

# Interpreting the Recent Decline in Labor Force Participation

*By Willem Van Zandweghe*

**A**t the turn of the 21st century, labor force participation in the United States reversed its decades-long increase and started trending lower. A more startling development has been the recent sharp decline in the labor force participation rate—from 66.0 percent in 2007 to 64.1 percent in 2011—a far bigger drop than in any previous four-year period.

Changes in labor force participation have historically reflected a number of factors. Demographic, cultural, and institutional trends have produced gradual, long-term changes in participation. The business cycle has also influenced participation, as bad times typically have been associated with lower participation rates, though the strength of this correlation is small. Thus, it is not immediately clear which of these factors would have caused the recent sharp decline in labor force participation.

This article presents a variety of evidence—including data on demographic shifts, labor market flows, gender differences, and the effects of long-term unemployment—to disentangle the roles of the business cycle and trend factors in the recent drop in participation. Taken together, the evidence indicates that long-term trend factors account for

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about half of the decline in labor force participation from 2007 to 2011, with cyclical factors accounting for the other half.

Understanding the sources of this decline is of concern to policymakers because of the implications for the trajectory of the economy and the unemployment rate over a longer horizon. The substantial influence of trend factors implies that part of the recent decline in labor force participation is likely to dampen the potential labor supply of the economy, as many workers have permanently left the labor force. However, the cyclical component of the decline in labor force participation will reverse course as the economic recovery progresses. As these workers return to the labor force, their re-entry will put upward pressure on both the unemployment rate and the labor force participation rate.

The first section of this article contrasts the recent behavior of the labor force participation rate with its historical patterns. The second section considers empirical evidence on the causes of the recent decline in the labor force participation rate. The third section uses a statistical procedure to decompose the labor force participation rate into its trend and cyclical components. The fourth section describes the implications of the decline in labor force participation for labor market variables and potential output over the next few years.

## **I. FACTS ABOUT LABOR FORCE PARTICIPATION**

The historical behavior of the labor force participation rate (LFPR) is characterized by gradual trend shifts and a fairly weak association with the economy's cyclical fluctuations. Neither of these factors appears capable of easily explaining the recent sharp drop in the LFPR.

The LFPR is the percentage of the civilian, noninstitutional, working-age population (16 years and older) that is part of the labor force. The labor force consists of the people who are active in the labor market, either as employed workers or as unemployed job seekers. The Bureau of Labor Statistics (BLS) provides monthly estimates of the number of employed workers, unemployed job seekers, members of the labor force, and the size of the population. These estimates—based on the Census Bureau's Current Population Survey of about 60,000 households—are the primary source of information on U.S. labor force characteristics and are the main data source for this article.

In the four years since the start of the recent recession, the LFPR has declined faster than in any preceding four-year period on record (Chart 1). The LFPR declined from an average of 66.0 percent in 2007 to 65.4 percent in 2009 and to 64.1 percent in 2011.

Growth in the size of the labor force depends on changes in the LFPR and population growth. From 2007 to 2011, the U.S. population continued to grow while the LFPR shrank. As a consequence, the size of the labor force was little changed from 2007 to 2011.

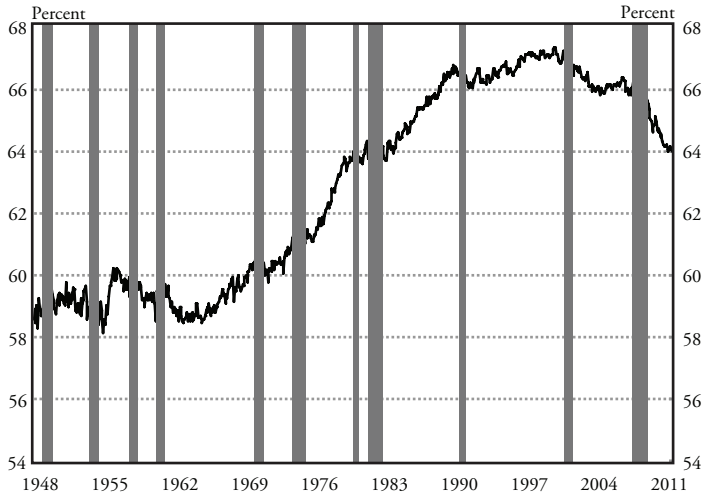
### *Trends in labor force participation*

Over a longer horizon, the evolution of the LFPR in Chart 1 can be classified into three phases. Phase one occurred from 1948 to the mid-1960s and was characterized by a roughly stable participation rate. Phase two occurred from the mid-1960s to 2000 and was characterized by steadily rising labor force participation. Phase three began at the turn of the century and is characterized by declining labor force participation. These distinctive phases in the participation rate resulted from demographic, cultural, and institutional changes (Stephanie Aaronson and others; DiCecio and others; Mosisa and Hipple).

The steady rise in the LFPR during the second phase can be explained primarily by two developments. First, the baby-boom generation (the people born from 1946 to 1964) grew up and shifted gradually into age cohorts with high levels of labor force participation. Because this generation is relatively large, this group's move into prime working age caused the economy's LFPR to increase during the 1970s and 1980s. Second, more women entered the labor force. The LFPR of women increased from 33 percent in 1948 to 60 percent in 1999, at which point it leveled off (Chart 2). The steady increase in female labor force participation contrasts with the gradual decline of male participation over the past six decades.

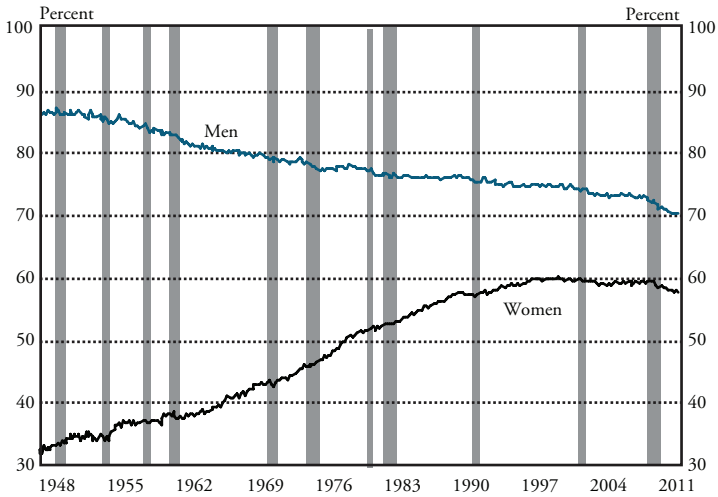
The steady decline of the LFPR since its peak at the turn of the century is also related largely to demographic factors. The primary factor behind this decline is the rising share of older workers in the population as the baby-boom generation ages and life expectancies increase. The rising share of older workers pulls down the LFPR because older workers have lower participation rates than prime-age workers. A second factor behind the gradual decline of the LFPR has been a steady

*Chart 1*  
LABOR FORCE PARTICIPATION RATE



Note: Gray bars are recessions as defined by the National Bureau of Economic Research (NBER).  
Source: BLS

*Chart 2*  
LFPR BY GENDER



Note: Gray bars are recessions as defined by the NBER.  
Source: BLS

reduction in labor force participation among young people over the last decade, resulting in large part from rising school enrollment (Daniel Aaronson and others 2006).<sup>1</sup>

### *Cyclical fluctuations in labor force participation*

In addition to gradual shifts over the longer term, labor force participation typically exhibits moderate movements associated with the business cycle (for instance, Veracierto). Looking at the business cycles over the past six decades, fluctuations in labor force participation have been weakly procyclical. That is, labor force participation has tended to be somewhat higher during economic expansions when ample job opportunities are available. But in recessions, when jobs are scarce, labor force participation has tended to be somewhat subdued.

One way to measure the cyclical variation in labor force participation is by comparing the change in the LFPR during expansions and recessions as determined by the National Bureau of Economic Research (NBER). Since 1948, the average annualized monthly change in the LFPR was 0.09 percentage point during expansions and 0.07 percentage point during recessions. While this behavior is procyclical, it is only weakly related to the state of the economy. Moreover, the difference between the average change in the LFPR during expansions and recessions is not statistically significant.

## **II. THE RECENT DECLINE IN LABOR FORCE PARTICIPATION**

The rapid decline in the LFPR from 2007 to 2011 poses a conundrum. While gradual trend shifts, due for instance to the aging of the population, have likely pushed labor force participation lower over this period, they would appear unlikely to cause a sudden sharp drop in participation. Similarly, while cyclical weakness in the economy would appear to explain the timing of the decline in participation, such a decline would mark a departure from historical experience when the LFPR was only weakly associated with the business cycle.

This section considers a number of cyclical factors, such as slack in the labor market, and trend factors, such as the effects of slow demographic changes, that may have contributed to the recent decline in

the LFPR. It finds that trend and cyclical factors are both important in explaining the decline.

*Strengthened association of labor force participation with the business cycle*

Over a long time horizon, labor force participation has been only weakly related to the business cycle. But this long time horizon can disguise more recent movements. In fact, since 2007, the LFPR has moved somewhat more strongly with the state of the economy.

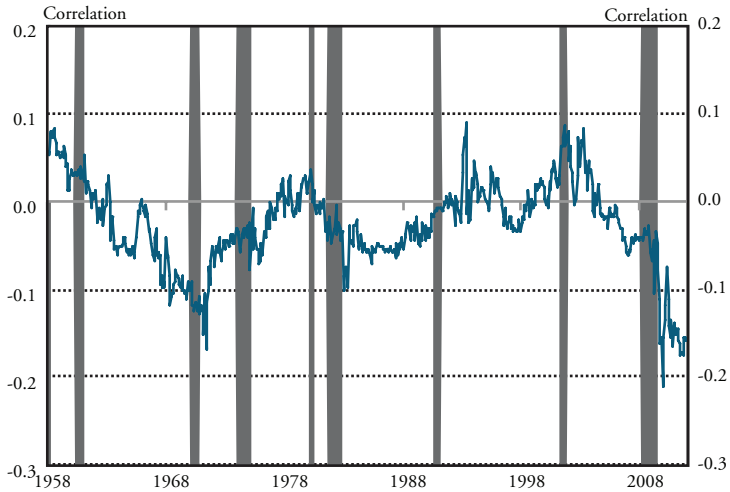
One way to assess the changing business cycle behavior of labor force participation is to compare correlations of the LFPR and the unemployment rate over time. From 1948 to 2011, the unemployment rate and changes in the LFPR were uncorrelated. But since the start of the recent recession in 2007 this correlation has changed to  $-0.13$ . That is, in recent years, a higher unemployment rate has been associated with declines in labor force participation. More generally, the rolling correlation between the unemployment rate and changes in the LFPR over a 10-year window has declined during the four years since the start of the recent recession to record lows (Chart 3).

Looking beyond the national data, data from U.S. states also point to a stronger relationship between labor force participation and the business cycle over the last few years. In general, U.S. states with high unemployment rates tend to have low participation rates, as evidenced by negative correlations between these measures (Chart 4). This relationship has typically become more negative immediately after recessions. Although this relationship has persisted throughout the 35-year period of available data, the correlation between the unemployment rate and the participation rate across U.S. states has declined sharply since the end of the last expansion. For example, from 2007 to 2011, the average annual correlation dropped 20 percentage points, from  $-0.32$  to  $-0.52$ , which was the steepest decline in a four-year period since 1984.<sup>2</sup>

The recent strengthening of the association between the LFPR and the unemployment rate, as measured by the correlations over time or across U.S. states, suggests that labor market participation has become more sensitive to the cyclical weakness in the labor market. Thus, the labor market slump may be an important factor for understanding the recent decline in participation.

Chart 3

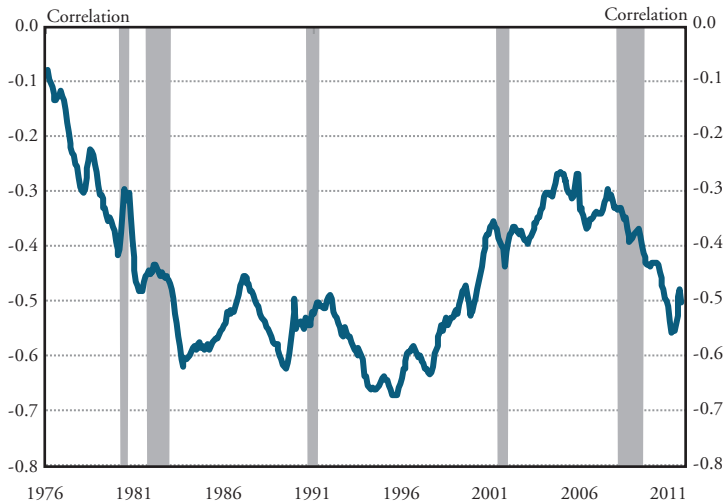
10-YEAR ROLLING CORRELATION OF CHANGES IN THE LFPR AND THE UNEMPLOYMENT RATE



Note: Gray bars are recessions as defined by the NBER.  
Sources: BLS and author's calculations.

Chart 4

CORRELATION OF THE LFPR AND THE UNEMPLOYMENT RATE ACROSS U.S. STATES



Note: Gray bars are recessions as defined by the NBER.  
Sources: BLS and author's calculations.

*Increased worker flows between unemployment and nonparticipation*

Interpreting part of the recent decline in the LFPR as a cyclical phenomenon is also supported by data on workers' movements both inside and out of the labor force, known as labor force status flows. These flow data track the number of people who change their status from being employed, unemployed, or not participating in the labor force to another one of these states in a given month. The net result of these gross flows, which are usually large, is the change in the number of people employed, unemployed, and not participating in the labor force, which is relatively small.<sup>3</sup>

Since the beginning of the 2007-09 recession, the average monthly flow of workers moving from unemployment to not participating in the labor force (*UN*), and the reverse flow from nonparticipation to unemployment (*NU*), have risen substantially (Chart 5, top panel). In contrast, the flows from employment to nonparticipation (*EN*) and the reverse flow (*NE*) have remained roughly stable (bottom panel). These patterns appear to be driven primarily by cyclical forces.

Notably, some unemployed workers drop out of the labor force due to a lack of job prospects. Those workers are still close or "marginally attached" to the labor force. A marginally attached worker is no longer actively searching for work but wants to work, is available for work, and has searched for a job in the past year. In turn, a portion of the pool of marginally attached workers consists of discouraged workers, who believe that no job is available for them and, therefore, are discouraged from job seeking.<sup>4</sup>

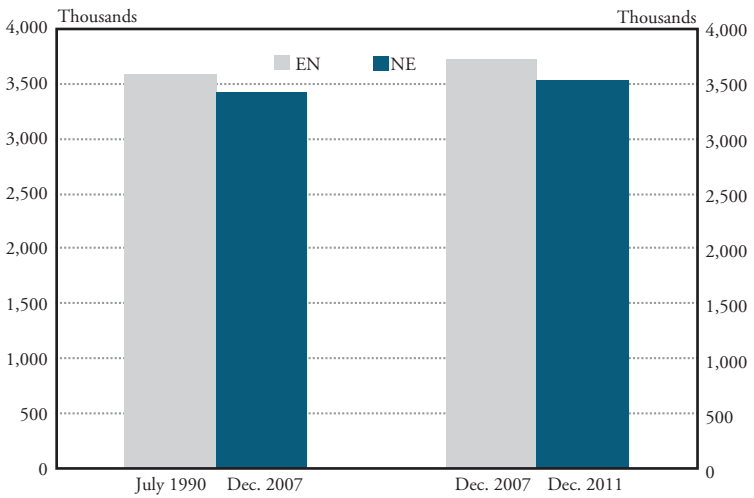
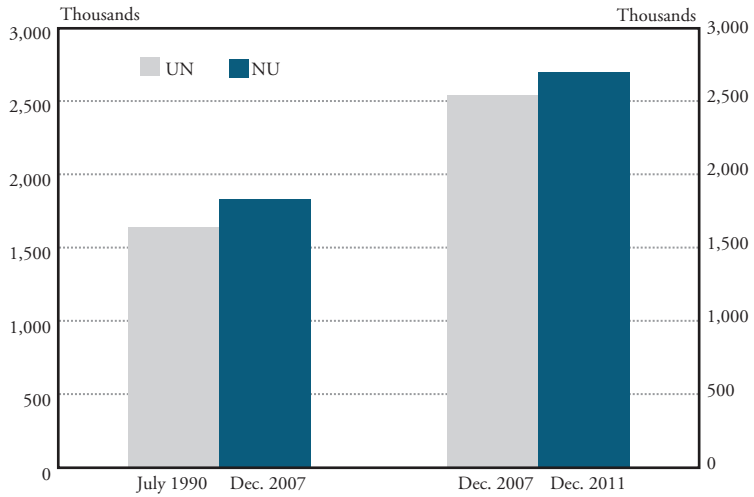
In line with the increase in worker flows between unemployment and nonparticipation, the number of people who are marginally attached to the labor force has surged since the start of the recent recession. The number of marginally attached workers has risen by 50 percent, from less than 1.5 million on average from 1994 (the start of the data series) to 2007 to more than 2.2 million on average in 2008-2011. The number of discouraged workers has more than doubled on average across the same time periods, from less than 400,000 to more than 800,000 (Chart 6).

The surge in marginally attached workers suggests that the weakness of the labor market can explain much of the increase in worker flows between unemployment and nonparticipation. Many unemployed



Chart 5

WORKER FLOWS BETWEEN EMPLOYMENT, UNEMPLOYMENT, AND NOT PARTICIPATING IN THE LABOR FORCE

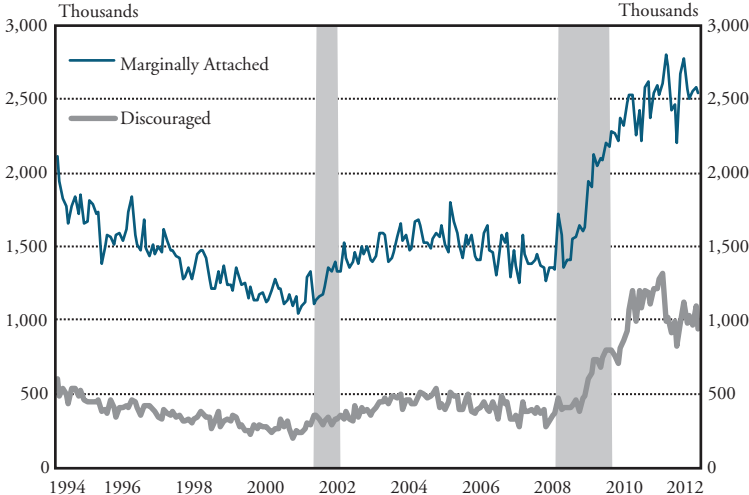


Notes: UN (EN) represents the average monthly worker flows from unemployment (employment) to not participating in the labor force. NU (NE) represents the reverse worker flows from nonparticipation to unemployment (employment).

Sources: BLS and author's calculations.

Chart 6

## MARGINALLY ATTACHED AND DISCOURAGED WORKERS NOT IN THE LABOR FORCE



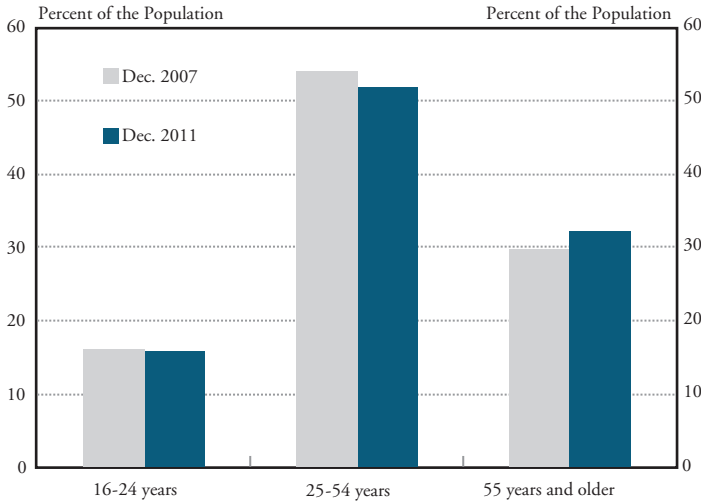
Note: Gray bars are recessions as defined by the NBER.  
Source: BLS

workers become discouraged when they search for jobs unsuccessfully, which raises the *UN* flow. At the same time, many people who are marginally attached to the labor force may begin searching as soon as they perceive some improvement in their job-finding prospects, which can boost the *NU* flow. In contrast, declines in labor force participation that were driven by broader trend shifts coming from demographic or cultural changes would likely affect the flow of workers between employment and nonparticipation—for instance, an accelerated rate of retirement due to the aging of the population would raise the *EN* flow.

### *Factors behind the trend decline in LFPR*

While the cyclical downturn in the labor market appears to be a significant factor behind the recent decline in labor force participation, trend shifts have likely played a role as well. Among the factors affecting the trend in labor force participation, the aging of the population has been the most important over the last decade. The age distribution of the population is gradually shifting toward older people (Chart 7).

Chart 7  
POPULATION AGING



Sources: BLS and author's calculations.

Isolating the effect of population aging on the LFPR yields one estimate of the decline in the trend participation rate.

The decline in the LFPR due to population aging can be calculated from the data on labor force participation and population by age group. The LFPR in a given month  $t$  is

$$LFPR_t = s_t^y * LFPR_t^y + s_t^p * LFPR_t^p + s_t^o * LFPR_t^o,$$

where  $y$  represents young people ages 16 to 24,  $p$  stands for prime-age workers 25 to 54, and  $o$  represents those 55 and older. The weights  $s_t^y$ ,  $s_t^p$ , and  $s_t^o$  are the population shares of the three age groups.

If the age distribution of the population had remained at its December 2007 levels, the participation rate would have been

$$LFPR_{t,12/07} = s_{12/07}^y * LFPR_t^y + s_{12/07}^p * LFPR_t^p + s_{12/07}^o * LFPR_t^o,$$

where  $s_{12/07}^y$ ,  $s_{12/07}^p$ , and  $s_{12/07}^o$  represent the December 2007 population shares for the young, prime-age, and old groups, respectively. The difference between  $LFPR_t$  and  $LFPR_{t,12/07}$  measures the change in the participation rate due to changes in the age distribution of the population since December 2007. The actual LFPR in December 2011 ( $LFPR_t$ ) was 64.0 percent; the alternative measure, using the December 2007 weights ( $LFPR_{t,12/07}$ ), was 65.0 percent. Thus, the shift in the age distribution

accounted for a decline in the LFPR of 1.0 percentage point, half of the 2.0 percentage point change in the actual participation rate over this time.

Other factors also contributed to the declining trend in the LFPR. Specifically, shifts in the participation rates of workers in the various age groups have influenced the trend participation rate. Older workers' participation rate has been rising steadily during the last two decades (Chart 8). The rise can be explained by longer term developments, such as improving health and longevity, the need to build retirement savings due to the shift away from defined-benefit pensions, and decreased availability of retiree health benefits (Kwok and others). In contrast, the participation rate of young workers has been declining over the past decade. These shifts have likely offset each other to some extent, suggesting the effect of population aging may provide a reasonable estimate of the trend component of the participation rate.

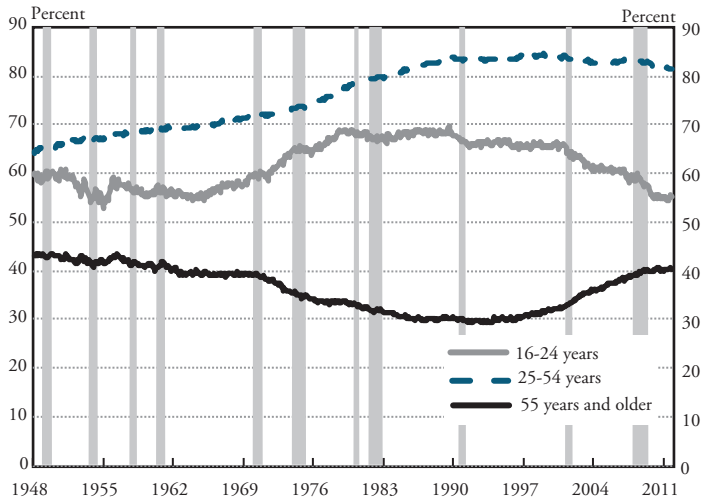
### **III. TREND-CYCLE DECOMPOSITION OF LABOR FORCE PARTICIPATION**

The recent shifts in the age distribution of the population and in the worker flows in and out of the labor force suggest that trend factors and the cyclical downturn account about evenly for the recent decline in labor force participation. While each of these two shifts presents a different perspective on the LFPR, they provide an informal analysis of the recent decline in participation.

A statistical trend-cycle decomposition of the participation rate offers a more formal approach to account for the recent drop in participation. This section estimates such a decomposition and finds that slightly more than half of the recent decline in the participation rate is due to the recent recession, and slightly less than half is due to trend shifts.

It is also possible to decompose changes in the participation rate for different groups within the population and for alternative measures that capture the depth of recessions. For instance, decomposing the LFPR separately for men and women reveals key gender differences: the decline in men's participation is mostly a continuation of trend factors, while the decline in women's participation is wholly explained by cyclical factors. Using the long-term unemployment rate to capture the severity of recessions finds a greater role for cyclical factors in the recent

Chart 8  
LFPR BY AGE GROUP



Note: Gray bars are recessions as defined by the NBER.  
Sources: BLS and author's calculations

decline in participation compared with using the unemployment rate to measure the severity of recessions.

### Methodology

The movements in the LFPR are separated into trend factors and cyclical factors using a statistical procedure called a multivariate Beveridge-Nelson decomposition (Evans; Evans and Reichlin). The idea behind such a decomposition is that movements in the LFPR are driven by various shocks, which have both transitory (cyclical) and long-term (trend) effects. The decomposition is multivariate because it uses more than one variable to detect the cyclical and trend effects.<sup>5</sup> The trend-cycle decomposition is implemented in two steps.

The first step estimates a statistical model of the LFPR. The model relates the current change in the LFPR to its past changes, to past readings on at least one variable that moves with the business cycle, and to two error terms that capture other forces not explicitly included in the model.<sup>6</sup> To capture movements in the business cycle, past values of the unemployment rate are used as the sole cyclical indicator in the baseline statistical model.<sup>7</sup>

The second step uses the estimated model to compute the trend component of the LFPR. The trend component embodies the expected long-term effects of the shocks on the participation rate. The cyclical component of the LFPR is then the difference between the actual participation rate and its trend component.

### *Trend and cycle of the LFPR*

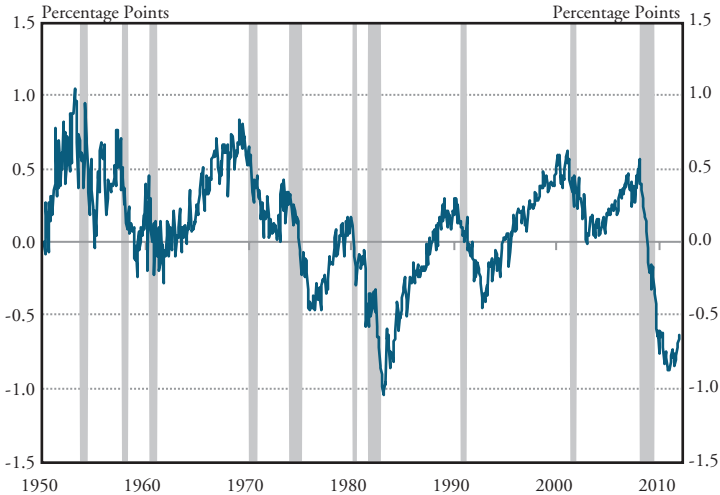
The Beveridge-Nelson decomposition reveals that cyclical factors have noticeably pulled down the LFPR in the last few years (Chart 9). The final estimate for December 2011 suggests that the weak state of labor markets exerted a drag on participation of -0.6 percentage point. This is a considerable reversal from the late 1990s and early 2000s, when the booming economy had temporarily boosted the labor force participation rate above its trend levels.

Based on the Beveridge-Nelson decomposition, a little more than half of the recent decline in the participation rate comes from cyclical factors. Smoothing through some of the monthly volatility that is evident in Chart 9 by using annual averages, the LFPR declined from 66.0 percent in 2007 to 64.1 percent in 2011. The Beveridge-Nelson decomposition attributes 1.1 percentage points of this decline (58 percent) to the cyclical downturn. Long-term trend factors, such as demographics, account for the remaining 0.8 percentage point of the decline (42 percent).

The role of cyclical factors in the recent decline in the LFPR may be understated, however, because of extensions of unemployment benefits. To combat the weakness in the economy, Congress increased the maximum length of unemployment benefits to 99 weeks during this period, compared with the normal maximum duration of 26 weeks. The increase in duration likely raised the unemployment rate by encouraging jobless workers to continue searching for work. Had the duration of unemployment benefits not been increased, some of the unemployed job seekers would likely have accepted work while others would have given up searching for work and left the labor force. Estimates of the increase in the unemployment rate due to the extension of unemployment benefits range from 0.7 percentage point (Daniel Aaronson and others 2010) and 0.8 percentage point (Daly and others) to 1.2 percentage points (Fujita).

Chart 9

## CYCLICAL COMPONENT OF THE LFPR



Note: Gray bars are recessions as defined by the NBER.  
Sources: BLS and author's calculations

Because more job seekers would have left the labor force had unemployment benefits not been extended, the drop in the LFPR would have been larger than the actual reported decline. Suppose, for example, that unemployment benefits had not been extended and the unemployment rate had remained 0.8 percentage point below the actual rate in 2009 and 2010. If the workers who exhausted their unemployment benefits left the labor force, then this 0.8 percentage point reduction in the unemployment rate would have coincided with a 0.6 percentage point reduction in the LFPR. Because the benefits are only available to workers who become unemployed through no fault of their own, the associated decline in labor force participation would have been largely cyclical. Thus, in the absence of the extended unemployment benefits, the share of the recent decline in the LFPR due to the cyclical downturn would likely have exceeded the estimate of a little more than one half.

### *Trend and cycle of the LFPRs of men and women*

Trend factors and cyclical factors both played a substantial part in the recent decline in aggregate LFPR. But this decline in participation and the influence of trend factors and cyclical factors have been different for men and women. This is not surprising—after all, the participa-

tion rates of men and women have followed different patterns through history (see Chart 2).

A Beveridge-Nelson decomposition for men's participation finds a larger role for trend factors behind the decline in the LFPR of men from 2007 to 2011 (Chart 10). The average annual LFPR of men fell 2.8 percentage points from 2007 to 2011, of which 60 percent was due to a decline in trend participation. Although it may seem surprising that such a large drop in labor force participation is not related more strongly to the recession, the LFPR of men has been falling steadily for 60 years. This decline is attributed to increased access to Social Security benefits and the declining real wages of low-skilled workers (Autor and Duggan; Juhn). Hence, the combination of such long-term forces and the strengthening impact of population aging may have caused the pace of decline in male labor force participation to accelerate in recent years.

By contrast, a Beveridge-Nelson decomposition for women's participation finds a central role for cyclical factors. Women's average annual LFPR fell 1.2 percentage points from 2007 to 2011. The decomposition attributes essentially all of this decline to the cyclical downturn in the labor market. This result is in line with the finding that, among prime-age workers, the labor force participation of women is more sensitive to the business cycle than that of men (see Table 5 in Stephanie Aaronson and others). Because women often acquire human capital specific to both market and nonmarket activities, the difference between the benefits of working or not working may often be fairly small. Thus, when labor market conditions worsen, nonmarket work can become relatively more productive for many women, which may lead them to leave the labor force. In contrast, the human capital of men is often more specialized toward market activities.

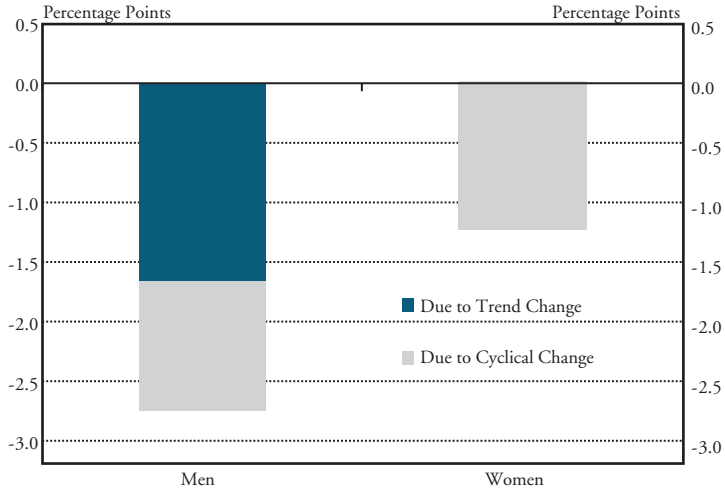
### *Trend and cycle using an alternative business cycle measure*

A striking feature of the 2007-09 recession is the unprecedented rise in the long-term unemployment rate (Chart 11). Because it is unprecedented, the recent rise in long-term unemployment has generated considerable uncertainty. Some economists believe that the high level of long-term unemployment reflects fundamental shifts in the structure of the labor market that are likely to persist for some time; hence, these shifts are trend rather than cyclical. But others view the high rate of



Chart 10

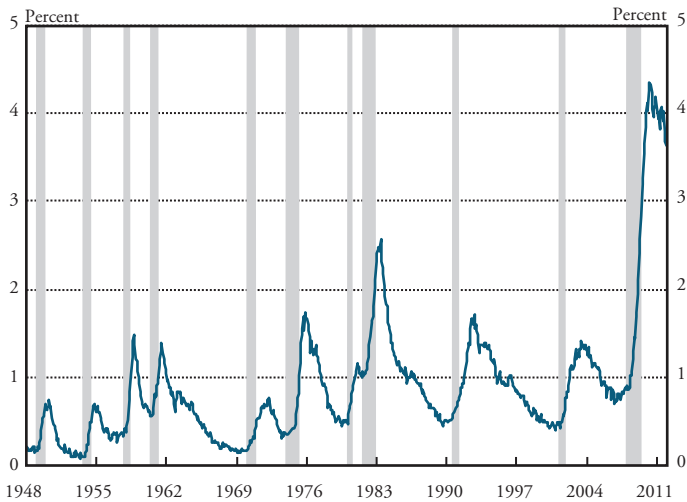
RECENT CHANGES IN TREND AND CYCLICAL LABOR FORCE PARTICIPATION OF MEN AND WOMEN



Note: For 2007-11.  
Sources: BLS and author's calculations

Chart 11

PEOPLE UNEMPLOYED FOR AT LEAST SIX MONTHS AS A PERCENTAGE OF THE LABOR FORCE



Note: Gray bars are recessions as defined by the NBER.  
Source: BLS

long-term unemployment as proof of the profound cyclical weakness in the economy, rather than an indicator of longer-term trend shifts.

In some ways, the high rate of long-term unemployment may better capture the severity of the recent recession than the official unemployment rate. For instance, many economic indicators suggest that the 2007-09 recession was the most severe recession since the Great Depression, yet the unemployment rate peaked at 10.0 percent in October 2009, below the 10.8 percent peak in November and December 1982. Moreover, high long-term unemployment may be an especially accurate measure of the discouraging effect a labor market slump has on labor force participation, as the likelihood of finding a job dwindles with the duration of unemployment.

To capture the implications of high long-term unemployment on labor force participation, it is possible to perform an alternative Beveridge-Nelson decomposition using the long-term unemployment rate rather than the official unemployment rate as the cyclical indicator. Doing so provides a different take on the recent behavior of the labor force participation rate (Chart 12, blue line). Prior to the 2007-09 recession, the estimates of the cyclical component of the LFPR are little changed compared with the baseline model estimated earlier (the gray line). In the last few years, however, this decomposition produces a much larger cyclical decline in the LFPR. In fact, using the long-term unemployment rate as the business cycle indicator now attributes 90 percent of the recent decline in the LFPR to cyclical factors coming from the recession, and only 10 percent is attributed to a lower trend participation rate.

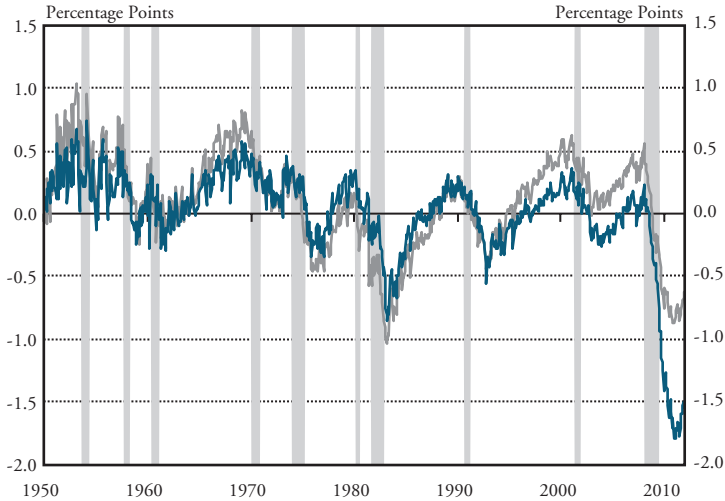
#### **IV. IMPLICATIONS FOR THE ECONOMIC OUTLOOK**

Demographic forces, such as population aging, played a major role in the recent decline of the LFPR. In addition, the recession created a cyclical gap between the participation rate and its trend. The preceding analysis suggests that trend factors and cyclical factors account about evenly for the recent decline in labor force participation. Such accounting is important because declines in participation due to trend shifts or to a cyclical downturn have different implications for the economic outlook.

This section evaluates how each of these factors affects the outlook for the participation rate, the potential labor supply available in the

Chart 12

## CYCLICAL COMPONENT OF THE LFPR BASED ON THE LONG-TERM UNEMPLOYMENT RATE



Notes: The blue line is the cyclical component of the LFPR when the long-term unemployment rate is used as the business cycle indicator in the Beveridge-Nelson decomposition. The gray line is the cyclical component of the LFPR when the official unemployment rate is used, as in Chart 9. Gray bars are recessions as defined by the NBER.

Sources: BLS and author's calculations

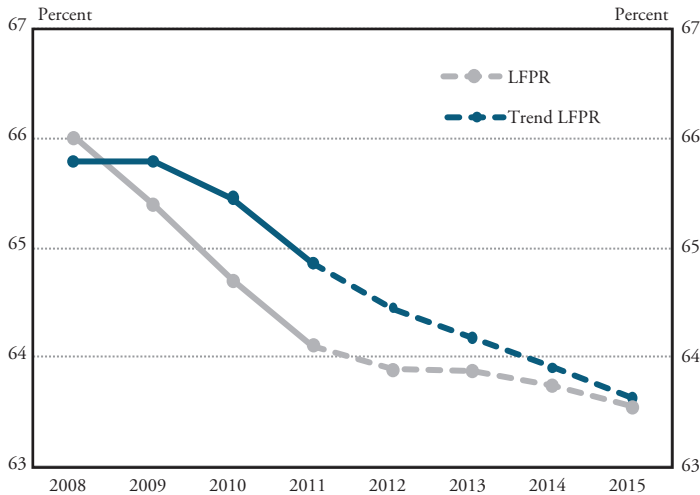
economy, and the unemployment rate. While the trend decline in participation is likely to adversely affect the nation's potential labor supply in the future, the current cyclical gap between the participation rate and its trend is likely to hold back the return of the unemployment rate to its long-run rate.

### *Outlook for participation, potential labor supply, and unemployment*

The baseline statistical model estimated in the previous section can generate a forecast of the LFPR and the unemployment rate over the next few years.

This baseline model projects that the participation rate will continue to decline over the next four years, though at a slower pace than over the previous four years (Chart 13). According to the model, labor force participation will decline only slightly in 2012 and 2013, from 64.1 percent in 2011 to 63.9 percent in 2013, as the continuing decline in the trend component of the participation rate is expected to be largely offset by a rebound in its cyclical component. If labor force participation were at its

Chart 13  
FORECAST OF THE LFPR



Notes: The chart shows annual averages of monthly observations (solid lines) and forecasts (dashed lines). The business cycle indicator in the Beveridge-Nelson decomposition is the official unemployment rate. Sources: BLS and author's calculations

trend, it would likely fall more than three times as much, by 0.7 percentage point, during these years. This is clear from comparing the forecast of the actual participation rate (the gray line) and the forecast of the trend participation rate (the blue line). The gap between the two lines, which represents the forecast of the cyclical component of the participation rate, closes gradually in 2012 and 2013. In the subsequent two years, the participation rate is expected to closely track its trend path, with the participation rate ending at 63.5 percent in 2015.

The baseline model projects a lower LFPR than some long-term labor market forecasts made by government agencies. For example, population and labor force growth forecasts of the U.S. Social Security Administration (SSA) imply that the LFPR will fall to 63.7 percent by 2015. The Congressional Budget Office (CBO) predicts that the participation rate will decline to 63.9 percent in 2015. And, the BLS anticipated in its forecast of 2010 that the participation rate would decline to 65.1 percent in 2015. Although these forecasters use substantially more detailed data for their projections than does the statistical model, their projections were based on a shorter data sample, which did not include some of the sharp recent declines in participation.

The analysis has implications for the potential labor supply in the economy. The trend LFPR is an important determinant of the potential supply of labor to the economy and, thus, has an important influence on potential output, which is the economy's maximum sustainable rate of production (Stephanie Aaronson and others). Other key determinants of the potential labor supply include the size of the working-age population and the average number of hours worked.

A substantial portion of the recent decline in labor force participation is due to the shifting trend in participation. The trend participation rate dropped 0.8 percentage point from 2007 to 2011 and is projected to fall another 1.3 percentage points by 2015 as the share of older workers in the population continues to rise. Hence, the recent decline in the participation rate is likely to reduce the potential labor supply. In addition, population growth is expected to slow, from an average annual rate of 1.4 percent during 1948-2011, to 1.1 percent during 2012-21 (CBO; SSA). Combined, these two factors will weigh on the potential labor supply available in the economy and the level of potential output over time.

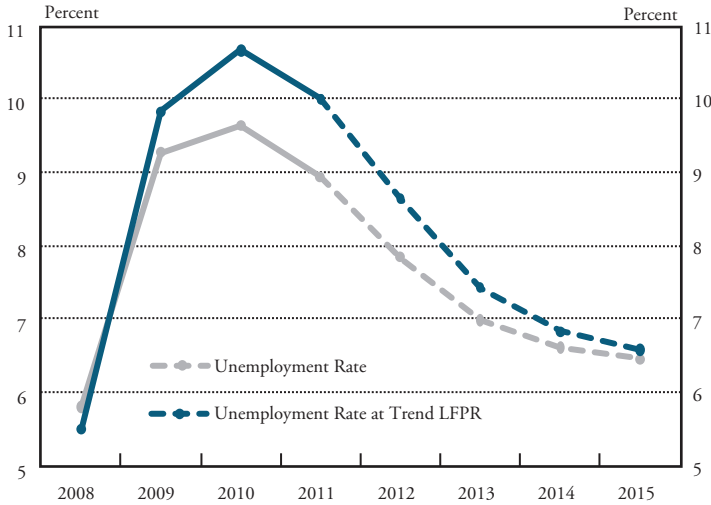
Analyzing the likely trajectory of the LFPR can also shed light on the unemployment outlook. The same baseline statistical model from earlier can also produce a forecast of the unemployment rate over the next few years. In this forecast, the unemployment rate gradually declines from 8.9 percent in 2011 to 6.5 percent by 2015 (Chart 14, gray line) as the economic recovery progresses.

The dynamics of the unemployment rate are influenced by movements in labor force participation. The cyclical drop in participation during the recession and the first two years of the recovery reduced the unemployment rate compared with where it would have been had participation not declined so dramatically (Chart 14, blue line).<sup>8</sup> If the participation rate were at its trend, the unemployment rate would have averaged 10.7 percent in 2010, compared with the actual average of 9.6 percent. In 2011, unemployment would have averaged 10.0 percent rather than its actual 8.9 percent. Going forward, the model predicts that the measured unemployment rate will continue to be lower than if participation were at its trend rate.

Although the unemployment rate would have been higher throughout the recovery in the absence of the cyclical gap in the participation

Chart 14

## FORECAST OF THE UNEMPLOYMENT RATE



Notes: The chart shows annual averages of monthly observations (solid lines) and forecasts (dashed lines). The business cycle indicator in the Beveridge-Nelson decomposition is the official unemployment rate.  
Sources: BLS and author's calculations

rate, it also would decline more rapidly in 2012 and 2013. Instead, many job seekers who gave up their search during the cyclical downturn will likely find their way back to the labor force over the next few years. As a result, their return will put upward pressure on the unemployment rate. That is, the slow projected decline in the unemployment rate is partly due to the gradual closing of the cyclical gap in the participation rate.

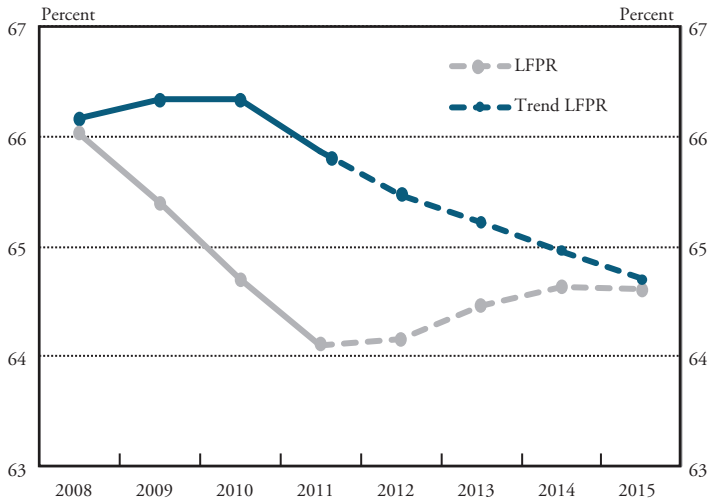
### *Risks to the outlook*

A key risk to these projections comes from the recent movements in the long-term unemployment rate. The baseline decomposition incorporates movements in the long-term unemployment rate only to the extent that they affect the official unemployment rate. In fact, the long-term unemployment rate may affect the outlook for labor force participation, potential labor supply, and the unemployment rate more directly.

One possibility is that the high level of long-term unemployment is cyclically depressing the LFPR. Indeed, the Beveridge-Nelson decomposition using the long-term unemployment rate as the business cycle indicator in Section III (and as illustrated in Chart 12) found that the

Chart 15

### FORECAST OF THE LFPR WHEN THE STATE OF THE BUSINESS CYCLE IS MEASURED BY THE LONG-TERM UNEMPLOYMENT RATE



Notes: The chart shows annual averages of monthly observations (solid lines) and forecasts (dashed lines). The business cycle indicator in the Beveridge-Nelson decomposition is the long-term unemployment rate.  
Sources: BLS and author's calculations

cyclical downturn explained much of the recent decline in participation. As the economic recovery progresses, this large cyclical decline in participation would disappear gradually by 2015 (Chart 15). Because the return of workers to the labor force during the recovery would more than offset the ongoing trend decline in labor force participation, the LFPR would rise, from 64.1 percent in 2011 to 64.6 percent in 2015. The workers returning to the labor force would put upward pressure on the unemployment rate, keeping it above its long-run rate for a prolonged period. However, the recent decline in the LFPR would have a limited adverse impact on the potential labor supply of the economy.

An alternative possibility is that the high rate of long-term unemployment could reduce the economy's labor supply and potential output (see Box). If part of the recent decline in the LFPR caused by the labor market downturn becomes permanent, the economy's potential labor supply would be reduced even further and measured unemployment would decline faster. For example, suppose the future path of the trend participation rate lies below the projected trend path; that is, the

**BOX****POTENTIAL LABOR SUPPLY DAMAGE FROM  
THE CYCLICAL DOWNTURN**

An important but difficult issue is whether the unprecedented increase in long-term unemployment during the recent recession will lead to a permanent decline in labor force participation.

In the baseline case, the Beveridge-Nelson decomposition used in this article estimates the influence of long-term unemployment on the trend and cycle of the LFPR only through its impact on the official unemployment rate. In the alternative case, the long-term unemployment rate is used directly as the business cycle indicator, though both cases associate a higher long-term unemployment rate with a larger cyclical decline in labor force participation.

A key question is whether the cyclical decline in participation will have long-term effects on the LFPR; that is, will workers who left the labor force due to the recession return when the economy improves? The rise in long-term unemployment may point to such a scenario, leading to a larger trend decline in the LFPR than indicated by the Beveridge-Nelson decompositions. People who experience long spells of unemployment typically have lower probabilities of finding new jobs (Shimer). Long unemployment spells can lead to erosion of skills, loss of attachment to the labor force, and a drying up of networks—a concern that has recently been voiced by policymakers (Bernanke). Workers who suffer long periods of unemployment may remain in the labor force but become chronically unemployed, raising the structural unemployment rate. However, others may become permanently less attached to the labor force or even permanently exit the labor force.

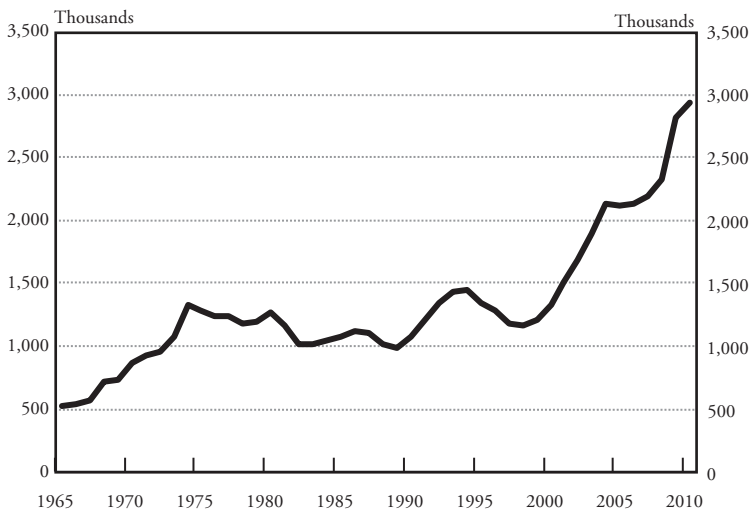
What would happen to unemployed workers whose labor force attachment permanently declines? Some of these workers may apply for disability benefits, as indicated by the surge in the number of disability applications since 2009 (Chart A).



Although not all applications result in awards, most people who are granted benefits remain permanently outside the labor force (CBO). Other unemployed workers may decide to retire sooner than planned. Fifteen percent of job seekers were 55 or older in 2011, and these workers might consider retirement if they have difficulty finding work. Still others may find it difficult after a long period of unemployment to find stable employment and may spend more time out of the labor force during the remainder of their careers.

*Chart A*

APPLICATIONS FOR DISABILITY BENEFITS



Source: SSA

trend line shifts down in Chart 13. Then the smaller cyclical gap in the participation rate closes more rapidly than currently projected, and the participation rate would be at its trend rate before 2015. As fewer inactive workers return to the labor force during the economic recovery, the unemployment rate declines more rapidly toward its long-run rate as well. However, despite this faster decline in unemployment, the potential labor supply in the economy would be reduced, thereby reducing the economy's level of potential output.

## V. CONCLUSION

The sharp decline of the LFPR since the onset of the recent recession is due to long-term shifts related to demographic trends and to the cyclical downturn in the labor market. A variety of evidence indicates that, on balance, trend factors account for about half of the decline in labor force participation from 2007 to 2011, with cyclical factors accounting for the other half.

The influence of the trend factors implies that potential labor supply, and hence potential output, is likely to be adversely affected by the recent decline in labor force participation even as the economy continues to recover from the recession. The influence of the cyclical factors implies that the unemployment rate will likely return only gradually to its long-run rate, as the ongoing recovery of the labor market encourages labor force participation.

## ENDNOTES

<sup>1</sup>Şahin and Willis examine the impact of these long-term trends on employment growth in the current recovery.

<sup>2</sup>The annual correlation for 2011 is the average of the available monthly correlations. For the state data, monthly data were available through November 2011.

<sup>3</sup>The gross flow data are more sensitive to certain measurement errors than the stock data, such as the LFPR in Chart 1 or the widely used unemployment rate. Specifically, classification error arises when survey respondents are somehow classified in the wrong labor market state. Such misclassifications accumulate in the gross flow data whereas they largely cancel each other out in the stock data. Margin error arises because not all of the survey respondents used in the calculation of the stock data can be used in calculating the gross flow data.

<sup>4</sup>Alternative measures of labor underutilization take into account discouraged workers and other marginally attached workers in addition to unemployed persons. For example, in December 2011, the standard unemployment rate (called U-3) was 8.5 percent. The broader measure that takes discouraged workers into account (U-4) was 9.1 percent. The even broader measure that accounts for all marginally attached workers (U-5) was 10.0 percent.

<sup>5</sup>The method is an extension of the univariate approach of Beveridge and Nelson for decomposing a nonstationary time series into a permanent and transitory component. In that approach, the trend component consists of the long-term forecast based on an ARIMA specification of the time series. The forecast is the level of the series that is expected after all transitory dynamics have dissipated. Thus, if the time series is expected to increase faster than its mean growth rate in the future, its current value must be below trend. In the extension to the multivariate case, the long-term forecast of the trend is based on a vector autoregression (VAR) model of the nonstationary time series and a number of stationary cyclical indicators. A multivariate model can produce a better forecast by enlarging the information set. As a result, more of the fluctuations in the time series are attributed to the cyclical component (Evans and Reichlin).

In general, a univariate decomposition of the LFPR would ascribe a larger share of the recent decline to a shift in the trend component than the multivariate decomposition results reported in this article.

<sup>6</sup>The model is a monthly VAR of the unemployment rate and changes in the LFPR. The lag length of the model is 24 months, based on the Hannan-Quinn information criterion. The estimation allows for a trend break in the LFPR at its peak in February 2000. This date marks the end of the second phase of a steadily rising LFPR and the start of the third phase of steady decline.

<sup>7</sup>Using the unemployment rate as the cyclical indicator might raise a concern that changes in the labor force are associated with changes in the

participation rate and the unemployment rate by definition. Suppose a trend decline in the LFPR reduces the labor force through an increased flow of employed workers exiting the labor force. Then the smaller labor force raises the unemployment rate even if the number of unemployed workers—and the position of the economy in the business cycle—has not changed. Hence, fluctuations in the unemployment rate may not just be associated with the cyclical component of the LFPR but also with its trend component. One way to mitigate this concern is by using the unemployment-to-population ratio as the cyclical indicator rather than the unemployment rate. The results are very similar with either approach. In fact, the cyclical component accounts for slightly more of the recent decline in the LFPR with the unemployment-to-population ratio than with the unemployment rate. This finding indicates that movements in the unemployment rate do not attribute trend shifts in the LFPR to the cyclical component.

Each of the two error terms of the model is a combination of underlying, uncorrelated structural shocks, which can be uncovered with additional assumptions. However, these assumptions do not affect the trend-cycle decomposition. The decomposition can thus be obtained from the reduced-form VAR model. Identifying the structural shocks through a Cholesky factorization, which assumes that one variable is not contemporaneously affected by the other, would conflict with the fact that both variables are contemporaneously related by definition.

<sup>8</sup>The unemployment rate associated with the trend participation rate is calculated under the assumption that additional labor force participants at the trend participation rate are absorbed entirely by the pool of unemployed workers. A forecast of the labor force is obtained by combining the forecast of the LFPR with the forecast of population growth from the CBO (Table 1). Using the population growth forecast of the SSA would yield a very similar forecast.

## REFERENCES

- Aaronson, Daniel, Bhashkar Mazumder, and Shani Schechter. 2010. "What Is Behind the Rise in Long-Term Unemployment?" Federal Reserve Bank of Chicago, *Economic Perspectives*, Second Quarter, pp. 28-51.
- Aaronson, Daniel, Kyung-Hong Park, and Daniel Sullivan. 2006. "The Decline in Teen Labor Force Participation." Federal Reserve Bank of Chicago, *Economic Perspectives*, First Quarter, pp. 2-18.
- Aaronson, Stephanie, Bruce Fallick, Andrew Figura, Jonathan Pingle, and William Wascher. 2006. "The Recent Decline in the Labor Force Participation Rate and Its Implications for Potential Labor Supply." *Brookings Papers on Economic Activity*, First quarter, pp. 69-134.
- Autor, David H., and Mark G. Duggan. 2003. "The Rise in the Disability Rolls and the Decline in Unemployment." *Quarterly Journal of Economics*, vol. 118, pp. 157-205.
- Bernanke, Ben S. 2011. "The Near- and Long-Term Prospects for the U.S. Economy." Remarks at the Federal Reserve Bank of Kansas City Economic Symposium, Jackson Hole, Wyo., Aug. 26.
- Beveridge, Stephen, and Charles R. Nelson. 1981. "A New Approach to Decomposition of Economic Time Series into Permanent and Transitory Components with Particular Attention to Measurement of the 'Business Cycle'." *Journal of Monetary Economics*, vol. 7, pp. 151-174.
- Bureau of Labor Statistics. 2010. "Labor Force (Demographic) Data."
- Congressional Budget Office. 2011. "CBO's Labor Force Projections Through 2021." Congressional Budget Office, March.
- Daly, Mary, Bart Hobijn, Aysegül Şahin, and Robert Valletta. Forthcoming. "A Rising Natural Rate of Unemployment: Transitory or Permanent?" *Journal of Economic Perspectives*.
- DiCecio, Riccardo, Kristie M. Engemann, Michael T. Owyang, and Christopher H. Wheeler. 2008. "Changing Trends in the Labor Force: A Survey." Federal Reserve Bank of St. Louis, *Review*, January/February, pp. 47-62.
- Evans, George W., 1989. "Output and Unemployment Dynamics in the United States: 1950-1985." *Journal of Applied Econometrics*, vol. 4, pp. 213-237.
- Evans, George W., and Lucrezia Reichlin. 1994. "Information, Forecasts, and Measurement of the Business Cycle." *Journal of Monetary Economics*, vol. 33, pp. 233-254.
- Fujita, Shigeru. 2011. "Effects of Extended Unemployment Insurance Benefits: Evidence from the Monthly CPS." Federal Reserve Bank of Philadelphia, Working Paper 10-35/R, January.
- Juhn, Chinhui. 1992. "Decline of Male Labor Market Participation: The Role of Declining Market Opportunities." *Quarterly Journal of Economics*, vol. 107, pp. 79-121.
- Kwok, Joyce, Mary Daly, and Bart Hobijn. 2010. "Labor Force Participation and the Future Path of Unemployment." Federal Reserve Bank of San Francisco, *Economic Letter*, 2010-17.

- Mosisa, Abraham, and Steven Hipple. 2006. "Trends in Labor Force Participation in the United States." Bureau of Labor Statistics, *Monthly Labor Review*, October, pp. 35-57.
- Şahin, Aysegul, and Jonathan L. Willis. 2011. "Employment Patterns During the Recovery: Who Are Getting the Jobs and Why?" Federal Reserve Bank of Kansas City, *Economic Review*. Fourth Quarter.
- Shimer, Robert. 2008. "The Probability of Finding a Job." *American Economic Review: Papers and Proceedings*, vol. 98, pp. 268-273.
- U.S. Social Security Administration. 2011. The 2011 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds. Washington, D.C.
- Veracierto, Marcelo. 2008. "On the Cyclical Behavior of Employment, Unemployment and Labor Force Participation." *Journal of Monetary Economics*, vol. 55, pp. 1143-1157.