	8.68	8.66	8.76	345.10	338.52	344.67	353.03
Furniture and fixtures	7.81	8.06	8.10	8.09	305.37	315.15	320.76	318.75
Stone, clay, and glass products	10.41	10.63	10.62	10.72	442.43	436.89	446.04	458.82
Primary metal industries	12.11	12.28	12.28	12.37	526.79	532.95	534.18	536.86
Blast furnaces and basic steel products	13.94	14.13	14.14	14.26	613.36	617.48	622.16	630.29
Fabricated metal products	10.22	10.44	10.45	10.49	426.17	433.26	434.72	436.38
Machinery, except electrical	10.88	11.19	11.21	11.21	463.49	474.46	476.43	475.30
Electrical and electronic equipment	10.09	10.25	10.29	10.29	411.67	416.15	416.75	419.83
Transportation equipment	13.28	13.64	13.69	13.63	569.71	586.52	592.78	588.82
Motor vehicles and equipment	14.09	14.27	14.34	14.25	621.37	625.03	633.83	627.00
Instruments and related products	9.89	10.11	10.15	10.23	410.44	419.57	417.17	420.45
Miscellaneous manufacturing	7.92	8.20	8.19	8.19	309.67	320.62	321.87	323.51
Nondurable goods	9.37	9.62	9.65	9.64	373.86	382.88	385.04	384.64
Food and kindred products	9.14	9.27	9.34	9.31	361.03	367.09	372.67	371.47
Tobacco manufactures	14.98	14.62	15.18	15.56	576.73	552.64	551.03	608.40
Textile mill products	7.35	7.59	7.59	7.62	301.35	307.40	311.19	312.42
Apparel and other textile products	6.04	6.29	6.31	6.31	222.27	231.47	232.84	232.84
Paper and allied products	11.60	11.79	11.82	11.78	498.80	505.79	508.26	506.54
Printing and publishing	10.40	10.75	10.80	10.76	395.20	405.28	409.32	405.65
Chemicals and allied products	12.57	12.89	12.92	12.87	529.20	546.54	546.52	545.69
Petroleum and coal products	15.00	15.52	15.54	15.49	666.00	682.88	668.22	673.82
Rubber and misc. plastics products	9.04	9.27	9.29	9.32	377.87	384.71	385.54	385.85
Leather and leather products	6.29	6.51	6.55	6.54	232.73	246.08	244.97	246.56
Transportation and public utilities	12.27	12.51	12.48	12.56	480.98	489.14	490.46	496.12
Wholesale trade	9.88	10.21	10.19	10.32	377.42	384.92	385.18	393.19
Retail trade	6.26	6.46	6.46	6.48	180.91	182.82	184.11	187.27
Finance, insurance, and real estate	9.03	9.47	9.43	9.55	326.89	339.03	337.59	347.62
Services	8.82	9.26	9.26	9.30	287.53	300.02	300.02	305.04

1/ See footnote 1, table B-2.

p = preliminary.

Table B-4. Average hourly earnings of production or nonsupervisory workers1/ on private nonagricultural payrolls by industry, seasonally adjusted

Industry	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989p/	Apr. 1989p/	Percent change from: Mar. 1989-Apr. 1989
Total private2/:							
Current dollars	$9.23	$9.45	$9.49	$9.50	$9.52	$9.59	0.7
Constant (1977) dollars3/	4.85	4.82	4.81	4.80	4.79	N.A.	(4)
Construction	12.93	13.09	13.14	13.18	$13.25	$13.34	.7
Manufacturing	10.11	10.31	10.32	10.35	10.37	10.39	.2
Excluding overtime5/	9.65	9.84	9.86	9.88	9.90	9.92	.2
Transportation and public utilities	12.29	12.36	12.46	12.46	12.51	12.59	.6
Wholesale trade	9.88	10.08	10.18	10.15	10.17	10.32	1.5
Retail trade	6.25	6.42	6.43	6.43	6.44	6.47	.5
Finance, insurance, and real estate	8.99	9.37	9.41	9.35	9.36	9.50	1.5
Services	8.81	9.09	9.14	9.17	9.20	9.29	1.0

1/ See footnote 1, table B-2.

2/ Includes mining, not shown separately, because its seasonal component is too small to be separated out with sufficient precision.

3/ The Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) is used to deflate this series.

4/ Change was -0.2 percent from February to March 1989, the latest month available.

5/ Derived by assuming that overtime hours are paid at the rate of time and one-half.

N.A. = not available.

p/ = preliminary.

Table B-5. Indexes of aggregate weekly hours of production or nonsupervisory workers1/ on private nonagricultural payrolls by industry

(1977=100)

Industry	Not seasonally adjusted				Seasonally adjusted					
	Apr. 1988	Feb. 1989	Mar. 1989p/	Apr. 1989p/	Apr. 1988	Dec. 1988	Jan. 1989	Feb. 1989	Mar. 1989p/	Apr. 1989p/
Total private	123.6	123.9	125.4	128.0	125.1	127.2	128.3	127.8	128.1	129.5
Goods-producing industries	100.8	99.4	101.1	102.9	102.7	103.5	104.4	104.2	104.1	104.8
Mining	83.8	78.4	79.7	83.1	85.9	81.2	80.4	80.7	81.8	85.1
Construction	135.4	123.2	130.4	140.3	141.1	144.6	146.3	145.4	145.8	146.0
Manufacturing	94.9	95.8	96.4	96.5	96.1	96.6	97.4	97.3	97.1	97.7
Durable goods	93.4	94.2	94.8	94.9	94.0	94.8	95.7	95.3	94.8	95.6
Lumber and wood products	102.5	97.9	100.2	101.4	104.7	105.2	106.0	103.0	103.8	103.6
Furniture and fixtures	111.9	114.0	115.7	114.9	113.2	113.9	116.2	115.3	116.5	116.2
Stone, clay, and glass products	87.7	82.3	85.4	88.9	88.3	88.9	89.5	88.4	88.5	89.5
Primary metal industries	67.8	69.4	70.0	69.7	67.6	69.6	69.8	69.2	69.3	69.5
Blast furnaces and basic steel products	54.7	54.2	54.8	54.7	54.8	54.1	54.8	54.4	54.9	54.8
Fabricated metal products	91.0	93.1	93.3	93.1	91.8	93.7	94.7	94.3	93.6	94.0
Machinery, except electrical	91.4	95.5	96.1	95.6	91.5	94.3	95.1	95.6	95.1	95.8
Electrical and electronic equipment	101.4	101.3	100.4	100.6	102.8	102.3	102.2	102.1	100.6	102.1
Transportation equipment	100.0	100.6	101.0	100.8	100.0	98.7	99.9	99.8	99.4	100.6
Motor vehicles and equipment	90.3	90.7	91.0	90.5	89.8	89.0	91.0	90.1	88.6	90.1
Instruments and related products	105.8	109.3	108.7	109.0	106.5	108.3	109.6	109.6	108.0	109.6
Miscellaneous manufacturing	84.0	83.3	84.5	85.4	85.0	83.6	85.3	85.8	85.4	86.5
Nondurable goods	97.2	98.2	98.8	98.9	99.1	99.2	99.9	100.2	100.3	100.8
Food and kindred products	95.0	96.7	97.4	97.6	101.0	102.1	102.3	102.9	103.4	103.8
Tobacco manufactures	66.7	69.0	63.8	63.0	73.8	73.2	67.8	70.5	67.3	71.1
Textile mill products	80.9	79.3	80.3	80.5	82.2	79.1	80.6	80.0	80.9	81.8
Apparel and other textile products	85.0	85.3	86.0	85.8	86.2	84.2	85.4	86.0	86.1	86.9
Paper and allied products	100.2	100.0	100.5	100.5	101.4	101.3	101.1	101.1	101.7	101.7
Printing and publishing	136.3	137.3	138.7	138.3	136.5	137.5	138.7	138.7	138.8	138.5
Chemicals and allied products	97.2	99.9	100.1	100.8	97.1	99.5	100.3	100.7	100.2	100.9
Petroleum and coal products	84.0	82.1	81.2	84.0	84.9	86.7	84.1	85.9	83.0	84.7
Rubber and misc. plastics products	122.7	126.4	127.1	126.8	122.9	125.1	126.2	126.9	126.9	127.0
Leather and leather products	54.8	56.0	55.6	55.7	55.5	55.6	57.0	58.2	56.9	56.6
Service-producing industries	136.1	137.5	138.8	141.9	137.4	140.4	141.5	140.9	141.4	143.2
Transportation and public utilities	111.9	114.5	115.0	116.3	113.5	116.2	117.4	116.5	117.0	118.0
Wholesale trade	123.8	127.1	128.1	129.8	124.8	128.1	129.1	129.3	129.8	130.7
Retail trade	123.2	121.4	123.1	126.3	126.0	127.8	128.2	127.7	128.2	129.5
Finance, insurance, and real estate	140.6	139.4	139.6	142.5	141.1	140.0	142.1	140.7	141.0	143.3
Services	158.8	162.5	164.2	168.3	159.0	164.1	165.6	164.9	165.6	168.1

1/ See footnote 1, table B-2.

p = preliminary.

Table B-6. Diffusion indexes of employment change, seasonally adjusted

(Percent)

Time span	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
	Private nonagricultural payrolls, 349 industries1/											
Over 1-month span:												
1987	57.4	58.3	59.9	64.6	61.3	61.6	68.6	60.6	62.3	67.6	63.9	65.0
1988	60.3	64.6	64.0	63.0	58.9	66.6	62.3	56.2	54.0	62.5	68.9	61.7
1989	65.0	57.9	p/59.0	p/53.0								
Over 3-month span:												
1987	61.3	62.2	67.3	68.9	69.3	69.8	71.5	72.5	72.1	73.4	74.5	68.2
1988	70.6	68.8	68.3	67.2	69.1	69.8	68.8	61.9	62.6	68.3	71.9	73.4
1989	68.5	p/67.0	p/60.2									
Over 6-month span:												
1987	69.2	66.3	66.3	70.1	72.5	75.2	76.9	77.4	78.5	74.2	74.4	75.6
1988	72.2	71.5	70.8	74.2	72.2	69.1	68.8	74.5	71.1	72.3	72.5	p/73.6
1989	p/72.9											
Over 12-month span:												
1987	68.1	70.3	71.1	74.1	76.6	77.2	77.4	77.8	79.1	78.7	77.8	80.5
1988	77.2	78.1	74.2	73.9	75.6	75.6	77.8	76.5	p/75.2	p/75.5		
1989												
	Manufacturing payrolls, 143 industries1/											
Over 1-month span:												
1987	46.8	52.5	53.9	56.4	58.9	55.7	67.7	56.0	64.2	64.2	64.2	61.0
1988	58.2	55.7	55.7	60.6	57.4	61.3	60.3	44.0	46.8	61.7	68.1	57.4
1989	61.0	51.4	p/53.5	p/46.8								
Over 3-month span:												
1987	50.7	50.7	58.5	63.8	63.5	68.4	69.5	73.8	70.2	74.1	74.5	67.0
1988	66.0	61.0	62.8	64.5	66.7	68.8	61.3	52.1	53.5	65.6	70.9	69.5
1989	62.1	p/61.3	p/51.8									
Over 6-month span:												
1987	58.5	57.1	57.1	66.7	69.1	74.5	75.5	76.6	79.4	74.1	72.7	72.3
1988	68.4	67.0	66.0	70.9	66.0	63.8	62.1	68.8	66.0	66.0	67.7	p/71.6
1989	p/66.7											
Over 12-month span:												
1987	59.6	63.5	64.5	68.8	73.0	73.8	75.2	75.2	75.9	75.9	75.2	79.1
1988	74.1	72.3	68.8	70.6	72.0	70.9	72.3	71.3	p/69.5	p/69.5		
1989												

1/ Based on seasonally adjusted data for 1-, 3-, and 6-month spans and unadjusted data for the 12-month span. Data are centered within the span.

p/ = preliminary.

NOTE: Figures are the percent of industries with employment increasing plus one-half of the industries with unchanged employment, where 50 percent indicates an equal balance between industries with increasing and decreasing employment.

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Table B-6. Diffusion indexes of employment change, seasonally adjusted

(Percent)

Time span	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
	Private nonagricultural payrolls, 349 industries1/											
Over 1-month span:												
1987	57.4	58.3	59.9	64.6	61.3	61.6	68.6	60.6	62.3	67.6	63.9	65.0
1988	60.3	64.6	64.0	63.0	58.9	66.6	62.3	56.2	54.0	62.5	68.9	61.7
1989	p/64.8	p/57.3										
Over 3-month span:												
1987	61.3	62.2	67.3	68.9	69.3	69.8	71.5	72.5	72.1	73.4	74.5	68.2
1988	70.6	68.8	68.3	67.2	69.1	69.8	68.8	61.9	62.6	68.3	71.9	p/74.4
1989	p/69.1											
Over 6-month span:												
1987	69.2	66.3	66.3	70.1	72.5	75.2	76.9	77.4	78.5	74.2	74.4	75.6
1988	72.2	71.5	70.8	74.2	72.2	69.1	68.8	74.5	71.1	p/72.6	p/72.6	
1989												
Over 12-month span:												
1987	68.1	70.3	71.1	74.1	76.6	77.2	77.4	77.8	79.1	78.7	77.8	80.5
1988	77.2	78.1	74.2	73.9	75.6	75.6	p/78.4	p/76.5				
1989												
	Manufacturing payrolls, 143 industries1/											
Over 1-month span:												
1987	46.8	52.5	53.9	56.4	58.9	55.7	67.7	56.0	64.2	64.2	64.2	61.0
1988	58.2	55.7	55.7	60.6	57.4	61.3	60.3	44.0	46.8	61.7	68.1	57.4
1989	p/61.0	p/51.8										
Over 3-month span:												
1987	50.7	50.7	58.5	63.8	63.5	68.4	69.5	73.8	70.2	74.1	74.5	67.0
1988	66.0	61.0	62.8	64.5	66.7	68.8	61.3	52.1	53.5	65.6	70.9	p/70.9
1989	p/62.1											
Over 6-month span:												
1987	58.5	57.1	57.1	66.7	69.1	74.5	75.5	76.6	79.4	74.1	72.7	72.3
1988	68.4	67.0	66.0	70.9	66.0	63.8	62.1	68.8	66.0	p/66.7	p/69.9	
1989												
Over 12-month span:												
1987	59.6	63.5	64.5	68.8	73.0	73.8	75.2	75.2	75.9	75.9	75.2	79.1
1988	74.1	72.3	68.8	70.6	72.0	70.9	p/72.3	p/69.9				
1989												

1/ Based on seasonally adjusted data for 1-, 3-, and 6-month spans and unadjusted data for the 12-month span. Data are centered within the span.
p/ = preliminary.

NOTE: Figures are the percent of industries with employment increasing plus one-half of the industries with unchanged employment, where 50 percent indicates an equal balance between industries with increasing and decreasing employment.

ESTABLISHMENT DATA

Table B-5. Indexes of aggregate weekly hours of production or nonsupervisory workers1/ on private nonagricultural payrolls by industry

(1977=100)

Industry	Not seasonally adjusted				Seasonally adjusted					
	Feb. 1988	Dec. 1988	Jan. 1989p/	Feb. 1989p/	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989p/	Feb. 1989p/
Total private	120.1	128.9	124.5	124.1	123.9	127.1	127.1	127.2	128.3	127.9
Goods-producing industries	96.6	104.7	100.5	99.3	101.1	104.0	104.5	103.5	104.3	104.1
Mining	80.5	83.2	79.6	77.7	82.5	83.5	80.9	81.2	79.9	80.0
Construction	115.0	141.0	127.4	123.4	136.0	145.3	147.5	144.6	146.2	145.6
Manufacturing	93.7	98.6	96.3	95.7	95.2	96.9	97.2	96.6	97.4	97.2
Durable goods	91.6	97.2	94.9	94.2	92.7	95.2	95.6	94.8	95.7	95.3
Lumber and wood products	98.5	103.9	100.4	98.3	103.6	104.8	104.7	105.2	106.0	103.2
Furniture and fixtures	111.6	119.1	114.3	113.8	113.2	114.2	114.5	113.9	115.9	115.3
Stone, clay, and glass products	81.1	87.2	83.6	82.0	87.3	88.3	88.9	88.9	89.7	88.0
Primary metal industries	66.7	70.8	70.2	69.6	66.4	70.1	70.0	69.6	69.9	69.3
Blast furnaces and basic steel products	54.0	54.9	54.6	54.3	53.9	55.1	54.8	54.1	54.6	54.4
Fabricated metal products	89.5	96.3	94.2	93.1	90.8	93.6	94.6	93.7	94.5	94.4
Machinery, except electrical	90.0	96.9	95.3	95.5	90.2	93.7	94.3	94.3	95.0	95.7
Electrical and electronic equipment	101.1	105.9	102.8	101.3	101.8	103.4	103.7	102.3	102.1	102.2
Transportation equipment	98.1	103.0	100.9	100.1	97.3	100.7	100.8	98.7	100.3	99.3
Motor vehicles and equipment	85.4	94.2	91.0	90.3	85.7	91.9	92.6	89.0	91.2	89.7
Instruments and related products	104.8	111.2	110.2	110.0	105.0	109.5	109.0	108.3	110.4	110.4
Miscellaneous manufacturing	81.9	84.9	82.2	83.6	84.8	83.1	83.6	83.6	85.5	86.3
Nondurable goods	96.9	100.7	98.2	97.9	99.0	99.4	99.7	99.2	99.8	99.9
Food and kindred products	95.7	102.9	98.2	96.2	101.7	102.7	103.3	102.1	102.4	102.1
Tobacco manufactures	74.1	78.6	71.1	67.2	75.8	69.7	72.7	73.2	67.6	69.9
Textile mill products	81.8	80.4	79.4	79.3	82.7	80.2	80.2	79.1	80.1	79.9
Apparel and other textile products	84.6	85.3	83.8	84.9	85.5	83.9	84.9	84.2	85.4	85.7
Paper and allied products	100.2	103.5	100.9	100.2	101.5	101.3	101.3	101.3	101.1	101.5
Printing and publishing	134.3	141.0	137.3	137.4	135.5	137.6	137.2	137.5	138.7	138.7
Chemicals and allied products	96.4	100.7	99.5	99.5	97.1	99.7	99.4	99.5	100.5	100.2
Petroleum and coal products	80.4	84.9	81.2	81.7	84.5	87.3	86.3	86.7	83.7	86.1
Rubber and misc. plastics products	120.5	127.7	125.9	126.4	121.0	124.7	126.0	125.1	125.9	126.8
Leather and leather products	55.0	56.8	55.8	55.3	57.2	56.4	55.1	55.6	57.0	57.4
Service-producing industries	133.2	142.3	137.8	137.7	136.4	139.9	139.6	140.4	141.6	141.2
Transportation and public utilities	109.7	117.5	114.5	114.8	111.8	115.0	115.2	116.2	117.2	117.0
Wholesale trade	120.9	129.0	127.3	127.1	123.1	127.4	127.7	128.1	129.3	129.5
Retail trade	119.0	134.2	123.5	122.1	125.2	127.2	126.7	127.8	128.7	128.6
Finance, insurance, and real estate	140.2	140.5	140.7	139.0	141.6	141.2	140.4	140.0	142.4	140.3
Services	155.9	163.0	161.2	162.7	158.0	163.5	163.2	164.1	165.4	164.7

1/ See footnote 1, table B-2.

p = preliminary.

ESTABLISHMENT DATA

Table B-3. Average hourly and weekly earnings of production or nonsupervisory workers1/ on private nonagricultural payrolls by industry

Industry	Average hourly earnings				Average weekly earnings			
	Feb. 1988	Dec. 1988	Jan. 1989p/	Feb. 1989p/	Feb. 1988	Dec. 1988	Jan. 1989p/	Feb. 1989p/
Total private	$9.17	$9.46	$9.54	$9.54	$316.37	$330.15	$329.13	$327.22
Seasonally adjusted	9.13	9.45	9.50	9.51	317.72	327.92	330.60	330.00
Mining	12.71	12.97	13.11	13.03	531.28	553.82	549.31	542.05
Construction	12.82	13.16	13.21	13.16	462.80	489.55	480.84	476.39
Manufacturing	10.05	10.37	10.37	10.37	409.04	431.39	425.17	422.06
Durable goods	10.58	10.90	10.90	10.90	436.95	462.16	454.53	451.26
Lumber and wood products	8.53	8.75	8.70	8.69	339.49	353.50	344.52	339.78
Furniture and fixtures	7.74	8.04	8.07	8.06	301.09	325.62	316.34	314.34
Stone, clay, and glass products	10.33	10.58	10.60	10.60	426.63	446.48	439.90	432.48
Primary metal industries	12.03	12.27	12.27	12.23	519.70	541.11	537.43	530.78
Blast furnaces and basic steel products	13.89	14.07	13.99	13.96	609.77	621.89	614.16	610.05
Fabricated metal products	10.13	10.43	10.44	10.44	418.37	445.36	436.39	432.22
Machinery, except electrical	10.82	11.20	11.16	11.20	459.85	486.08	474.30	473.76
Electrical and electronic equipment	10.02	10.29	10.27	10.25	406.81	430.12	420.04	414.10
Transportation equipment	13.17	13.65	13.63	13.61	553.14	595.14	586.09	582.51
Motor vehicles and equipment	13.85	14.31	14.29	14.26	587.24	636.80	625.90	623.16
Instruments and related products	9.92	10.10	10.17	10.24	408.70	424.20	424.09	425.98
Miscellaneous manufacturing	7.90	8.17	8.22	8.20	307.31	324.35	323.05	321.44
Nondurable goods	9.31	9.60	9.62	9.62	370.54	388.80	383.84	381.91
Food and kindred products	9.06	9.26	9.28	9.30	358.78	378.73	371.20	367.35
Tobacco manufactures	14.01	14.18	14.33	14.71	540.79	565.78	543.11	551.63
Textile mill products	7.30	7.52	7.59	7.60	301.49	309.07	308.15	307.80
Apparel and other textile products	6.02	6.27	6.29	6.28	220.93	232.62	230.84	230.48
Paper and allied products	11.50	11.79	11.77	11.80	494.50	518.76	508.46	507.40
Printing and publishing	10.40	10.71	10.73	10.69	393.12	411.26	404.52	401.94
Chemicals and allied products	12.55	12.91	12.84	12.92	530.87	553.84	545.70	547.81
Petroleum and coal products	14.96	15.28	15.30	15.34	647.77	676.90	662.49	664.22
Rubber and misc. plastics products	9.00	9.27	9.32	9.29	372.60	389.34	388.64	384.61
Leather and leather products	6.19	6.45	6.49	6.53	227.79	247.04	245.97	245.53
Transportation and public utilities	12.23	12.43	12.51	12.48	475.75	490.99	489.14	487.97
Wholesale trade	9.78	10.12	10.22	10.22	370.66	386.58	388.36	386.32
Retail trade	6.23	6.42	6.47	6.49	177.56	190.03	184.40	184.97
Finance, insurance, and real estate	9.02	9.32	9.48	9.45	328.33	333.66	343.18	338.31
Services	8.81	9.15	9.24	9.27	287.21	297.38	301.22	300.35

1/ See footnote 1, table B-2.

p = preliminary.

Table B-4. Average hourly earnings of production or nonsupervisory workers1/ on private nonagricultural payrolls by industry, seasonally adjusted

Industry	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989p/	Feb. 1989p/	Percent change from: Jan. 1989-Feb. 1989
Total private2/:							
Current dollars	$9.13	$9.43	$9.42	$9.45	$9.50	$9.51	0.1
Constant (1977) dollars3/	4.84	4.84	4.82	4.82	4.82	N.A.	(4)
Construction	12.82	13.03	13.01	13.09	13.13	$13.17	.3
Manufacturing	10.03	10.28	10.29	10.31	10.32	10.35	.3
Excluding overtime5/	9.59	9.81	9.83	9.84	9.86	9.88	.2
Transportation and public utilities	12.19	12.43	12.37	12.36	12.50	12.43	-.6
Wholesale trade	9.72	10.13	10.04	10.08	10.19	10.16	-.3
Retail trade	6.20	6.37	6.42	6.42	6.43	6.46	.5
Finance, insurance, and real estate	8.91	9.36	9.26	9.37	9.43	9.33	-1.1
Services	8.72	9.06	9.04	9.09	9.14	9.18	.4

1/ See footnote 1, table B-2.

2/ Includes mining, not shown separately, because its seasonal component is too small to be separated out with sufficient precision.

3/ The Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) is used to deflate this series. The seasonally adjusted CPI-W has been revised to reflect the experience through December 1988. Constant-dollar earnings series have been revised back to 1984.

4/ Real earnings were unchanged from December 1988 to January 1989, the latest month available.

5/ Derived by assuming that overtime hours are paid at the rate of time and one-half.

N.A. = not available.

p/ = preliminary.

ESTABLISHMENT DATA

Table B-2. Average weekly hours of production or nonsupervisory workers1/ on private nonagricultural payrolls by industry

Industry	Not seasonally adjusted				Seasonally adjusted					
	Feb. 1988	Dec. 1988	Jan. 1989p/	Feb. 1989p/	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989p/	Feb. 1989p/
Total private	34.5	34.9	34.5	34.3	34.8	34.9	34.8	34.7	34.8	34.7
Mining	41.8	42.7	41.7	41.6	(2)	(2)	(2)	(2)	(2)	(2)
Construction	36.1	37.2	36.4	36.2	(2)	(2)	(2)	(2)	(2)	(2)
Manufacturing	40.7	41.6	41.0	40.7	41.0	41.2	41.2	40.8	41.0	41.0
Overtime hours	3.6	4.2	3.8	3.7	3.7	4.0	3.9	3.9	3.9	3.9
Durable goods	41.3	42.4	41.7	41.4	41.5	41.9	41.9	41.5	41.8	41.6
Overtime hours	3.7	4.5	4.0	3.9	3.8	4.2	4.2	4.1	4.1	4.0
Lumber and wood products	39.8	40.4	39.6	39.1	40.3	40.7	40.3	40.3	40.3	39.6
Furniture and fixtures	38.9	40.5	39.2	39.0	39.5	39.4	39.4	39.2	40.0	39.6
Stone, clay, and glass products	41.3	42.2	41.5	40.8	42.3	42.5	42.6	42.4	42.6	41.8
Primary metal industries	43.2	44.1	43.8	43.4	43.1	43.8	43.7	43.4	43.7	43.3
Blast furnaces and basic steel products	43.9	44.2	43.9	43.7	43.8	44.3	44.0	43.7	43.9	43.7
Fabricated metal products	41.3	42.7	41.8	41.4	41.6	41.9	42.2	41.7	41.8	41.7
Machinery, except electrical	42.5	43.4	42.5	42.3	42.6	42.6	42.5	42.3	42.4	42.4
Electrical and electronic equipment	40.6	41.8	40.9	40.4	40.9	41.0	41.0	40.7	40.7	40.7
Transportation equipment	42.0	43.6	43.0	42.8	42.0	43.3	43.3	42.4	42.7	42.8
Motor vehicles and equipment	42.4	44.5	43.8	43.7	42.3	44.2	44.6	43.0	43.4	43.6
Instruments and related products	41.2	42.0	41.7	41.6	41.3	41.9	41.6	41.0	41.7	41.7
Miscellaneous manufacturing	38.9	39.7	39.3	39.2	39.3	39.1	39.2	38.9	39.5	39.6
Nondurable goods	39.8	40.5	39.9	39.7	40.2	40.2	40.2	39.9	40.1	40.1
Overtime hours	3.4	3.8	3.5	3.5	3.6	3.8	3.6	3.6	3.6	3.7
Food and kindred products	39.6	40.9	40.0	39.5	40.3	40.6	40.6	40.3	40.1	40.2
Tobacco manufactures	38.6	39.9	37.9	37.5	(2)	(2)	(2)	(2)	(2)	(2)
Textile mill products	41.3	41.1	40.6	40.5	41.6	41.0	41.0	40.5	40.8	40.7
Apparel and other textile products	36.7	37.1	36.7	36.7	37.0	36.8	37.0	36.6	37.0	37.0
Paper and allied products	43.0	44.0	43.2	43.0	43.3	43.2	43.1	43.1	43.1	43.3
Printing and publishing	37.8	38.4	37.7	37.6	38.1	38.0	37.8	37.7	38.0	37.9
Chemicals and allied products	42.3	42.9	42.5	42.4	42.4	42.5	42.4	42.3	42.5	42.5
Petroleum and coal products	43.3	44.3	43.3	43.3	(2)	(2)	(2)	(2)	(2)	(2)
Rubber and misc. plastics products	41.4	42.0	41.7	41.4	41.6	41.5	41.7	41.2	41.6	41.6
Leather and leather products	36.8	38.3	37.9	37.6	37.8	37.9	37.3	37.7	38.3	38.6
Transportation and public utilities	38.9	39.5	39.1	39.1	39.1	39.4	39.2	39.4	39.5	39.3
Wholesale trade	37.9	38.2	38.0	37.8	38.2	38.1	38.0	38.0	38.2	38.1
Retail trade	28.5	29.6	28.5	28.5	29.1	29.2	29.0	29.2	29.2	29.1
Finance, insurance, and real estate	36.4	35.8	36.2	35.8	(2)	(2)	(2)	(2)	(2)	(2)
Services	32.6	32.5	32.6	32.4	32.7	32.8	32.6	32.6	32.8	32.5

1/ Data relate to production workers in mining and manufacturing; construction workers in construction; and nonsupervisory workers in transportation and public utilities; wholesale and retail trade; finance; insurance, and real estate; and services. These groups account for approximately four-fifths of the total employees on private nonagricultural payrolls.

2/ These series are not published seasonally adjusted since the seasonal component is small relative to the trend-cycle and/or irregular components and consequently cannot be separated with sufficent precision.
p = preliminary.

ESTABLISHMENT DATA

Table B-1. Employees on nonagricultural payrolls by industry

(In thousands)

Industry	Not seasonally adjusted				Seasonally adjusted					
	Feb. 1988	Dec. 1988	Jan. 1989p/	Feb. 1989p/	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989p/	Feb. 1989p/
Total	103,373	108,491	106,523	106,939	104,729	106,973	107,419	107,641	108,056	108,345
Total private	85,844	90,654	88,989	89,053	87,475	89,481	89,855	90,100	90,515	90,739
Goods-producing industries	24,609	25,869	25,419	25,313	25,271	25,743	25,849	25,889	26,044	26,012
Mining	720	724	710	703	731	729	722	719	716	714
Oil and gas extraction	413.9	410.0	402.7	396.9	415	413	406	402	399	398
Construction	4,628	5,376	5,053	4,956	5,150	5,366	5,413	5,430	5,535	5,513
General building contractors	1,260.9	1,415.6	1,348.3	1,316.2	1,377	1,393	1,406	1,414	1,440	1,435
Manufacturing	19,261	19,769	19,656	19,654	19,390	19,648	19,714	19,740	19,793	19,785
Production workers	13,136	13,507	13,403	13,414	13,249	13,412	13,465	13,481	13,524	13,524
Durable goods	11,348	11,681	11,626	11,617	11,404	11,595	11,637	11,651	11,688	11,674
Production workers	7,552	7,803	7,756	7,756	7,599	7,733	7,765	7,776	7,806	7,801
Lumber and wood products	731.4	759.8	750.2	745.1	756	760	767	771	776	770
Furniture and fixtures	535.4	545.9	541.8	542.7	535	540	541	540	540	542
Stone, clay, and glass products	560.8	585.7	571.7	569.5	584	588	590	592	592	593
Primary metal industries	771.0	795.2	796.3	795.4	770	794	796	794	796	794
Blast furnaces and basic steel products	279.7	280.4	280.8	281.0	280	282	282	280	281	281
Fabricated metal products	1,430.7	1,484.5	1,481.0	1,482.1	1,438	1,469	1,474	1,479	1,487	1,490
Machinery, except electrical	2,093.1	2,193.9	2,196.4	2,204.8	2,091	2,173	2,185	2,190	2,196	2,203
Electrical and electronic equipment	2,108.7	2,131.8	2,122.3	2,110.9	2,112	2,126	2,130	2,123	2,120	2,115
Transportation equipment	2,036.6	2,071.6	2,061.6	2,055.9	2,031	2,045	2,050	2,051	2,066	2,050
Motor vehicles and equipment	837.8	872.8	862.0	858.9	837	859	860	858	871	857
Instruments and related products	704.3	723.0	728.1	728.2	705	719	721	726	729	729
Miscellaneous manufacturing	375.6	384.3	376.6	382.2	382	381	383	385	386	388
Nondurable goods	7,913	8,088	8,030	8,037	7,986	8,053	8,077	8,089	8,105	8,111
Production workers	5,584	5,704	5,647	5,658	5,650	5,679	5,700	5,705	5,718	5,723
Food and kindred products	1,594.0	1,646.5	1,614.4	1,603.0	1,649	1,654	1,661	1,656	1,664	1,658
Tobacco manufactures	54.4	56.0	54.3	52.3	54	52	53	53	52	52
Textile mill products	729.3	722.9	721.7	721.5	732	722	723	722	725	724
Apparel and other textile products	1,103.4	1,095.6	1,088.4	1,099.3	1,104	1,086	1,093	1,096	1,096	1,100
Paper and allied products	682.2	695.4	687.9	687.2	686	691	691	692	691	691
Printing and publishing	1,543.1	1,598.5	1,595.3	1,598.6	1,544	1,581	1,583	1,592	1,597	1,599
Chemicals and allied products	1,043.8	1,074.0	1,074.3	1,076.2	1,049	1,071	1,073	1,076	1,081	1,082
Petroleum and coal products	161.5	166.1	163.9	164.1	165	169	169	168	167	168
Rubber and misc. plastics products	856.2	890.4	885.7	891.5	856	882	887	890	887	892
Leather and leather products	145.5	144.7	143.8	143.2	147	145	144	146	145	145
Service-producing industries	78,764	82,622	81,104	81,626	79,458	81,230	81,570	81,752	82,012	82,333
Transportation and public utilities	5,446	5,716	5,648	5,653	5,513	5,631	5,658	5,670	5,711	5,723
Transportation	3,217	3,470	3,401	3,406	3,272	3,380	3,407	3,422	3,453	3,465
Communication and public utilities	2,229	2,246	2,247	2,247	2,241	2,251	2,251	2,248	2,258	2,258
Wholesale trade	5,979	6,313	6,285	6,306	6,035	6,246	6,275	6,301	6,332	6,362
Durable goods	3,550	3,783	3,777	3,792	3,573	3,736	3,758	3,779	3,796	3,815
Nondurable goods	2,429	2,530	2,508	2,514	2,462	2,510	2,517	2,522	2,536	2,547
Retail trade	18,521	20,070	19,264	19,101	19,045	19,327	19,401	19,429	19,557	19,631
General merchandise stores	2,479.1	2,857.2	2,644.5	2,517.2	2,561	2,520	2,533	2,544	2,580	2,600
Food stores	2,994.7	3,243.3	3,176.1	3,166.5	3,029	3,143	3,157	3,177	3,195	3,202
Automotive dealers and service stations	2,018.0	2,095.1	2,085.2	2,085.4	2,047	2,103	2,106	2,106	2,108	2,115
Eating and drinking places	6,018.4	6,390.5	6,168.7	6,213.5	6,291	6,415	6,440	6,449	6,466	6,493
Finance, insurance, and real estate	6,571	6,720	6,678	6,675	6,636	6,708	6,725	6,741	6,732	6,743
Finance	3,289	3,318	3,313	3,308	3,305	3,308	3,314	3,325	3,320	3,325
Insurance	2,051	2,099	2,093	2,097	2,053	2,089	2,092	2,101	2,095	2,099
Real estate	1,231	1,303	1,272	1,270	1,278	1,311	1,319	1,315	1,317	1,319
Services	24,718	25,966	25,695	26,005	24,975	25,826	25,947	26,070	26,139	26,268
Business services	5,287.9	5,627.3	5,494.8	5,517.6	5,385	5,553	5,563	5,605	5,578	5,619
Health services	7,037.3	7,451.1	7,481.7	7,521.1	7,056	7,365	7,414	7,466	7,497	7,544
Government	17,529	17,837	17,534	17,886	17,254	17,492	17,564	17,541	17,541	17,606
Federal	2,955	2,981	2,952	2,957	2,972	2,989	2,989	2,990	2,973	2,975
State	4,109	4,156	4,033	4,177	4,014	4,070	4,074	4,071	4,061	4,079
Local	10,465	10,700	10,549	10,752	10,268	10,433	10,501	10,480	10,507	10,552

p = preliminary.

Table A-13. Employment status of the civilian population for eleven large States—Continued

(Numbers in thousands)

State and employment status	Not seasonally adjusted[1]			Seasonally adjusted[2]					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
Pennsylvania									
Civilian noninstitutional population	9,343	9,404	9,409	9,343	9,390	9,396	9,400	9,404	9,409
Civilian labor force	5,672	5,884	5,814	5,793	5,744	5,779	5,816	5,947	5,932
Employed	5,337	5,592	5,533	5,487	5,436	5,510	5,543	5,689	5,679
Unemployed	335	292	281	306	308	269	273	258	253
Unemployment rate	5.9	5.0	4.8	5.3	5.4	4.7	4.7	4.3	4.3
Texas									
Civilian noninstitutional population	12,015	11,997	11,994	12,015	12,005	12,003	12,000	11,997	11,994
Civilian labor force	8,184	8,188	8,150	8,289	8,309	8,308	8,284	8,303	8,254
Employed	7,469	7,566	7,556	7,616	7,708	7,725	7,693	7,713	7,703
Unemployed	715	622	594	673	601	583	591	590	551
Unemployment rate	8.7	7.6	7.3	8.1	7.2	7.0	7.1	7.1	6.7

[1] These are the official Bureau of Labor Statistics' estimates used in the administration of Federal fund allocation programs.

[2] The population figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and the seasonally adjusted columns.

Table A-13. Employment status of the civilian population for eleven large States

(Numbers in thousands)

State and employment status	Not seasonally adjusted[1]			Seasonally adjusted[2]					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
California									
Civilian noninstitutional population	20,726	20,994	21,016	20,726	20,927	20,951	20,973	20,994	21,016
Civilian labor force	13,910	14,168	14,083	13,947	14,063	14,186	14,198	14,220	14,117
Employed	13,102	13,407	13,309	13,199	13,363	13,451	13,524	13,505	13,405
Unemployed	808	761	774	748	700	735	674	715	712
Unemployment rate	5.8	5.4	5.5	5.4	5.0	5.2	4.7	5.0	5.0
Florida									
Civilian noninstitutional population	9,598	9,839	9,860	9,598	9,777	9,798	9,819	9,839	9,860
Civilian labor force	5,966	6,052	6,013	6,034	6,170	6,144	6,085	6,155	6,086
Employed	5,667	5,693	5,702	5,722	5,862	5,823	5,755	5,793	5,762
Unemployed	298	358	312	312	308	321	330	362	324
Unemployment rate	5.0	5.9	5.2	5.2	5.0	5.2	5.4	5.9	5.3
Illinois									
Civilian noninstitutional population	8,733	8,709	8,706	8,733	8,718	8,716	8,712	8,709	8,706
Civilian labor force	5,717	5,791	5,903	5,793	5,771	5,844	5,817	5,837	5,976
Employed	5,249	5,419	5,543	5,369	5,388	5,433	5,429	5,491	5,663
Unemployed	467	372	359	424	383	411	388	346	313
Unemployment rate	8.2	6.4	6.1	7.3	6.6	7.0	6.7	5.9	5.2
Massachusetts									
Civilian noninstitutional population	4,593	4,598	4,598	4,593	4,598	4,598	4,598	4,598	4,598
Civilian labor force	3,098	3,139	3,162	3,141	3,151	3,153	3,150	3,166	3,205
Employed	2,982	3,020	3,038	3,038	3,047	3,032	3,043	3,063	3,094
Unemployed	116	119	124	103	104	121	107	103	111
Unemployment rate	3.8	3.8	3.9	3.3	3.3	3.8	3.4	3.3	3.5
Michigan									
Civilian noninstitutional population	6,992	7,069	7,075	6,992	7,050	7,057	7,063	7,069	7,075
Civilian labor force	4,482	4,589	4,612	4,535	4,615	4,652	4,648	4,687	4,668
Employed	4,083	4,230	4,300	4,161	4,282	4,310	4,306	4,364	4,382
Unemployed	399	358	312	374	333	342	342	323	286
Unemployment rate	8.9	7.8	6.8	8.2	7.2	7.4	7.4	6.9	6.1
New Jersey									
Civilian noninstitutional population	6,025	6,051	6,053	6,025	6,046	6,048	6,050	6,051	6,053
Civilian labor force	3,969	4,009	4,031	3,981	3,963	3,978	4,043	4,046	4,043
Employed	3,808	3,825	3,851	3,841	3,810	3,821	3,875	3,888	3,884
Unemployed	161	184	180	140	153	157	168	158	159
Unemployment rate	4.0	4.6	4.5	3.5	3.9	3.9	4.2	3.9	3.9
New York									
Civilian noninstitutional population	13,787	13,806	13,807	13,787	13,805	13,807	13,807	13,806	13,807
Civilian labor force	8,437	8,652	8,624	8,517	8,533	8,560	8,580	8,621	8,701
Employed	8,065	8,170	8,152	8,176	8,174	8,177	8,177	8,198	8,258
Unemployed	372	482	473	341	359	383	403	423	443
Unemployment rate	4.4	5.6	5.5	4.0	4.2	4.5	4.7	4.9	5.1
North Carolina									
Civilian noninstitutional population	4,872	4,967	4,975	4,872	4,943	4,951	4,959	4,967	4,975
Civilian labor force	3,294	3,381	3,381	3,306	3,387	3,386	3,371	3,435	3,390
Employed	3,156	3,231	3,255	3,185	3,254	3,266	3,254	3,302	3,283
Unemployed	138	150	125	121	133	120	117	133	107
Unemployment rate	4.2	4.4	3.7	3.7	3.9	3.5	3.5	3.9	3.2
Ohio									
Civilian noninstitutional population	8,214	8,286	8,292	8,214	8,269	8,276	8,281	8,286	8,292
Civilian labor force	5,298	5,384	5,380	5,355	5,349	5,366	5,355	5,426	5,432
Employed	4,922	5,015	5,063	5,014	5,049	5,059	5,060	5,094	5,152
Unemployed	376	369	317	341	300	307	295	332	280
Unemployment rate	7.1	6.9	5.9	6.4	5.6	5.7	5.5	6.1	5.2

See footnotes at end of table.

Table A-11. Occupational status of the employed and unemployed, not seasonally adjusted

(Numbers in thousands)

Occupation	Civilian employed		Unemployed		Unemployment rate	
	Feb. 1988	Feb. 1989	Feb. 1988	Feb. 1989	Feb. 1988	Feb. 1989
Total, 16 years and over[1]	112,460	115,023	7,482	6,883	6.2	5.6
Managerial and professional specialty	28,621	30,106	586	602	2.0	2.0
Executive, administrative, and managerial	13,759	14,592	348	378	2.5	2.5
Professional specialty	14,862	15,514	238	224	1.6	1.4
Technical, sales, and administrative support	35,209	35,400	1,502	1,478	4.1	4.0
Technicians and related support	3,381	3,569	113	102	3.2	2.8
Sales occupations	13,376	13,600	648	623	4.6	4.4
Administrative support, including clerical	18,453	18,231	741	752	3.9	4.0
Service occupations	15,170	15,537	1,311	1,043	8.0	6.3
Private household	885	910	67	35	7.0	3.7
Protective service	1,897	1,950	85	80	4.3	3.9
Service, except private household and protective	12,388	12,678	1,158	928	8.6	6.8
Precision production, craft, and repair	13,373	13,466	993	985	6.9	6.8
Mechanics and repairers	4,558	4,596	197	169	4.1	3.6
Construction trades	4,728	4,705	572	608	10.8	11.4
Other precision production, craft, and repair	4,086	4,165	223	208	5.2	4.8
Operators, fabricators, and laborers	17,237	17,655	1,977	1,785	10.3	9.2
Machine operators, assemblers, and inspectors	7,914	8,169	756	658	8.7	7.5
Transportation and material moving occupations	4,696	4,683	451	373	8.8	7.4
Handlers, equipment cleaners, helpers, and laborers	4,627	4,803	770	755	14.3	13.6
Construction laborers	684	719	254	205	27.1	22.2
Other handlers, equipment cleaners, helpers, and laborers	3,943	4,084	515	549	11.6	11.8
Farming, forestry, and fishing	2,849	2,858	299	265	9.5	8.5

[1] Persons with no previous work experience and those whose last job was in the Armed Forces are included in the unemployed total.

Table A-12. Employment status of male Vietnam-era veterans and nonveterans by age, not seasonally adjusted

(Numbers in thousands)

Veteran status and age	Civilian noninstitutional population		Civilian labor force							
			Total		Employed		Unemployed			
							Number		Percent of labor force	
	Feb. 1988	Feb. 1989	Feb. 1988	Feb. 1989	Feb. 1988	Feb. 1989	Feb. 1988	Feb. 1989	Feb. 1988	Feb. 1989
VIETNAM-ERA VETERANS										
Total, 30 years and over	7,877	7,914	7,243	7,226	6,881	6,936	362	290	5.0	4.0
30 to 44 years	6,033	5,664	5,724	5,371	5,433	5,142	291	229	5.1	4.3
30 to 34 years	781	564	732	515	688	487	44	28	6.0	5.4
35 to 39 years	2,329	1,905	2,223	1,808	2,082	1,701	141	107	6.3	5.9
40 to 44 years	2,923	3,195	2,769	3,048	2,663	2,954	106	94	3.8	3.1
45 years and over	1,844	2,250	1,519	1,855	1,448	1,794	71	61	4.7	3.3
NONVETERANS										
Total, 30 to 44 years	20,071	21,081	18,873	19,870	17,905	18,971	968	899	5.1	4.5
30 to 34 years	9,001	9,255	8,529	8,740	8,027	8,337	502	403	5.9	4.6
35 to 39 years	6,637	7,190	6,223	6,786	5,901	6,491	322	295	5.2	4.3
40 to 44 years	4,433	4,636	4,121	4,344	3,977	4,143	144	201	3.5	4.6

NOTE: Male Vietnam-era veterans are men who served in the Armed Forces between August 5, 1964 and May 7, 1975. Nonveterans are men who have never served in the Armed Forces; published data are limited to those 30 to 44 years of age, the group that most closely corresponds to the bulk of the Vietnam-era veteran population.

Table A-9. Unemployed persons by sex and age, seasonally adjusted

Sex and age	Number of unemployed persons (in thousands)			Unemployment rates[1]					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
Total, 16 years and over	6,892	6,716	6,328	5.7	5.3	5.4	5.3	5.4	5.1
16 to 24 years	2,531	2,663	2,316	11.1	10.9	10.6	10.9	11.9	10.5
16 to 19 years	1,243	1,323	1,168	15.5	15.0	14.1	14.8	16.4	14.8
16 to 17 years	588	581	572	17.7	17.2	15.8	16.6	18.3	18.2
18 to 19 years	665	751	605	14.1	13.3	12.9	13.3	15.4	12.7
20 to 24 years	1,288	1,340	1,148	8.7	8.6	8.7	8.7	9.3	8.1
25 years and over	4,377	4,101	4,026	4.4	4.1	4.2	4.1	4.1	4.0
25 to 54 years	3,887	3,632	3,559	4.7	4.3	4.4	4.3	4.2	4.2
55 years and over	485	474	466	3.2	2.8	2.8	3.0	3.1	3.1
Men, 16 years and over	3,702	3,710	3,540	5.5	5.4	5.4	5.3	5.5	5.2
16 to 24 years	1,340	1,494	1,302	11.4	11.8	10.9	11.1	12.8	11.1
16 to 19 years	649	772	687	15.8	16.5	14.8	15.4	18.6	16.7
16 to 17 years	300	330	317	17.6	18.5	17.3	17.3	20.6	19.6
18 to 19 years	360	455	379	14.9	15.0	13.0	13.5	17.9	15.1
20 to 24 years	691	722	615	9.0	9.2	8.8	8.7	9.6	8.1
25 years and over	2,369	2,245	2,246	4.3	4.0	4.2	4.1	4.0	4.0
25 to 54 years	2,071	1,986	1,943	4.5	4.2	4.4	4.3	4.2	4.1
55 years and over	297	269	303	3.4	3.0	3.2	3.3	3.0	3.4
Women, 16 years and over	3,190	3,006	2,787	5.9	5.3	5.3	5.4	5.4	5.0
16 to 24 years	1,191	1,169	1,014	10.9	9.9	10.3	10.7	10.9	9.7
16 to 19 years	594	551	481	15.1	13.3	13.3	14.2	14.0	12.8
16 to 17 years	288	251	255	17.7	15.8	14.1	15.8	15.9	16.8
18 to 19 years	305	296	226	13.3	11.6	12.8	13.1	12.7	10.0
20 to 24 years	597	618	533	8.5	7.9	8.6	8.7	9.1	8.0
25 years and over	2,008	1,856	1,780	4.6	4.2	4.2	4.1	4.1	3.9
25 to 54 years	1,816	1,646	1,616	4.9	4.5	4.4	4.4	4.3	4.2
55 years and over	188	205	164	3.0	2.4	2.4	2.6	3.1	2.5

[1] Unemployment as a percent of the civilian labor force.

Table A-10. Employment status of black and other workers

(Numbers in thousands)

Employment status	Not seasonally adjusted			Seasonally adjusted[1]					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
Civilian noninstitutional population	26,196	26,779	26,830	26,196	26,590	26,641	26,697	26,779	26,830
Civilian labor force	16,544	17,075	17,147	16,777	17,070	17,079	17,172	17,283	17,386
Participation rate	63.2	63.8	63.9	64.0	64.2	64.1	64.3	64.5	64.8
Employed	14,641	15,279	15,276	14,897	15,394	15,365	15,457	15,449	15,540
Employment-population ratio[2]	55.9	57.1	56.9	56.9	57.9	57.7	57.9	57.7	57.9
Unemployed	1,904	1,795	1,871	1,880	1,676	1,714	1,715	1,833	1,846
Unemployment rate	11.5	10.5	10.9	11.2	9.8	10.0	10.0	10.6	10.6
Not in labor force	9,652	9,704	9,682	9,419	9,520	9,562	9,525	9,496	9,444

[1] The population figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and seasonally adjusted columns.

[2] Civilian employment as a percent of the civilian noninstitutional population.

Table A-7. Duration of unemployment

(Numbers in thousands)

Weeks of unemployment	Not seasonally adjusted			Seasonally adjusted					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
DURATION									
Less than 5 weeks	2,973	3,464	3,117	3,097	3,059	3,117	3,029	3,181	3,247
5 to 14 weeks	2,602	2,258	2,329	2,093	1,835	1,935	2,039	2,081	1,865
15 weeks and over	1,907	1,586	1,436	1,732	1,554	1,502	1,495	1,512	1,304
15 to 26 weeks	977	817	768	842	788	787	758	757	665
27 weeks and over	930	770	668	890	766	715	737	755	639
Average (mean) duration, in weeks	14.3	12.3	12.3	14.1	13.4	12.6	12.8	12.7	12.1
Median duration, in weeks	7.1	5.6	6.0	6.3	5.7	5.6	5.8	5.7	5.3
PERCENT DISTRIBUTION									
Total unemployed	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than 5 weeks	39.7	47.4	45.3	44.7	47.4	47.6	46.2	47.0	50.6
5 to 14 weeks	34.8	30.9	33.8	30.2	28.5	29.5	31.1	30.7	29.1
15 weeks and over	25.5	21.7	20.9	25.0	24.1	22.9	22.8	22.3	20.3
15 to 26 weeks	13.1	11.2	11.2	12.2	12.2	12.0	11.5	11.2	10.4
27 weeks and over	12.4	10.5	9.7	12.9	11.9	10.9	11.2	11.1	10.0

Table A-8. Reason for unemployment

(Numbers in thousands)

Reasons	Not seasonally adjusted			Seasonally adjusted					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
NUMBER OF UNEMPLOYED									
Job losers	3,739	3,701	3,382	3,182	2,951	3,031	3,066	3,121	2,876
On layoff	1,181	1,210	1,042	877	844	814	819	827	774
Other job losers	2,558	2,491	2,340	2,305	2,107	2,217	2,247	2,294	2,102
Job leavers	988	1,067	1,005	969	984	963	998	985	985
Reentrants	1,974	1,866	1,799	1,916	1,747	1,766	1,725	1,835	1,740
New entrants	782	675	696	855	747	799	799	780	765
PERCENT DISTRIBUTION									
Total unemployed	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Job losers	50.0	50.7	49.1	46.0	45.9	46.2	46.5	46.4	45.2
On layoff	15.8	16.6	15.1	12.7	13.1	12.4	12.4	12.3	12.2
Other job losers	34.2	34.1	34.0	33.3	32.8	33.8	34.1	34.1	33.0
Job leavers	13.2	14.6	14.6	14.0	15.3	14.7	15.1	14.7	15.5
Reentrants	26.4	25.5	26.1	27.7	27.2	26.9	26.2	27.3	27.3
New entrants	10.4	9.2	10.1	12.4	11.6	12.2	12.1	11.6	12.0
UNEMPLOYED AS A PERCENT OF THE CIVILIAN LABOR FORCE									
Job losers	3.1	3.0	2.8	2.6	2.4	2.5	2.5	2.5	2.3
Job leavers	.8	.9	.8	.8	.8	.8	.8	.8	.8
Reentrants	1.6	1.5	1.5	1.6	1.4	1.4	1.4	1.5	1.4
New entrants	.7	.6	.6	.7	.6	.7	.7	.6	.6

Table A-5. Range of unemployment measures based on varying definitions of unemployment and the labor force, seasonally adjusted

(Percent)

Measure	Quarterly averages					Monthly data		
	1987	1988				1988	1989	
	IV	I	II	III	IV	Dec.	Jan.	Feb.
U-1 Persons unemployed 15 weeks or longer as a percent of the civilian labor force	1.5	1.4	1.3	1.3	1.2	1.2	1.2	1.1
U-2 Job losers as a percent of the civilian labor force	2.7	2.6	2.5	2.5	2.5	2.5	2.5	2.3
U-3 Unemployed persons 25 years and over as a percent of the civilian labor force	4.5	4.4	4.2	4.2	4.1	4.1	4.1	4.0
U-4 Unemployed full-time jobseekers as a percent of the full-time civilian labor force	5.5	5.3	5.1	5.1	5.0	5.1	5.0	4.8
U-5a Total unemployed as a percent of the labor force, including the resident Armed Forces	5.8	5.6	5.4	5.4	5.3	5.3	5.4	5.1
U-5b Total unemployed as a percent of the civilian labor force	5.9	5.7	5.5	5.5	5.3	5.3	5.4	5.1
U-6 Total full-time jobseekers plus 1/2 part-time jobseekers plus 1/2 total on part time for economic reasons as a percent of the civilian labor force less 1/2 of the part-time labor force	8.1	7.9	7.6	7.6	7.5	7.6	7.5	7.2
U-7 Total full-time jobseekers plus 1/2 part-time jobseekers plus 1/2 total on part time for economic reasons plus discouraged workers as a percent of the civilian labor force plus discouraged workers less 1/2 of the part-time labor force	8.9	8.7	8.3	8.4	8.2	N.A.	N.A.	N.A.

N.A. = not available.

Table A-6. Selected unemployment indicators, seasonally adjusted

Category	Number of unemployed persons (in thousands)			Unemployment rates[1]					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
CHARACTERISTIC									
Total, 16 years and over	6,892	6,716	6,328	5.7	5.3	5.4	5.3	5.4	5.1
Men, 16 years and over	3,702	3,710	3,540	5.5	5.4	5.4	5.3	5.5	5.2
Men, 20 years and over	3,053	2,938	2,853	4.9	4.6	4.8	4.7	4.6	4.5
Women, 16 years and over	3,190	3,006	2,787	5.9	5.3	5.3	5.4	5.4	5.0
Women, 20 years and over	2,596	2,455	2,306	5.1	4.7	4.7	4.7	4.7	4.5
Both sexes, 16 to 19 years	1,243	1,323	1,168	15.5	15.0	14.1	14.8	16.4	14.8
Married men, spouse present	1,416	1,304	1,289	3.4	3.1	3.3	3.1	3.1	3.1
Married women, spouse present	1,205	1,115	1,028	4.0	3.7	3.8	3.7	3.6	3.4
Women who maintain families	557	557	558	8.3	7.9	7.7	8.2	8.0	8.0
Full-time workers	5,526	5,295	5,024	5.3	5.0	5.0	5.1	5.0	4.8
Part-time workers	1,379	1,445	1,314	7.9	7.4	7.1	7.0	7.9	7.3
Labor force time lost[2]	--	--	--	6.6	6.1	6.2	6.3	6.2	5.9
INDUSTRY									
Nonagricultural private wage and salary workers	5,149	5,177	4,749	5.7	5.4	5.5	5.4	5.6	5.1
Goods-producing industries	1,965	1,894	1,784	6.8	6.4	6.4	6.4	6.4	6.1
Mining	66	43	57	7.8	8.8	8.9	7.7	6.1	8.0
Construction	688	663	648	10.9	10.0	10.6	10.4	10.4	10.0
Manufacturing	1,211	1,189	1,079	5.6	5.3	5.1	5.2	5.3	4.9
Durable goods	734	661	576	5.7	5.0	4.9	5.0	5.0	4.4
Nondurable goods	477	528	503	5.4	5.7	5.3	5.5	5.7	5.5
Service-producing industries	3,184	3,283	2,965	5.2	4.9	5.1	4.9	5.2	4.7
Transportation and public utitities	247	245	244	3.8	3.5	4.0	3.8	3.8	3.9
Wholesale and retail trade	1,460	1,489	1,284	6.3	6.0	6.2	6.3	6.3	5.6
Finance and service industries	1,477	1,550	1,437	4.6	4.5	4.6	4.1	4.7	4.3
Government workers	501	486	477	2.9	2.6	2.5	2.7	2.7	2.7
Agricultural wage and salary workers	192	176	160	10.5	10.2	9.3	8.8	9.5	8.9

[1] Unemployment as a percent of the civilian labor force.

[2] Aggregate hours lost by the unemployed and persons on part time for economic reasons as a percent of potentially available labor force hours.

Table A-3. Employment status of the civilian population by race, sex, age, and Hispanic origin—Continued

(Numbers in thousands)

Employment status, race, sex, age, and Hispanic origin	Not seasonally adjusted			Seasonally adjusted[1]					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
HISPANIC ORIGIN									
Civilian noninstitutional population	13,153	13,564	13,606	13,153	13,458	13,495	13,533	13,564	13,606
Civilian labor force	8,905	9,110	9,129	8,987	9,075	9,148	9,133	9,205	9,219
Participation rate	67.7	67.2	67.1	68.3	67.4	67.8	67.5	67.9	67.8
Employed	8,086	8,274	8,441	8,241	8,368	8,419	8,441	8,434	8,596
Employment-population ratio[2]	61.5	61.0	62.0	62.7	62.2	62.4	62.4	62.2	63.2
Unemployed	820	836	688	746	707	729	692	771	624
Unemployment rate	9.2	9.2	7.5	8.3	7.8	8.0	7.6	8.4	6.8

[1] The population figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and seasonally adjusted columns.

[2] Civilian employment as a percent of the civilian noninstitutional population.

NOTE: Detail for the above race and Hispanic-origin groups will not sum to totals because data for the "other races" group are not presented and Hispanics are included in both the white and black population groups.

Table A-4. Selected employment indicators

(In thousands)

Category	Not seasonally adjusted			Seasonally adjusted					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
CHARACTERISTIC									
Civilian employed, 16 years and over	112,460	114,786	115,023	114,273	115,573	115,947	116,009	116,711	116,853
Married men, spouse present	39,868	40,475	40,314	40,488	40,504	40,407	40,483	40,925	40,928
Married women, spouse present	28,477	29,323	29,265	28,620	28,890	28,995	29,053	29,589	29,412
Women who maintain families	6,157	6,435	6,391	6,151	6,344	6,375	6,399	6,416	6,385
MAJOR INDUSTRY AND CLASS OF WORKER									
Agriculture:									
Wage and salary workers	1,407	1,420	1,416	1,640	1,661	1,672	1,698	1,684	1,645
Self-employed workers	1,274	1,287	1,284	1,410	1,405	1,450	1,349	1,387	1,419
Unpaid family workers	79	124	95	123	177	125	149	189	150
Nonagricultural industries:									
Wage and salary workers	101,341	103,158	103,644	102,498	103,733	103,770	103,904	104,510	104,797
Government	17,270	17,532	17,623	16,961	17,240	17,387	17,423	17,393	17,311
Private industries	84,071	85,626	86,021	85,537	86,493	86,383	86,481	87,117	87,486
Private households	1,067	1,116	1,056	1,167	1,152	1,209	1,210	1,196	1,135
Other industries	82,984	84,510	84,965	84,370	85,341	85,174	85,271	85,921	86,350
Self-employed workers	8,146	8,517	8,321	8,338	8,479	8,619	8,602	8,718	8,517
Unpaid family workers	213	280	262	232	232	300	266	298	285
PERSONS AT WORK PART TIME[1]									
All industries:									
Part time for economic reasons	5,377	5,138	4,996	5,369	4,963	5,061	5,321	5,097	4,981
Slack work	2,661	2,634	2,554	2,408	2,220	2,279	2,549	2,302	2,303
Could only find part-time work	2,390	2,150	2,153	2,591	2,399	2,375	2,410	2,352	2,333
Voluntary part time	15,446	15,755	15,958	14,619	15,161	15,446	15,363	15,401	15,126
Nonagricultural industries:									
Part time for economic reasons	5,117	4,914	4,725	5,101	4,727	4,819	5,033	4,837	4,697
Slack work	2,504	2,455	2,343	2,258	2,095	2,116	2,377	2,144	2,105
Could only find part-time work	2,292	2,112	2,102	2,477	2,319	2,288	2,307	2,283	2,272
Voluntary part time	15,055	15,374	15,584	14,172	14,679	14,986	14,928	14,970	14,688

[1] Excludes persons "with a job but not at work" during the survey period for such reasons as vacation, illness, or industrial dispute.

Table A-3. Employment status of the civilian population by race, sex, age, and Hispanic origin

(Numbers in thousands)

Employment status, race, sex, age, and Hispanic origin	Not seasonally adjusted			Seasonally adjusted[1]					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
WHITE									
Civilian noninstitutional population	157,773	158,865	158,947	157,773	158,524	158,603	158,705	158,865	158,947
Civilian labor force	103,398	105,020	104,758	104,404	105,051	105,395	105,411	106,106	105,798
Participation rate	65.5	66.1	65.9	66.2	66.3	66.5	66.4	66.8	66.6
Employed	97,819	99,506	99,747	99,350	100,199	100,543	100,567	101,183	101,278
Employment-population ratio[2]	62.0	62.6	62.8	63.0	63.2	63.4	63.4	63.7	63.7
Unemployed	5,579	5,514	5,012	5,054	4,852	4,852	4,844	4,923	4,521
Unemployment rate	5.4	5.3	4.8	4.8	4.6	4.6	4.6	4.6	4.3
Men, 20 years and over									
Civilian labor force	54,268	54,854	54,920	54,627	54,861	54,922	54,898	55,213	55,308
Participation rate	77.9	78.0	78.0	78.4	78.3	78.3	78.2	78.5	78.6
Employed	51,551	52,159	52,399	52,348	52,612	52,624	52,636	53,007	53,197
Employment-population ratio[2]	74.0	74.2	74.4	75.2	75.1	75.0	75.0	75.4	75.6
Unemployed	2,717	2,695	2,521	2,279	2,249	2,298	2,262	2,205	2,111
Unemployment rate	5.0	4.9	4.6	4.2	4.1	4.2	4.1	4.0	3.8
Women, 20 years and over									
Civilian labor force	42,748	43,803	43,657	42,848	43,298	43,625	43,644	43,936	43,770
Participation rate	56.1	57.0	56.8	56.2	56.5	56.9	56.9	57.2	56.9
Employed	40,780	41,948	42,008	40,942	41,583	41,889	41,930	42,201	42,177
Employment-population ratio[2]	53.5	54.6	54.6	53.7	54.2	54.6	54.6	54.9	54.8
Unemployed	1,969	1,854	1,649	1,906	1,715	1,736	1,714	1,734	1,593
Unemployment rate	4.6	4.2	3.8	4.4	4.0	4.0	3.9	3.9	3.6
Both sexes, 16 to 19 years									
Civilian labor force	6,381	6,363	6,182	6,929	6,892	6,848	6,869	6,958	6,720
Participation rate	53.7	54.5	53.0	58.3	58.5	58.3	58.6	59.6	57.7
Employed	5,488	5,399	5,340	6,060	6,004	6,030	6,001	5,975	5,904
Employment-population ratio[2]	46.2	46.2	45.8	51.0	51.0	51.3	51.2	51.1	50.7
Unemployed	893	964	841	869	888	818	868	983	816
Unemployment rate	14.0	15.2	13.6	12.5	12.9	11.9	12.6	14.1	12.1
Men	14.8	18.5	16.4	12.5	14.4	12.6	13.4	16.4	14.0
Women	13.2	11.7	10.6	12.6	11.3	11.3	11.8	11.7	10.2
BLACK									
Civilian noninstitutional population	20,569	20,877	20,905	20,569	20,786	20,811	20,842	20,877	20,905
Civilian labor force	12,965	13,275	13,303	13,138	13,290	13,330	13,405	13,477	13,476
Participation rate	63.0	63.6	63.6	63.9	63.9	64.1	64.3	64.6	64.5
Employed	11,288	11,705	11,655	11,504	11,807	11,831	11,856	11,860	11,873
Employment-population ratio[2]	54.9	56.1	55.8	55.9	56.8	56.8	56.9	56.8	56.8
Unemployed	1,678	1,570	1,648	1,634	1,483	1,499	1,549	1,617	1,603
Unemployment rate	12.9	11.8	12.4	12.4	11.2	11.2	11.6	12.0	11.9
Men, 20 years and over									
Civilian labor force	6,094	6,163	6,153	6,140	6,157	6,146	6,179	6,226	6,199
Participation rate	74.7	74.3	74.0	75.2	74.6	74.3	74.6	75.0	74.6
Employed	5,352	5,504	5,432	5,469	5,566	5,545	5,561	5,576	5,549
Employment-population ratio[2]	65.6	66.3	65.3	67.0	67.4	67.1	67.1	67.2	66.7
Unemployed	742	659	721	671	591	601	618	650	650
Unemployment rate	12.2	10.7	11.7	10.9	9.6	9.8	10.0	10.4	10.5
Women, 20 years and over									
Civilian labor force	6,114	6,357	6,327	6,135	6,234	6,280	6,316	6,369	6,349
Participation rate	59.7	61.1	60.7	59.9	60.2	60.6	60.9	61.2	61.0
Employed	5,462	5,712	5,669	5,490	5,620	5,663	5,654	5,706	5,697
Employment-population ratio[2]	53.4	54.9	54.4	53.6	54.3	54.6	54.5	54.9	54.7
Unemployed	652	645	658	645	614	617	662	663	651
Unemployment rate	10.7	10.1	10.4	10.5	9.8	9.8	10.5	10.4	10.3
Both sexes, 16 to 19 years									
Civilian labor force	757	755	822	863	899	904	910	881	928
Participation rate	34.8	34.7	37.8	39.7	41.2	41.5	41.7	40.5	42.7
Employed	473	490	553	545	621	623	641	577	627
Employment-population ratio[2]	21.8	22.5	25.4	25.1	28.5	28.6	29.4	26.5	28.8
Unemployed	284	265	269	318	278	281	269	304	301
Unemployment rate	37.5	35.1	32.7	36.8	30.9	31.1	29.6	34.5	32.4
Men	42.9	37.8	35.2	39.9	32.8	32.1	29.8	36.7	33.1
Women	32.5	32.3	30.0	33.8	28.6	29.9	29.3	32.0	31.6

See footnotes at end of table.

Table A-2. Employment status of the civilian population by sex and age

(Numbers in thousands)

Employment status, sex, and age	Not seasonally adjusted			Seasonally adjusted[1]					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
TOTAL									
Civilian noninstitutional population	183,969	185,644	185,777	183,969	185,114	185,244	185,402	185,644	185,777
Civilian labor force	119,942	122,095	121,906	121,165	122,091	122,510	122,563	123,428	123,181
Participation rate	65.2	65.8	65.6	65.9	66.0	66.1	66.1	66.5	66.3
Employed	112,460	114,786	115,023	114,273	115,573	115,947	116,009	116,711	116,853
Employment-population ratio[2]	61.1	61.8	61.9	62.1	62.4	62.6	62.6	62.9	62.9
Unemployed	7,482	7,309	6,883	6,892	6,518	6,563	6,554	6,716	6,328
Unemployment rate	6.2	6.0	5.6	5.7	5.3	5.4	5.3	5.4	5.1
Men, 20 years and over									
Civilian noninstitutional population	80,203	81,162	81,256	80,203	80,851	80,924	81,001	81,162	81,256
Civilian labor force	62,205	62,926	63,031	62,614	62,915	62,995	63,002	63,358	63,490
Participation rate	77.6	77.5	77.6	78.1	77.8	77.8	77.8	78.1	78.1
Employed	58,626	59,442	59,681	59,561	60,004	59,999	60,049	60,420	60,636
Employment-population ratio[2]	73.1	73.2	73.4	74.3	74.2	74.1	74.1	74.4	74.6
Agriculture	2,027	2,054	2,065	2,279	2,315	2,313	2,292	2,277	2,320
Nonagricultural industries	56,599	57,387	57,616	57,282	57,689	57,686	57,757	58,143	58,316
Unemployed	3,578	3,485	3,350	3,053	2,911	2,996	2,953	2,938	2,853
Unemployment rate	5.8	5.5	5.3	4.9	4.6	4.8	4.7	4.6	4.5
Women, 20 years and over									
Civilian noninstitutional population	89,178	90,072	90,153	89,178	89,807	89,887	89,954	90,072	90,153
Civilian labor force	50,407	51,850	51,675	50,530	51,201	51,558	51,587	51,998	51,821
Participation rate	56.5	57.6	57.3	56.7	57.0	57.4	57.3	57.7	57.5
Employed	47,714	49,287	49,279	47,934	48,788	49,113	49,165	49,543	49,514
Employment-population ratio[2]	53.5	54.7	54.7	53.8	54.3	54.6	54.7	55.0	54.9
Agriculture	552	606	578	638	640	640	646	715	666
Nonagricultural industries	47,162	48,681	48,702	47,296	48,148	48,473	48,519	48,827	48,849
Unemployed	2,693	2,563	2,396	2,596	2,413	2,445	2,422	2,455	2,306
Unemployment rate	5.3	4.9	4.6	5.1	4.7	4.7	4.7	4.7	4.5
Both sexes, 16 to 19 years									
Civilian noninstitutional population	14,588	14,410	14,367	14,588	14,456	14,433	14,447	14,410	14,367
Civilian labor force	7,331	7,319	7,199	8,021	7,975	7,957	7,974	8,071	7,871
Participation rate	50.2	50.8	50.1	55.0	55.2	55.1	55.2	56.0	54.8
Employed	6,120	6,057	6,062	6,778	6,781	6,835	6,795	6,748	6,703
Employment-population ratio[2]	42.0	42.0	42.2	46.5	46.9	47.4	47.0	46.8	46.7
Agriculture	181	171	152	283	283	285	255	307	237
Nonagricultural industries	5,939	5,886	5,910	6,495	6,498	6,550	6,540	6,441	6,466
Unemployed	1,211	1,261	1,137	1,243	1,194	1,122	1,179	1,323	1,168
Unemployment rate	16.5	17.2	15.8	15.5	15.0	14.1	14.8	16.4	14.8

[1] The population figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and seasonally adjusted columns.

[2] Civilian employment as a percent of the civilian noninstitutional population.

Table A-1. Employment status of the population, including Armed Forces in the United States, by sex

(Numbers in thousands)

Employment status and sex	Not seasonally adjusted			Seasonally adjusted[1]					
	Feb. 1988	Jan. 1989	Feb. 1989	Feb. 1988	Oct. 1988	Nov. 1988	Dec. 1988	Jan. 1989	Feb. 1989
TOTAL									
Noninstitutional population[2]	185,705	187,340	187,461	185,705	186,801	186,949	187,098	187,340	187,461
Labor force[2]	121,678	123,791	123,590	122,901	123,778	124,215	124,259	125,124	124,865
Participation rate[3]	65.5	66.1	65.9	66.2	66.3	66.4	66.4	66.8	66.6
Total employed[2]	114,196	116,482	116,707	116,009	117,260	117,652	117,705	118,407	118,537
Employment-population ratio[4]	61.5	62.2	62.3	62.5	62.8	62.9	62.9	63.2	63.2
Resident Armed Forces	1,736	1,696	1,684	1,736	1,687	1,705	1,696	1,696	1,684
Civilian employed	112,460	114,786	115,023	114,273	115,573	115,947	116,009	116,711	116,853
Agriculture	2,760	2,831	2,795	3,200	3,238	3,238	3,193	3,300	3,223
Nonagricultural industries	109,700	111,955	112,228	111,073	112,335	112,709	112,816	113,411	113,630
Unemployed	7,482	7,309	6,883	6,892	6,518	6,563	6,554	6,716	6,328
Unemployment rate[5]	6.1	5.9	5.6	5.6	5.3	5.3	5.3	5.4	5.1
Not in labor force	64,026	63,549	63,871	62,804	63,023	62,734	62,839	62,216	62,596
Men, 16 years and over									
Noninstitutional population[2]	89,099	89,914	89,973	89,099	89,637	89,716	89,792	89,914	89,973
Labor force[2]	67,484	68,197	68,273	68,289	68,569	68,686	68,638	69,032	69,113
Participation rate[3]	75.7	75.8	75.9	76.6	76.5	76.6	76.4	76.8	76.8
Total employed[2]	63,252	63,944	64,233	64,587	64,976	65,074	65,055	65,322	65,572
Employment-population ratio[4]	71.0	71.1	71.4	72.5	72.5	72.5	72.5	72.6	72.9
Resident Armed Forces	1,577	1,532	1,521	1,577	1,526	1,542	1,534	1,532	1,521
Civilian employed	61,675	62,412	62,712	63,010	63,450	63,532	63,521	63,790	64,051
Unemployed	4,232	4,252	4,040	3,702	3,593	3,612	3,583	3,710	3,540
Unemployment rate[5]	6.3	6.2	5.9	5.4	5.2	5.3	5.2	5.4	5.1
Women, 16 years and over									
Noninstitutional population[2]	96,606	97,427	97,488	96,606	97,164	97,234	97,306	97,427	97,488
Labor force[2]	54,195	55,594	55,317	54,612	55,209	55,529	55,621	56,091	55,752
Participation rate[3]	56.1	57.1	56.7	56.5	56.8	57.1	57.2	57.6	57.2
Total employed[2]	50,944	52,538	52,474	51,422	52,284	52,578	52,650	53,085	52,965
Employment-population ratio[4]	52.7	53.9	53.8	53.2	53.8	54.1	54.1	54.5	54.3
Resident Armed Forces	159	164	163	159	161	163	162	164	163
Civilian employed	50,785	52,374	52,311	51,263	52,123	52,415	52,488	52,921	52,802
Unemployed	3,250	3,057	2,843	3,190	2,925	2,951	2,971	3,006	2,787
Unemployment rate[5]	6.0	5.5	5.1	5.8	5.3	5.3	5.3	5.4	5.0

[1] The population and Armed Forces figures are not adjusted for seasonal variation; therefore, identical numbers appear in the unadjusted and seasonally adjusted columns.

[2] Includes members of the Armed Forces stationed in the United States.

[3] Labor force as a percent of the noninstitutional population.

[4] Total employment as a percent of the noninstitutional population.

[5] Unemployment as a percent of the labor force (including the resident Armed Forces).

Because these seasonal events follow a more or less regular pattern each year, their influence on statistical trends can be eliminated by adjusting the statistics from month to month. These adjustments make nonseasonal developments, such as declines in economic activity or increases in the participation of women in the labor force, easier to spot. To return to the school's-out example, the large number of people entering the labor force each June is likely to obscure any other changes that have taken place since May, making it difficult to determine if the level of economic activity has risen or declined. However, because the effect of students finishing school in previous years is known, the statistics for the current year can be adjusted to allow for a comparable change. Insofar as the seasonal adjustment is made correctly, the adjusted figure provides a more useful tool with which to analyze changes in economic activity.

Measures of labor force, employment, and unemployment contain components such as age and sex. Statistics for all employees, production workers, average weekly hours, and average hourly earnings include components based on the employer's industry. All these statistics can be seasonally adjusted either by adjusting the total or by adjusting each of the components and combining them. The second procedure usually yields more accurate information and is therefore followed by BLS. For example, the seasonally adjusted figure for the labor force is the sum of eight seasonally adjusted civilian employment components, plus the resident Armed Forces total (not adjusted for seasonality), and four seasonally adjusted unemployment components; the total for unemployment is the sum of the four unemployment components; and the overall unemployment rate is derived by dividing the resulting estimate of total unemployment by the estimate of the labor force.

The numerical factors used to make the seasonal adjustments are recalculated regularly. For the household survey, the factors are calculated for the January-June period and again for the July-December period. The January revision is applied to data that have been published over the previous 5 years. For the establishment survey, updated factors for seasonal adjustment are calculated only once a year, along with the introduction of new benchmarks which are discussed at the end of the next section.

Sampling variability

Statistics based on the household and establishment surveys are subject to sampling error, that is, the estimate of the number of people employed and the other estimates drawn from these surveys probably differ from the figures that would be obtained from a complete census, even if the same questionnaires and procedures were used. In the household survey, the amount of the differences can be expressed in terms of standard errors. The numerical value of a standard error depends upon the size of the sample, the results of the survey, and other factors. However, the numerical value is always such that the chances are approximately 68 out of 100 that an estimate based on the sample will differ by no more than the standard error from the results of a complete census. The chances are approximately 90 out of 100 that an estimate based on the sample will differ by no more than 1.6 times the standard error from the results of a complete census. At approximately the 90-percent level of confidence—the confidence limits used by BLS in its analyses—the error for the monthly change in total employment is on the order of plus or minus 358,000; for total unemployment it is 224,000; and, for the overall unemployment rate, it is 0.19 percentage point. These figures do not mean that the sample results are off by these magnitudes but, rather, that the chances are approximately 90 out of 100 that the "true" level or rate would not be expected to differ from the estimates by more than these amounts.

Sampling errors for monthly surveys are reduced when the data are cumulated for several months, such as quarterly or annually. Also, as a general rule, the smaller the estimate, the larger the sampling error. Therefore, relatively speaking, the estimate of the size of the labor force is subject to less error than is the estimate of the number unemployed. And, among the unemployed, the sampling error for the jobless rate of adult men, for example, is much smaller than is the error for the jobless rate of teenagers. Specifically, the error on monthly change in the jobless rate for men is .25 percentage point; for teenagers, it is 1.29 percentage points.

In the establishment survey, estimates for the 2 most current months are based on incomplete returns; for this reason, these estimates are labeled preliminary in the tables. When all the returns in the sample have been received, the estimates are revised. In other words, data for the month of September are published in preliminary form in October and November and in final form in December. To remove errors that build up over time, a comprehensive count of the employed is conducted each year. The results of this survey are used to establish new benchmarks—comprehensive counts of employment—against which month-to-month changes can be measured. The new benchmarks also incorporate changes in the classification of industries and allow for the formation of new establishments.

Additional statistics and other information

In order to provide a broad view of the Nation's employment situation, BLS regularly publishes a wide variety of data in this news release. More comprehensive statistics are contained in *Employment and Earnings,* published each month by BLS. It is available for $8.50 per issue or $25.00 per year from the U.S. Government Printing Office, Washington, DC 20204. A check or money order made out to the Superintendent of Documents must accompany all orders.

Employment and Earnings also provides approximations of the standard errors for the household survey data published in this release. For unemployment and other labor force categories, the standard errors appear in tables B through J of its "Explanatory Notes." Measures of the reliability of the data drawn from the establishment survey and the actual amounts of revision due to benchmark adjustments are provided in tables M, O, P, and Q of that publication.

Industry Payroll Employment (Establishment Survey Data)

Total nonagricultural employment increased by 290,000 in February, after seasonal adjustment, to a level of 108.3 million. This followed an increase of 415,000 in January. The February gain was confined to the service-producing sector; employment in the goods sector decreased slightly, largely because of a weather-related decline in construction. (See table B-1.)

In the service-producing sector, the services industry led the over-the-month gains with an employment increase of 130,000. Within services, employment in the health services component rose by 45,000, and business services, which had declined in January, rebounded by 40,000. Elsewhere in the sector, retail trade added 75,000 jobs, and wholesale trade, with an increase of 30,000, continued its pattern of strong job growth.

In the goods-producing sector, the construction industry, which posted a very large increase in January, lost 20,000 jobs in February. This swing in construction employment probably reflects the shift in weather conditions from unusually mild to harsh over the 2 months. Employment in manufacturing, which had been increasing since September, showed little movement in February. The only sizable change was a decline of 15,000 in auto employment; this followed a similar increase in the prior month. In mining, employment was also about unchanged over the month.

Weekly Hours (Establishment Survey Data)

The average workweek for production or nonsupervisory workers on private nonagricultural payrolls edged down by 0.1 hour to 34.7 hours in February, after seasonal adjustment, while both the factory workweek and overtime were unchanged at 41.0 and 3.9 hours, respectively. (See table B-2.)

The index of aggregate weekly hours of production or nonsupervisory workers on private nonagricultural payrolls, at 127.9 (1977=100), declined by 0.3 percent, seasonally adjusted. The index for manufacturing, at 97.2, showed little change. (See table B-5.)

Hourly and Weekly Earnings (Establishment Survey Data)

Both average hourly and average weekly earnings of private production or nonsupervisory workers were little changed in February, after seasonal adjustment, following large increases in January. Prior to seasonal adjustment, average hourly earnings remained at $9.54, and average weekly earnings declined by $1.91 to $327.22. Hourly earnings rose by 4.0 percent over the past year, and weekly earnings were up 3.4 percent. (See tables B-3 and B-4.)

The Employment Situation for March 1989 will be released on Friday, April 7, at 8:30 A.M. (EST).

Explanatory Note

This news release presents statistics from two major surveys, the Current Population Survey (household survey) and the Current Employment Statistics Survey (establishment survey). The household survey provides the information on the labor force, total employment, and unemployment that appears in the A tables, marked HOUSEHOLD DATA. It is a sample survey of about 55,800 households that is conducted by the Bureau of the Census with most of the findings analyzed and published by the Bureau of Labor Statistics (BLS).

The establishment survey provides the information on the employment, hours, and earnings of workers on nonagricultural payrolls that appears in the B tables, marked ESTABLISHMENT DATA. This information is collected from payroll records by BLS in cooperation with State agencies. The sample includes over 300,000 establishments employing over 38 million people.

For both surveys, the data for a given month are actually collected for and relate to a particular week. In the household survey, unless otherwise indicated, it is the calendar week that contains the 12th day of the month, which is called the survey week. In the establishment survey, the reference week is the pay period including the 12th, which may or may not correspond directly to the calendar week.

The data in this release are affected by a number of technical factors, including definitions, survey differences, seasonal adjustments, and the inevitable variance in results between a survey of a sample and a census of the entire population. Each of these factors is explained below.

Coverage, definitions, and differences between surveys

The sample households in the household survey are selected so as to reflect the entire civilian noninstitutional population 16 years of age and older. Each person in a household is classified as employed, unemployed, or not in the labor force. Those who hold more than one job are classified according to the job at which they worked the most hours.

People are classified as *employed* if they did any work at all as paid civilians; worked in their own business or profession or on their own farm; or worked 15 hours or more in an enterprise operated by a member of their family, whether they were paid or not. People are also counted as employed if they were on unpaid leave because of illness, bad weather, disputes between labor and management, or personal reasons. Members of the Armed Forces stationed in the United States are also included in the employed total.

People are classified as *unemployed,* regardless of their eligibility for unemployment benefits or public assistance, if they meet all of the following criteria: They had no employment during the survey week; they were available for work at that time; and they made specific efforts to find employment sometime during the prior 4 weeks. Persons laid off from their former jobs and awaiting recall and those expecting to report to a job within 30 days need not be looking for work to be counted as unemployed.

The *labor force* equals the sum of the number employed and the number unemployed. The *unemployment rate* is the percentage of unemployed people in the labor force (civilian plus the resident Armed Forces). Table A-5 presents a special grouping of seven measures of unemployment based on varying definitions of unemployment and the labor force. The definitions are provided in the table. The most restrictive definition yields U-1 and the most comprehensive yields U-7. The overall unemployment rate is U-5a, while U-5b represents the same measure with a civilian labor force base.

Unlike the household survey, the establishment survey only counts wage and salary employees whose names appear on the payroll records of nonagricultural firms. As a result, there are many differences between the two surveys, among which are the following:

— The household survey, although based on a smaller sample, reflects a larger segment of the population; the establishment survey excludes agriculture, the self-employed, unpaid family workers, private household workers, and members of the resident Armed Forces;

— The household survey includes people on unpaid leave among the employed; the establishment survey does not;

— The household survey is limited to those 16 years of age and older; the establishment survey is not limited by age;

— The household survey has no duplication of individuals, because each individual is counted only once; in the establishment survey, employees working at more than one job or otherwise appearing on more than one payroll would be counted separately for each appearance.

Other differences between the two surveys are described in "Comparing Employment Estimates from Household and Payroll Surveys," which may be obtained from the BLS upon request.

Seasonal adjustment

Over the course of a year, the size of the Nation's labor force and the levels of employment and unemployment undergo sharp fluctuations due to such seasonal events as changes in weather, reduced or expanded production, harvests, major holidays, and the opening and closing of schools. For example, the labor force increases by a large number each June, when schools close and many young people enter the job market. The effect of such seasonal variation can be very large; over the course of a year, for example, seasonality may account for as much as 95 percent of the month-to-month changes in unemployment.

News
United States Department of Labor
Bureau of Labor Statistics Washington, D.C. 20212

Technical information: (202) 523-1371
523-1944
523-1959
Media contact: 523-1913

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THE EMPLOYMENT SITUATION: FEBRUARY 1989

Employment continued to increase in February and unemployment declined, the Bureau of Labor Statistics of the U.S. Department of Labor reported today. Both the overall and the civilian worker unemployment rates were 5.1 percent, down from 5.4 percent in January.

Nonagricultural payroll jobs, as measured by the survey of business establishments, rose by 290,000 in February, with the gains confined to the service-producing industries. Total civilian employment, as measured by the household survey, rose only slightly, following a very large gain in January.

Unemployment (Household Survey Data)

The number of unemployed persons dropped to a seasonally adjusted level of 6.3 million in February. As a result, the civilian worker unemployment rate fell to 5.1 percent, the lowest since May 1974. The rate was 5.3 or 5.4 percent in the prior 5 months. (See table A-2.)

The February decline in unemployment was limited essentially to youth 16-24 years of age. The rate for teenagers dropped by 1.6 percentage points to 14.8 percent, after rising by the same magnitude in January, and the 20-24 young adult rate fell 1.2 points to 8.1 percent. There was little change among adults 25 years and over. The unemployment rate for Hispanics, which often fluctuates from month to month, fell by 1.6 percentage points to 6.8 percent. The rate for white workers (4.3 percent) also declined, while that for blacks (11.9 percent) was about unchanged. (See tables A-2, A-3, and A-9.)

The unemployment decrease in February occurred among persons jobless for more than 5 weeks. The proportion jobless for 27 weeks and over fell to 10 percent of the unemployed, the lowest in nearly 9 years. Both the mean (average) and median duration of unemployment declined--to 12.1 and 5.3 weeks, respectively. The number of unemployed persons who had lost their jobs also dropped over the month to 2.9 million. (See tables A-7 and A-8.)

Civilian Employment and the Labor Force (Household Survey Data)

Following a large increase in January, civilian employment rose only slightly in February, to a seasonally adjusted level of 116.9 million. The proportion of the population with jobs (the employment-population ratio) held at the record high level of 62.9 percent attained in the previous month. (See table A-2.)

The civilian labor force, which had also increased markedly in January, showed a small decline in February. As a result, the labor force participation rate edged down to 66.3 percent. Over the year, the labor force expanded by about 2.0 million. (See table A-2.)

Table A. Major indicators of labor market activity, seasonally adjusted

Category	Quarterly averages		Monthly data			Jan.-Feb. change
	1988		1988	1989		
	III	IV	Dec.	Jan.	Feb.	
HOUSEHOLD DATA	Thousands of persons					
Labor force 1/.....	123,570	124,084	124,259	125,124	124,865	-259
Total employment 1/..	116,892	117,539	117,705	118,407	118,537	130
Civilian labor force...	121,881	122,388	122,563	123,428	123,181	-247
Civilian employment..	115,202	115,843	116,009	116,711	116,853	142
Unemployment.....	6,678	6,545	6,554	6,716	6,328	-388
Not in labor force.....	62,959	62,865	62,839	62,216	62,596	380
Discouraged workers..	941	951	N.A.	N.A.	N.A.	N.A.
	Percent of labor force					
Unemployment rates:						
All workers 1/.....	5.4	5.3	5.3	5.4	5.1	-0.3
All civilian workers.	5.5	5.3	5.3	5.4	5.1	-.3
Adult men.....	4.7	4.7	4.7	4.6	4.5	-.1
Adult women.....	4.9	4.7	4.7	4.7	4.5	-.2
Teenagers.....	15.3	14.6	14.8	16.4	14.8	-1.6
White.....	4.8	4.6	4.6	4.6	4.3	-.3
Black.....	11.2	11.3	11.6	12.0	11.9	-.1
Hispanic origin....	8.0	7.8	7.6	8.4	6.8	-1.6
ESTABLISHMENT DATA	Thousands of jobs					
Nonfarm employment.....	106,478	107,344	107,641	p108,056	p108,345	p289
Goods-producing.....	25,650	25,827	25,889	p26,044	p26,012	p-32
Service-producing....	80,828	81,517	81,752	p82,012	p82,333	p321
	Hours of work					
Average weekly hours:						
Total private.....	34.7	34.8	34.7	p34.8	p34.7	p-0.1
Manufacturing.....	41.1	41.1	40.8	p41.0	p41.0	p0
Overtime.....	3.9	3.9	3.9	p3.9	p3.9	p0

1/ Includes the resident Armed Forces. N.A.=not available.
p=preliminary.