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ABSTRACT

Although projecting what the labor market will be like in 10 years is extremely difficult, it is useful to consider what is in store for the nation in terms of employment. In 1985, the civilian labor force of the United States averaged 115 million persons, with 8 million (7.2 percent) unemployed. Unemployment was much higher for young people and minority groups. It is expected that the labor force will grow by 15.6 million people between 1985 and 1995. The growth rate will vary considerably, however, among various demographic groups. The labor force is projected to be concentrated among prime-age workers, with a slightly higher median age than in 1984. The majority of growth is expected to result from increasing labor force participation by women. Employment opportunities will not change dramatically over the next 10 years. Although some professions will have substantial growth, the demand for labor among most professions will remain constant or increase slightly. Demand and supply should hold steady. One clear trend that is emerging is that persons entering the labor force have more years of schooling than those they replace. Although this fact should mean that workers are more adaptable to change in the workplace, this may not be the case, since the quality of schooling has declined. With the changes taking place in technology, the labor market needs more responsive educational institutions to meet the demands of the next 10 years and beyond. (KC)

LABOR MARKET CHANGES IN THE NEXT TEN YEARS

By

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PREFACE

The National Association of Counties (NACo) is pleased to forward to you the fourth in its series of Issue Papers. This Issue Paper, which addresses labor market changes in the next ten years, was written by Burt S. Barnow of ICF Incorporated. It is based on a presentation made at the National Association of Counties 14th Annual Employment Policy Conference held in Atlanta, Georgia, November 10-13, 1985, and a study prepared for the National Commission for Employment Policy (NCEP) in June 1985, entitled "The Education, Training, and Work Experience of the Adult Labor Force." Since the time of the NCEP report and the NACo conference, the Bureau of Labor Statistics of the US Department of Labor has updated its labor force and employment projections, and this report is based on the revised projections. Sara Toye and Stephen Baldwin provided helpful comments on an earlier draft of this paper.

This paper does not necessarily represent the views or opinions of the National Association of Counties, the NACo Employment and Training Programs or the US Department of Labor. It does represent, however, the opinions and perspectives of its author, Burt S. Barnow.

This series of Issue Papers is meant to stimulate discussion within the employment and training community on issues which NACo believes are important to and impact on the future of employment and training in the United States. Therefore, the National Association of Counties welcomes your reactions to and comments on these Issue Papers. Please address your comments to Jerald McNeil, Director, Employment and Training Programs, National Association of Counties, 440 First Street, NW, Washington, DC, 20001. These comments may be published in the future.

EXECUTIVE SUMMARY

Projecting what the labor market will be like in 10 years is extremely difficult. Nonetheless, it is useful to consider what is in store for the nation, employment-wise.

The present employment picture is clear. In 1985, the civilian labor force of the United States averaged 115 million persons. Of this, approximately 8 million or 7.2 percent were unemployed. Unemployment is not evenly distributed among the population. It is much higher for young people, and higher still for minorities.

One clear trend that is emerging is that individuals entering the labor force have more years of schooling than those they replace. The higher level of general education among labor force entrants might lead one to conclude that the labor force is more adaptable to changes. However, the evidence is that the quality of education has declined significantly in recent years. More promising is the ability of educational institutions to respond to changes in technology, though this responsiveness is greater in post-secondary institutions than it is in secondary institutions. Given the evidence that the adult labor force is dynamic and that large numbers of adults gain new skills through education and training, the need for more responsive educational institutions is increasing.

It is expected that the labor force will grow by 15.6 million people between 1985 and 1995. The growth rate will vary considerably, however, among various demographic groups with some groups seeing declines of up to 20 percent and other groups increasing by over 50 percent. It is projected to be concentrated among prime-age workers, with a slightly higher median age than was the case in 1984. A majority of growth is expected to result from increasing labor force participation by women. Employment opportunities will not change dramatically over the next ten years. While some professions will witness substantial growth, the demand for labor among most professions will remain constant or increase slightly. It appears safe to conclude that dramatic changes either on the demand or supply side of labor will not occur and that there will be no major imbalance between the supply of and demand for labor.

1. INTRODUCTION

Projecting what the labor market will be like in 10 years is as perilous as forecasting the weather for next week. In both cases we know a great deal about the situation today and we know what factors will influence the situation later, but we do not know exactly how these factors will change. Just as weather conditions are determined by the interaction of high pressure and low pressure air masses, labor market conditions may be thought of as resulting from an interaction between the supply of workers to the labor market (in terms of their numbers and the skills they bring) and the demand for workers (again, in terms of numbers and skills) by employers.

While county officials and other policy makers at the local level have a full agenda trying to meet today's local needs, it is also useful for them to consider what is in store for the nation as a whole in the future. Employment and training policies and programs that focus only on today's problems and resources may not be flexible enough to meet the challenges of tomorrow. This paper takes a long-term perspective on the national labor market over the next 10 years, considering what is likely to occur in terms of supply and demand. Emphasis is placed on consideration of how well the workers and jobs are likely to match, rather than on whether there will be "too many" or "too few" workers available. Perhaps surprisingly, the U.S. labor market has been able to adapt reasonably well to major changes in the number of workers in the labor force. During the 1960s and 1970s, for example, the U.S. labor force has absorbed the influx from the "baby boom" generation and the rising labor force participation rates of women fairly well.

The next section of the paper provides a brief overview of the current labor force. The third section summarizes the evidence on how members of the labor force adjust to changing employment requirements through education,

training, and occupational mobility. In the fourth section, projections of the composition of the 1995 labor force are provided, and the fifth section describes projected changes in the occupational composition in 1995. The final section of the paper presents conclusions and implications for policy consideration.

2. AN OVERVIEW OF THE LABOR FORCE

In 1985, the civilian labor force of the United States averaged 115 million men and women.[1] Of this total, 107 million were employed and 8 million, or 7.2 percent of the labor force, were unemployed. While this unemployment rate is high from a historical perspective, we can see that nearly 93 percent of the individuals defined as being in the labor force are able to obtain work.[2]

The burden of unemployment is not spread evenly among the labor force. The unemployment rate for teenagers, 18.6 percent, is over twice the unemployment rate for the entire labor force. The unemployment rate for whites, 6.2 percent, is less than half the rate of blacks, 15.1 percent, and women have a slightly higher unemployment rate than men, 7.4 percent compared to 7.0 percent. Minority youth have the highest unemployment rates, averaging about 40 percent in 1985.

To the extent that demographic groups with higher unemployment rates increase their share of the labor market over the next 10 years, we might expect to find increasing problems in matching workers to jobs. Labor market problems might also aris to the extent that workers are unable to gain new skills required for the jobs of the future. We address this latter issue in the next section.

3. LABOR FORCE ADJUSTMENTS TO CHANGING CONDITIONS

Two types of changes occur in the labor force that help determine how well the needs of employers are met. First, each year a portion of the labor force retires and is replaced with a cohort of new entrants. The key issue for this group is whether youth and the institutions that train and educate them can adapt quickly enough to changing occupational needs induced by technological change and other factors. Second, once individuals enter the labor force, there is a question of whether or not they can learn new skills required to remain gainfully employed. Both of these issues are important in determining how well the labor market will function in the future.

One clear trend that emerges from labor force data is that individuals entering the labor force have more years of schooling on average than those they replace. A study of the educational attainment of the 1981 labor force found that 33 percent of the men and 29 percent of the women ages 55 to 64 in the labor force had less than four years of high school education, while only 13 percent of the men and 11 percent of the women ages 25-34 had this little education.[3] There has been a similar, but less dramatic, increase in the proportion of younger labor force members who have a college education compared to older individuals.

The higher level of general education among labor force entrants is likely to make the labor force more adaptable if the increase in the number of years of schooling is accompanied by an increase in the skills that education is intended to produce. Unfortunately, there is evidence that the quality of education has declined significantly in recent years. For example, among college-bound seniors, the average score on the verbal portion of the Scholastic Aptitude Test (SAT) declined 7.8 percent between 1970 and 1981, and the average math score declined 4.7 percent.[4] One researcher who reviewed

the literature on the decline in educational quality concluded that the evidence indicates that between 1972 and 1980 there was a deterioration in academic course completions, test performance, and homework effort.[5] Thus, the evidence on how well the school system prepares youth for the labor market is mixed. The proportion of youth who complete high school has increased over time, but in recent years the quality of education has declined.

A closely related issue is how well youth and educational institutions respond to changing skill needs generated by technological change and other factors.[6] The evidence here is more positive, although there are some important caveats. At the college level, this adaptation is especially evident. Between 1971 and 1982, for example, the percentage of undergraduates majoring in education declined from 20 percent to 10 percent. Over this same period, the proportion majoring in business increased by 65 percent, and the share majoring in computer and information sciences increased by 660 percent. These changes have generally paralleled the changes in employment opportunities. However, some types of educational institutions may face difficulties in continuing to meet the future needs of employers. One study concluded that vocational education in comprehensive high schools is relatively unresponsive to changes in skill requirements, the post-secondary system is facing a period of enrollment decline that is likely to slow its responsiveness, and the aging of the post-secondary system's faculty is likely to limit its ability to change the fields of study.[7] The nation's educational system clearly faces major challenges in helping youth adapt to the changing skill needs of employers. Fortunately, these problems are well recognized, and preventive actions may be undertaken.

A common view of the labor market is that most people gain their employment skills when they are young and remain in a selected occupational

field for most of their adult life. A review of the evidence, however, reveals that the adult labor force is quite dynamic. A large number of adults gain new skills each year through education and training. Moreover, the adult labor force exhibits a surprising amount of occupational mobility. We consider now the adjustments made by adult members of the labor force.

Vocational education provides a good example of a means used by adults to gain additional labor market skills. Post-secondary vocational education is offered in a variety of settings including four-year colleges and universities, two-year junior colleges, and a variety of noncollegiate post-secondary schools that do not grant degrees but provide training in one or more vocational fields. Although a majority of the students enrolled in post-secondary vocational education in 1982 were between the ages of 16 and 24, 40 percent were over age 25.[8] Nearly 800,000 people age 25 and above were enrolled in post-secondary courses and working toward a vocational certificate, associate occupational degree, or other award. A majority of the post-secondary education students were employed while taking their courses, with 32 percent employed full time and 29 percent employed part time.

Other studies also indicate a substantial amount of education by adults and the adult labor force in particular. The 1981 Participation in Adult Education (PAE) survey estimated that approximately 21 million people over age 17 participated in adult education courses in the 12 months prior to the survey. Of this total, nearly 18 million were in the labor force. Thus, approximately 17 percent of the labor force age 18 and older took adult education courses in the survey year.

Participation in adult education varied significantly by occupation: 23 percent of white-collar workers participated, compared to only 11 percent of blue-collar workers. Participation was highest among health workers (43

percent), physicians and dentists (39 percent), and primary and secondary school teachers (37 percent). White-collar workers in managerial, sales, and clerical occupations had somewhat lower participations rates (17 to 20 percent). The only blue-collar categories with more than 10 percent participation were craft and service workers, each having about 13 percent participation. Employers were indicated as the source of financial support in one-third of the cases, more frequently for men (41 percent) than women (26 percent).

It is clear that a significant share of the adult labor force participates in job-related adult education each year. Most of the education is provided to individuals in white-collar jobs, and adult education is taken more often by individuals in high-skill jobs. About 80 percent of the job-related adult education taken by members of the labor force was to improve or advance in the current job. Adult education does not appear to be a major source of occupational mobility, as only 550,000 courses were taken for the purpose of entering a new occupation and some of these courses were taken by people outside the labor force.

Over the past 10 years, several researchers have attempted to estimate how much employee training takes place in the United States on an annual basis. Unfortunately, there is no comprehensive data base that covers private sector training, and it is frequently difficult to differentiate between training and education. Estimates have ranged up to 50 percent of the workforce receiving training each year, but the term training in most of these studies has generally been very broadly defined.[9]

The question of how workers acquired the skills needed for their jobs was addressed in a special survey conducted by the Bureau of Labor Statistics (BLS).[10] Overall, 55 percent of the workers, representing nearly 54 million

individuals, responded that they needed some form of training or education to qualify for their current jobs. The most common ways of obtaining these skills were through schools (29 percent) and informal on-the-job training (28 percent). (Note that respondents were asked to indicate all sources of relevant training, and many respondents had more than one source.) College programs of four or more years provided qualifying skills for 17 percent of the workforce, and 10 percent of the workforce received their qualifying skills from formal company-sponsored training. High school vocational training, post-secondary vocational training, and junior colleges and technical institutes were each listed as a source of skill acquisition by 5 percent or less of the respondents. Somewhat surprisingly, training received in the armed forces was listed as a source by only 2 percent of the respondents.

The BLS survey also asked respondents if they had taken training to improve their skills while on their present job. In response to this question, 35 percent, representing 33.9 million workers, responded that they had taken such training. Informal on-the-job training was the most common means of acquiring additional skills in the job, with 14 percent using this source. Formal company training was the second most common source, with 11 percent of the workers participating. Schooling was used by 12 percent of the respondents, with 6 percent taking courses in four-year colleges and universities, 3 percent using junior colleges and technical institutes, and 2 percent using post-secondary vocational education schools.

Federal government training efforts are provided primarily through the Job Training Partnership Act (JTPA) which began operation in October 1983. Target groups under JTPA include economically disadvantaged youth and adults for Title IIA programs and dislocated workers for Title III programs. During

the first full program year, July 1984 to June 1985, 941,600 people were served under Title IIA and 177,700 were served under Title III.[11]

It should be noted that although JTPA programs are generally referred to as training programs, other activities and services are permitted. Classroom and on-the-job training have accounted for the initial program assignments for about three-fifths of the Title IIA participants, with the remainder receiving job search assistance, work experience, and other services. In the Title III program, the Department of Labor has estimated slightly less than half the participants received classroom or on-the-job training, with a majority of the remainder in job search assistance.

Although JTPA may be an important source of skill acquisition for the participants, it is not a major factor for the labor force as a whole or even for the eligible population. One recent study found that under two percent of those eligible for Title IIA can be served in a given year.[12] In contrast, it is reasonable to assume that at least 25 percent of the labor force receives some form of education or training each year.

In addition to education and training, another indication of the dynamic nature of the labor force is the occupational mobility that occurs.[13] While not all occupational mobility is voluntary and in some cases changing one's occupation may not involve the use of new skills, occupational mobility reflects the ability of the labor force to adapt to changing labor market conditions. Table 1 presents occupational mobility rates for the 1982-1983 period by age and sex.

The high occupational mobility rates for individuals under age 25 are not surprising. Youth are interested in "shopping" among various occupations until they find the best fit. Also, young people are less likely to have as many occupation-specific skills that will not be rewarded in another occupation; thus, there are not high costs for youth to change occupations.

TABLE 1

OCCUPATIONAL MOBILITY RATES BY AGE AND SEX FOR 1982-1983a/

Age	Men	Women	Both Sexes
18-19	29.0	26.0	27.5
20-24	21.3	20.1	20.7
25-34	11.5	11.9	11.7
35-44	6.7	7.8	7.2
45-54	4.8	4.9	4.8
55-64	3.1	3.8	3.4
65 years and older	1.9	1.4	1.7
Age 25 years and over	7.2	7.9	7.5

a/ Number of persons employed in a different occupation in 1983 as a proportion of the total employed in both 1982 and 1983.

Source: Sehgal (1984) and unpublished BLS data from the January 1983 Current Population Survey.

Occupational mobility rates decline with age, but there is still significant mobility among adults. Between 1982 and 1983, it is estimated that 7.5 percent of the labor force age 25 and over changed occupations. Although the occupational mobility for adults may not appear extraordinarily high, it is likely that a majority of workers change occupations at least once after age 25. For example, the median length of occupational tenure for men ages 35 to 44 in 1983 was 10.4 years, indicating that 50 percent of the men in this age group were in their occupation less than 10.4 years.

To put the occupational mobility figures into perspective, approximately 5.5 million adults age 25 and over changed occupations between 1982 and 1983. This is further evidence of the dynamic nature of the labor force in the United States.

4. CHANGES IN THE COMPOSITION OF THE LABOR FORCE THROUGH 1995[14]

In this section we consider ways in which the labor force in 1995 is expected to differ from the current labor force in terms of size and demographic composition. The 1995 projections we present are based on the most recent BLS "middle growth scenario," which was published in 1985. BLS labor force projections are made by extrapolating labor force participation rates for 82 demographic groups. High, middle, and low scenarios are developed by changing assumptions on the extent to which recent trends will continue. The baseline for the most recent BLS projections is 1984, and in presenting the BLS projections for 1995, we indicate how the labor force is expected to differ from the 1984 figures. The BLS middle scenario projections are presented in Table 2.

Overall, the labor force is projected to grow by 15.6 million people between 1984 and 1995, a total of 13.8 percent. This increase corresponds to

TABLE 2

CIVILIAN LABOR FORCE, BY SEX, AGE, AND RACE IN 1984 AND BLS MIDDLE GROWTH TO PROJECTION TO 1995

(Numbers in thousands)

Labor Group	1984	1995	Percent Change 1984-1995
Total	113,544	129,168	13.8%
Men	63,835	69,282	8.5
16-19	4,134	3,750	-9.3
20-24	8,594	6,790	-21.0
25-34	18,488	18,247	-1.3
35-44	14,037	19,232	37.0
45-54	9,776	13,721	40.4
55-64	7,050	6,119	-13.2
65 and over	1,755	1,423	-18.9
Women	49,704	59,886	20.5
16-19	3,809	3,307	-13.2
20-24	7,451	6,316	-15.2
25-34	14,234	16,168	13.6
35-44	10,896	16,943	55.5
45-54	7,230	11,408	57.8
55-64	4,911	4,695	-4.4
65 and over	1,173	1,049	-10.6
White men 25-54	37,067	44,062	18.9
White women 25-54	27,378	37,090	35.5
Black men 25-54	4,041	5,528	36.8
Black women 25-54	3,994	5,791	45.0

Source: Fullerton (1985).

an annual growth rate of 1.2 percent. However, the growth varies considerably among various demographic groups, with some age-sex groups declining by as much as 20 percent and other groups growing by over 50 percent.

In terms of age, the labor force of 1995 is projected to be more concentrated among prime-age workers (age 25 to 54) than was the case in 1984. For both men and women, the number of teenagers and young adults in the labor force is projected to be smaller in 1995 than was the case in 1984. This projected decline results from the fact that the "baby boom" generation has now moved through the youngest age groups and been replaced by a smaller cohort. The projected declines for men and women age 55 and over result from projections by BLS that the labor force participation rates among those age 55 and over will decline by more than enough to offset the increase in the population over age 54. While the labor force of 1995 is projected to include fewer individuals in the youngest and oldest age groups, the median age of the labor force is projected to rise from 35.2 to 37.6.

The BLS projections indicate that women will comprise a greater share of the labor force in 1995 than they did in 1984. While the male labor force is projected to grow by 8.5 percent over this period, the female labor force is projected to grow by 20.5 percent. Thus, in 1995 women are projected to constitute 46 percent of the labor force compared to 44 percent in 1984. Perhaps a more important way to consider the labor force growth of women over this period is that women are projected to make up 10.2 million (or 65 percent) of the 15.6 million new members of the labor force between 1984 and 1995.

The black labor force in also projected to increase faster than average between 1984 and 1995. The projections indicate that 17.7 percent of the labor force growth over the period will be among blacks, and their percentage

of the labor force is projected to rise from 10.6 percent in 1984 to 11.5 percent in 1995.

In summary, the labor force of 1995 is projected to be more concentrated among prime-age workers, with a slightly higher median age than was the case in 1984. A majority of the growth is expected to result from increasing labor force participation of women. Because women have fewer years of work experience than men on average, it is unclear whether the average amount of labor force work experience will increase or decrease between 1984 and 1995.

5. OCCUPATIONAL CHANGE THROUGH 1995[15]

In an age of rapidly changing technology and increased international competition, an important issue for those involved in the employment and training field is the impact these changes will have on the distribution of jobs among various occupations and industries. An examination of the BLS projections on occupational and industrial employment can help us to see what shifts are occurring and how important they are.

When considering the BLS projections, their limitations must be kept in mind. First, like all projections, the BLS projections may not accurately extrapolate the trends in the economy and thus may then be somewhat inaccurate. Second, the BLS projections consider total employment, but they do not consider replacement needs due to retirements and occupational mobility. Thus, two occupations with the same net increase in jobs may provide significantly different employment opportunities if one of the occupations has higher turnover. Finally, the BLS projections cannot deal with changes in occupational skill requirements that result from technological change. For example, the advent of microprocessors and computers has changed the job content in occupations such as cashiers, machinists, and civil engineers.

Employment growth can be considered from two perspectives. We can look at which occupations have the highest growth rates, and we can also look at which occupations will be adding the most jobs to the economy. The two are not necessarily the same. An occupation could have very few people working in it in 1984 and double by 1995 and still contribute a very small share of the jobs added to the economy. On the other hand, an occupation with a large employment base in 1984 and a low growth rate could still contribute a large number of new jobs by 1995. As is illustrated below, this is frequently the case.

Table 3 presents the 20 occupations that BLS projects to be the fastest growing between 1984 and 1995. These occupations are largely concentrated in the computer and electronics field (7 of the 20 occupations) and the health area (4 occupations). The fastest growing occupation on the list, paralegal personnel, is expected to nearly double over the eleven-year period. The 20th ranked occupation, employment interviewers, is expected to grow by nearly a third.

These occupations are not necessarily the ones that employment and training programs should be concentrating on. Collectively, these rapidly growing occupations account for under 15 percent of the job growth expected over the period. Only six of the occupations are also among the 20 occupations with the largest job growth. In addition, many of the jobs require a college degree or significantly more training than can be typically provided in a government program. On the positive side, occupations that are growing rapidly are often more likely to have above-average wage increases to attract more people into the field. Note, however, that the average annual growth rate in the fastest growing occupation, paralegal personnel, is only 6.4 percent.

TABLE 3

FASTEST GROWING OCCUPATIONS, 1984-95
(Numbers in thousands)

Occupation	Employment 1984	Employment 1995	Changes in employment 1984-95 Number	Changes in employment 1984-95 Percent	Percent of total job growth 1984-95
Paralegal personnel	53	104	51	97.5	.3
Computer programmers	341	586	245	71.7	1.5
Computer systems analysts, electronic data processing (EOP)	308	520	212	68.7	1.3
Medical assistants	128	207	79	62.0	.5
Data processing equipment repairers	50	78	28	56.2	.2
Electrical and electronics engineers	390	597	206	52.8	1.3
Electrical and electronics technicians and technologists	404	607	202	50.7	1.3
Computer operators, except peripheral equipment	241	353	111	46.1	.7
Peripheral EDP equipment operators	70	102	32	45.0	.2
Travel agents	721	103	32	43.9	.2
Physical therapists	58	83	25	42.2	.2
Physician assistants	25	35	10	40.3	.1
Securities and financial services salesworkers	81	113	32	39.1	.2
Mechanical engineering technicians and technologists	55	75	20	36.6	.1
Lawyers	490	665	174	35.5	1.1
Correction officers and jailers	130	175	45	34.9	.3
Accountants and auditors	882	1,189	307	34.8	1.9
Mechanical engineers	237	317	81	34.0	.5
Registered nurses	1,377	1,829	452	32.8	2.8
Employment interviewers, private or public employment service	72	95	23	31.7	.1

Source: Silvestri and Lukasiewicz (1985, p. 52).

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The occupations projected by BLS to have the largest job growth through 1994 are presented in Table 4. These 37 occupations are expected to account for about half of the employment growth over this period. While some of the occupations on this list require a college education or an advanced degree, many do not require a great deal of specialized training. Many of these occupations should be considered for employment and training programs because of their prevalence as well as their growth potential. Also, many of the jobs are characterized by relatively high replacement demand because of turnover.

Before leaving the subject of how employment growth is likely to be distributed, it is useful to consider how important a role the "high technology" industries can be expected to play. Unfortunately, the term high technology means different things to different people. BLS has defined high technology industries based on the level of research and development expenditures, the ratio of scientific and technical personnel to total employment, and product sophistication.[16] While BLS projects that the high technology industries will have above average growth, they are expected to account for under 11 percent of all jobs added between 1984 and 1995. Note also that the BLS definition of high technology includes industries such as cleaners and toilet preparations and paints and allied products that may not always be thought of as high technology industries.

6. CONCLUSIONS AND IMPLICATIONS

The broad look at the labor market over the next 10 years that has been presented above suggests several interesting conclusions. First, we have seen that the labor force will not grow evenly over the next 10 years. The oldest and youngest age groups are expected to decline in size, with all the growth concentrated among 25 to 54 year old prime age workers. Blacks will make up a somewhat larger share of the labor force in the future, but perhaps the most

TABLE 4

OCCUPATIONS WITH THE LARGEST JOB GROWTH, 1984-95
(Numbers in thousands)

Occupation	Employment		Changes in employment 1984-95		Percent of total job growth 1984-95
	1984	1995	Number	Percent	
Cashiers	1,902	2,469	556	29.8	3.6
Registered nurses	1,377	1,829	452	32.8	2.8
Janitors and cleaners, including maid and housekeeping cleaners	2,940	3,383	443	15.1	2.8
Truck drivers	2,484	2,911	428	17.2	2.7
Waiters and waitresses	1,625	2,049	424	26.1	2.7
Wholesale trade salesworkers	1,248	1,617	369	29.6	2.3
Nursing aides, orderlies, and attendants	1,204	1,552	348	28.9	2.2
Salespersons, retail	2,732	3,075	343	12.6	2.2
Accountants and auditors	882	1,189	307	34.8	1.9
Teachers, kindergarten and elementary	1,381	1,662	281	20.3	1.9
Secretaries	2,797	3,064	268	9.6	1.7
Computer programmers	341	586	245	71.7	1.5
General office clerks	2,398	2,629	231	9.6	1.4
Food preparation workers, excluding fast food	987	1,205	129	22.1	1.4
Food preparation and service workers, fast food	1,201	1,417	215	17.9	1.4
Computer systems analysts, electronic data processing	308	520	212	68.7	1.3
Electrical and electronics engineers	390	597	206	52.8	1.3
Electrical and electronics technicians and technologists	404	607	202	50.0	1.3
Guards	733	921	188	25.6	1.2
Automotive and motorcycle mechanics	922	1,107	185	20.1	1.2
Lawyers	490	665	174	35.5	1.1
Cosmetologists and related workers	524	674	150	28.7	.9
Cooks, restaurant	463	601	138	29.7	.9
Maintenance repairers, general utility	878	1,015	137	15.6	.9
Bookkeeping, accounting, and auditing clerks	1,973	2,091	118	6.0	.7
Bartenders	400	512	112	27.9	.7
Computer operators, excluding peripheral equipment	241	353	111	46.1	.7
Physicians and surgeons	476	585	109	23.0	.7
Licensed practical nurses	602	708	106	17.6	.7
Carpenters	944	1,046	101	10.7	.6
Switchboard operators	347	447	100	28.7	.6
Food service and lodging managers	657	746	89	13.6	.6
Electricians	545	633	88	16.2	.6
Teacher aides and educational assistants	479	566	88	18.3	.6
Blue-collar workers supervisors	1,470	1,555	85	5.8	.5
Receptionists and information clerks	458	542	83	18.2	.5
Mechanical engineers	237	317	81	34.0	.5

Source: Silvestri and Lukasiewicz (1985, p. 51).

interesting finding is that women will account for about 65 percent of the labor force growth.

On the demand side, we have noted 37 occupations that are projected to account for approximately 50 percent of the growth in employment. While some of these occupations are found in high technology industries, such as computers and data processing, many of the occupations with projected high growth do not require a great deal of highly technical training -- jobs such as cashiers, truck drivers, and nursing aides. The so-called high technology industries are projected to have above-average growth rates, but they are not expected to account for a large share of the jobs that will be added to the economy.

When considered together, the changes in the supply and demand for labor do not appear to indicate a major imbalance ahead, although some individual occupations may experience shortages or surpluses. Because women will constitute such a large share of the added workers, there is likely to be less occupational segregation in the future if the labor force growth is to be accommodated well.

We have also noted that the labor force undertakes a large amount of education and training each year to improve current skills or learn new ones. While the exact magnitude of this effort is unknown, it is likely that at least 25 percent of the labor force undertakes some job-related education or training each year. We have also seen that informal on-the-job training is a common method of gaining job skills. On balance, the labor market appears to adjust reasonably well to changing requirements, and the changes projected for the next 10 years do not appear that great.

Given that the overall labor market appears to work reasonably well, it is useful to consider the role of employment and training programs. The

programs funded under JTPA are targetted on the economically disadvantaged and dislocated workers. In addition, there is evidence that adult education and training are much more concentrated on high-skill blue-collar and professional white-collar workers than on workers in relatively unskilled jobs.[17] Thus, economically disadvantaged low skill workers start with a lower skill base, and they are likely to fall farther behind their peers.

Attention by county and local officials to employment and training programs is essential. The changes projected at the national level provide a good starting point for local planning, but each labor market area has a unique mix of industry and human resources. Occupations that are growing slowly nationally may provide good opportunities in some areas. In addition, it is important for local governments to keep up with changes in the skills required for the occupations selected; good communication with local industry is essential.

In conclusion, it appears that the U.S. economy should be able to cope quite well with the changes in labor supply and demand that are likely to occur over the next decade. While the nation's labor force and employment and training system need to be aware and take account of the expected changes, these growing pains do not appear likely to create a major labor market crisis.

NOTES

1. All labor force data presented in this section are 1985 averages and were obtained from the 1986 Economic Report of the President.

2. While the unemployment rate is a useful summary statistic, it is not a comprehensive measure of labor market problems. For example, the unemployment rate does not include discouraged workers (those who would like a job but have not searched actively for at least four weeks), workers who are employed part-time for economic reasons, and underemployed workers. Also, note that we are concerned here with labor market problems rather than poverty. While unemployment and poverty are clearly related, many individuals are unemployed but not in poverty while many others are employed and are still in poverty.

3. This information is from Young (1982).

4. See p. 157 of the 103rd edition of the Statistical Abstract of the United States. In more recent years, however, SAT scores have stabilized.

5. See Berryman (1985, p. 24).

6. This discussion is based on Berryman (1985, pp. 25-47).

7. See Berryman (1985, pp. vi-vii).

8. Data are from the National Center for Education Statistics (1984, p. 124).

9. For a review of the Literature on estimates of employer training in the United States, see Carnevale and Goldstein (1983) or Barnow (1985).

10. See Carey and Eck (1984) for detailed information on how workers get their training.

11. Both the Title IIA and Title III activity estimates are based on the Job Training Longitudical Survey (JTLS) administered by the Department of Labor. Because of problems in developing an appropriate sample for Title III programs, the estimates should be considered as rough approximations only. In PY84, the JTLS estimates for Title III were that 23 percent of the new enrollees were in classroom training and 20 percent were in on-the-job training.

12. See Hunt and Rupp (1984).

13. Information in this section is from Sehgal (1984) and Barnow (1985).

14. This discussion is based on Fullerton (1985).

15. BLS occupational employment projections data are from Silvestri and Lukasiewicz (1985), which provides a great deal of additional data and explanatory text than we covered in this report.

16. See Personick (1985, p. 37) for BLS's projections of employment growth in high technology industries. More information on the BLS definition and earlier projections can be found in Riche, Hecker, and Burgan (1983).

17. See Barnow (1985, pp. 71-74).

BIBLIOGRAPHY

Barnow, Burt S. The Education, Training, and Work Experience of the Adult Labor Force From 1984 to 1995. Washington, D.C.: National Commission for Employment Policy, 1985.

Berryman, Sue E. The Adjustments of Youth and Educational Institutions to Technologically-Generated Changes in Skill Requirements. Washington, D.C.: National Commission for Employment Policy, 1985.

Carey, Max and Alan Eck. "How Workers Get Their Training." Occupational Outlook Quarterly. Winter 1984.

Carnevale, Anthony P. and Harold Goldstein. Employee Training: Its Changing Role and An Analysis of New Data. Washington, D.C.: American Society for Training and Development, 1983.

Fullerton, Howard N., Jr. "The 1995 Labor Force: BLS' Latest Projections." Monthly Labor Review. November 1985, pp. 17-25.

Hunt, Allan H. and Kalman Rupp. "The Implementation of Title IIA of JTPA in the States and Service Delivery Areas: The New Partnership and Program Directions." Undated paper presented at the 1984 meetings of the Industrial Relations Research Association.

National Center for Education Statistics. Digest of Education Statistics, 1983-84. Washington, D.C.: GPO, 1984.

Personick, Valerie A. "A Second Look at Industry Output and Employment Trends to 1985." Monthly Labor Review. November 1985, pp. 26-41.

Sehgal, Ellen. "Occupational Mobility and Job Tenure in 1983." Monthly Labor Review. October 1984, pp. 13-23.

Silvestri, George T. and John M. Lukasiewicz. "Occupational Employment Projections: the 1984-95 Outlook." Monthly Labor Review. November 1985, pp. 42-57.

U.S. Bureau of the Census. Statistical Abstract of the United States, 1982-1983. Washington, D.C.: GPO, 1982.

U.S. Government. Economic Report of the President. Washington, D.C.: GPO, 1986.

Young, Anne McDougall. "Educational Attainment of Workers, March 1981." Monthly Labor Review. April 1982, pp. 52-55.

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