

# Education and demographics: how do they affect unemployment rates?

*The rise in the number of college graduates may mean that some may continue to take jobs away from high school graduates; however, the entrance of smaller cohorts into the labor force may ease competitive pressures for both groups*

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The 20-year period between 1967 and 1987 was one of enormous expansion in the number of high school and college graduates in the labor force. This was attributed primarily to the entry of the post-World War II baby-boom generation into the labor force, whose educational levels were much higher than those of earlier generations.<sup>1</sup> As a result, about 1 of 4 current members of the labor force ages 25 to 64 has completed 4 or more years of college—twice the ratio of 2 decades earlier.<sup>2</sup> Similarly, the proportion with 1 to 3 years of college has more than doubled to 20 percent, whereas the proportion who completed 4 years of high school (who did not go on to college) rose from 35 to 40 percent. As a consequence, the proportion of the adult labor force with less than 4 years of high school plummeted 26 percentage points—from 41 to 15 percent. (See table 1.)

Despite those educational gains, the jobless rate for 25- to 64-year-olds doubled to about 6 percent. Because the economy was in the midst of an expansionary phase both in 1967 and 1987, any explanation of changes in aggregate unemployment between the two periods must focus on structural developments.<sup>3</sup> Structural unemployment arises from a fundamental mismatch between supply and demand, including skill or locational mismatches in the labor market.

This article concentrates on the relationship between the changing demographic composition and educational level of

the labor force and the impact of those factors on the structural rise in unemployment. Its focus is on how the labor market has adjusted to the increased supply of relatively young and inexperienced but well-educated workers, with particular emphasis given to the job market experiences of high school and college graduates. It will be shown that the labor market's response to the rising educational level of an expanding labor force was a relative weakening of the labor market position for high school graduates, compared with those with higher levels of education.<sup>4</sup>

The article also provides a brief analysis of the effect of cyclical trends on the job market performance of workers with varying levels of education between January 1967 and December 1986. Although unemployment rises and falls for all educational groups over the course of the business cycle, the degree of cyclical movement is generally smaller for the higher educated groups.

## Secular trends

"Shift-share analysis" was used to examine the role of the changing educational and demographic composition of the labor force on the rise in the adult unemployment rate between 1967 and 1987. Through this technique, the change in the overall unemployment rate could be allocated among three components: the changing rate of unemployment of each educational attainment group, each group's shifting labor force share, and the covariance or interaction between the first two conditions.<sup>5</sup>

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The first column in table 2 shows the total percentage contribution of each educational attainment group to the change in the overall adult unemployment rate between 1967 and 1979, and between 1979 and 1987, after all component parts of the shift-share analysis are totaled.<sup>6</sup> For example, during the earlier period, the adult unemployment rate rose by 1.2 percentage points—from 3.0 to 4.2 percent. Persons whose education ended with 4 years of high school accounted for two-thirds of that increase. The groups with 1 to 3 years and 4 years or more of college each constituted about one-fourth of the rise. However, high school dropouts accounted for -20 percent of the change in the overall unemployment rate.

The largest percentage-point increase in the actual unemployment rate for any educational attainment group (2.7 percentage points) occurred among high school dropouts. (See table 1.) Nevertheless, the results of the analysis show that, overall, dropouts exerted a downward pressure on the overall unemployment rate. This apparent contradiction can be explained by examining the component parts of the shift-share results. The first component of the analysis, which is presented in column 2 of table 2, results by holding the labor force proportion of each educational attainment group constant in 1967, while allowing the unemployment rates applicable to those groups to change as they actually did between 1967 and 1979. This isolates the change in the total unemployment rate attributable to changing unemployment within each group. The large positive value (85.2) for high school dropouts indicates that the unemployment rate among dropouts grew much faster than the total unemployment rate during that period.

The second component of the shift-share analysis holds each educational group's unemployment rate constant, while allowing the labor force proportion of each group to change as it did over that period. In other words, the analysis isolates the effect of the change in the educational mix of the labor force on the overall rate of unemployment. The large negative value for dropouts in column three (-65.1) reflects the 19-percentage point decline in labor force share

**Table 2. Percent contribution of years of school completed to the changes in the overall unemployment rate, March 1967-87**

Years of school completed	Total	Due to change in group's unemployment rate	Due to change in group's labor force share	Covariance <sup>1</sup>
<b>March 1967-79</b>				
Total, ages 25 to 64 .....	100.0	—	—	—
Less than 4 years of high school .....	-19.7	85.2	-65.1	-39.8
4 years of high school .....	66.6	51.7	8.4	6.5
1 to 3 years of college .....	27.9	10.5	10.7	6.7
4 years of college or more .....	25.3	12.5	5.2	7.6
<b>March 1979-87</b>				
Total, ages 25 to 64 .....	100.0	—	—	—
Less than 4 years of high school .....	8.4	63.2	-34.5	-20.3
4 years of high school .....	58.0	55.4	1.8	.8
1 to 3 years of college .....	22.3	14.6	5.7	2.1
4 years of college or more .....	11.1	4.5	5.7	.9

<sup>1</sup>Interaction between the previous two components.

for that group. Therefore, the marked decline in the role of dropouts in the overall labor market between 1967 and 1979 mitigated the effect of the rise in that group's unemployment rate on the overall unemployment rate.

Changes in a group's labor force share and unemployment rates are interrelated. This interaction is represented in the covariance term. In this context, the covariance or interactive term is a mathematical truism that belongs in undetermined proportions to the group's unemployment rate and share of the labor force.<sup>7</sup> It would be inappropriate to distribute it arbitrarily among those direct effects and is, therefore, reported separately as an indirect effect. Part of the interaction may be attributed to crowding, and part may be attributed to discouragement. Crowding results when a large inflow of a group into the labor force raises the supply of that group relative to demand for these workers in the labor market. Consequently, there is a rise in that group's unemployment rate. The discouraged-worker effect occurs when declines in a group's labor force share result from an increase in that group's rate of unemployment. That is, higher rates of unemployment discourage some people from looking for work.<sup>8</sup>

As the results show, discouragement and crowding are, in some cases, quite important. For example, the large negative covariance term for high school dropouts in column 4 of table 2 (-39.8) undoubtedly reflects a large amount of labor market discouragement among that group. This, when combined with the effect of the dropouts' declining labor force share, more than offsets the effect of the group's large unemployment rate increase.

High school graduates with no additional education accounted for the bulk of the 1967-79 rise in the unemployment rate, a result of an above average rise in their jobless rate combined with a sizable labor force share increase. Although the group unemployment rates for those with 1 to 3 and 4 years or more of college grew in line with the overall

**Table 1. Changes in unemployment rates and labor force shares by years of school completed, March 1967-87**

Years of school completed	1967	1979	1987	Percentage point change	
				1967-79	1979-87
<b>Unemployment rates</b>					
Total, ages 25 to 64 .....	3.0	4.2	5.7	1.2	1.4
Less than 4 years of high school .....	4.3	7.0	11.1	2.7	4.1
4 years of high school .....	2.4	4.3	6.3	1.9	2.0
1 to 3 years of college .....	2.0	3.3	4.5	1.3	1.2
4 years of college or more .....	.8	2.0	2.3	1.2	.3
<b>Labor force shares</b>					
Total, ages 25 to 64 .....	100.0	100.0	100.0	0	0
Less than 4 years of high school .....	41.1	21.9	14.9	-19.2	-7.0
4 years of high school .....	35.2	39.6	40.2	4.4	.6
1 to 3 years of college .....	10.6	17.3	19.7	6.7	2.4
4 years of college or more .....	13.2	21.3	25.3	8.1	4.0

**Table 3. Percent contribution of high school and college graduates to the change in the overall unemployment rate, by selected characteristics, March 1967-87**

Characteristic	March 1967-79				March 1979-87			
	Total	Due to change in group's unemployment rate	Due to change in group's labor force share	Covariance <sup>1</sup>	Total	Due to change in group's unemployment rate	Due to change in group's labor force share	Covariance <sup>1</sup>
<b>4 years of high school</b>								
Total ages 25 to 64 .....	66.6	51.7	8.4	6.5	58.0	55.4	1.8	0.8
Men .....	35.5	35.2	.2	.2	37.8	39.4	-1.0	-.6
Women .....	31.1	15.6	10.8	4.7	20.2	16.3	3.0	.8
Ages 25 to 34 .....	38.0	24.5	6.6	6.9	32.3	22.0	7.4	3.0
Men .....	19.1	16.4	1.2	1.6	21.2	14.6	4.4	2.3
Women .....	18.9	7.6	6.8	4.5	11.2	7.3	3.0	.8
Ages 35 to 44 .....	12.4	11.8	.4	.2	20.0	16.3	2.4	1.3
Men .....	8.4	9.8	.6	.8	10.7	10.8	-.1	-.1
Women .....	4.0	1.6	2.1	.2	9.2	5.6	2.6	.1
Ages 45 to 54 .....	7.9	9.0	-.7	-.4	8.5	11.8	-2.0	-1.2
Men .....	3.4	4.9	-.8	-.7	8.2	10.9	-1.2	-1.5
Women .....	4.4	3.7	.5	.2	.3	1.1	-.7	-.1
Ages 55 to 64 .....	8.2	3.6	3.1	1.5	-2.7	-.2	-2.6	0
Men .....	4.4	2.3	1.4	.6	-2.2	-.2	-2.1	0
Women .....	3.8	1.4	1.5	.9	.5	.2	-.6	0
<b>4 years of college or more</b>								
Total, ages 25 to 64 .....	25.3	12.5	5.2	7.6	11.1	4.5	5.7	0.9
Men .....	13.4	7.6	2.2	3.6	10.5	8.5	1.4	.7
Women .....	11.9	4.1	3.8	4.0	.7	-3.5	5.6	-1.4
Ages 25 to 34 .....	16.1	5.7	3.5	7.0	1.7	1.1	.5	0
Men .....	8.2	3.9	.9	3.4	2.7	3.9	-.8	-.4
Women .....	7.8	1.1	4.3	2.4	-.4	-2.5	2.2	0
Ages 35 to 44 .....	3.6	1.9	1.0	.7	7.1	2.5	3.2	1.4
Men .....	2.0	1.5	.2	.3	5.7	3.1	1.3	1.3
Women .....	1.5	0	1.4	0	1.5	-.3	2.1	-.3
Ages 45 to 54 .....	2.6	1.4	.7	.5	2.2	1.7	.4	.2
Men .....	1.2	.4	.6	.2	2.4	2.3	0	0
Women .....	1.7	1.1	.2	.4	-.6	.9	.6	-.3
Ages 55 to 64 .....	2.8	2.3	.2	.4	.2	-.2	.4	0
Men .....	1.9	1.3	.2	.4	.2	-.4	.2	0
Women .....	.9	1.0	0	0	.4	.2	.2	0

<sup>1</sup>Interaction between previous two components.

rate, those groups also accounted for a disproportionately large share of the rise in the overall unemployment rate. This was attributed to the marked increase in the labor market role of college-educated workers, resulting from the large numbers of the baby-boom generation that attended college and entered the labor force during the 1967-79 period.

Between 1979 and 1987, the overall adult unemployment rate rose by 1.4 percentage points. Again, the labor market experiences of the educational attainment groups were vastly different. The rise in the unemployment rate attributable to those with solely 4 years of high school (58 percent of the increase) was almost as high in this period as in the earlier one. Almost all of the 1979-87 change among high school graduates was attributed to rising unemployment, as their labor force share remained constant at 40 percent. (See table 1.) As table 2 shows, high school dropouts accounted for 8 percent of the rise in the overall unemployment rate between 1979 and 1987, related entirely to a rise in the group jobless rate. Those with 1 to 3 years of college accounted for 22 percent of the change, down slightly from the 1967-79 period. The biggest improvement in labor market performance in the second period occurred among those with 4 or more years of college; their contribution toward the change in the overall unemployment rate,

which was 25 percent in the first period, dropped to only 11 percent in the second period.

*Baby-boom crowding.* In order to understand better the interrelationships between labor market composition and unemployment, we calculated an age-sex decomposition of the sources of the rising unemployment rate attributable to high school and college graduates. (See table 3.) Close examination of the reasons for the rising group unemployment among these graduates in the earlier period points to labor market problems for those who were between 25 and 34 years of age. The high school graduate portion of that cohort was responsible for 38 percent of the total over-the-period rise in the overall unemployment rate, although the group made up only between 11 and 14 percent of the total labor force during that period. Most of that group's contribution to the rise in the overall unemployment rate was linked to an increase in group unemployment. Apparently, this growing group of young, inexperienced high school graduates had a difficult time competing among themselves and with other members of the labor force. The interrelationship between unemployment and labor force size experienced by high school graduates ages 25 to 34 is best shown by the fact that all other high school graduate age-sex groups experienced little change in labor force size over that period.

Moreover, they all contributed toward the rise in the overall unemployment rate in amounts roughly proportionate to their labor force share.

During the same 1967–79 period, there was a particularly large increase in the number of college graduates ages 25 to 34 in the labor force. Their labor force share increased by 5 percentage points to 9 percent of the total. This young college graduate cohort accounted for 16 percent of the total rise in the overall unemployment rate—almost twice as large as their labor force share in 1979. Because of the surge in the number of young college graduates entering the labor market, supply outstripped traditional sources of demand for their services.<sup>9</sup> Not only did this serve to raise jobless rates, but it also forced many young men and women with college degrees to take jobs that were traditionally performed by high school graduates. Options for cohorts of high school graduates entering the labor market, however, seldom include movement into jobs ordinarily performed by college graduates. In the 1967–79 period, educational upgrading of jobs resulted in a worsening of the job market situation for the young high school graduates. Therefore, although young college graduates had a relatively difficult time in the job market in the 1967–79 period, compared with other college-educated cohorts, their labor market experience was much better than that of young high school graduates.

College graduates improved their relative job market position between 1979 and 1987. The labor force share among all college graduates rose by 4 percentage points to 25 percent of the total labor force. Despite this increase, they accounted for only 11 percent of the over-the-period change in the unemployment rate. The new 25- to 34-year-old cohort fared particularly well. (See table 3.) On the supply side, the labor force share of this group—at 10 percent—was little changed during that period, adding no further strain on the job market for those workers. On the demand side, those young workers benefited from the changing educational requirements that occurred earlier. Also, there was particularly strong growth in the number of managerial,

**Table 4. Percent distribution of employed persons age 16 and over, and the proportion of college graduates, by occupation, 1972–87**

Occupation	Percent of total unemployed		Changes 1972–87	Proportion of college graduates 1987 <sup>1</sup>
	1972	1987 <sup>1</sup>		
Total .....	100.0	100.0	—	22.9
Executive, administrative, and managerial .....	8.9	11.8	2.9	44.7
Professional specialty .....	10.7	13.3	2.6	74.5
Technicians and related support .....	2.3	2.9	.6	31.2
Sales occupations .....	10.4	11.9	1.5	22.0
Administrative support, including clerical .....	16.0	16.5	.5	11.3
Service occupations .....	13.1	13.5	.4	6.1
Precision production, craft, and repair .....	12.6	12.0	-.6	5.8
Operators, fabricators, and laborers .....	21.2	15.2	-6.0	3.5
Farming, forestry, and fishing .....	4.7	2.9	-1.8	7.3

<sup>1</sup>Data refer to March.

**Table 5. Percentage changes in unemployment rates for high school and college graduates during business cycles**

Business cycles	4 years of high school	4 years of college or more
<b>Recessionary periods:</b>		
December 1969–November 1970 .....	60.6	39.3
November 1973–March 1975 .....	34.6	22.7
January 1980–July 1980 .....	111.1	43.5
July 1981–November 1982 .....	-80.8	78.6
Average monthly change during recessionary periods .....	6.0	4.0
<b>Recovery periods:</b>		
January 1967–December 1969 .....	-34.0	-30.8
November 1970–November 1973 .....	-10.8	3.7
March 1975–January 1980 .....	-27.6	-33.3
July 1980–July 1981 .....	-23.4	-8.0
November 1982–December 1986 .....	-3.7	7.7
Average monthly change during recovery periods .....	-.6	-.2
Average monthly change during all periods (January 1967–December 1986) .....	5.3	3.8

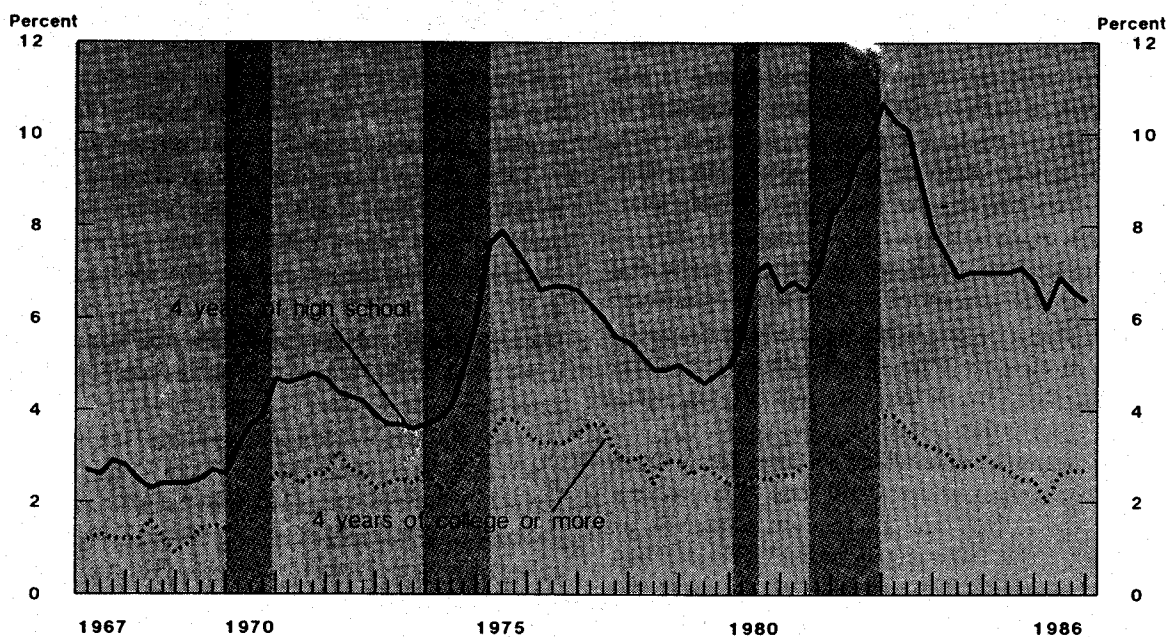
NOTE: Recessionary and recovery periods are those designated by the National Bureau of Economic Research.

professional, and technical jobs that required a college education. Table 4 shows that the easing of the competitive pressures for college graduates ages 25 to 34 resulted in their having virtually no effect on the overall rise in joblessness. This group did not have to cope with a rapid rise in labor force share as did the 25- to 34-year-olds in the earlier period.

The 35-to-44 age bracket accounted for most of the college graduate contribution toward the rise in the unemployment rate in the 1979–87 period. That was basically the same cohort which was responsible for most of the college graduate contribution towards the rising overall unemployment rate in the 1967–79 period. As a group, however, they accounted for much less of the rise in unemployment in the more recent period (7 percent) than the earlier one (16 percent). The major reason for the improvement between the two periods was that, as 35- to 44-year-olds (largely) in the second period, the rise in that group's unemployment rate was smaller than the increase in the overall unemployment rate. This was primarily because of a surge in the demand for those college-trained workers. As a result, the rising group labor force share, stemming from increases in population and labor force participation, was, in aggregate, not a large problem.

While the overall labor market situation improved for college graduates in the 1979–87 period, high school graduates continued to have their labor market problems. The 25- to 34-year-old high school graduate cohort, which accounted for more than one-third of the rise in the overall unemployment rate in the 1967–79 period, was still responsible for more than one-fifth of the increase in the 1979–87 period as 35- to 44-year-olds. And, as in the earlier period,

**Chart 1. Unemployment rates for high school and college graduates, 1967--1986, seasonally adjusted**



NOTE: Shaded areas indicate recessions, as designated by the National Bureau of Economic Research.

high school graduates ages 25 to 34 continued to experience difficulties, accounting for roughly the same proportion of the unemployment increase (a third) in both periods. The increase in the unemployment rate for men in the 25-54 age group was twice as large as the rise in the overall unemployment rate. However, the contribution of female high school graduates between ages 25 and 54 was in line with or smaller than their share of the labor force. In contrast, 55- to 64-year-old men and women both experienced unemployment rate and labor force share declines.

One of the factors behind the increased demand for college graduates was the large employment growth in the service-producing sector of the economy, which employs 82 percent of all college graduates. Also, from the occupational perspective, the improved job market for college graduates is reflected in the fact that, between 1972 and 1987, occupations with comparatively high proportions of workers with 4 or more years of college grew, while those with low ratios of college graduates generally declined.<sup>10</sup> Among the major occupational groups, professionals, managers, and technicians have the highest proportion of their work force with college degrees. (See table 4.) Over the 1972-87 period, the proportion of all workers in these occupations increased by 6 percentage points to 28 percent of the total. In contrast, the employment share of operators, fabricators, and laborers

(few of whom are college graduates) dropped by 6 percentage points to 15 percent.

Part of the improved job market for college graduates was attributed to educational upgrading. Faced with a growing supply of relatively inexperienced labor force participants, employers may have more often used education as a screening device to determine the suitability of a potential employee. In addition, skill requirements increased for many jobs owing to changes in technology and in business practices during the past 20 years.<sup>11</sup>

### Cyclical trends

Business cycle fluctuations also strongly influence the rate of unemployment for the various educational groups. A comparison of the percentage change in the seasonally adjusted unemployment rates for high school and college graduates during the past several business cycle expansions and contractions is presented in table 5.<sup>12</sup> A clear pattern emerges when comparing the effects of both recessionary and recovery periods on the unemployment rates. Between January 1967 and December 1986, high school graduates experienced a much larger monthly increase in their rate of unemployment during recessions, but only a slightly larger unemployment rate decrease during recovery periods. Overall, during downturns, the unemployment rate for high

school graduates grew by 5.3 percent per month, compared with only 3.8 percent for college graduates. This disparate cyclical sensitivity is clearly evident in chart 1.

In addition to their presumed greater knowledge and skills, another reason that college graduates are less vulnerable to business cycle expansions and contractions is that they tend to work in industries that are less susceptible to swings in the business cycle. For example, in March 1987, 42 percent of all college graduates were employed in professional services—an industry that has been relatively unaffected by changes in the business cycle. In contrast, only 15 percent of all high school graduates were employed in that industry. However, 30 percent of all high school graduates were employed in the goods-producing sector of the economy, which is most susceptible to business cycle fluctuations. In March 1987, only 18 percent of all college graduates were employed in that sector.

Even within industries where there are large fluctuations in employment, college graduates still tend to experience less unemployment. They are more often employed as "overhead" labor (such as managers and office staff) than are high school graduates. College graduates have, in the past, been the last workers to be laid off during recessionary periods. In the production of manufactured goods, decreased product demand during recessions results in disproportionate reductions among "production" labor. Because high school graduates tend to be employed as production laborers, they may be more likely to be among the first to be let go.

IN SUMMARY, more education has always reduced the probability of being unemployed. And, it has become an increasingly important criterion for job market success over time. While the supply of both high school and college graduates has grown sharply, there has been a relative increase in the demand for college graduates, largely at the expense of demand for high school graduates during the 1967-87 period. Employers, finding both high school and college grad-

uates more available in a period of rising educational attainment, were more likely to hire people with higher levels of education, even when the job content did not necessarily become more complex or require more education. In addition, skills possessed by high school graduates often have not matched the skills required for available jobs in a growing economy. This is a particular problem for many older workers displaced from dying or stagnant industries.

These factors have combined to create a mismatch between the number of job openings for persons with only 4 years of high school education and the number of such workers entering the job market. This mismatch is reflected in the fact that high school graduates accounted for more than 60 percent of the over-the-period rise in unemployment, while college graduates were only responsible for 8 percent.

It is likely that the competitive advantage held by college graduates will continue into the future.<sup>13</sup> This will be particularly true during downturns in the business cycle, when the unemployment rate differential between high school and college graduates typically increases. The number of college graduates who are reentrants into the labor force is expected to increase over the 1987-95 period and should more than offset a projected decline in the number of new college graduate entrants.<sup>14</sup> Although few college graduates are likely to face prolonged unemployment, supply pressures may mean that some college graduates will continue to take jobs away from high school graduates. In addition, labor market problems could persist for many of those without any college education, because of the expected continuation of the educational upgrading and skill requirements for jobs that occurred in the 1967-87 period. However, just as labor market crowding has had an upward effect on unemployment rates of the baby-boom generation, the entrance of smaller cohorts into the adult labor force should serve to ease competitive pressures for both high school and college graduates. □

—FOOTNOTES—

<sup>1</sup> The fastest growing groups in the adult labor force between 1967 and 1987 were 25- to 34-year-old college and high school graduates. Their numbers increased by 268 and 132 percent, respectively, while the overall labor force grew by only 56 percent.

<sup>2</sup> Data relate to persons 25 to 64 years old, unless otherwise specified. Because the emphasis of the article is on structural unemployment problems, age 25 was selected for a lower age cutoff because of the greater likelihood that workers that age had completed their schooling and formed a more permanent attachment to the labor force. Workers 16 to 24 and 65 years and older were excluded because they exhibit labor market behavior distinct from prime-age workers.

<sup>3</sup> Sar A. Levitan, Garth L. Mangum, and Ray Marshall, *Human Resources and Labor Markets* (New York, Harper and Row, 1981), pp. 35-39.

<sup>4</sup> Data in the secular trends section are based on tabulations from the March supplement to the Current Population Survey (CPS). CPS data on educational attainment actually refer to years of school completed in regu-

lar public or private schools and colleges of the United States or in equivalent schools of other countries. Additionally, the measure of educational attainment includes only schooling which may lead to a high school diploma or degree. The data do not provide a strict estimate of degrees earned, but do provide a reasonable proxy. Therefore, those who attend high school for 4 years only will sometimes be referred to as high school graduates, and those who attended college for 4 or more years will be designated as college graduates.

<sup>5</sup> The three components of the change in the overall unemployment rate for 25- to 64 year-olds are defined as follows:

$$\Delta U = \sum (W_i^b \Delta U_i) \quad \text{(Due to change in group unemployment rate)}$$

$$+ \sum (U_i^b \Delta W_i) \quad \text{(Due to change in labor force share)}$$

$$\Delta U_i \Delta W_i \quad \text{(Covariance)}$$

Where:

U = Overall unemployment rate;

W<sub>i</sub> = Labor force share of educational attainment group i;



$U_i$  = Unemployment rate of educational attainment group  $i$ ;

$\Delta$  = Change in the appropriate variable between the base and comparison years.

<sup>6</sup> Because the technique must be applied over a discrete time period, the choice of the base and comparison years may bias the results. The years 1967, 1979, and 1987 were selected for comparison because they occur during a recovery phase of the economic cycle. Although the choice of March 1977 as a target date would have allowed the 1967 to 1987 period to be divided into two evenly spaced spans of time, March 1979 was chosen because it fell 48 months, rather than 24 months, into a recovery period. Consequently, it was better suited for comparison with March 1967, which occurred 73 months into a recovery period, and March 1987, 52 months into a recovery.

To determine the effect of the Vietnam era on the labor force behavior of the four educational attainment groups, we tested 1973 as an alternative base year. However, when the results of the shift-share analysis for the 1967-79 and 1973-79 periods were compared, there was little difference in the overall percent contribution of each of the four groups to the change in the overall unemployment rate.

<sup>7</sup> For a discussion of the importance of including the covariance term, see Joseph Antos, Wesley Mellow, and Jack E. Triplett, "What is a current equivalent to the unemployment rates of the past?," *Monthly Labor Review*, March 1979, pp. 36-46.

<sup>8</sup> The discouraged worker effect derived from the shift-share analysis

should not be interpreted as equivalent to the measurement of discouragement in the Current Population Survey, as some people affected by the so-called discouragement effect may not, in fact, report themselves as discouraged workers.

<sup>9</sup> Samuel M. Ehrenhalt, "No Golden Age for College Graduates," *Challenge*, July-August 1983, pp. 42-50.

<sup>10</sup> Employment data are annual averages derived from the monthly cps, and refer to persons age 16 and over.

<sup>11</sup> Jon Sargent, "The Job Outlook for College Graduates Through the Mid-1990's," *Occupational Outlook Quarterly*, Summer 1984, pp. 2-7.

<sup>12</sup> Data in the cyclical trends section are derived from unpublished unemployment display tables of the cps. Unadjusted unemployment rates were seasonally adjusted using the X-11 Arima procedure. Seasonally adjusted monthly unemployment rates by level of education between January 1967 and December 1986 refer to persons 16 years old and over. Therefore, because of the inclusion of the expanded age coverage, data are not strictly comparable to those used in the secular trends section of this article, which relate only to 25- to 64-year-olds.

<sup>13</sup> Jon Sargent, "An Improving Job Market for College Graduates: The 1986 Update of Projections to 1995," *Occupational Outlook Quarterly*, Summer 1986, pp. 3-7.

<sup>14</sup> *Improving Job Market*, pp. 6-7.

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### A note on communications

The *Monthly Labor Review* welcomes communications that supplement, challenge, or expand on research published in its pages. To be considered for publication, communications should be factual and analytical, not polemical in tone. Communications should be addressed to the Editor-in-Chief, *Monthly Labor Review*, Bureau of Labor Statistics, U.S. Department of Labor, Washington, DC 20212.

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