

# Methodology behind the Federal Reserve Bank of Atlanta's Labor Force Participation Dynamics

<https://www.frbatlanta.org/chcs/labor-force-participation-dynamics>

By [Ellyn Terry](#)

The methodology for decomposing labor force participation is described below in four sections. Section A explains how the demographic groups used in this analysis were chosen. Section B describes the creation of nonparticipation categories. Section C shows how each nonparticipation category varies by broad demographic group. Finally, in section D, the formula for decomposing the change in each category into demographic and nondemographic components is described.

## A: Defining Demographic Groups

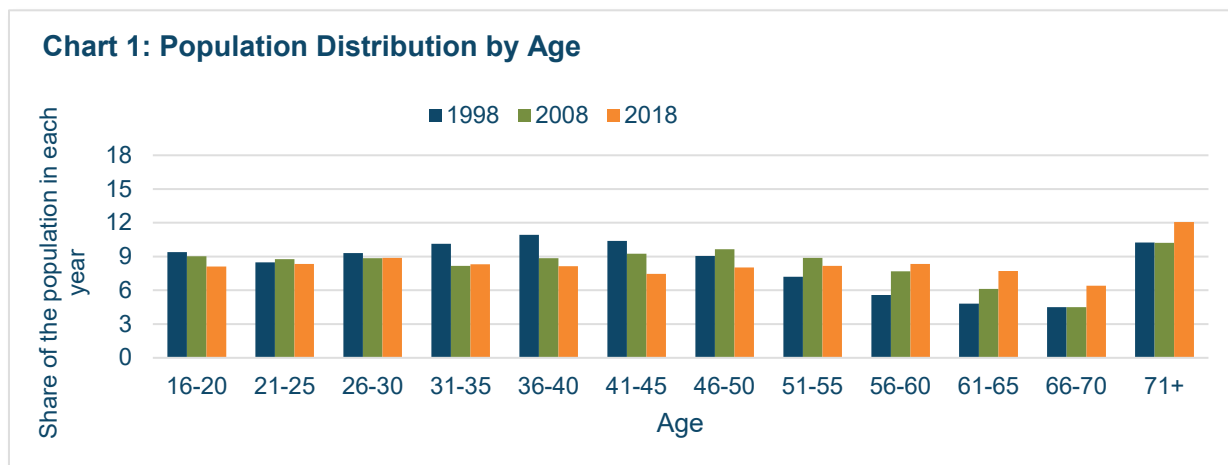
The data we use come from the Current Population Survey (CPS), a monthly survey of about 60,000 households jointly produced by the U.S. Census Bureau and the U.S. Bureau of Labor Statistics (BLS). While the CPS provides timely data on labor force participation (LFP) and rich demographic detail, the size of the monthly sample restricts how much of this detail can be used. Thus, some demographic characteristics must be grouped. Because this grouping can affect how much of the change in nonparticipation is attributable to demographic changes versus other factors, we give careful consideration to how these groups are constructed.

In general, groupings are made where LFP rates are similar (for example, 16 year olds are grouped with 17 year olds) so that the resulting final groups for a particular characteristic have differing LFP rates. In addition, it is important that the distribution of the population is changing across demographic groups over time, otherwise differing LFP rates between groups will not help explain changing demographics. Finally, data should be available for the group throughout the period of examination. The use of these criteria reflects the balancing act of trying to capture as much of the impact of changing demographics on LFP as possible while also maintaining enough observations to perform the decompositions at the group level. In addition to isolating the impact of changing demographics, we created an [interactive tool](#) to examine LFP changes among specific demographic groups. Therefore, in some cases demographic groups are formed because they may be of interest to researchers and policy makers.

This examination of the data using these criteria reveal three demographic trends later found to be particularly relevant to understanding changes in LFP: an aging population, a rising fraction of the population with an associate's degree or higher, and an increasing Hispanic share of the population.

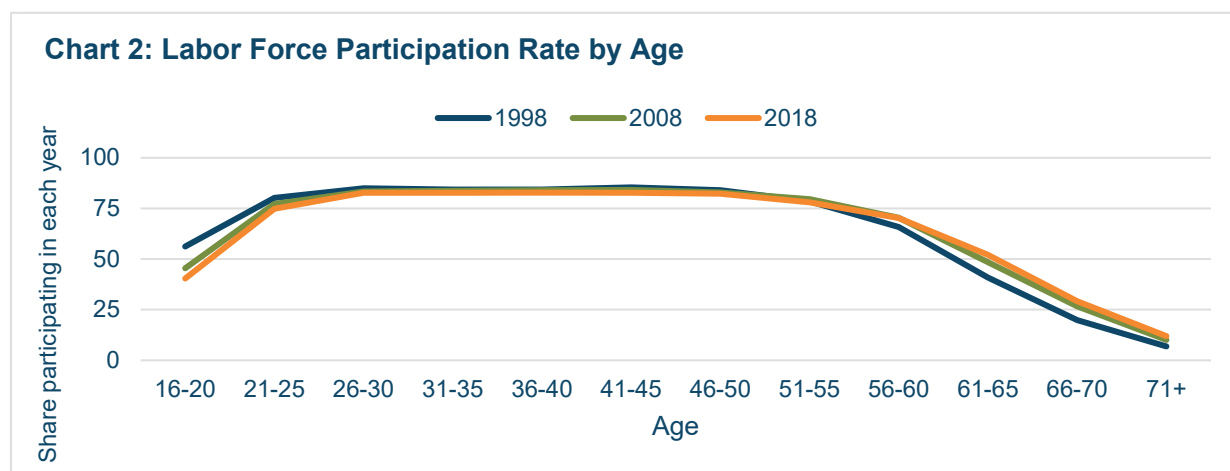
### *1. An older population*

The birth rate in the United States surged during the 20 years after World War II. The so-called baby boomer generation—people born between 1946 and 1964—caused a bulge in the population's age distribution. These baby boomers are now graying. The oldest of them turned 62 and became eligible for Social Security retirement benefits in 2008—right in the middle of the Great Recession. This has led to a significant shift in the age distribution of the population during the past two decades (see chart 1 below).



Source: Current Population Survey from the U.S. Bureau of Labor Statistics  
 Author's calculations.

This shift in the age distribution has had significant implications for the overall LFP rate. As shown in chart 2, LFP varies considerably over the life cycle. The rate of participation tends to be low among young individuals and high and relatively stable between 26 and 50, after which it begins to decline. As chart 2 also shows, the LFP rate within age groups has also changed over time. In particular, the LFP rate has declined for young, prime-aged individuals and increased for older individuals.



Source: Current Population Survey from the U.S. Bureau of Labor Statistics, author's calculations

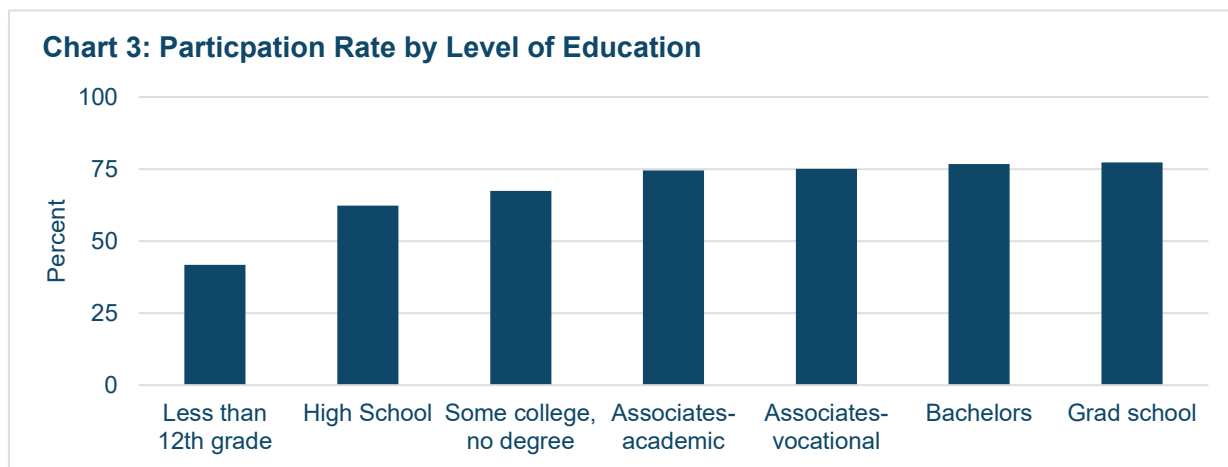
Due to the differences in LFP rates by age and the change within age categories that has occurred over time, age is grouped into five-year age buckets, except for those 71 and older. This age cohort is grouped into one category due to relatively low LFP rates among that group and a lack of specific age information after age 79.<sup>1</sup> The combination of the shift in the age distribution of the population toward retirement age combined with the relatively low rates of participation among older age-cohorts shown above has

<sup>1</sup> In the Current Population Survey, age is topcoded at 90 before 2003, at 80 between 2003 and mid-2004, and at 85 from mid-2004 on. In 1998, the LFP rates of 71 to 90+ year olds ranged from 14.6 percent to 3 percent.

provided a substantial downward influence on overall LFP in recent years, some of which has been offset by higher LFP rates among older generations.

## 2. A more educated population

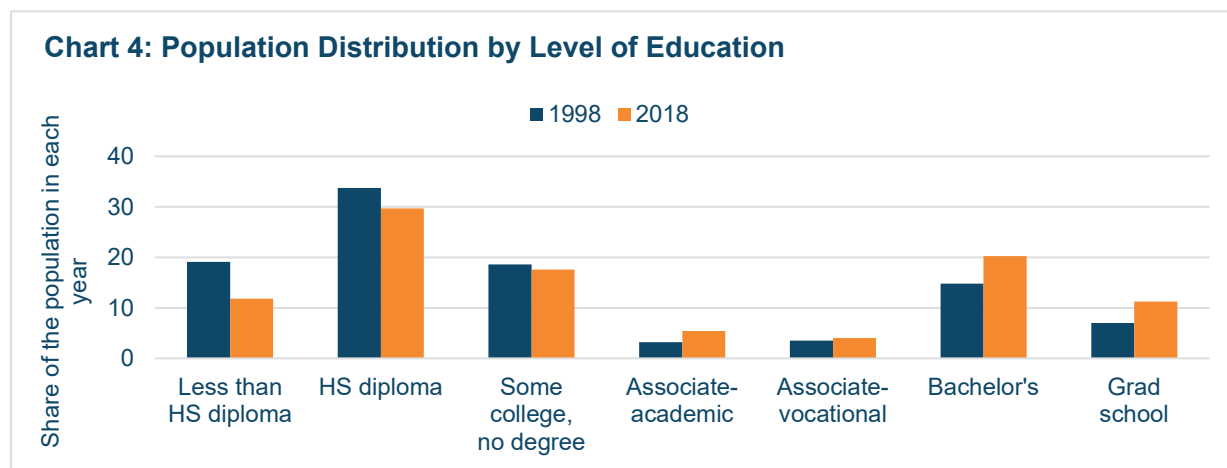
LFP tends to be higher for individuals with more years of schooling, as shown in chart 3 below. In particular, individuals with less than a high school diploma are the least likely to participate. Having a high school diploma or some college is associated with relatively greater participation. People with an associate, bachelor's, or graduate degree have the highest levels of participation.



Note: Data depict the average between 1998 and 2018.

Source: Current Population Survey from the U.S. Bureau of Labor Statistics, author's calculations

The population has also been becoming more educated over time. As chart 4 shows, the share of the population with less than a high school diploma is almost half of what it was two decades ago. Likewise, the share with only a high school diploma or some college (but no degree) is lower. In contrast, the share possessing an associate, bachelor's, or graduate degree has risen from 29 percent to 41 percent of the population during the last two decades.

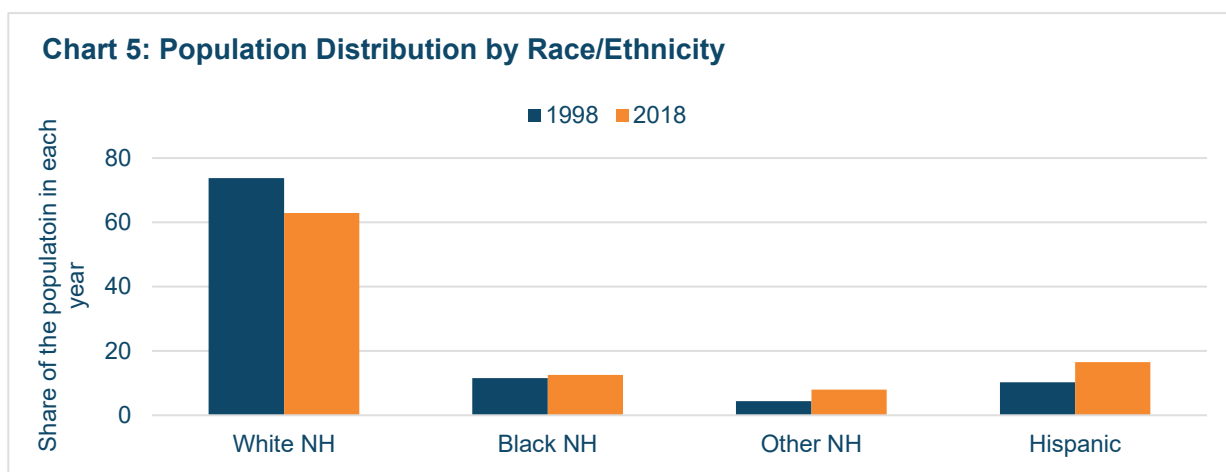


Source: Current Population Survey from the U.S. Bureau of Labor Statistics, author's calculations

Based on the different LFP rates and trends over time described above, education is grouped into three categories: Less than HS diploma, HS or some college, and Associate degree or higher.<sup>2</sup> This trend toward more education combined with the fact that those with a degree tend to be more likely to participate has pushed LFP higher than it otherwise would have been had the education distribution of the population not changed.

### 3. A more diverse population

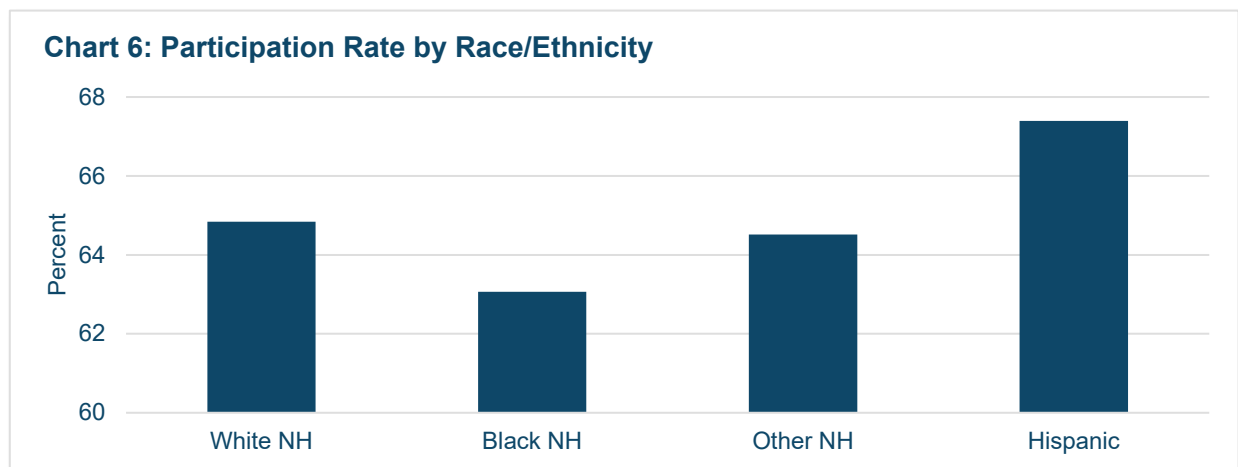
The racial and ethnic composition of the U.S. population has also changed during the last two decades. As chart 5 shows, the white non-Hispanic (NH) share has declined from 74 percent in 1998 to 63 percent in 2018. The share of the population that is black NH and other NH have increased somewhat, growing 1 percentage points and 4 percentage points respectively. But the largest change has been in the Hispanic share of the population, which has grown from 10 percent to 17 percent of the population.



Source: Current Population Survey from the U.S. Bureau of Labor Statistics, author's calculations

The Hispanic population also tends to participate more in the labor market. As chart 6 shows, the average rate of participation during the last two decades has been 67 percent among Hispanics, 65 percent among white NH, 63 percent among black NH, and 65 percent for other non-Hispanics.

<sup>2</sup> We define associate degree as any kind of associate degree, including vocational, technical, or academic.



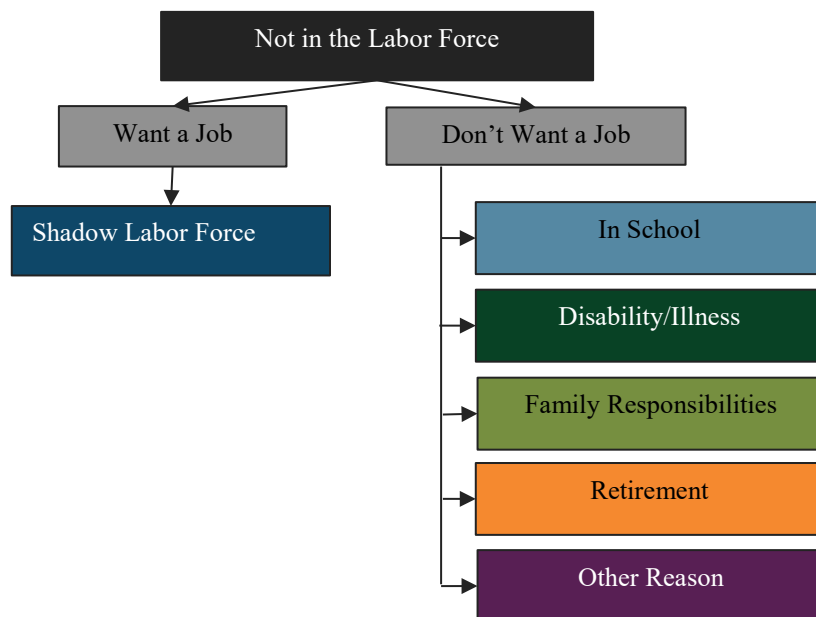
Note: Data depict the average between 1998 and 2018. NH means non-Hispanic. Source: Current Population Survey from the Bureau of Labor Statistics, Author's calculations.

Using the criteria described at the beginning, the differing LFP rates between NHs and Hispanics and the large change in the share of the Hispanic population suggest the data should be grouped into NH and Hispanic. However, examining how the categories of nonparticipation have changed within race and ethnicity may be of interest to researchers and policy makers. Therefore, race/ethnicity are grouped into three categories: white and other NH, black NH, and Hispanic.

In the end, twelve age categories (16-20, 21-25, 26-30, 31-35, 36-40, 41-45, 46-50, 51-55, 56-60, 61-65, 66-70, and 71 or older), three education categories (less than a HS diploma, HS diploma or some college, and associate degree or higher), and three race/ethnicity categories (black NH, white or other NH, and Hispanic) are created. The data are also grouped by gender. Although the population distribution does not vary much by gender over time and therefore does not meet the criteria presented at the beginning of this section, the propensity to select some nonparticipation categories are very different for men and for women and thus may be of interest to researchers and policy makers. With gender included, a total of 216 demographic groups are created.

## B. Defining Nonparticipation Categories

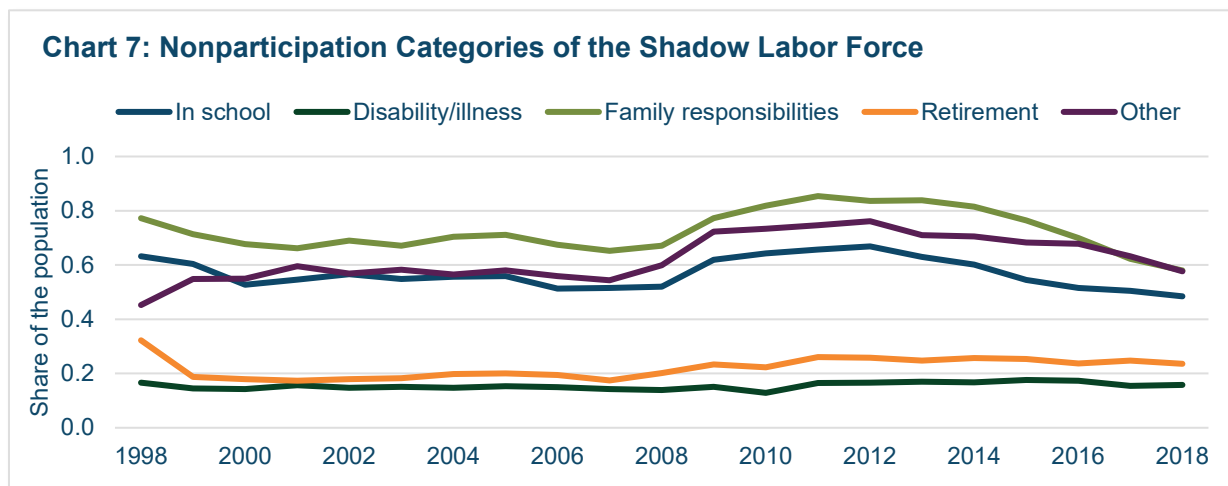
The monthly CPS data are used to generate frequently reported statistics such as the unemployment rate. A lesser-known feature of the survey is that it also gathers some information about the activities of those not in the labor force. Using the publicly available monthly microdata from the CPS, six mutually exclusive categories of nonparticipation are constructed, as the diagram shows.



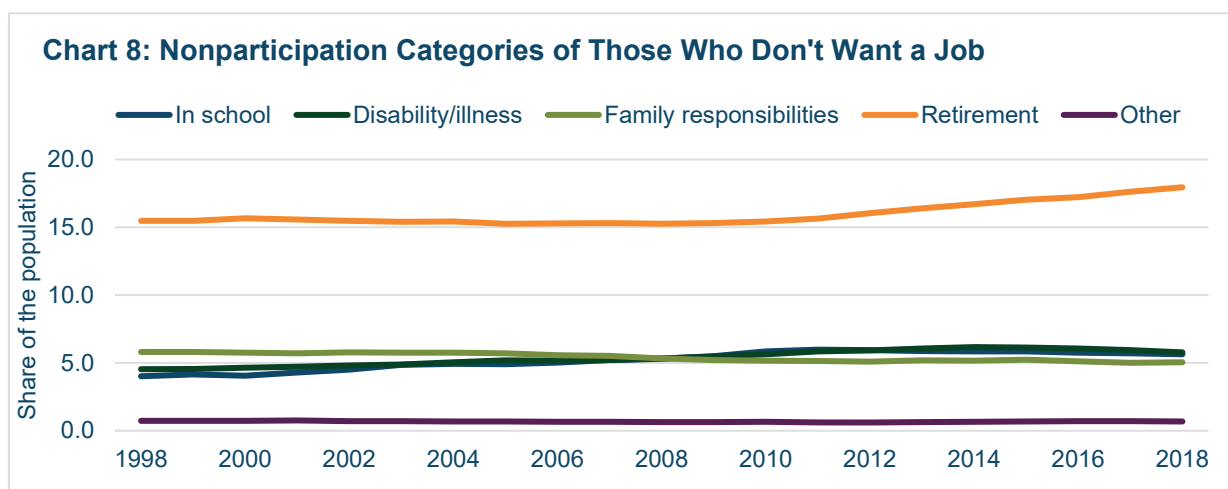
Individuals not in the labor force who want a job (the shadow labor force) are separated from those who don't want a job due to their relatively higher attachment to the labor market.<sup>3</sup> Individuals in the shadow labor force are about six times as likely to flow back into the labor force as those who do not want a job. For example, in 2018, 29 percent of the shadow labor force reentered the labor force the next month compared to 5 percent of individuals who did not want a job.<sup>4</sup> Further, as chart 7 shows, the share of the population in the shadow labor force moves with the business cycle, increasing at the onset of the Great Recession and declining slowly in its aftermath. Thus, the shadow labor force category may provide useful insight into the effect of business cyclical conditions on LFP.

<sup>3</sup> Everyone not in the labor force are asked their primary nonparticipation activity, so technically it is possible to create only five categories of nonparticipating instead of six (thus not separating out the shadow labor force). Fujita (2014) also separates out those who want a job, calling them the "discouraged" instead of the "shadow labor force." He treats them separately because nonparticipation due to economic and noneconomic reasons are strongly negatively correlated.

<sup>4</sup> Flow rates back into the labor force are higher among those who want a job for each nonparticipation category. Compared to individuals who do not want a job, individuals who want a job but are in school, or those who cite family responsibilities are three times as likely to flow back into the labor force, those who are retired are seven times as likely to flow back into the labor force. Individuals who are too sick or disabled to work were 10 times as likely to flow back into the labor force if they wanted a job compared to those who did not want a job.



Source: Current Population Survey from the U.S. Bureau of Labor Statistics, author's calculations



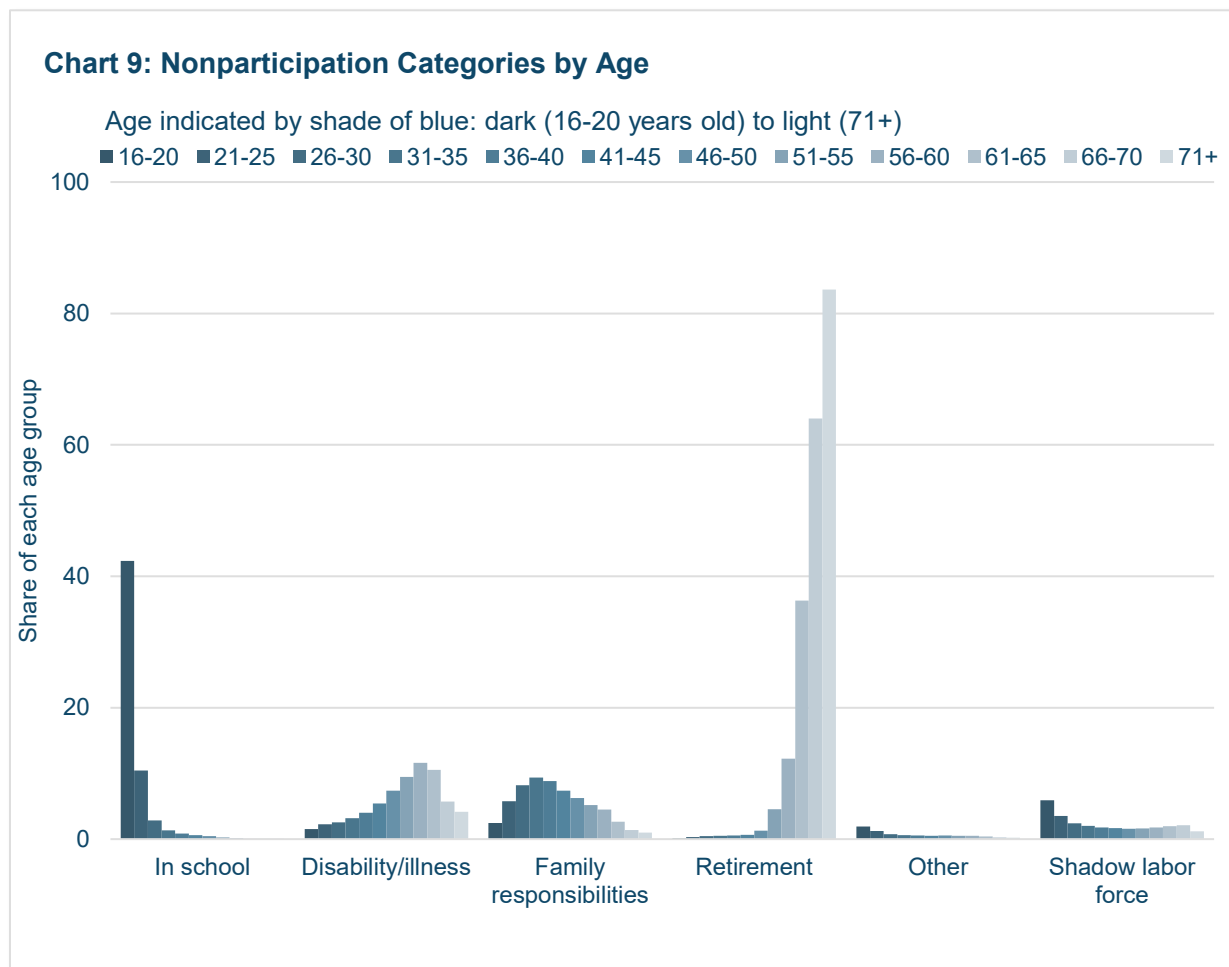
Source: Current Population Survey from the U.S. Bureau of Labor Statistics, author's calculations

### C. Nonparticipation Categories by Demographic Groups

This section shows how each of the six nonparticipation categories vary by the broad demographic groups described above: twelve age categories (16-20, 21-25, 26-30, 31-35, 36-40, 41-45, 46-50, 51-55, 56-60, 61-65, 66-70, and 70 or older), three education categories (Less than a HS diploma, HS diploma or some college, and associate degree or higher), and three race/ethnicity categories (black NH, white or other NH, and Hispanic) and gender.

Categories of nonparticipation vary the most by age. Being in school is a very common among 16-20 year olds, but school as a reason for not participating quickly declines in older groups. Forty-two percent of 16-

20 year olds do not want a job because they are in school, compared to 10 percent of 21-25 year olds and less than 3 percent of 26-30 year olds.<sup>5</sup> Family responsibilities gradually become more common with age, peaking among individuals 25 to 40 years old, after which they gradually decline. Likewise, the propensity of individuals to say they are too sick or disabled to work increases with age and is most common among those age 45 to age 60. After age 60, the likelihood of falling into the disability/illness is less common as individuals are more likely to say they are retired instead (see chart 9).



Note: Data depict averages between 1998 and 2018.

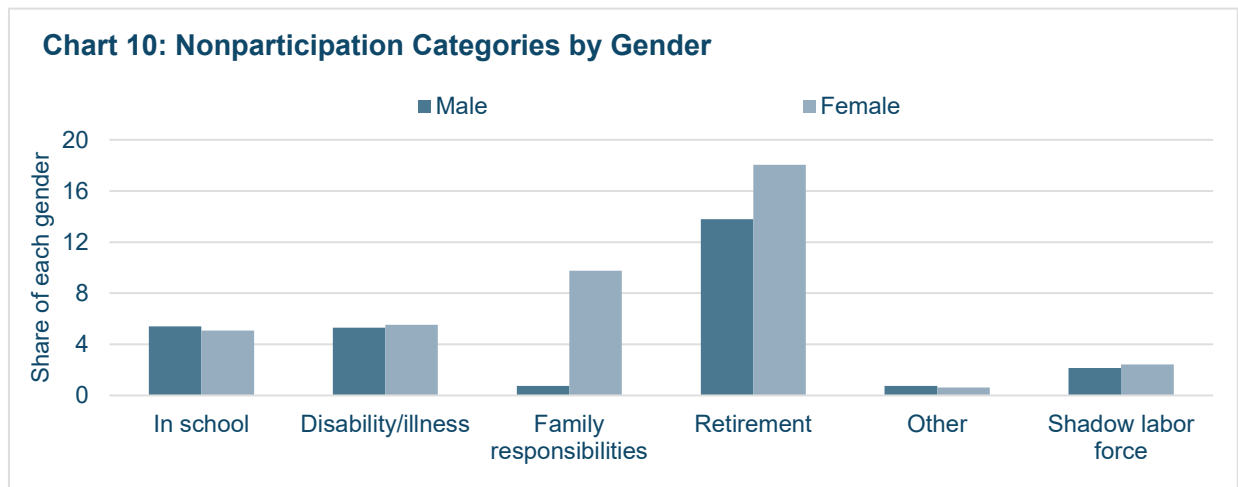
Source: Current Population Survey from the U.S. Bureau of Labor Statistics, author's calculations

The largest differences between men and women are that women are more likely to cite family responsibilities and say they are retired (see chart 10). Individuals of Hispanic descent are more likely to cite family responsibilities (see chart 11). Hispanic individuals are more likely to be in school, but this partially reflects the fact that the Hispanic population is slightly younger on average. Among 16-25 year olds in 2017, 31 percent of the Hispanic population did not want a job because they were in school versus 30 percent for the NH population. Hispanics are also less likely to say they are retired, and this lower likelihood holds for those 61 and over. In 2017, 56 percent of the 61 years and over Hispanic population were retired compared to 63 percent of the 61 years and over NH population. Looking across education

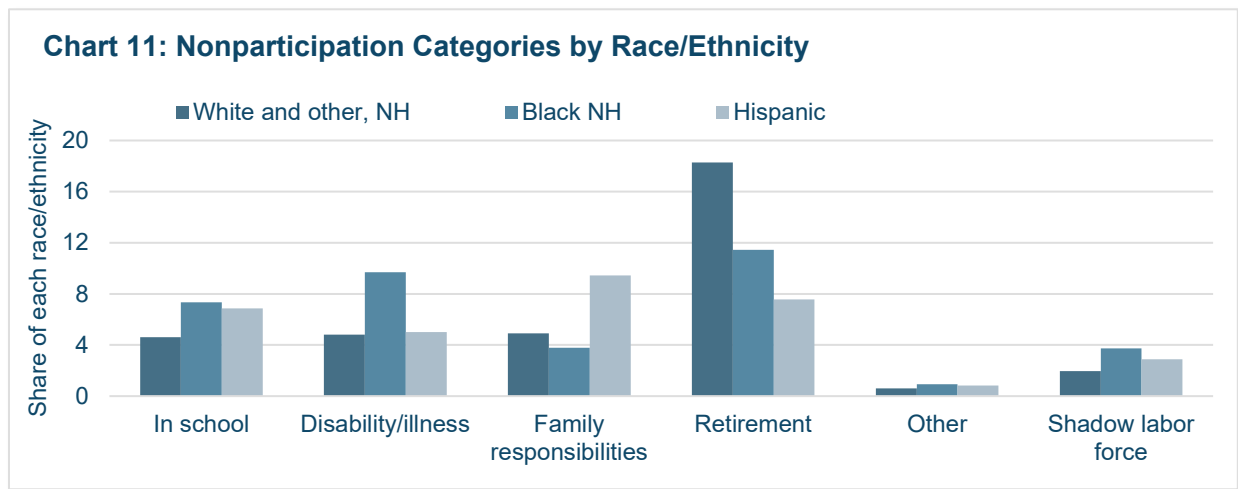
<sup>5</sup> The share of the population not participating because they are in school is not the same as the share of the population that are in school because many persons in the labor market are also in school.



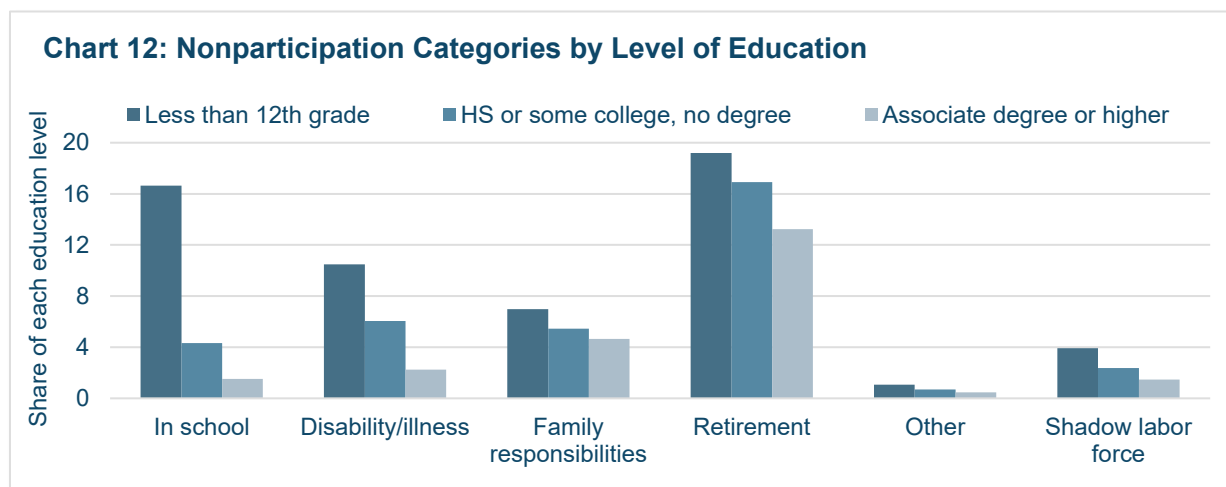
levels shows that the less education an individual has, they more likely they are to be in each nonparticipation category.



Note: Data depict averages between 1998 and 2018.  
 Source: Current Population Survey from the U.S. Bureau of Labor Statistics, author's calculations



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## D. Method for Demographically Adjusting Nonparticipation Rates

For each of the 216 demographic groups ( $g$ ), the share of the total civilian noninstitutionalized population 16 years of age and older that group represents ( $PopShare_g$ ) and the share not participating for the six nonparticipation categories listed above ( $NonPartRate_c$ ) is computed. For each time period  $t$  (quarterly data starting in 1998Q1) and each nonparticipation category  $c$ , the nonparticipation rate of the population is the sum of the nonparticipation rate for each demographic group weighted by their share of the population.<sup>6</sup>

The change in the nonparticipation rate for each category ( $NonPartRate_c$ ) between two time periods decomposed into the part accounted for by changes in the population share between demographic groups ( $DemogEffect_g$ ) and the part stemming from a change in the nonparticipation rate within each demographic group ( $BehaviorEffect_c$ ). This “behavior effect” reflects differences in group preferences as well as the impact of many other factors such as the state of the economy, trade policies, health trends, etc.<sup>7</sup> It also reflects changing demographics that cannot be controlled for here because of data limitations.

This methodology is often referred to as a “shift-share” or “within-between” decomposition. When comparing the two periods, a chain-weighted approach is used, giving equal weight to both periods.<sup>8</sup> The decomposition, shown in equations 1 and 2 below, compares the change between periods  $t_0$  and  $t_1$ , where  $t_1 > t_0$ .

<sup>6</sup> None of the data are seasonally adjusted.

<sup>7</sup> For more information on these factors see Abraham and Keeney (2018).

<sup>8</sup> See Fernald et al. (2017) or Shimer (1999) for other examples of this.

$$\begin{aligned}
 \text{Equation 1: } BehaviorEffect_c &= \sum_{g=1}^{96} \frac{PopShare_{g,t_1} + PopShare_{g,t_0}}{2} \\
 &\quad \times (NonPartRate_{g,c,t_1} - NonPartRate_{g,c,t_0}) \\
 \text{Equation 2: } DemogEffect_c &= \sum_{g=1}^{96} \frac{NonPartRate_{c,g,t_1} + NonPartRate_{c,g,t_0}}{2} \\
 &\quad \times (PopShare_{g,t_1} - PopShare_{g,t_0})
 \end{aligned}$$

The total change in the nonparticipation rate between  $t_0$  and  $t_1$  accounted for by behavioral differences is the sum of the behavior effects for each category. Likewise, the sum of the demographic effects for each category is the change in total nonparticipation accounted for by changes in demographics. The sum of the behavior (eq. 3) and demographic (eq 4) effects for each category, plus a small residual that arises when there are no people in a particular demographic group in one of the periods of comparison, is the total change in nonparticipation between the two periods, as shown in equation 5 below.<sup>9</sup>

$$\text{Equation 3: } BehaviorEffect = \sum_{r=1}^6 BehaviorEffect_c$$

$$\text{Equation 4: } DemogEffect = \sum_{r=1}^6 DemogEffect_c$$

$$\text{Equation 5: } \Delta NonPartRate = BehaviorEffect + DemogEffect + e$$

When the nonparticipation rate increases, the participation rate decreases by the same amount. Thus, the decomposition can be used to account for the sources of the change in overall LFP attributable to demographic changes and changes that result from other factors for each nonparticipation category.

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<sup>9</sup> There are only two data points for which there is no data for a specific demographic group. First, in the fourth quarter of 1999 there are no 16-20 year old Hispanic men with at least an associate degree in the survey. Second, in the fourth quarter of 1998 there are no 16-20 year old black NH men with at least an associate degree in the survey.