Labor Force Participation in the 21st Century

Aditi Singh

Abstract

The labor force participation rate in the United States has exhibited a sharp drop after the 2008 recession. Using the Current Population Survey, this paper first disentangles the trends in the participation rate along various demographic groups using shift-share analysis. Next, using time series, cross-section and individual variation, it examines the determinants of an individual's participation decision. Finally, it concludes with a discussion of the plausibility of various theories explaining the decline in participation from a labor supply lens.

1 Introduction

The labor force participation rate is defined as the ratio of the adult population (aged 15 and above) either working or looking for work and the total non-institutionalized, civilian working-age population. It is a measure of an economy's active workforce. Figure 1(a) depicts the labor force participation rate in the United States over the past 70 years. Participation started increasing in 1960s, consistent with labor market reforms that allowed women to enter the workforce. The participation rate rose from 59% in 1948 to 67% in 1990. After that, the increase plateaued out. Participation started falling after 2000, followed by a sharp decline during the 2008 recession. The participation rate decreased from its peak of 67% to almost 62%, a decline
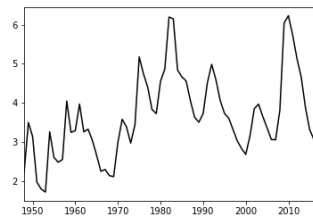
Figure 1: Evolution of labor force statistics across time
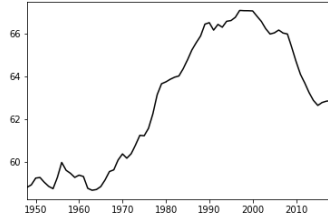
(a) Labor force participation rate
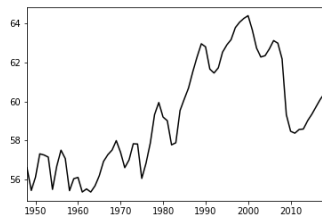
(b) Employment rate

(c) Unemployment rate

of 5 percentage points. This is a huge drop and corresponds to almost 15 million people leaving the labor force. Curiously, labor force participation has not increased even after a decade post recession. This decrease and the subsequent failure of the labor force participation rate to rise to pre-recession levels is the focus of this paper.

Figure 1(b) and (c) plot the employment and (modified) unemployment rate[1] in the US. In contrast to the participation rate, these two are very cyclical. In fact, even though unemployment rose dramatically during the 2008 recession, it was back to its pre-recession level in 2014. If a large portion of the workers who are currently out of the labor force represents workers who are temporarily out of the labor force, then the unemployment rate by itself might not be a good measure of the slack in the economy. So does the sustained decrease in labor force participation signal a deeper weakness in the

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[1]The unemployment rate is defined as the proportion of unemployed people in the total labor force. I denote the (modified) unemployment rate here to mean the proportion of unemployed in the total population.

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labor market, one that is not captured by the unemployment rate, or is it a permanent change in trend caused by something unrelated to the recession?

The literature examines three broad categories of factors that affect the participation rate: labor supply, labor demand and structural factors. Labor supply factors include improvements in the options available to non-workers, increases in the costs of participating in the labor force or changing attitudes towards work. The outside options of workers have seen a rise with increases in the availability and generosity of social insurance programs like disability insurance (Eberstadt (2016)), Supplemental Nutrition Assistance Program (SNAP) (East (2018)) and subsidized healthcare (Garthwaite, Gross and Notowidigdo (2013)). Lack of childcare support has made it costly for parents to work, forcing some of them to stay home to look after the children (Rossin-Slater (2016)). Aguiar et al. (2017) use the American Time Use Survey to show that the value of leisure has increased for the younger generation.

Labor demand factors include increased import competition, particularly from China, and labor displacing advances in technology. Charles et al. (2016) find that the decline in manufacturing jobs during 2000-2007 was almost entirely offset by increase in employment in housing. From 2007-11, the housing boom ended but decline in manufacturing continued. Autor, Dorn and Hansen (2013) find that growth in imports from China led to higher unemployment, lower participation and reduced wages in local markets that were more exposed to these imports. Other works like Acemoglu et al. (2016), Bloom et al. (2019) also support this. Yagan (2018) explores the possibility of negative hysteresis and finds that low local labor demand combined with mobility frictions contributed to falling employment. Autor, Dorn and Hansen (2015) examine susceptibility to computerization, and find sharp declines in local manufacturing employment leading to net increases in both unemployment and non-participation. These declines are much larger for non-college educated workers. Acemoglu and Restrepo (2017) look at a model where robots exert both a negative displacement effect as well as a positive productivity effect, but find the net effect to be negative quantitatively.

Structural factors that affect the labor market include increase in minimum wages (Clemens and Wither (2019), Jardim et al (2017)), rise in occupational licensing (Johnson and Kleiner (2017)), increased skill mismatch (Sahin et

Figure 2: Aggregate Non-participation Rate

(a) NPR for entire population

(b) NPR for persons less than 65 years old
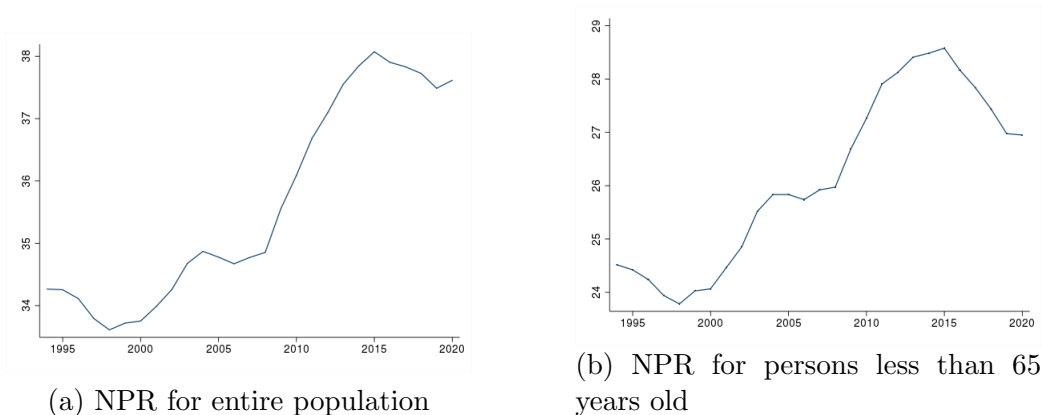
al. (2014)), spatial mismatch (Andersson et al. (2018)), reduced geographic mobility (Molloy, Smith and Woznaik (2011)) and even incarceration (Doleac (2016)). Abrahams and Kearney (2019) compare all these three categories and find that it is the demand factors that are driving the decline in labor force participation.

The most popular explanation for the decline in participation rate is population aging. The baby boomer generation reached retirement beginning in 2007-08 and began exiting the labor force participation. Figure 2 (a) plots the aggregate non-participation rate (the fraction of population out of the labor force) for the US. As can be seen, there was a sharp increase in the proportion of people out of the labor force in 2008. Aaronson et al. (2006) develop a cohort-based model to disentangle effects of an aging population from changes in a cohort's participation rate. Fallick and Pingle (2006) and Kudlyak (2013) further develop this model. Grigoli, Koczan and Topalova (2018) estimate the model for 17 advanced economies. Nevertheless, estimates of how much aging contributes to decline in labor force vary widely from 20% (Sherk (2012)) to 60% (Furman (2016)). However, figure 2(b) shows that even if we restrict our analysis to persons less than 65 years old, the proportion of people leaving the labor force has still increased, though there has been some recovery in recent years.

This paper contributes to the literature examining the decline in labor force

participation by taking a more comprehensive view from a labor supply perspective. I use survey data on a sample of the US population to explore heterogeneity along a variety of demographic margins. I pay special attention to the young and working age population, since this is a group whose participation should not be affected by the demographic transition. Finally, I exploit time series, cross sectional and individual variation to pinpoint the determinants of participation in the labor market.

The paper proceeds as follows: first, I do a descriptive analysis of the data. I try to analyse trends in non-participation rate (NPR) for several categories such as gender, age, education etc. Second, I look more directly at variables which indicate that workers are unable to join the workforce due to a weakness in the labor market. Finally, using individual, cross-sectional and time variation, I try to identify the main driver of increase in NPR.

Section 2 presents the data and methodology used in the paper. Section 3 presents results of the descriptive analysis. Section 4 lays down a model of determinants of an individual's participation decision, and section 5 concludes.

2   Data and Methodology

I use data from the Current Population Survey (CPS) (Ruggles et al. (2020)) of the Bureau of Labor Statistics. The CPS is a monthly survey of U.S. households that provides a wide range of information about employment, unemployment, hours of work, earnings, and people not in the labor force. Each individual in the CPS is interviewed for four months, followed by no interviews for eight months, and is then interviewed again for four months. Section 4 talks more about how I exploit the panel component of the CPS.

I use monthly data from January 1994 to February 2020. The CPS underwent a major redesign in 1994, and since many variables of interest to me are not available prior to 1994, so I take that as my starting point. Further, the decline in participation only began in 1999-2000, so it seems reasonable to restrict my analysis to post 1994. I do not use data after February 2020 since

that would reflect the effects of COVID-19.

The non-participation rate (NPR) is defined as the ratio of nonparticipants or people out of the labor force to the total population. It is equal to one minus the labor force participation rate. The NPR can also be thought of as the exit rate or the quit rate from the labor force.

Changes in aggregate NPR can either be driven by changes in the share of population of a group, or by changes in NPR of that group keeping population shares constant. For example, if the proportion of older workers increases in the US, then even holding their non-participation rate constant, aggregate non-participation will increase. However, if older workers today are more likely to work than older workers two decade ago, then that represents a change in NPR within the class of all older workers.

In order to disentangle the effects of various demographic groups on the aggregate NPR, I employ a standard shift-share analysis. Consider a set J of mutually exclusive and exhaustive groups along which we wish to decompose the NPR. At any time t, we have

$$NPR_t = \sum_{j \in J} NPR_{jt} \tag{1}$$

Now NPR_{jt} can further be decomposed as:

$$
\begin{aligned}
NPR_{jt} &= \frac{NP_{jt}}{TotalPop_t} \\
&= \frac{NP_{jt}}{Pop_{jt}} * \frac{Pop_{jt}}{TotalPop_t} \\
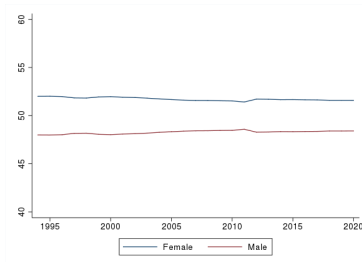&= NPR_{jt}^W * s_{jt}
\end{aligned}
$$

where s_{jt} is the population share of group j at time t, and NPR_{jt}^W represents the within group NPR. Thus the aggregate NPR becomes a weighted sum of the NPRs of different demographic groups:

$$NPR_t = \sum_{j \in J} NPR_{jt} = \sum_{j \in J} s_{jt} * NPR_{jt}^W \tag{2}$$
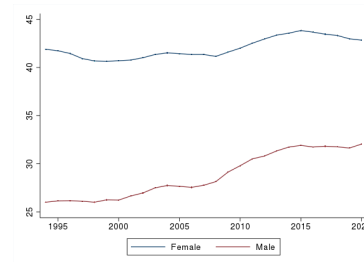
Figure 3: Non-participation rate by gender
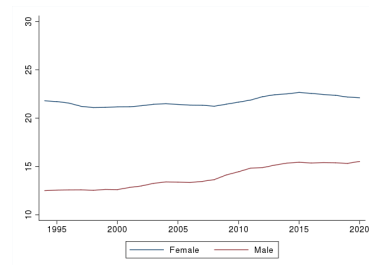
(a) Aggregate NPR

(b) Population share

(c) Within group NPR

Therefore, changes in the overall NPR of any group can be decomposed into changes in NPR within that group and changes in the population share of that group.

3   Analysis across demographic groups

I begin by taking a look at the non-participation rate divided along various demographic margins. First, I disaggregate the NPR by gender. As can be seen from figure 3(a), non-participation rates vary widely among both the genders. The NPR for females is much higher than that of males. Further, although male non-participation has been continuously increasing in the period under study, female non-participation was stable until 2008 and has shown a small increase since then. Delving further, we see that the population shares of both groups have been roughly stable, and so it is the within group trends that drive the aggregate trend.

Figure 4: Non-participation rate by marital status

(a) Aggregate NPR

(b) Population share

(c) Within group NPR
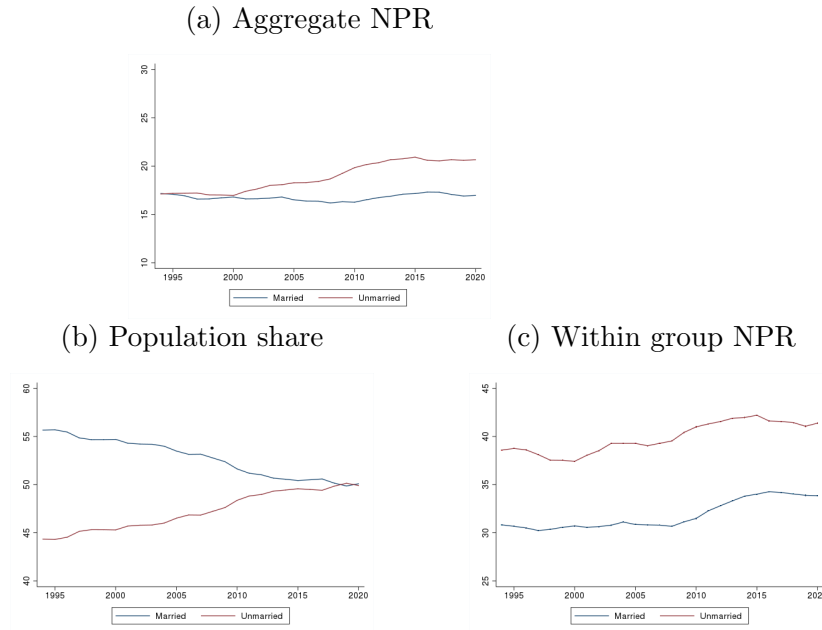
Second, I examine NPR by marital status. As can be seen in figure 4, NPRs differ widely among the two groups. The NPR for married people has remained roughly constant, while that for unmarried people has been steadily rising since 2000. The within group trends are broadly similar for the two categories, with NPR having remained roughly constant till 2008 and increased after that. However, the proportion of married people in the US has been steadily declining while that of unmarried people has been rising. Thus even though the within group trends are similar, the differential growth in population shares causes the aggregate NPR for unmarried people to dramatically diverge from that of married people.

Next, I examine NPR by race and ethnicity. The CPS has two major racial groups: whites and blacks/African-Americans. Figure 5 also plots data for people with Hispanic ethnicity, even though they can belong to any of the racial groups. The aggregate NPRs have remained relatively stable across the different racial groups, though whites have seen some increase in non-participation after 2008. The NPR for Hispanics has been continuously growing since 1994. Looking at the population share, the whites are the majority

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Figure 5: Non-participation rate by race

(a) Aggregate NPR

(b) Population share
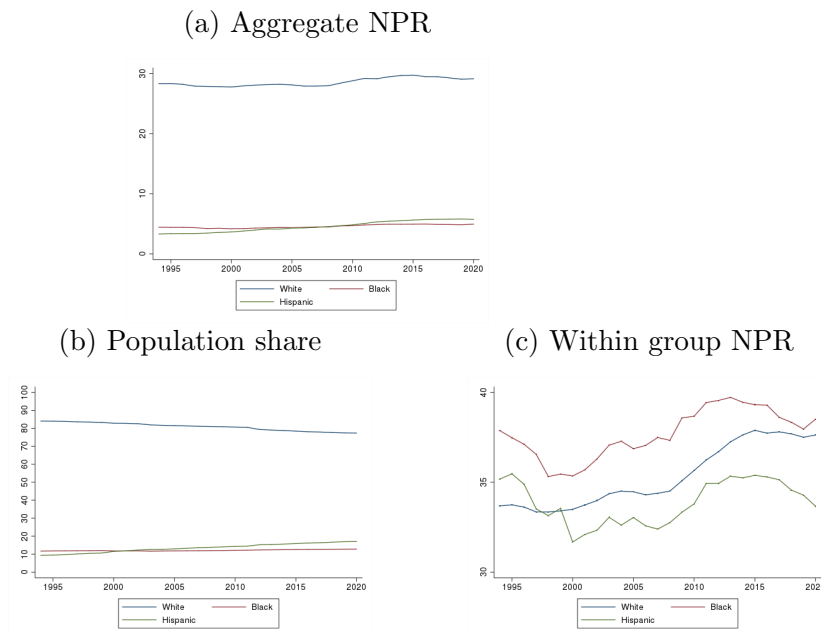
(c) Within group NPR

race group in the US, although their share has been slowly declining. However, the aggregate NPR hides significant within group heterogeneity. Non-participation rates are highest for blacks. The NPR for people with Hispanic ethnicity was higher than for whites in 1994, but decreased in the late 1990s. While NPR has been rising for both whites and blacks since 2000, it has started escalating for Hispanics only after 2007.

Next, I examine the variation in non-participation across age categories. For the purpose of analysis in this paper, we divide age into three categories: young adults (ages 16 to 24), working age group (ages 25 to 64) and older workers (ages 65 and above). Figure 6(b) shows that beginning in the late 2000s, the proportion of retired people in the population began to increase, while the proportion of young adults and working age people declined. Figure 6(a) plots the overall NPR for these three categories. The NPR for young adults as well as working age population increased in the late 1990s-early 2000s, but has recently declined. The NPR for retired workers, however, shows the opposite trend. It was decreasing up until the beginning of the Great recession, and saw a sharp increase thereafter. This is because the

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Figure 6: Non-participation rate by age

(a) Aggregate NPR

(b) Population share
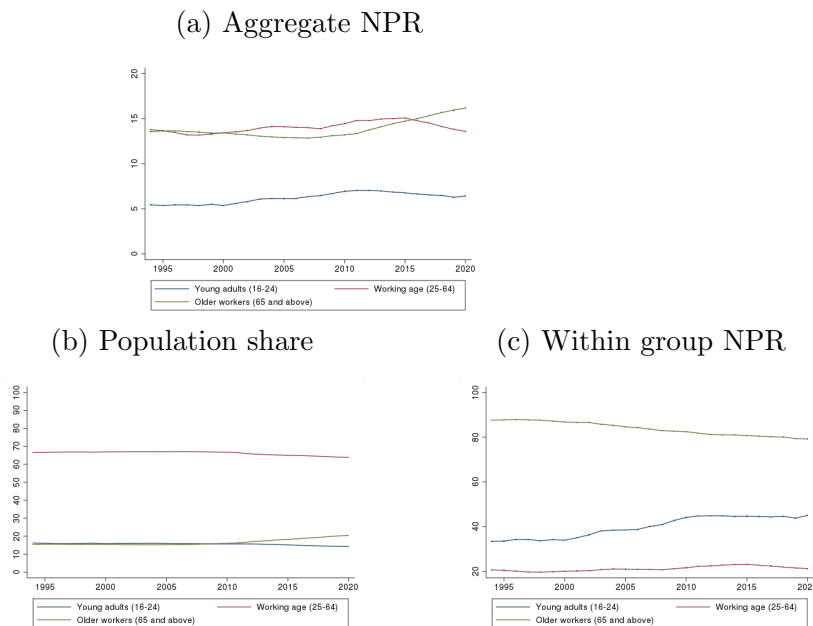
(c) Within group NPR

baby boomer generation started reaching retirement around this time and began to quit the workforce. However, looking at the within group trends for older workers, we see that non-participation has actually fallen for them. Thus, more older workers are staying in the labor force now as opposed to two decades earlier. This could be driven by rising life expectancy as well as increasing healthcare costs, forcing older individuals to stay in the labor force for longer.

I now move on to examining trends in NPR by education. Figure 7(a) plots the aggregate NPR for four education groups: high school dropouts, high school graduates, some college or associate degree and college graduates and above. Non-participation has increased for all groups except high school dropouts. Even for people with college degrees, the NPR has doubled from less than 4% in 1994 to more than 8% in 2020. Assuming that education is a proxy for skill, then this means that the more skilled workers are dropping out of the labor force, while the least skilled workers are staying on. This is a very curious result that has not been reported in the literature before, and warrants further inquiry.

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Figure 7: Non-participation rate by education

(a) Aggregate NPR

(b) Population share
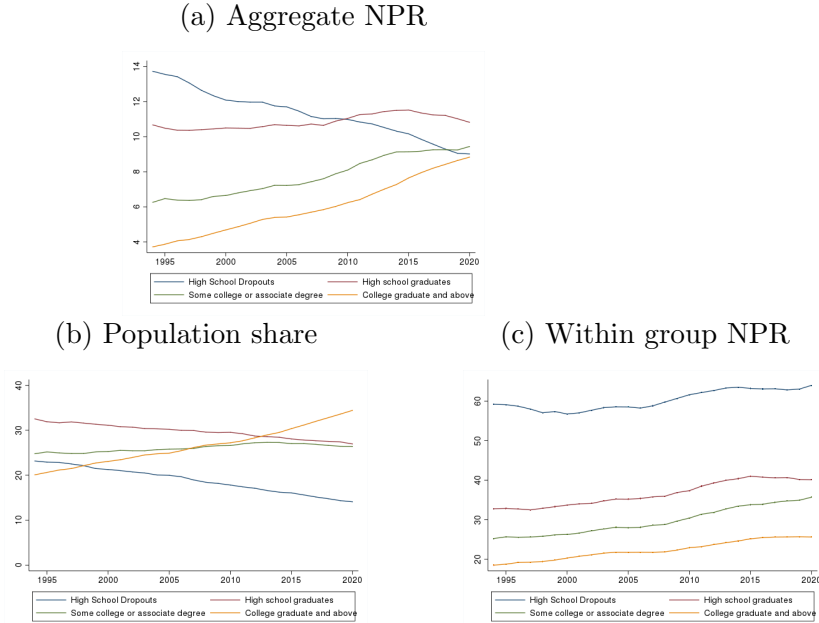

(c) Within group NPR

Figure 7(b) shows the evolution of the distribution of education across time. As we can see, there has been a movement towards acquiring greater education over time. The proportion of people with a high school degree or less has decreased over time, while the proportion of people with a college degree has increased sharply from 20% in 1994 to 34% in 2020. Figure 7(c) plots the within group NPRs. Within group trends are the same as aggregate trends for all groups except high school dropouts. Non-participation has been rising steadily across all education categories. NPR is highest for high school dropouts, and decreases as education increases. However, even here, we see the peculiar fact that non-participation has gone up even for the highest skilled groups. NPR for college graduate and above grew from 18% in 1994 to 24% in 2020, an increase of 6 percentage points.

Here, we can also see how the population shares and within group trends explain the aggregate NPR. For high school dropouts, the decrease in population shares is greater than the increase in within group NPR, and therefore the aggregate trend is decreasing. For high school graduates, the two cancel each other leaving the aggregate NPR almost constant. For people with some

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Figure 8: Non-participation rate by education across age categories

(a) Ages 16-24

(b) Ages 25-64

(c) Ages 65 and above
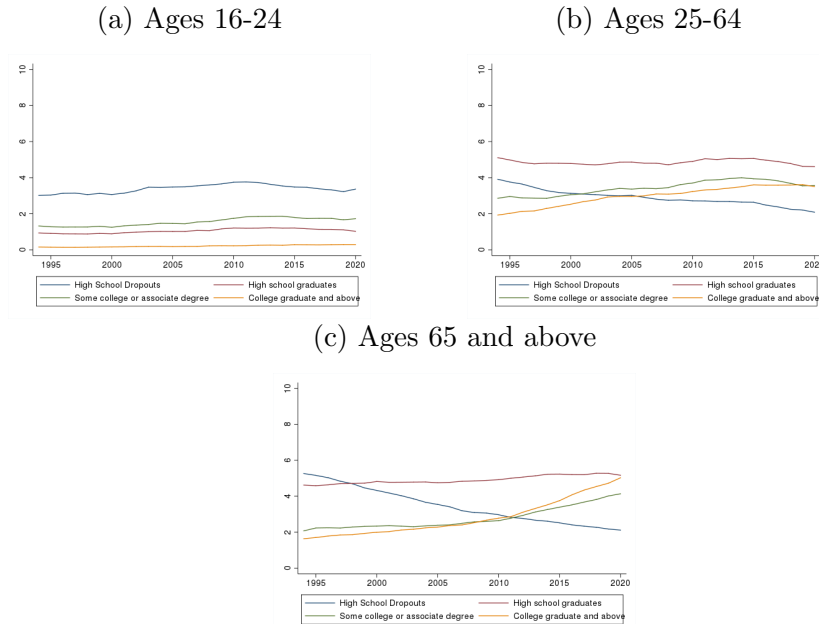
college or college graduates, the two work in the same direction resulting in an escalating aggregate NPR.

Figure 8 takes a closer look at the interaction between age and education. The education distribution for the young population has remained quite stable. The vast proportion of the young who are out of the labor force are high school dropouts, while only a very small fraction have college degrees. For the working age population, the picture is quite different. The proportion of high school dropouts who are out of the labor force has steadily decreased, while those with some college or college graduates has increased. The NPR for high school graduates has remained quite stable. The trends for retired workers are similar, albeit sharper. Only the least skilled retirees are still continuing to work, while higher skilled retirees are choosing to exit the labor force. With an increase in life expectancy and higher healthcare costs, it makes sense that the least skilled, who are also the lowest paid, are the ones who need to continue working in order to sustain themselves. The higher skilled retirees would have built up their savings in order to finance living and medical expenditures in old age.

Figure 9: Non-participation by education and gender for working age population

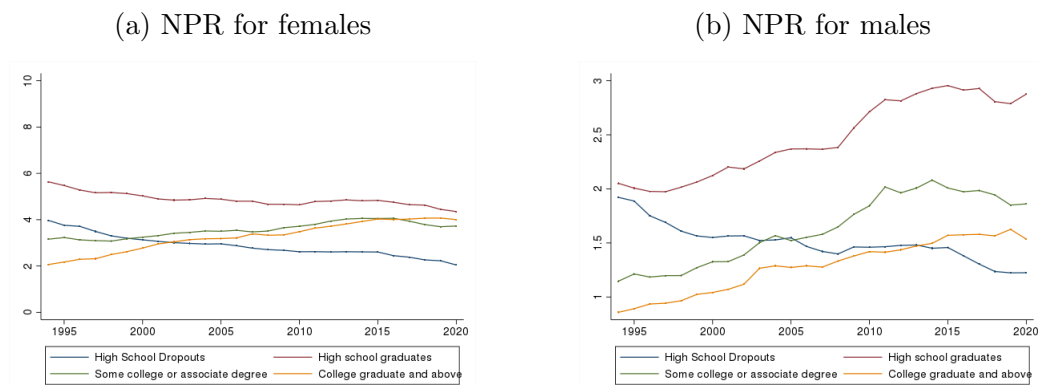| (a) NPR for females	(b) NPR for males

Figure 9 shows the NPR for different education categories by gender for the working age population (ages 25 to 64). The trends for males mimic the trends for the aggregate NPR. The only difference for females is that non-participation is decreasing even for high school graduates. However, for both genders, NPR has risen for the higher skill categories.

In order to understand this result better, figure 10 plots NPR for people who report wanting a job versus those who don't for the different education groups. The first thing to notice is that for all groups, the proportion of people who report not wanting a job is far greater than the proportion who report wanting a job. Thus, it seems that the overall decline in NPR is driven by people who are voluntarily leaving the labor force, instead of some weakness in the labor market. For all groups, the fraction of people reporting that they would like to work stays constant throughout. However, the proportion of people who report that they do not want a job has decreased for high school dropouts, stayed constant for high school graduates and increased for workers with some college or college degree. Tying things back with figure 7(a), it appears that trends in aggregate NPR across different educational categories are driven by people who do not want a job, and have voluntarily exited the labor force.
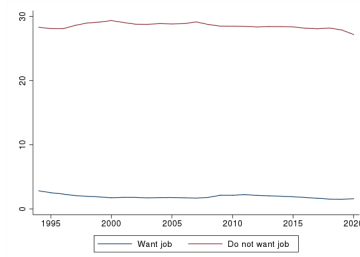
The share of people who are out of the labor force and on disability has steadily increased over the years, and it is now almost 70%. For the remain-

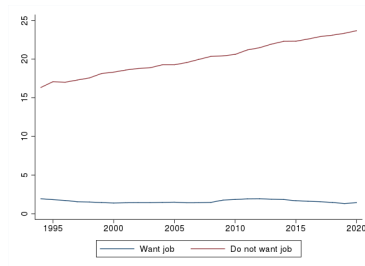Figure 10: Non-participation by education and want job

(a) High school dropouts
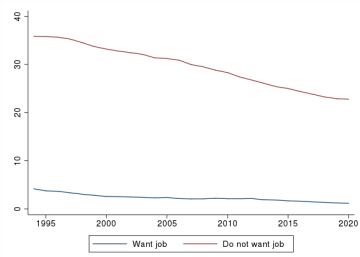
(b) High school graduates

(c) Some college or associate degree
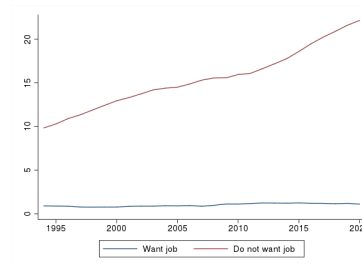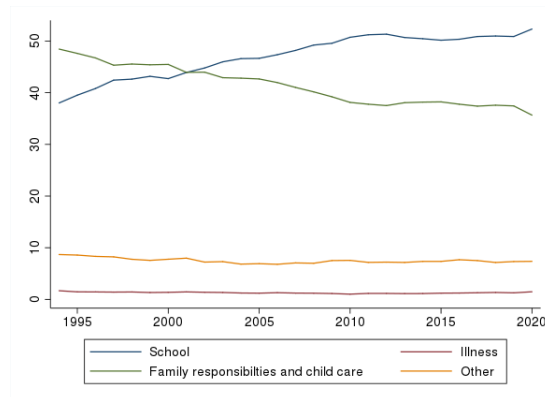
(d) College graduate and above

Figure 11: Reason for Non-participation

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ing people i.e. those who are not retired or disabled, figure 11 plots the reasons people give for being out of the labor force. As can be seen from the figure, the two major drivers of non-participation are schooling and family responsibilities and child care. However, the contribution of schooling to non-participation has been steadily rising, while that of family responsibilities and child care has been steadily falling.

4   A model of participation decision

As discussed in section 2, each individual in the CPS is observed eight times. Thus, I have an opportunity to observe individuals switching between employment, unemployment and non-participation. I exploit this panel component of the CPS and estimate the following logit model:

$$NP_{it} = \alpha + school_{it} + care_{it} + disabled_{it} + illness_{it} + \gamma * X_{it} + \delta_t + \epsilon_{it} \quad (3)$$

where i represents individuals and t represents time. NP represents an individual's decision to be out of the labor force or not. $School$ is an indicator variable which is 1 when a person is enrolled in school. $Care$ is an indicator variable which is 1 when a person has taken a leave of absence, quit their job or is out of the labor force because of unavailability of childcare, family responsibilities or maternal or paternal leave. $Disabled$ is an indicator variable which is 1 when a person reports having a disability. $Illness$ is an indicator variable which is 1 when a person has taken a leave of absence, quit their job or is out of the labor force due to a temporary illness or some health condition. X_{jt} are demographic controls that include gender, race, marital status, education, age and industry. δ_t is a time fixed effect which will absorb business cycle variation.

I run four specifications of the model. In the first, I include both age and education. In the second, I include age as well as age squared to proxy for experience. In the third, I estimate the model using the three age categories separately (young adult, working age, older workers). In the final specification, I include age categories interacted with education categories. I only estimate the model for people less than 65 years of age since I want to focus on the participation decision of the young and working age population.

Table 1: Participation decision

	(1)	(2)	(3)	(4)
School	0.240***	0.165***	0.177***	0.191***
	(0.000325)	(0.000283)	(0.000300)	(0.000597)
Care	0.179***	0.188***	0.157***	0.178***
	(0.000293)	(0.000286)	(0.000277)	(0.000645)
Disabled	0.427***	0.448***	0.453***	0.465***
	(0.00202)	(0.00191)	(0.00211)	(0.00410)
Illness	0.0260***	0.0319***	0.0252***	0.0251***
	(0.000283)	(0.000275)	(0.000282)	(0.000604)
Observations	26599119	26599119	26599119	6107254

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 1 reports the marginal effects of the logit model. Disability has the largest effect on an individual's participation decision, followed by schooling. After controlling for demographic characteristics, being disabled increases the likelihood of a person quitting the labor force by around 45%, while being in school increases the likelihood by 20%. Among the demographic variables, the probability of being a non-participant increases if an individual is black, female, married female, while the likelihood decreases if an individual is white, hispanic, married, or with higher education levels.

5   Conclusion

An examination of the non-participation rate across different demographic groups yields several interesting results. The NPR for men has steadily been increasing, while that for women has been relatively constant. Married people are much more likely to be a part of the labor force than unmarried people. Black people are much more likely to be out of the labor force than white

people or people of Hispanic ethnicity. Although older people are more likely to be out of the labor force, but non-participation has increased even for the younger and working age population.

The most interesting result seems to be the behaviour of non-participation across different education groups. Aggregate NPR has decreased for high school dropouts and increased for all other education groups. However, the decline can be explained by the contracting share of people dropping out of high school. Nevertheless, within group NPRs have significantly risen for all education categories, even the most skilled. Real wages for skilled workers have been increasing over the last two decades. Further, jobs in the US have become increasingly polarized into high skill-high wages and low skill-low wages ((Autor, Katz and Kearney (2006, 2008), Autor (2019))). Skill-biased technological change of the kind that has occurred in the US ensures that not only are wages expected to remain on their upward trend, but that jobs requiring high levels of skills will continue to be created since skill and technology are complements in the production function. The rise in skilled wages along with the increased availability of high skill jobs is an ideal environment for skilled workers to prosper. Therefore, the observation that their non-participation rate has been increasing seems puzzling.

It could be argued that since education acquisition is increasing in the economy as a whole, thus more people compete for the high skilled jobs. Since the middle of the jobs distribution has hollowed out, so even workers in the middle of the skill distribution prefer to compete for the greater paying high skill jobs than the jobs requiring lower levels of skills. This increased competition could force workers with college degrees to become discouraged and exit the labor force. However, my analysis suggests that this does not seem to be the case. The proportion of people who report that they want a job is very small. Further, for people with some college or college degrees, the share of those reporting that they do not want a job has increased. This suggests that factors other than labor demand are at play. The voluntary nature of the rise in non-participation is assuring, because it indicates that the unemployment rate is not underestimating the slack in the labor market.

What then could be causing this increase in non-participation? One reason could be greater reliance on social safety nets. Indeed, the number of people receiving disability insurance grew during this period (Eberstadt (2016)).

Recent work also suggests a role of changing social norms and an increase in the value of leisure. Aguiar et al. (2017) study whether innovations to leisure technology, specifically to recreational computer and gaming, reduced the labor supply of younger men. Using data from the American Time Use Survey for 2004-2015, they find that the drop in market hours for young men was matched by a roughly equivalent increase in leisure hours. A related explanation could be that changing social norms have made it more socially acceptable for young men to be out of work and financially supported by their parents or other relatives. Indeed, Aguiar et al. (2017) note that the share of young men (aged 21-30) living with a parent or close relative other than their spouse increased from 46% in 2000-03 to 67% in 2012-15. This is true even for women, suggesting that parents play the role of social safety nets, similar to disability insurance. Another factor, especially relating to married men, could be that it is now more acceptable for men to rely on the earnings of their wives. However, a study by the Council of Economic Advisors (2016) suggests that this might not be the case as the share of prime age men out of the labor force who have a working spouse actually fell between 1995-2015.

Coglianese (2018) suggests that a large part of the decline in labor force participation of prime age men comes from "in-and-outs" i.e. as men who temporarily leave the labor force. These individuals account for 20–40% of the decline in participation between 1984 and 2011. In-and-outs are distinct from unemployed individuals as they experience no loss of future income as a result of their time out of the labor force. He uses the Survey of Income and Program Participation to show that nonparticipation has increased for all durations, from 1-4 months to greater than 29 months. He suggests that the rise of in-and-outs may be due to changes in the desired amount of labor supply among prime age men in the US. This paper supports his conclusion that changes in participation are driven not by labor demand, but by labor supply factors and changing social structures. However, further study is required to fully determine the factors influencing participation decisions among the young and working age populations.

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