

Employment Patterns During the Recovery: Who Are Getting the Jobs and Why?

By Ayşegül Şahin and Jonathan L. Willis

Employment in the United States is recovering slowly from the Great Recession. After declining by 8 million in the economic downturn, the number of employed workers has increased by only 1 million thus far in the recovery.

Economists have offered different explanations for this sluggish recovery. Some have posited that the labor market has been weighed down by a mismatch of the jobs being created in the recovery and the available workers. By extension, this reasoning sees the labor market as imposing a constraint on overall growth. Others have argued that cyclical factors are responsible: The weak recovery in the broad economy is holding back the labor market, instead of the reverse.

This article examines the distribution of employment gains in the recovery to shed light on this issue. It finds that employment growth has differed sharply depending on workers' level of education, age, and gender. Workers with high levels of education, workers age 55 and older, and men have experienced the strongest employment gains in the recovery. Workers with less than a high school education and workers ages

Ayşegül Şahin is an assistant vice president at the Federal Reserve Bank of New York. Jonathan L. Willis is an assistant vice president and economist at the Federal Reserve Bank of Kansas City. Carter Braxton, a research associate at the bank, helped prepare the article. This article is on the bank's website at www.KansasCityFed.org.

25 to 54 have remained stuck in recession and continue to experience employment declines.

The employment patterns appear to reflect two key factors: long-term trends and cyclical fluctuations. The strong employment growth for highly educated and older workers is a continuation of longer term shifts toward a more highly educated workforce and the aging of the baby boom generation. The employment gains for men are associated with men having a stronger cyclical attachment to the labor force when labor market conditions are weak.

The employment patterns based on this analysis do not provide evidence of a mismatch of workers and jobs at this stage of the labor market recovery. The workers in highest demand are those with the most education, yet the population of highly educated workers has increased at a faster rate than employment in the recovery.

The first section of the article describes the employment patterns during the economic recovery. The second section analyzes patterns based on the education level of workers and discusses the factors contributing to these patterns. The third and fourth sections undertake similar analyses of employment growth patterns based on gender and age, respectively.

I. EMPLOYMENT DURING THE RECOVERY

Employment has increased modestly during the labor recovery. Although the economic recovery began in June 2009, as determined by the NBER's Business Cycle Dating Committee, the labor recovery did not start until the end of 2009.¹ From January 2010 through August 2011, employment of workers age 16 and older increased by 1.1 million. This increase follows the decline of 7.8 million that occurred in the labor recession, which is measured as starting in December 2007 and ending in January 2010.

The primary data source for employment in this article comes from the Current Population Survey (CPS), commonly referred to as the household survey. The data are collected on a monthly basis from approximately 60 thousand households by the U.S. Census Bureau for the Bureau of Labor Statistics (BLS). The primary advantage of this survey over others is that it contains detailed employment data on various characteristics of workers, including their education, age, and

Table 1

NET CHANGE IN EMPLOYMENT FROM JANUARY 2010 TO AUGUST 2011

	Net change	Percent change
<i>Total Employment (age 16 and older)</i>	1,116,000	0.8%
<i>By level of educational attainment (age 25 and older)</i>		
Less than high school diploma	-66,000	-0.7%
High school graduate, no college	-576,000	-1.7%
Some college or associate's degree	345,000	1.0%
Bachelor's degree and higher	1,103,000	2.5%
<i>By gender (age 16 and older)</i>		
Men	1,514,000	2.1%
Women	-314,000	-0.5%
<i>By age</i>		
Ages 16-24	281,000	1.7%
Ages 25-54	-512,000	-0.5%
Age 55 and older	1,430,000	5.2%

Source: Household survey (CPS, BLS)

gender.² The household survey reveals that all of the employment gains during the labor recovery have accrued to workers with at least some college education. Employment for workers with a bachelor's degree or higher has increased by 1.1 million, and employment for workers with some college or an associate's degree has increased by 345 thousand (Table 1). Employment has declined for less-educated workers, by 576 thousand for workers with a high school diploma (or equivalent) but no college, and by 66 thousand for workers with less than a high school diploma.

A sharp distinction also exists for employment growth by gender. All of the net increase in employment in the household survey has accrued to men during the recovery. Employment of men has risen by 1.5 million while employment of women has declined by 314 thousand.

Based on the worker's age, employment gains during the recovery have been largest for older workers. Employment for workers age 55 and older has risen by 1.4 million. For young workers, ages 16 to 24, employment has risen by 281 thousand. Employment of prime-age workers, those ages 25 to 54 who comprise the bulk of the labor force, actually has fallen during the recovery by 512 thousand.

Understanding these patterns may help distinguish between explanations offered for the sluggish recovery. The next three sections follow a common framework to analyze employment patterns based on education, gender, and age. Each section compares current employment patterns with the recent past to assess the role of cyclical or longer term trends and then identifies the key factors responsible for these patterns.

II. EMPLOYMENT GROWTH PATTERNS BY LEVEL OF EDUCATIONAL ATTAINMENT

What accounts for the sharp differences in employment patterns across workers with different levels of educational attainment? One possibility is that the pattern is related to cyclical factors, such as the current weak state of labor markets or the reversal of job cuts that occurred during the recession. An alternative explanation is that the recent pattern is part of a broader shift in employment toward more highly educated workers. Under this alternative scenario, employment patterns during the recovery would look similar to employment growth patterns over the past decade.

This section looks at a broad range of evidence to determine whether employment patterns based on levels of education are influenced by cyclical or longer term shifts. The patterns are analyzed using data from industry-level employment patterns, vacancy posting rates, and population trends.

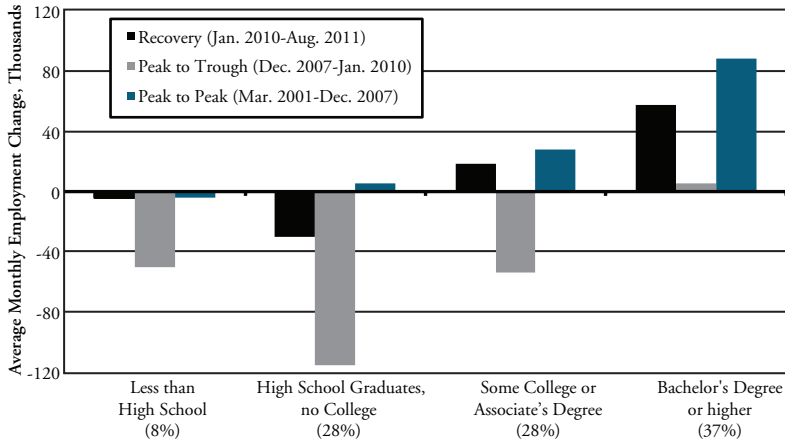
The findings suggest that employment patterns in the recovery are part of a longer term shift in the workforce toward highly educated workers. There are striking similarities between employment patterns in the recovery and over the past decade, indicating continual strong demand for workers with a bachelor's degree or higher. However, the observed employment gains for highly educated workers in the recovery have not kept pace with population increases, particularly for the group with some college education.

Recent trends

Employment growth during the recovery has been concentrated exclusively in the categories of workers with some college education or higher. The average monthly growth in employment for individuals with a bachelor's degree or higher was 58 thousand from January 2010

Chart 1

EMPLOYMENT CHANGE BY LEVEL OF EDUCATIONAL ATTAINMENT



Notes: Employment includes workers age 25 and older. For each group, the share of total employment in January 2010 is shown in parentheses.

Source: Household survey (CPS, Bureau of Labor Statistics) and authors' calculations

through August 2011 and 18 thousand per month for workers with some college education (Chart 1). Employment fell by an average of 30 thousand workers per month for those with a high school diploma and no college and by 3 thousand per month for those with less than a high school education.³

The pattern of employment growth during the recession was similar to that of the recovery in that the least educated fared the worst.⁴ Employment fell most for those with a high school diploma and no college. Employment also declined for those with less than a high school diploma and for those with some college education. Only the group of workers with a bachelor's degree or higher avoided a decline in employment on average.

Employment growth followed a similar pattern over the past decade in which the only significant gains accrued to those with some college education or higher. To abstract from changes in employment associated with the business cycle, a measure of longer term employment trends can be constructed by computing the average monthly change in employment from the peak of one business cycle to the peak of the subsequent business cycle. Using the two recent business-cycle peaks, the average monthly employment growth from March 2001 to December 2007 was 89 thousand for those with a bachelor's degree or higher. For workers

with some college education or an associate's degree, average monthly employment growth was 28 thousand. Employment growth was modest for those with a high school diploma and no college, while employment declined slightly for those with less than a high school diploma.

The similar employment patterns across various periods in the past decade suggest that the workforce has been undergoing a broad shift toward more-educated workers. In all phases of the business cycle, the least educated segment of the population experienced the weakest job growth, while employment grew for the most-educated segment of the population, even during the severe recession.

Evidence from industry-level employment growth

An important determinant of employment patterns is the demand by firms for workers with different education levels. Some of the demand during the recovery may be from industries that were severely impacted during the recession but now are beginning to rebound, such as manufacturing. Demand also may be coming from industries that grew throughout the downturn and subsequent recovery, such as the health-care industry. Examining employment growth patterns across various industries may help explain why some types of workers are experiencing faster employment growth in the recovery than others.

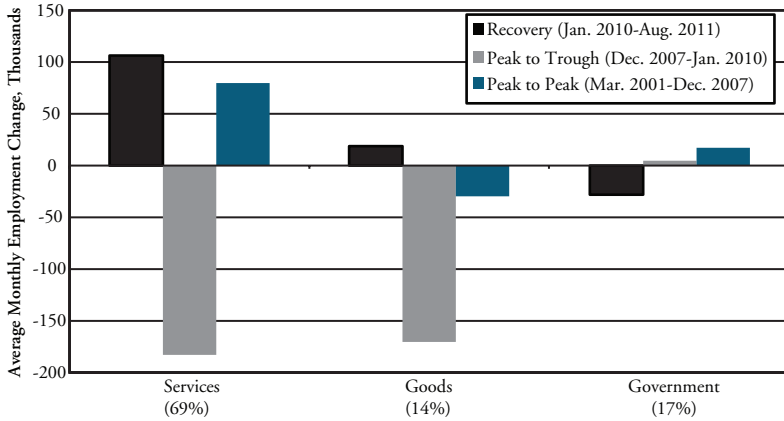
Workers with more education may benefit in two ways from the labor recovery. First, these workers possess skills that have been in demand over the past decade, so they should experience faster employment growth than less educated workers. Second, firms may increase job requirements and become more selective in response to the large pool of unemployed workers applying for open positions. This effect will further increase demand for highly educated workers and suppress demand for those with less education.

Testing this second proposition requires data on industry hiring trends. Employment data by industry are obtained from the Current Employment Statistics (CES) survey, commonly referred to as the establishment survey. The establishment survey, conducted by the Bureau of Labor Statistics, collects data from payroll records of approximately 140 thousand businesses and government agencies.⁵

The strongest employment growth has occurred in the private service-providing sector in both the labor recovery and over the past

Chart 2

EMPLOYMENT CHANGE BY SECTOR



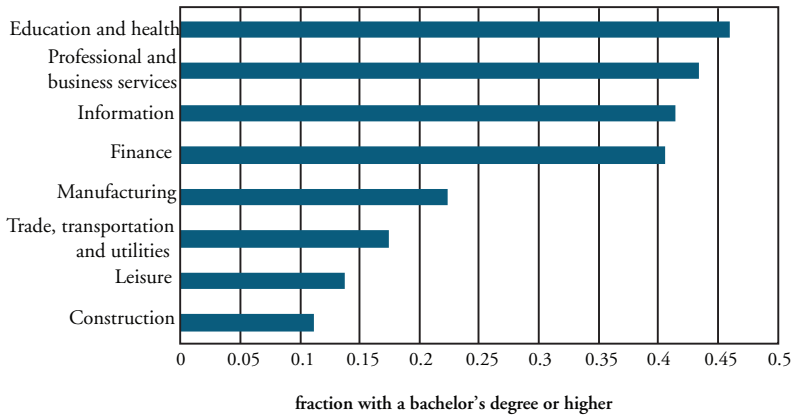
Note: For each group, the share of total employment in January 2010 is shown in parentheses.
Source: Establishment survey (CES, BLS) and authors' calculations

decade. During the current labor recovery, the average monthly increase in employment for the private service-providing sector has been 106 thousand (Chart 2). This rate of increase is greater than the average monthly increase that occurred between peaks of the business cycle in 2001 and 2007. The goods sector, which represents a much smaller share of employment, is experiencing modest employment growth following a severe contraction during the labor recession.⁶ Employment in the government sector has contracted during the recovery, due in large part to cutbacks at the state and local level.

Within the private service-providing sector, employment growth has been strong for most industries that employ a large share of highly educated workers. Based on a study of workers' educational attainment, the four industries with the most-educated workforce are education and health, professional and business services, information, and finance (Hartley and Mowry).⁷ For each of these industries, over 40 percent of employees have a bachelor's degree or higher (Chart 3). Employment growth in the education and health and the professional and business services industries has been strong during the labor recovery (Chart 4). In addition, these industries, along with the finance industry, expanded across the past business cycle, illustrated by employment increases

Chart 3

EDUCATIONAL ATTAINMENT OF WORKERS BY INDUSTRY



Source: Hartley and Mowry

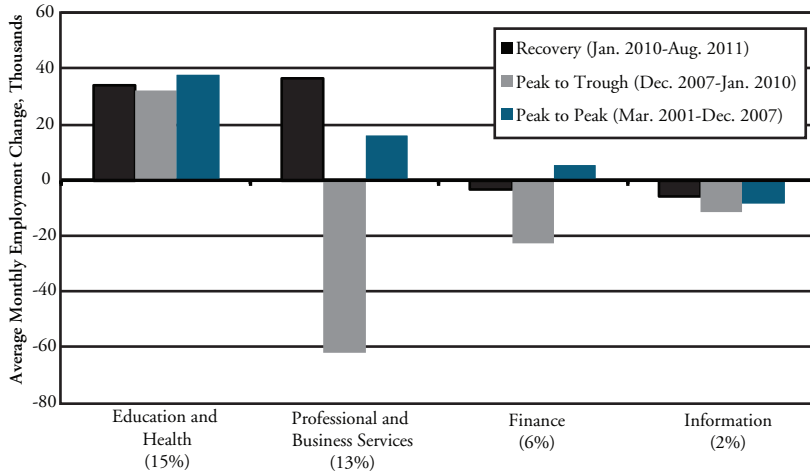
between business-cycle peaks in 2001 and 2007. The information industry has been the weakest of the high-education industries, evidenced by a steady decline in employment throughout the past decade.

In contrast, employment in low-education industries suffered deep cuts in the recession followed by only modest recovery. The four industries employing workers with low levels of educational attainment are trade, transportation and utilities; leisure and hospitality; manufacturing; and construction. Between 11 percent and 23 percent of workers in these industries have a bachelor's degree or higher (Hartley and Mowry). Each of these industries experienced sharp declines in employment during the recent labor recession (Chart 5). In the subsequent labor recovery, employment has increased in three of the industries (trade, leisure, and manufacturing), but the growth has been at a much slower pace than the rate of decline during the labor recession.

Can differences in employment growth across industries explain the absence in the recovery of employment gains for workers with less than a college degree? One way to answer this question is to conduct a counterfactual analysis. A counterfactual analysis performs a "what if" exercise that is meant to identify key relationships in the data. A researcher assumes a given set of relationships, which are used to generate a hypothetical data set. This alternative, or "counter," set of data is then compared with the actual data. This comparison enables the

Chart 4

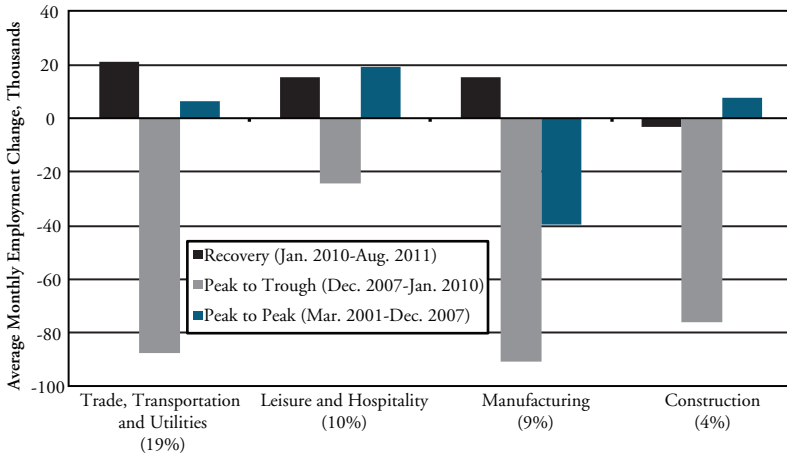
EMPLOYMENT CHANGE FOR HIGH-EDUCATION INDUSTRIES



Note: For each group, the share of total employment in January 2010 is shown in parentheses.
 Source: Establishment survey (CES, BLS) and authors' calculations

Chart 5

EMPLOYMENT CHANGE FOR LOW-EDUCATION INDUSTRIES



Note: For each group, the share of total employment in January 2010 is shown in parentheses.
 Source: Establishment survey (CES, BLS) and authors' calculations

researcher to determine whether the assumed relationships are consistent with the data or not.

With respect to worker-education employment patterns, the counterfactual analysis examines the extent to which employment growth for highly educated workers in the recovery is driven by longer term industry trends. The analysis measures the fraction of jobs that would be expected to go to workers with a bachelor's degree or higher, assuming that employment patterns continue to follow the trend observed between the peaks of the business cycle in 2001 and 2007. Using this assumption, the counterfactual share of jobs accruing to workers with a bachelor's degree or higher is computed by taking the observed employment change in each industry and multiplying it by the predicted fraction of highly educated workers in each industry.⁸

The counterfactual exercise reveals the extent to which highly educated workers were less severely impacted by the recession than other groups. Based on the patterns of job losses across industries, the exercise predicts that workers with a bachelor's degree or higher should have experienced about 21 percent of the total reduction in employment during the recession, which translates to 1.1 million job losses for highly educated workers age 25 and older. Instead of declining, employment of highly educated workers *rose* by 100 thousand during the labor recession while lesser-educated workers accounted for the entire fall in employment.

Similarly, the highest-educated workers have experienced disproportionate employment gains in the labor recovery. Based on the counterfactual exercise, workers with a bachelor's degree or higher should have experienced about 40 percent of the total increase in employment in the recovery, for a gain of 500 thousand employed workers. In fact, employment of the highest-educated workers has risen by 1.1 million, more than twice the predicted amount, while employment of lesser-educated workers has continued to decline. The findings suggest that there has been a shift toward a more-educated workforce within industries.

Evidence from job openings patterns

The shift in employment toward highly educated workers in recent years is likely a result of two factors. First, this pattern is a continuation—and an acceleration—of the longer term trend in employment toward highly educated workers.⁹ Second, with an unemployment rate

in excess of 9 percent, firms likely are receiving more qualified applicants for vacancies than when the unemployment rate was 5 percent or 6 percent. To the extent that a worker's productivity is correlated with educational attainment, firms may prefer to employ workers with higher levels of education in spite of any offsetting higher associated wage costs.

Evidence from data on job openings can be used to assess whether the strong concentration of employment gains among highly educated workers is due to a shift toward occupations that require higher levels of education or whether the shift can be attributed to firms choosing more-educated applicants. The Conference Board Help Wanted OnLine (HWOL) data provide monthly information on the types of vacancies that are posted on more than 1,200 major Internet job sites. This information includes details on vacancies for a broad range of occupational groups.

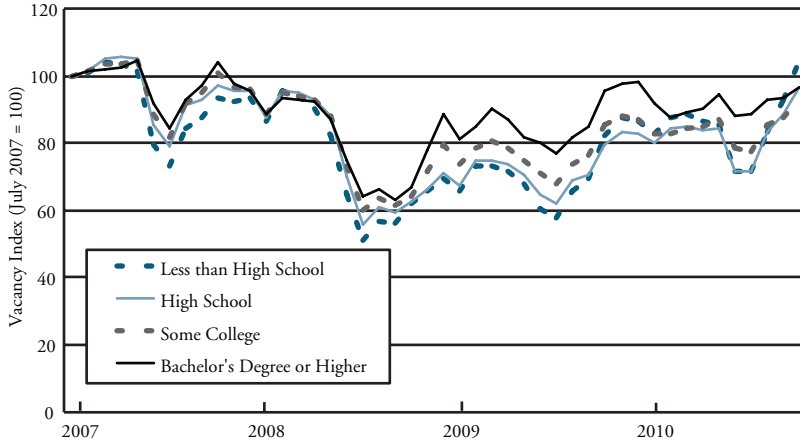
For each occupation in HWOL, data from the BLS are used to determine the distribution of workers across levels of educational attainment.¹⁰ For example, for the occupation of "electrical engineer," the BLS tabulation indicates that 78 percent of engineers have a bachelor's degree or higher, 18 percent have some college education, 4 percent have a high school diploma and no college, and less than 1 percent have less than a high school education. For the occupation of "plumber," 4 percent of workers have a bachelor's degree or higher, 29 percent have some college, 47 percent have a high school diploma and no college, and 19 percent have less than a high school diploma.

Using this distribution of education levels associated with each occupation, a vacancy-posting index can be constructed by level of educational attainment based on the occupations for which vacancies are posted each month. If hiring shifts toward occupations that typically require more-educated workers, this index would display an increase in vacancies for highly educated workers.

The HWOL data provide evidence of a shift in vacancies during the recession and the early stages of the recovery toward occupations that require higher levels of education. Vacancy postings associated with all levels of educational attainment fell sharply during the labor recession, but the decline was sharpest for the least-educated workers (Chart 6). As vacancies began to increase in 2009 and 2010, the increases were strongest for the most-educated groups, especially for occupations re-

Chart 6

VACANCY INDEX BY LEVEL OF EDUCATIONAL ATTAINMENT



Source: The Conference Board Help Wanted OnLine Survey and authors' calculations.

quiring a bachelor's degree or higher. This evidence is consistent with observed employment patterns.

Although employment gains have been concentrated among highly educated workers thus far in the recovery, recent data on vacancies suggest that demand for workers with lower levels of education also is rising. In 2011, vacancies have increased most for occupations that require a high school education or less.¹¹

Evidence from population patterns

How have people responded to the steady shift toward employment of highly educated workers? Evidence shows that there has been a marked increase over the past 30 years in the number of individuals obtaining college education and advanced training to accompany the shift in labor demand toward workers with higher levels of skills and education. As a result, the population has become successively more educated (Autor and others, Katz and Murphy).

This trend has continued over the past decade. From the business-cycle peak in 2001 to the peak in 2007, the population with a bachelor's degree or higher grew by 127 thousand per month, accounting for 64 percent of the total increase in the population age 16 and older.

Since January 2010, the highest-educated group has grown by an average of 105 thousand per month. Over the past decade, the population share for this group has increased from 26 percent in March 2001 to 31 percent in August 2011.

The segment of the population with some college or an associate's degree also has expanded rapidly during the recovery. Prior to the labor recession, this segment increased by an average of 57 thousand per month, accounting for 29 percent of the total increase in the population. This group continued to grow at a similar rate during the recession, but in the labor recovery the growth of this segment has nearly doubled to an average of 110 thousand per month.¹²

The impact of this population shift on employment growth patterns can be identified through a decomposition of employment into two factors that are illustrated in the following equation.

$$Employment_i = \frac{Employment_i}{Population_i} * Population_i$$

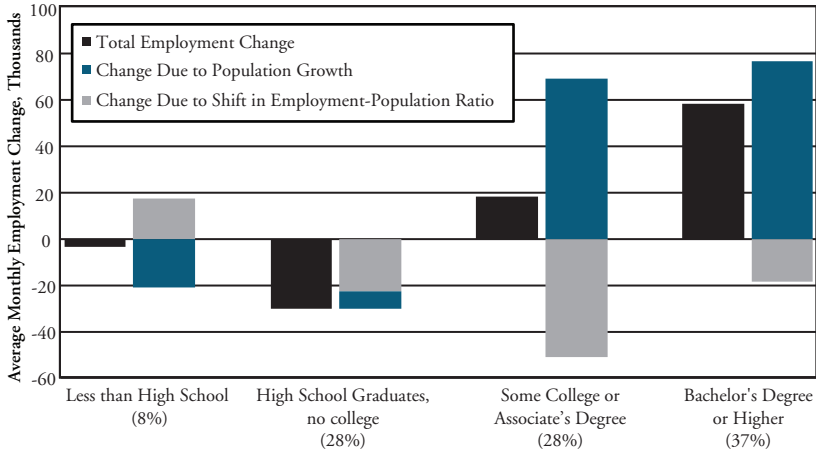
The first element in the decomposition is the employment-to-population ratio for a particular education group (designated as group *i*). The second element is the size of the population of a particular education group. Decomposing the net employment change into the changes in these two factors allows for an assessment of the contribution of each component to the overall change.¹³

This decomposition also can help identify potential mismatch between workers and available jobs. Mismatch would appear in employment patterns as a shortage of a particular type of worker, indicated by employment growth outpacing population growth.¹⁴ In the decomposition, a worker shortage would be associated with employment growth linked to a rising employment-to-population ratio.

The increase in employment for the highest-educated workers has not been fast enough to accommodate the population growth of this group. The impact of population growth is measured by the change in the population of each group during the recovery while holding the employment-to-population ratio constant. The growing population of highly educated workers contributed an increase of 77 thousand per month to employment, illustrated by the blue bars in Chart 7. The contribution from population growth exceeded the overall average em-

Chart 7

EMPLOYMENT DECOMPOSITION BASED ON LEVEL OF EDUCATIONAL ATTAINMENT



Notes: The employment change is measured from January 2010 to August 2011. For each group, the share of total employment in January 2010 is shown in parentheses.

Source: Household survey (CPS, BLS) and authors' calculations

ployment growth for highly educated workers, shown by the black bars in Chart 7.

Because employment growth for highly educated workers has not been sufficient to accommodate population growth in the recovery, the employment-to-population ratio for this group has fallen. This shift is measured by the change in the employment-to-population ratio for each age group while holding the population of the group constant. The fall in the employment-to-population ratio for highly educated workers has subtracted an average of 19 thousand per month from employment during the recovery, illustrated by the gray bars in Chart 7.

The impact of population growth has been even more stark for the group of workers with some college or an associate's degree. During the labor recovery, this population increased rapidly and would have contributed an increase of 70 thousand per month to employment if the employment-to-population ratio had remained constant. But with employment growth of only 18 thousand per month, a decline in the employment-to-population ratio was a significant drag on employment growth for workers with some college education. In other words, job growth in the recovery has not kept pace with population growth of this group. As a result, the employment-to-population ratio for workers

with some college or an associate's degree has fallen from 65.4 percent in January 2010 to 63.5 percent in August 2011.

For workers with no college education, shifts in education had less of an effect on employment growth. The population of workers with a high school education and no college has fallen only slightly in the labor recovery, so the decline in employment for this group largely has been due to a decline in the employment-to-population ratio. For workers with less than a high school education, the population of this group has fallen by more than employment. As a result, the employment-to-population ratio for this group has risen.

Thus far in the recovery, employment and education patterns have continued to follow the longer term trend toward highly educated workers, but the number of highly educated workers is expanding at a faster rate than employment growth. As a result, the employment-to-population ratios for all but the least-educated group have declined. This suggests that the weak labor market recovery is more a result of broad-based slow growth than a mismatch between workers and available jobs.

III. EMPLOYMENT GROWTH PATTERNS BY GENDER

Throughout the recent recession and recovery periods, the largest swings in employment have been for the male segment of the workforce. During the labor recession, the decline in employment for men accounted for 70 percent of the total fall in employment. The pattern during the labor recovery has been even more dramatic as 90 percent of the increase in employment has accrued to men.¹⁵

This section provides an analysis of the factors that contributed to these gender-based employment patterns. The sharp decline in male employment during the recession largely occurred in industries that experienced the biggest cyclical downturn. The sharp bounce back of male employment in the recovery, however, cannot be traced to a rebound in industry demand. Instead, the rise in male employment likely is tied to the large supply of unemployed workers. Evidence suggests that in the face of high unemployment and falling wages, men are more likely to accept less desirable employment opportunities than women.

Recent trends

Employment growth has differed dramatically across gender groups in the recovery. For men, employment has increased an average of 88 thousand per month since January 2010 (Chart 8). Women, on the other hand, have experienced an increase in employment of only 9 thousand per month on average during the recovery period.¹⁶

The employment pattern during the recession was the reverse of the pattern in the recovery. Between December 2007 and January 2010, employment for men fell sharply by an average of 242 thousand per month. For women, the decline was less severe at 106 thousand per month.¹⁷

The data used in this section come from the establishment survey, rather than the household survey. The establishment data for gender are more comparable with industry-level employment patterns, which also are based on the establishment survey.

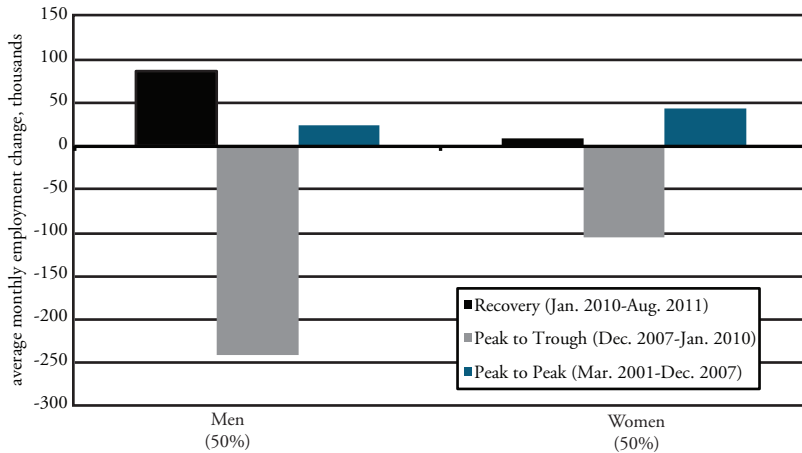
Evidence from industry-level employment patterns

As a first step to understanding these employment patterns, it is useful to conduct a counterfactual analysis similar to that used in the previous section. This counterfactual measures the fraction of employment changes that would be expected for men and women assuming that each industry maintained the same gender employment shares as measured in 2008.¹⁸ The share of employment changes for women is then based on the sum of the employment change in each industry multiplied by the fraction of women in each industry relative to the total change in employment.

The results of the counterfactual exercise suggest that employment declines for men and women during the recession are well explained by the pattern of employment declines across industries. The counterfactual exercise predicts that women should have experienced 31 percent of the decline in employment during the recession; in fact, the actual share of the employment decline for women during the recession was 31 percent, based on data from the establishment survey. Men sustained a larger share of the job losses because they accounted for a large share of employment in sectors that were severely impacted in the recession, such as construction; manufacturing; and trade,

Chart 8

EMPLOYMENT CHANGE BY GENDER



Notes: Employment includes workers age 16 and older. For each group, the share of total employment in January 2010 is shown in parentheses.

Source: Establishment survey (CES, BLS) and authors' calculations

transportation, and utilities. Therefore, industry employment patterns during the recession account for all of the observed gender employment differences.

Industry employment patterns, however, cannot account for differences in employment growth rates of men and women in the recovery. Based on industry employment changes during the recovery, the counterfactual exercise predicts that women should have experienced 50 percent of the observed gains in employment. This result is based on the fact that most employment growth during the recovery has occurred in the private service-providing sector, where men and women are employed with roughly equal shares. The establishment survey, however, reports that the actual female share of the employment gains during the labor recovery has been only 10 percent.

Differences between unemployed men and women

Because industry employment patterns cannot explain the strong employment gains by men in the recovery, differences in the characteristics and job-search behavior of the unemployed likely account for the observed employment patterns.

Part of the difference in employment growth is due to the relative number of men in the pool of unemployed workers. During the

recession, men accounted for 70 percent of the decline in employment. Therefore, men made up a larger fraction of job seekers as the labor recovery began, and they currently account for 56 percent of the pool of unemployed workers. However, this difference alone cannot explain why male employment gains have accounted for 90 percent of total employment growth in the labor recovery.

The differences in behavior of those who have lost jobs are consistent with men being more attached to the workforce than women. If so, men likely would accept a larger decline in wages than women during periods of weak labor markets in order to regain employment while women instead would be more likely to leave the labor force.

Several recent studies provide evidence in favor of this assertion. First, real wages for workers who find new employment are estimated to fall on average by 3 percent for every 1 percentage-point increase in the unemployment rate (Pissarides). Second, employment decisions of men are less sensitive to declines in wages than women, meaning that women are more likely to stop working if their wage falls (Kimmel and Kniesner). And third, for men and women who experienced a reduction in work in the recession, men spent more time obtaining human capital while women spent more time in home-production activities such as cooking, cleaning, and laundry (Aguiar and others).

Implications for highly educated unemployed men

The willingness of men to accept lower wages during periods of high unemployment also may be related to the extreme shift toward employment of highly educated workers. Employers may view the current weak state of labor markets as an opportunity to hire and retain more highly skilled workers than in normal periods. Recent research indicates that the pool of unemployed workers shifts during an economic downturn toward workers who received high wages in their previous job (Mueller). This shift primarily is due to an increase in the rate of job separation for high-wage workers during recessions.

Are high-wage male unemployed workers the type of worker that is finding employment in the recovery? Three pieces of evidence support this view.¹⁹ First, the majority of the employment gains during the labor recovery have occurred in industries that employ a large share of highly educated workers (Charts 3 and 4). These industries include

education and health, professional and business services, and finance. Second, all of the employment gains have been concentrated among workers with a high level of education (Chart 1). And third, increases in employment of men account for nearly all of the employment gains during the labor market recovery (Chart 8).

Overall, the strong job gains by men in the recovery appear to be driven by cyclical factors. As the recovery gains strength and labor market conditions improve, employment growth by gender may be expected to become more balanced as broad-based business expansion and rising wages produce desirable employment opportunities for both men and women.

IV. EMPLOYMENT GROWTH PATTERNS BY AGE

The shift in employment toward highly educated workers may seem to favor young college graduates. However, employment patterns based on worker age reveal the exact opposite: employment is shifting toward older workers.

This section provides a detailed analysis of employment growth patterns based on worker age. Demographic movements among employed workers rather than a transfer of jobs from young to old workers account for nearly all of the observed patterns. This shift is associated with the aging of the baby boom generation.

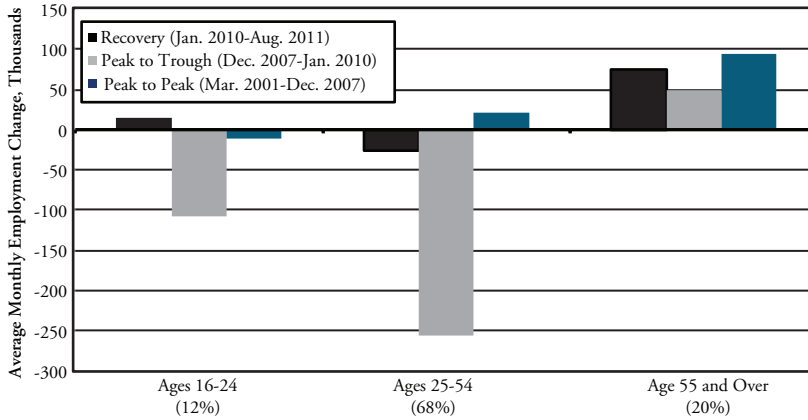
Recent trends

Employment growth has varied substantially during the labor recovery across different age groups. The average employment gain for those age 55 and older has been the strongest, increasing by 75 thousand per month since January 2010 (Chart 9). In contrast, employment has declined by an average of 27 thousand per month for the prime-age category of workers, ages 25 to 54. For the youngest segment of workers, ages 16 to 24, employment has increased an average of 15 thousand per month.²⁰

The pattern of employment changes during the labor recession was broadly similar to that during the labor recovery. Employment of prime-age workers during the labor recession exhibited the sharpest decline, falling by an average of 255 thousand per month between December 2007 and January 2010.²¹ Younger workers also saw

Chart 9

EMPLOYMENT CHANGE BY AGE



Notes: Employment includes workers age 16 and older. For each group, the share of total employment in January 2010 is shown in parentheses.

Source: Household survey (CPS, BLS) and authors' calculations.

employment declines averaging 107 thousand per month. However, employment increased for the oldest group of workers by an average of 48 thousand per month during the labor recession.

Looking over a longer period, the employment patterns suggest that the recent changes are part of a longer term shift in employment away from prime-age workers. During the period between the business-cycle peaks in 2001 and 2007, employment grew only modestly for prime-age workers, despite the fact that this group accounted for approximately two-thirds of total employment. Average monthly employment for workers age 55 and older grew three times as fast despite comprising only 20 percent of total employment.

Demographic factors

The employment patterns based on age are primarily a result of demographic factors. The aging of the baby boom generation has resulted in a shift among employed workers toward an older workforce. Over the past decade, the share of the prime-age population has declined from 57 percent to 52 percent, while the share of the older population has increased from 27 percent to 32 percent and the share of the young remained relatively stable at 16 percent.²²

These demographic factors have contributed directly to the employment patterns in the recovery. The effect can be measured using a decomposition that measures the contribution to net employment growth of observed shifts in the population while holding the employment-to-population ratio constant. The growing number of older workers in the recovery contributed an increase of 60 thousand per month (the blue bars in Chart 10). This demographic shift accounted for 88 percent of the total monthly change in employment for older workers. The decline in the number of prime-age workers represented a negative contribution of about half of the total decline in employment for that group. The size of the youngest group of workers increased modestly, resulting in a small contribution to employment growth.

Two of the age groups also have experienced employment gains associated with an increase in the share of the population that is employed. This effect is measured by tracking the effect of changes in the employment-to-population ratio for each age group while holding the population of the group constant. For the youngest and the oldest age groups, a rising employment-to-population ratio has contributed modestly to employment growth, illustrated by the gray bars in Chart 10.

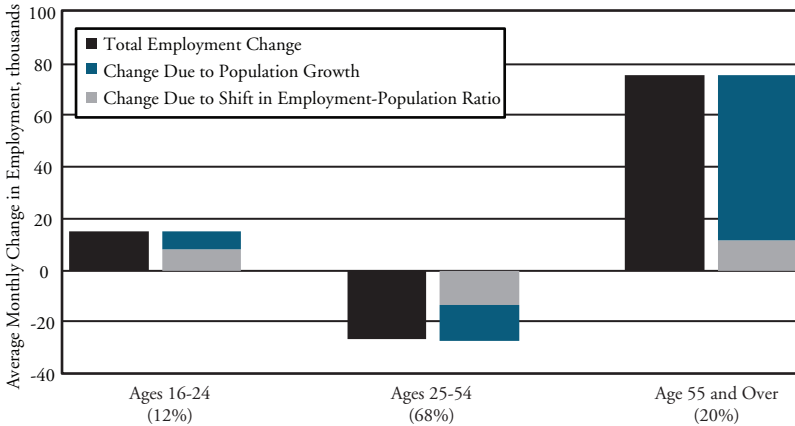
However, for prime-age workers, the employment-to-population ratio has fallen during the recovery, subtracting, on average, 16 thousand jobs per month. This observation is another indicator of the severity of the recession and the ongoing weakness in the labor market during the recovery. The prime-age employment-to-population ratio currently stands at 75 percent, the lowest level since 1984.

For the oldest group of workers, increases in the employment-to-population ratio may be related to additional factors beyond the economic recovery. A key determinant of the employment-to-population ratio for older workers is the retirement decision. Economic factors, such as declines in housing wealth and poor performance on retirement savings, may cause people to postpone retirement, contributing to an increase in the employment-to-population ratio for that group. Increases in life expectancy and improved health are two additional factors that contribute to an increase in the employment-to-population ratio for the older population.

Over the past decade, the biggest shift in retirement ages appears to be for individuals between the ages of 65 and 74. For individuals ages 65 to 69, the employment-to-population ratio has increased over the past decade from 24 percent to 30 percent as a larger share of

Chart 10

EMPLOYMENT DECOMPOSITION BASED ON AGE



Notes: The employment change is measured from January 2010 to August 2011. For each group, the share of total employment in January 2010 is shown in parentheses.

Source: Household survey (CPS, BLS) and authors' calculations

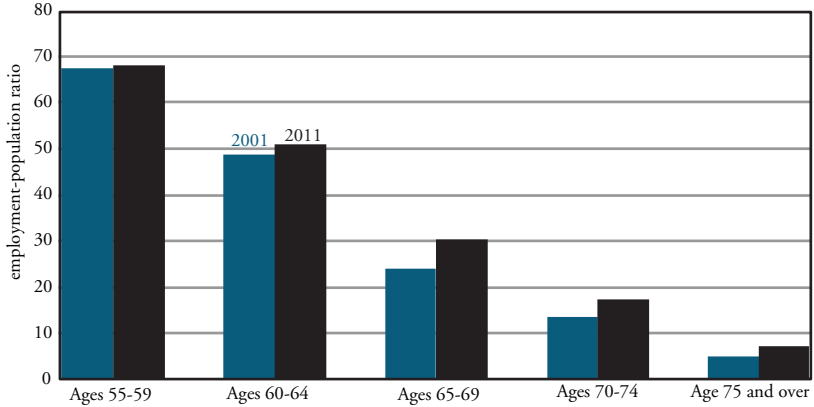
individuals in that age group continue to work (Chart 11). Similarly, the employment-to-population ratio for individuals ages 70 to 74 has increased from 13 percent to 17 percent over the past decade. The increases in the employment-to-population ratio for individuals ages 55 to 64 have been more modest.

The impact of shifts in retirement decisions has been small thus far, but this effect may increase in coming years as the baby boom generation continues to age. Over the past year and a half, increases in the employment-to-population ratio for the oldest group of workers have accounted for only 12 percent of the total monthly change in employment for older workers. This increase represents the combined effect of an improving labor market and the effects of delays in retirement. In 2011, the first members of the baby boom population will reach age 65 (Chart 12). Thus, the impact of delayed retirement decisions on net employment growth likely will grow as the bulk of the baby boom generation passes through the 65-to-74 age range where employment-to-population ratios have risen the most over the past decade.

The aging of the baby boom generation has produced a shift in currently employed workers to the 55-to-64 age cohort. As the baby

Chart 11

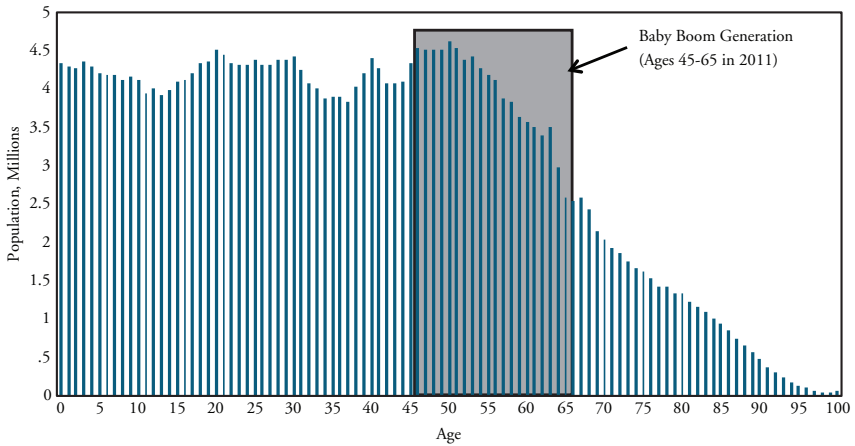
CHANGES IN THE EMPLOYMENT-TO-POPULATION RATIO FOR OLDER WORKERS



Source: Household survey (CPS, BLS) and authors' calculations

Chart 12

U.S. POPULATION DISTRIBUTION IN 2010



Source: U.S. Census Bureau (<http://www.census.gov/popest/national/asrh/2009-nat-res.html>)

boom generation begins to retire over the next decade, there will be a reallocation of jobs from old workers to younger workers.

V. CONCLUSION

Following the sharp drop in employment during the recent recession, the U.S. economy has experienced a modest increase in employment since the beginning of 2010. However, the expansion of employment has not benefited all types of workers equally. Employment gains have been concentrated among the highly educated, older workers, and men.

The article identifies two factors that appear to be key contributors to the employment patterns. First, employment growth has been concentrated among highly educated and older workers as part of a longer term trend, as the population continues to become more educated and the aging of the baby boom generation shifts currently employed workers into the older cohort of workers. Second, men have experienced larger employment gains than women due to a stronger cyclical attachment to the workforce when labor market conditions are weak.

Employment and population patterns suggest that weak demand rather than a mismatch of workers and jobs is the primary explanation for the sluggish recovery. While highly educated workers have experienced the largest job gains, the demand for these workers has not kept pace with the growing population of highly educated workers. Regarding the skewed employed gains for men, evidence suggests that men are more likely to accept less desirable employment opportunities in periods of weak labor demand, signified by high unemployment and falling wages.

APPENDIX:

EMPLOYMENT GROWTH BY RACE AND ETHNICITY

During the recovery, employment has increased for the largest racial groups, but the pace of growth has differed somewhat. Increases in employment of the white population accounted for 77 percent of the total increase in employment since January 2010 (Table A1). This employment gain share is similar to the overall employment share of the white population of 82 percent, which suggests that employment gains for the white population are roughly in line with the relative size of this group in the workforce. For the black or African-American population, increases in employment during the recovery accounted for 10 percent of the total increase in employment. This employment gain is approximately the same as the overall employment share for blacks, indicating that employment growth during the recovery has been similar for blacks as the rest of the population. Employment gains for the Asian population have accounted for 10 percent of the total increase in employment. This employment gain share is greater than the overall share of Asians in the workforce, which is 5 percent. Therefore, employment of Asians has been increasing at a faster pace than the overall average.

During the recession, the declines in employment exhibited similar patterns for most racial groups as seen in the recovery. The decline in employment for the white population accounted for 78 percent of the total decline in employment. This employment loss share is basically the same as the employment gain share in the recovery, indicating that whites have been affected similarly in the recession and the recovery. For the black population, the decline in employment accounted for 15 percent of the total decline. This implies that black workers fared somewhat worse in the recession than the rest of the population. Employment losses for the Asian population accounted for 4 percent of the total decline in employment in the recession, which is slightly smaller than their overall employment share of 5 percent. Therefore, the Asian workforce was relatively less adversely affected in the recession and has exhibited relatively stronger employment gains in the recovery than would be suggested based on their overall employment share.

Changes in employment for the Hispanic workforce over the past four years have been similar to the pattern for Asian workers.²⁴

Table A-1

EMPLOYMENT CHANGES BY RACE AND ETHNICITY

	Employment share (Dec. 2007)	Employment gain share during the recovery (Jan. 2010–Aug. 2011)	Employment loss share during the recession (Dec. 2007– Jan. 2010)
<i>By race</i>			
White	82.0%	77.2%	78.4%
Black or African-American	11.0%	10.4%	15.2%
Asian	4.7%	10.1%	4.4%
<i>By ethnicity</i>			
Hispanic or Latino	14.0%	31.5%	10.9%

Notes: Employment data are not seasonally adjusted. The employment loss share is the fraction of the decline in net employment during the recession accounted for by each group. The employment gain share is the fraction of the increase in net employment during the recovery accounted for by each group.

Source: Bureau of Labor Statistics

Employment gains for Hispanic workers in the recovery have accounted for 32 percent of the overall gain in employment. This employment gain share far exceeds the overall share of Hispanics in the workforce, which is 14 percent. During the recent recession, the employment losses for Hispanics represented 11 percent of total employment declines. This evidence implies that the Hispanic workforce fared better in both the recession and the recovery than it would have if its employment level changed in proportion to its employment share.

ENDNOTES

¹Due to large revisions in the population that were incorporated in the beginning of 2010, January 2010 is the date used in this article to denote the beginning of the labor market recovery.

²See the Appendix for an analysis of employment patterns based on race and ethnicity.

³The distribution of employment by level of educational attainment in January 2010 was 8 percent with less than a high school diploma, 28 percent with a high school diploma and no college, 28 percent with some college or an associate's degree, and 36 percent with a bachelor's degree or higher.

⁴This pattern is typical for recessions. See Elsby and others, and Mincer.

⁵The establishment survey currently reports stronger employment growth between January 2010 and August 2011 than the household survey: 1.9 million in the establishment survey versus 1.1 million in the household survey. This divergence across the surveys may be related to the sharper decline in employment during the recession reported by the establishment survey (-8.7 million) versus the household survey (-7.8 million). See Haltiwanger and others for an analysis of discrepancies between the household and establishment surveys.

⁶While the goods and the private service-providing sectors experienced similar declines in employment during the recession, the impact was much more severe for the goods sector because it is only one-quarter the size of the private service-providing sector.

⁷The three industries not displayed in the chart are government (38 percent with bachelor's degree or higher), other services (22 percent with a bachelor's degree or higher), and mining (18 percent with a bachelor's degree or higher). While the government sector employs a large share of workers with a bachelor's degree or higher, this sector is not likely contributing to employment increases for highly educated workers given recent declines in government employment. The other two sectors represent only 8 percent of private sector employment.

⁸The fraction of highly educated workers in each industry in 2008 is reported in Hartley and Mowry. The analysis assumes that the share of highly educated workers in each industry increases at an annual rate equal to the overall annual change in the employment share of workers with a bachelor's degree or higher between March 2001 and December 2007, which is 0.5 percentage point per year.

⁹See Krusell and others, and Katz and Murphy for an analysis of the increase in higher-skilled workers along with an increase in the skill premium, which is the wage of a skilled worker relative to an unskilled worker.

¹⁰The Bureau of Labor Statistics (BLS) compiles this data using the American Community Survey microdata from 2006 to 2008. For more detailed information, see the BLS website at http://www.bls.gov/emp/ep_table_111.htm and http://www.bls.gov/emp/ep_education_tech.htm.

¹¹The HWOL index is not a perfect predictor of employment for several reasons. First, vacancies are not always filled. For example, firms may post vacancies even if they are not yet committed to expanding employment. In addition, firms may also be more selective in terms of hiring, so vacancies may go unfilled for a longer period of time. Second, increases in the HWOL index may be associated with changes in recruiting processes rather than representing an increase in overall demand for workers as more employers shift toward posting vacancies online. Third, firms also use other channels, such as referrals, to recruit workers.

¹²Two factors likely accounted for part of the surge in the population with some college or an associate's degree. First, the high level of unemployment and accompanying lack of job opportunities may cause workers to pursue advanced education to improve job prospects. Second, this group may be increasing due to an increase in the college dropout rate. The cost of a college education has continued to rise at a rapid rate through the recession and recovery, but real personal income of U.S. households excluding current transfer receipts declined by nearly 9 percent during the recession and has only modestly recovered. In addition, cut-backs in federal and state funding of education have further shifted costs to students. The college dropout rate, therefore, may be rising due to high debt burdens of students and their families combined with the current lack of job opportunities for college graduates.

¹³Using the employment decomposition equation, the net employment change between period t and period T can be decomposed as $E_{[i,T]} - E_{[i,t]} = (E_{[i,T]}/P_{[i,T]} - E_{[i,t]}/P_{[i,t]}) * P_{[i,t]} + (E_{[i,T]}/P_{[i,T]}) * (P_{[i,T]} - P_{[i,t]})$.

¹⁴This analysis will only detect mismatch based on broad educational differences between workers. A more complete mismatch analysis would assess shortages based on more specific skills and specialized training of workers.

¹⁵This pattern is based on the establishment survey (CES). Using the household survey (CPS), the increase in employment for men during the labor recovery has accounted for all of the employment growth.

¹⁶The distribution of employment by gender in January 2010 was 50 percent male and 50 percent female.

¹⁷This observation caused many commentators to describe the recent recession as a "*mancession*." See Şahin and others and Engemann and Wall for a detailed discussion. This is, however, not a new phenomenon. Men generally are hit harder than women during recessions. One major reason for this regularity is the concentration of men in cyclically sensitive industries such as construction and manufacturing.

¹⁸The 2008 base year for the employment shares was selected to be symmetric with the counterfactual exercise in the prior section. If the base year were shifted to 2007, prior to the start of the recession, the results would be qualitatively the same.

¹⁹This article separately examines evidence on employment by level of educational attainment and by gender and does not look directly at employment pattern

for highly educated men. To do so would require an analysis of more detailed micro-level data from the CPS and is beyond the scope of this article.

²⁰The distribution of employment by age in January 2010 was 12 percent for workers ages 16 to 24, 68 percent for workers ages 25 to 54, and 20 percent for workers age 55 and older.

²¹Gomme and others find that fluctuations in hours worked across age groups is *U*-shaped: fluctuations are highest for young and old workers and lowest for prime-age workers. The pattern in the most recent recession deviates from this pattern since workers older than 55 did not experience a notable decline in their employment rate.

²²See Shimer for the effect of the aging of the baby boom cohort on the unemployment rate and Aaronson and others for potential effects of the aging of the U.S. population on the labor force participation rate projections.

²³Due to a lack of seasonally adjusted data for all racial groups, the analysis of employment changes by race relies on nonseasonally adjusted data and focuses on relative changes in employment rather than absolute changes in employment for each group.

²⁴The designation of a worker as Hispanic in the BLS' CPS of households is separate from the racial designation because Hispanic is considered to be an ethnicity. Therefore, individuals who identify themselves as of Hispanic ethnicity also are asked to select their race (white, black, Asian, etc.).

REFERENCES

- Aaronson, Stephanie, Bruce Fallick, Andrew Figura, Jonathan F. Pingle, and William L. Wascher. 2006. "The Recent Decline in the Labor Force Participation Rate and Its Implications for Potential Labor Supply," *Brookings Papers on Economic Activity*, vol. 1, pp. 69-154.
- Abraham, Katharine G., John Haltiwanger, Kristin Sandusky, and James Spletzer. 2009. "Exploring Differences in Employment Between Household and Establishment Data," NBER Working Paper 14805.
- Aguiar, Mark A., Erik Hurst, and Loukas Karabarbounis. 2011. "Time Use During Recessions," NBER Working Paper 17259.
- Autor, David H., Lawrence F. Katz, and Alan B. Krueger. 1998. "Computing Inequality: Have Computers Changed the Labor Market?" *Quarterly Journal of Economics*, vol. 113, pp. 1169-1213.
- Engemann, Kristie and Howard J. Wall. 2009. "The Effects of Recessions Across Demographic Groups," Federal Reserve Bank of St. Louis Working Paper 2009-052.
- Elsby, Michael W. L., Bart Hobijn, and Ayşegül Şahin. 2010. "The Labor Market in the Great Recession," *Brookings Papers on Economic Activity*, vol. 1, pp. 1-48.
- Gomme, Paul, Richard Rogerson, Peter Rupert and Randall Wright. 2004. "The Business Cycle and the Life Cycle." *NBER Macroeconomics Annual*, pp. 415-461.
- Hartley, Daniel and Beth Mowry. 2010. "Could Low Educational Attainment Be Slowing the Recovery?" Economic Trends, Federal Reserve Bank of Cleveland.
- Katz, Lawrence F., and Kevin M. Murphy. 1992. "Changes in Relative Wages, 1963-1987: Supply and Demand Factors." *Quarterly Journal of Economics*, vol. 107, pp. 35-78.
- Kimmel, Jean, and Thomas J. Kniesner. 1998. "New Evidence on Labor Supply: Employment Versus Hours Elasticities by Sex and Marital Status," *Journal of Monetary Economics*, vol. 42, pp. 289-301.
- Krusell, Per, Lee E. Ohanian, Jose-Victor Rios-Rull, and Giovanni L. Violante. 2000. "Capital-Skill Complementarity and Inequality: A Macroeconomic Analysis." *Econometrica*, vol. 68, pp. 1029-1053.
- Mincer, Jacob. 1991. "Education and Unemployment of Women," NBER Working Paper 3837.
- Mueller, Andreas. 2010. "Separations, Sorting and Cyclical Unemployment," mimeo, Columbia University.
- Mulligan, Casey. 2010. "Gender Segregation by the Clock," Economix, The New York Times
- Pissarides, Christopher A. 2009. "The Unemployment Volatility Puzzle: Is Wage Stickiness the Answer?" *Econometrica*, vol. 77, p. 1339-1369.
- Shimer, Robert. 2008. "The Probability of Finding a Job," *American Economic Review: Papers and Proceedings*, vol. 98, pp. 268-73.
- Şahin, Ayşegül, Joseph Song, and Bart Hobijn. 2010. "The Unemployment Gender Gap During the 2007 Recession," Federal Reserve Bank of New York, Current Issues in Economics and Finance, vol. 16, no. 2.