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## Explaining the decline in the U.S. labor force participation rate

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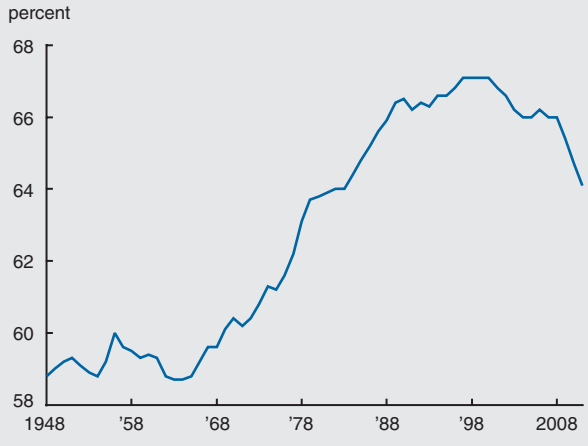
The authors conclude that just under half of the post-1999 decline in the U.S. labor force participation rate, or LFPR (the proportion of the working-age population that is employed or unemployed and seeking work), can be explained by long-running demographic patterns, such as the retirement of baby boomers. These patterns are expected to continue, offsetting LFPR improvements due to economic recovery.

**Since** peaking at 67.3% in early 2000, the aggregate LFPR has fallen by 3.3 percentage points, to 64.0% as of December 2011 (figure 1). This cumulative decline is over twice as large as any since World War II. While a sizable portion of this drop is related to the deep recession and lackluster economic recovery of the past four years, we argue that just under half can be traced to long-running demographic patterns. We project LFPR through 2020 and contend that some of these demographic patterns, particularly the ongoing retirement of baby boomers, are likely to accelerate the LFPR decline. We also show that the current LFPR is roughly 1 percentage point lower than our estimated trend rate (the LFPR consistent with the contemporaneous composition of the work force and an economy growing at its potential). This is the largest gap observed since at least the mid-1980s, likely leaving room for some improvement as the economy recovers further. Nevertheless, even allowing for some improvement due to the business cycle, we still expect the LFPR to be lower in 2020 than it is today.

**1. Actual LFPR, 1948–2011**




NOTE: The labor force participation rate (LFPR) is the proportion of the civilian noninstitutional population aged 16 and older that is employed or unemployed and seeking work.

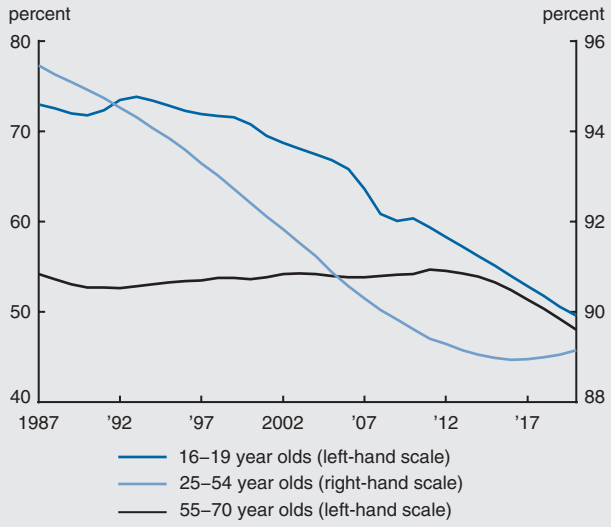
SOURCE: U.S. Bureau of Labor Statistics, *Current Population Survey*, from Haver Analytics.

### LFPR since World War II

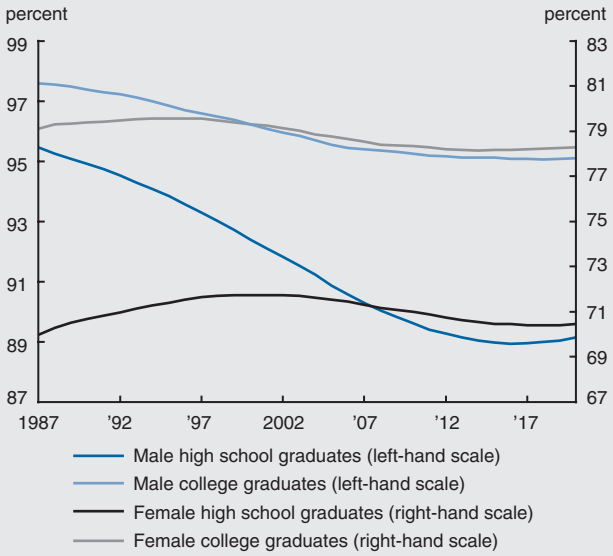
Figure 1 plots the annual aggregate LFPR over the period 1948–2011. LFPR began to reliably increase in the mid-1960s, persistently expanding through the 1990s. Several well-known demographic factors can account for this upsurge. First, more women entered the labor force; only one in three women were in the labor force in 1948, but by the mid-1990s, the female LFPR was roughly 60%. Second, the large baby boom cohort, born during the two decades following World War II, entered their prime working years during the 1970s and 1980s. Third, improvements in health technology may have boosted labor force participation directly, by improving the health and longevity of the work force, and indirectly, by requiring individuals to work longer (retire later) to accumulate enough wealth to support lengthier retirements.[1] Finally, rising rates of return to skills, particularly during the 1980s and 1990s, encouraged human capital investment, resulting in a shift away from manual labor occupations, which tend to have shorter average career lengths.

**2. Trend LFPR, by age, gender, and education, 1987–2020**

**A. Trend LFPR for male high school graduates, by age**



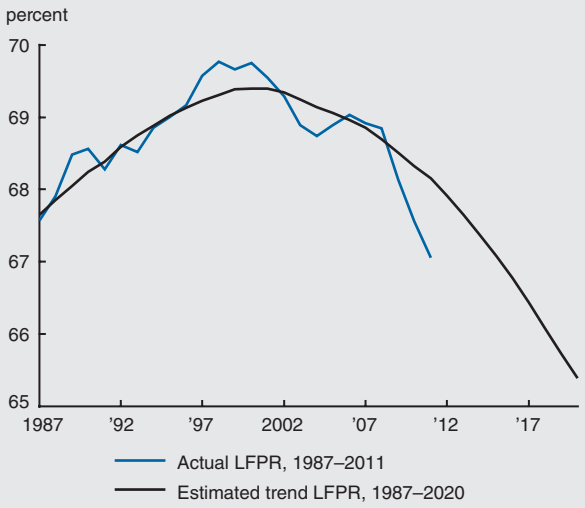

**B. Trend LFPR for 25–54 year olds, by gender and education**




NOTES: Trend labor force participation rate (LFPR) is the LFPR consistent with the contemporaneous composition of the work force and an economy growing at its potential. For details on the U.S. Census Bureau sources, see note 8.

SOURCES: Authors' calculations based on U.S. Bureau of Labor Statistics, *Current Population Survey*; and U.S. Census Bureau, population data and projections.

**3. Actual vs. trend LFPR, 16–79 year olds**




NOTES: Trend labor force participation rate (LFPR) is the LFPR consistent with the contemporaneous composition of the work force and an economy growing at its potential. For details on the U.S. Census Bureau sources, see note 8.

SOURCES: Authors' calculations based on U.S. Bureau of Labor Statistics, *Current Population Survey*; and U.S. Census Bureau, population data and projections.

However, since early 2000, LFPR has fallen by over 3 percentage points to a level last observed in the early 1980s. At least two demographic factors have contributed to this decline. First, in 1996 the first baby boomers turned 50—an age when labor force participation traditionally peaks. Since that time, a growing number of baby boomers have transitioned out of the labor force. Second, there has been a long-running downward shift in teen work activity—which picked up speed during the latter half of the 2000s.[2]

## A statistical model of LFPR

We consider all of these factors within a statistical model of labor force behavior. In particular, we use the U.S. Bureau of Labor Statistics' *Current Population Survey* (CPS), covering the years 1987–2007, to associate the probability that an individual aged 16–79[3] is in the labor force with that individual's gender, age, year of birth, race, and education, as well as a measure of where the national economy is in the business cycle.[4] We include indicators for every single age to account for the typical lifetime pattern of labor force participation—e.g., individuals work less frequently while in school and later in life. Year-of-birth indicators reflect unobservable work behavior, ethics, and norms that are specific to birth cohorts ("cohort effects"); e.g., the model allows that, at the same age, a cohort born in, say, 1954 might be more or less likely to work than another born in 1978. We estimate this model separately for 44 combinations of age (16–19, 20–24, 25–54, 55–70, and 71–79), gender, and educational attainment (less than high school, high school graduates, some college, college graduates, and some post-college education).[5] This allows the cohort effects and other controls to flexibly vary across age, gender, and education. Finally, we introduce additional conditioning variables to the base model that are specific to certain demographic groups. In particular, the model for 16–19 and 20–24 year olds conditions on the real state minimum wage and the ratio of the average youth hourly wage to average adult hourly wage;[6] that for 25–54 year olds conditions on indicators for being married with children and married with a young child (under age 6); and that for 55–70 and 71–79 year olds includes gender-specific life expectancies.[7]

To highlight the importance of considering trend LFPR separately for the

**4. Decomposition of change in trend LFPR**

| | 2000 | | 2011 | |
|---|---|---|---|---|
| Age group | Population share (1) | Trend LFPR (2) | Population share (3) | Trend LFPR (4) |
| 16–19 | 7.7 | 51.9 | 7.2 | 38.4 |
| 20–24 | 9.3 | 76.8 | 9.5 | 74.4 |
| 25–54 | 58.9 | 83.4 | 54.8 | 82.7 |
| 55–70 | 17.2 | 48.9 | 22.2 | 54.5 |
| 71–79 | 6.9 | 10.2 | 6.3 | 14.3 |
| Total | 100.0 | 69.4 | 100.0 | 68.2 |
| Total trend LFPR change, 2000–11 | | | –1.2 | |
| Due to aging | | | –0.8 | |
| Due to other effects | | | –0.4 | |

NOTES: All values are in percent except for those in the final three rows, which are in percentage points. Trend labor force participation rate (LFPR) is the LFPR consistent with the contemporaneous composition of the work force and an economy growing at its potential. For details on the U.S. Census Bureau sources, see note 8.

SOURCES: Authors' calculations based on U.S. Bureau of Labor Statistics, *Current Population Survey*; and U.S. Census Bureau, population data and projections.

combinations of age, gender, and educational attainment, we display six of our 44 estimated trend LFPRs. Panel A of figure 2 shows our estimates of trend LFPR for male high school graduates aged 16–19, 25–54, and 55–70.[8] Because the 25–54 year olds have a considerably higher trend LFPR, their LFPR is on a separate vertical axis (on the right). Each series shows a different pattern for male high school graduates. Trend LFPR among the 25–54 year olds has been declining steadily but is projected to flatten in the coming years. By contrast, the dramatic decline in trend LFPR for teens is expected to continue through 2020. Finally, trend LFPR for the 55–70 year olds has modestly increased since the early 1990s but is projected to fall starting later in this decade.

Panel B of figure 2 shows our estimates of trend LFPR for male and female high school graduates and college graduates who are aged 25–54. Among both genders, college graduates have a higher trend LFPR than high school graduates; and among both high school graduates and college graduates, males have a higher trend LFPR than females. The trend LFPR among males of prime working age has fallen over the past two decades, particularly among high school graduates. For females of prime working age, trend LFPR rose during the 1980s and 1990s and has been essentially flat since.

For figure 3, we amass the 44 different trend LFPRs into an aggregate trend LFPR for the population aged 16–79.[9] The model (black line) accurately predicts the increase in actual LFPR (blue line) during the 1980s and 1990s and the subsequent decrease during the 2000s. Since 2000, trend LFPR has fallen 1.2 percentage points, representing just under half of the 2.7 percentage point decline in the actual LFPR of those aged 16–79 over this period.

In figure 4, we decompose the total 1.2 percentage point decline in trend LFPR between 2000 and 2011 into two factors: the changes in the age distribution of the population (column 3 – column 1), holding trend LFPR fixed at the 2011 level (column 4), and the changes in trend LFPR within each age group (column 4 – column 2), holding the age distribution fixed at the 2000 level (column 1). Two-thirds (or 0.8 percentage points) of the total 1.2 percentage point decline in trend LFPR over the past 11 years is attributable to the change in the age distribution. The majority of this effect is caused by a 4 percentage point increase in the fraction of the population out of prime working age (25–54). The remaining one-third is due to other demographic shifts (such as changes in gender and educational attainment within age groups), as well as changes in labor force participation behavior within groups. A significant part of the latter is driven by the sharp 13.5 percentage point drop in teen LFPR.

As of late 2011, the actual LFPR for 16–79 year olds is 1.1 percentage points below trend LFPR, representing the largest deviation from the model's prediction over the period that we study, 1987–2011 (see figure 3). Indeed, over the 2008–11 period, we find that only one-quarter of the 1.8 percentage point decline in actual LFPR for 16–79 year olds can be attributed to demographic factors. Therefore, we would expect some improvement in the LFPR as the economy recovers and those out of the labor force return to work.

### LFPR projection through 2020

We use our statistical model and age-by-gender population projections from the U.S. Census Bureau to forecast the aggregate trend LFPR for the population aged 16–79 over the next decade (the black line in figure 3).[10] We expect shifting demographics to continue to put downward pressure on the LFPR for the foreseeable future. By 2020, we project that, all else being equal, the trend LFPR for those aged 16–79 will be 65.4%—roughly 3 percentage points lower than the December 2011 trend rate of 68.2%. Assuming the LFPR for those aged 80 and older remains constant at the 2011 rate and that age group's population share grows in accordance with U.S. Census Bureau projections, we forecast the trend LFPR of those aged 16 and older to be 62.4% by 2020—2.7 percentage points lower than it currently is. Roughly two-thirds of the decline is due to the aging of the labor force (in particular, baby boomer retirements).



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## Conclusion

Labor force participation has fallen significantly over the past decade. At least some of this decline is due to the recent deep recession and lackluster recovery. Additionally, for quite some time,[11] economists have forecasted that shifting demographics, particularly in the age structure of the population, would put downward pressure on labor force activity. We estimate that just under half of the decline in LFPR since 2000 is due to such factors. We expect these demographic patterns to continue for at least the next decade, and likely far beyond, as the large baby boom cohort continues the transition into retirement. Therefore, standard labor market measures used to compute gaps in resource utilization, such as the employment-to-population ratio and the LFPR, should reflect these long-running patterns.

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[1] Changes in public and private pension rules have also likely played an important role in pushing back retirement. See, e.g., Stephanie Aaronson, 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*, Vol. 37, No. 1, pp. 69–154.

[2] Daniel Aaronson, Kyung-Hong Park, and Daniel Sullivan, 2006, "The decline in teen labor force participation," *Economic Perspectives*, Federal Reserve Bank of Chicago, Vol. 30, First Quarter, pp. 2–18; and Christopher L. Smith, 2011, "Polarization, immigration, education: What's behind the dramatic decline in youth employment?," Finance and Economics Discussion Series, Board of Governors of the Federal Reserve System, working paper, No. 2011-41, October.

[3] We restrict our sample to those aged 16–79, since the CPS data report all individuals over age 80 as being age 80 in some years.

[4] For this measure, we use the gap between gross domestic product (GDP) and the Congressional Budget Office's estimate of potential GDP.

[5] Because of the negligible sample sizes, we do not estimate the model for college graduates aged 16–19, those with some postcollege education aged 16–19, and those with some postcollege education aged 20–24. This leaves us with $(5 \times 2 \times 5) - (2 \times 3) = 44$ groups.

[6] See, e.g., Smith (2011). The minimum wage is measured in deviations from the sample mean. The wage ratio is measured from the CPS March supplement and estimated using the Hodrick–Prescott filter.

[7] Life expectancies are taken from Felicitie C. Bell and Michael L. Miller, 2005, "Life tables for the United States Social Security area, 1900–2100," Social Security Administration, Office of the Chief Actuary, actuarial study, No. 120, August. Missing years are linearly interpolated.

[8] In addition to CPS data, we use the U.S. Census Bureau's population data and projections to calculate trend LFPRs. The population data come from the U.S. Census Bureau's national Quarterly Intercensal Resident Population files (1987–89) and the Monthly Postcensal Resident Population estimates (1990–2010). The U.S. Census Bureau's 2011–20 population projections are from the 2008 National Population Projections, which were released on August 14, 2008. Discontinuities between series are smoothed.

[9] The aggregate trend LFPR is weighted up from the individual's age-, gender-, and education-specific group trend rates based on a group's time-varying share of the overall population. Our aggregate measure applies our estimates of each group's trend LFPR to U.S. Census Bureau population data and projections (see note 8).

[10] Educational attainment, marital status, and children projections are not available. We use a separate statistical model to project educational attainment by gender and race for 2011–20. For marital status and presence of children, we assume race- and gender-specific rates of marriage with and without a young child (under age 6) are held constant at the 2010:Q4 rate for 2011–20.

[11] See Daniel Aaronson and Daniel Sullivan, 2001, "Growth in worker quality," *Economic Perspectives*, Federal Reserve Bank of Chicago, Vol. 25, Fourth Quarter, pp. 53–74.