

*The Decline in the U.S. Labor Force
Participation Rate: A Literature Review*

Francisco Pérez-Arce, María J. Prados

Paper No: 2020-005

**CESR-SCHAEFFER
WORKING PAPER SERIES**

The Working Papers in this series have not undergone peer review or been edited by USC. The series is intended to make results of CESR and Schaeffer Center research widely available, in preliminary form, to encourage discussion and input from the research community before publication in a formal, peer-reviewed journal. CESR-Schaeffer working papers can be cited without permission of the author so long as the source is clearly referred to as a CESR-Schaeffer working paper.

The Decline in the U.S. Labor Force Participation Rate: A Literature Review

Francisco Pérez-Arce

María J. Prados*

University of Southern California

August 20, 2020

Abstract

After peaking around the year 2000, the Labor Force Participation Rate (LFPR) of Americans declined substantially. The weakening in LFPR was faster after the financial crisis of 2007, the “Great Recession.” Since 2015, the LFPR has remained at its lowest in four decades.

This paper constitutes a comprehensive review of the literature investigating the causes of the LFPR’s recent decline. We determine what is known and identify the remaining gaps.

The literature reviewed signaled multiple causes behind this decline. Trend factors, such as long-running demographic patterns, explain an important part of the decline. The research on the extent to which the Great Recession caused the decline establishes that most of the drop cannot be attributed to cyclical factors. Part of the decline in LFPR can be attributed to factors such as technological innovations and trade, which affect the participation rates of specific subpopulations, as well as to changes in social programs, like Social Security Disability Insurance. Some subpopulation trends are clear, but their ultimate causes are not fully understood, as is the case for the LFPRs of women and youth. We list these factors and point to important areas for future research.

JEL classification: J21.

Keywords: Labor force participation, labor supply.

* Corresponding author. prados@usc.edu; c/o USC 635 Downey Way, Ste. 505. Los Angeles, CA 90089.

The research reported herein was performed pursuant to a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement Research Consortium through the University of Michigan Retirement Research Center Award RRC08098401. The opinions and conclusions expressed are solely those of the author(s) and do not represent the opinions or policy of SSA or any agency of the Federal Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of the contents of this report. Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply endorsement, recommendation or favoring by the United States Government or any agency thereof.

We thank the support of the Michigan Retirement and Disability Research Center and the Social Security Administration, which made this study possible. We thank Arie Kapteyn for his useful comments. We are very grateful

to Tarra Kohli for her contributions to the literature search and collaboration with organization of the bibliography. All errors remain our own.

Table of Contents

Abbreviations	iii
1. Introduction.....	1
2. Trend versus Cyclical Factors.....	5
3. Demographic Trends and the Remaining Puzzle.....	6
4. Factors that Affect the Individual Participation Rates	8
4.1. Trends in LFP within Population Groups and the Factors Affecting Them.....	9
4.2. Factors that Affect the Labor Supply Curve.....	14
4.2.1. Health and the Opioid Crisis	15
4.2.2. Changes to SSDI, Social Security Retirement, and Other Social Programs	16
4.2.3. Changing Education Levels.....	20
4.2.4. Changing Education Enrollment	20
4.2.5. Technology and Leisure (Video Games).....	21
4.2.6. Household Income and Wealth Effects	22
4.2.7. Immigration	22
4.2.8. Labor Market Frictions.....	23
4.2.9. Long-Term Impacts of Unemployment Spells	24
4.3. Factors that Directly Affect Wages and Labor Demand.....	26
4.3.1. International Trade	27
4.3.2. Technology	28
4.3.3. Minimum Wage.....	29
4.3.4. Criminal Records.....	29
4.4. Factors that Affect Mostly the LFP of Women	30
4.4.1. Policies Specifically Affecting Women	30
4.4.2. Other Factors Affecting Female Labor Force Participation.....	31
4.4.2.a Cultural Trends.....	31
4.4.2.b Increase in Child Care Costs.....	31
4.4.2.c Gender Wage Inequality.....	31
4.4.2.d Taxation.....	32
4.4.2.e “Just in Time” Production and Irregular Working Hours	32
4.4.2.f Older Cohorts.....	32
5. Discussion.....	33
References.....	36
Appendix A: Literature Searches	48
A.1. Search Terms.....	48
A.2. Results	48

Abbreviations

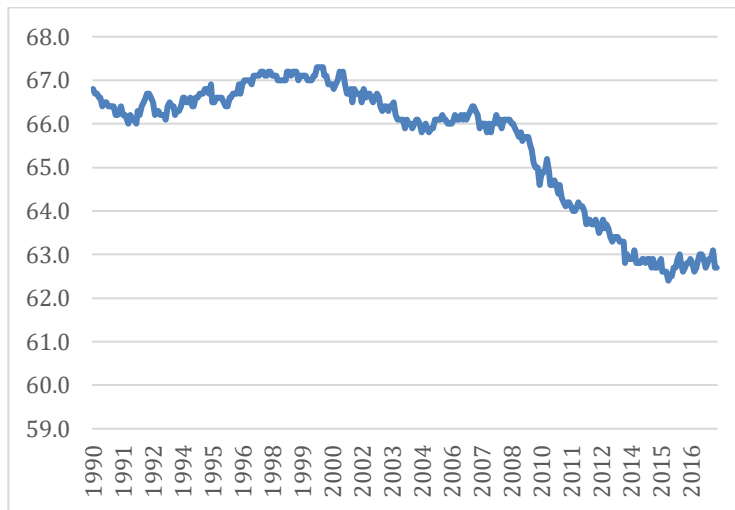
BLS	Bureau of Labor Statistics
BND	Beveridge-Nelson Decomposition
CPS	Current Population Survey
DC	Disability Compensation
FLFPR	Female Labor Force Participation Rate
LF	Labor Force
LFP	Labor Force Participation
LFPR	Labor Force Participation Rate
MLFPR	Male Labor Force Participation Rate
RD	Regression Discontinuity
SSA	Social Security Administration
SSDI	Social Security Disability Insurance
UR	Unemployment Rate

1. Introduction

After reaching a historical peak around the year 2000, the labor force participation rate (LFPR) of Americans declined substantially. The LFPR represents the country’s available workforce, measured by the percentage of the population age 16 and older who are either employed or actively looking for employment. The LFPR’s decline became more pronounced following the financial crisis of 2007, referred to as the “Great Recession.” Since 2015, the LFPR has remained stable at a low level, comparable to four decades ago when the LFPR still was growing. The overall LFPR declined from 67.3 percent in 2000 to 62.8 percent in 2017, a reduction of more than four percentage points..

There are multiple causes behind this decline. In the years immediately following the Great Recession, a lively discussion in the labor economics literature debated the extent to which the slump had caused the decline in labor force participation (LFP). But while the recession may have accelerated the decline in LFP, research shows this phenomenon was mostly related to trends predating the recession. The LFPR’s continuing decline even after the economy recovered has validated these findings (see Figure 1). The decline in LFP in the US contrasts with the trend in other developed countries. In the same 2000 to 2017 period, the labor force participation rate of most other advanced countries increased. For the European Union as a whole, the LFP rate of 25 to 64 year-olds increased from 73.9 to 79.6 percent, in Japan from 78.3 to 83.9, in Australia from 74.7 to 80.0 and in Canada from 79.1 to 81.7 (OECD 2020).

Figure 1. *Labor Force Participation Rate, Ages 16 and Older*



Source: Bureau of Labor Statistics

Having established how most of the LFPR’s drop could not be attributed to cyclical factors, the literature examines the relative importance of trend factors. Among them, long-running demographic patterns are very relevant. Research has shown that long-running demographic

patterns such as population aging – especially as the large cohort of Baby Boomers neared retirement – explain a significant part of the decline. Aaronson et al. (2012) and Krueger (2017) found these patterns explain at least half of the decline, but research has pointed to other contributing factors. For example, Krueger also argued that increased enrollment rates in education explain part of the reduction of labor force participation among young adults, while the opioid epidemic has become intertwined with, and may contribute to, the reduced labor force participation rate among prime-aged male adults. Other “behavioral” factors specific to certain subpopulations have also been found relevant. Changes in Social Security retirement benefits have incentivized older adults to stay longer in the labor force, whereas changes in other social programs, including Social Security Disability Insurance (SSDI), may have increased the incentives to quit working. The behavior of female LFP has differed from that of males, and many factors have affected its evolution over the last few decades. For instance, Albanesi and Prados (2017) argued that persistent gender gaps in compensation and career opportunities have caused a slowdown of labor force participation of prime-aged married women.

There have been few and incomplete attempts to summarize the sprawling economics literature on this topic. Bullard (2014) summarized existing studies and split them into those which considered a cyclical component for LFPR and those which considered demographic factors as responsible. A study by the Council of Economic Advisers (CEA, 2014) reviewed a subset of the factors behind the decline. Krueger (2017) added original research to a review of the literature on some causes of the decline for particular subgroups of the population. In what is closest in scope to this review, Abraham and Kearney (2018) selected the studies giving the best estimates of the impacts of a number of factors on employment and provided a decomposition of the employment-to-population ratio as explained by those factors.

A systematic review of the literature is needed to establish what is known about the causes of the decline in the LFPR and help policymakers analyze which actions are necessary, as well as to help researchers determine which areas to prioritize in future research. This study is a response to that need. We conducted a systematic and comprehensive review of the recent literature on the causes of the decline in the LFPR since the year 2000.

The closest paper to ours is Abraham and Kearney (2018). Their review focuses on the determinants of employment rather than participation rates. Conceptually, not all factors affecting employment affect participation in the same manner – like economic cycles (in Chapter 2, we discuss the relevance of cyclical factors on labor force participation) and minimum wages (which according to the standard neoclassical theory would reduce employment but increase labor force participation and hence increase unemployment by a larger margin); and not all factors that determine labor force participation are immediately relevant for the literature studying employment movements, like factors that affect the composition of the labor force (e.g., Social Security reforms, education trends, gender effects). This lack of overlap in focus and content results in differences in our reviews.

However, given that in the broad period of time covered in our paper the unemployment rate remained low, there is very high overlap between the evolution of determinants of participation and employment during this time. As a result, we review studies in many of the areas also covered by Abraham and Kearney. In addition, there are differences between the two reviews that are not

explained by this difference in focus. While both reviews were conducted in parallel, Abraham and Kearney was accepted for publication first. Overall, our review is more comprehensive in terms of areas covered. Some of the factors that are covered only in our review are those that affect only certain demographics: For instance, the increase in education enrollment rates or factors such as changes in social security retirement programs that affect only certain age groups, as well as changes in child care costs and other factors that affect women with small children. Appendix B presents a table that compares the factors reviewed in both studies. On the other hand, Abraham and Kearney perform analyses that aim to quantify the importance of some factors. Since the goal in our study is to synthesize the literature rather than to produce our own analysis, we stay away from that. Abraham and Kearney (2018) also conduct their own original analyses and hence their work is also included as source literature in our review. Appendix B provides the full comparison of topics (and papers) covered in Abraham and Kearney (2018) and our paper.

For this review, we picked only articles quantifying the impact of one or more factors affecting LFPR, either through statistical or econometric analysis, or economic modeling. We included studies addressing the question of whether the decline was cyclical or structural, seeking to quantify the extent to which it was caused by demographic trends while aiming to establish the impact of factors affecting the LFP of a group or the population as a whole, and whose estimates may serve to explain changes in that group's LFPR since the early 2000s. The Appendix describes the process for the literature search, and the criteria applied in the selection of studies.

The paper is structured as follows. Chapter 2 summarizes the research on cyclical versus structural changes in LFP, which concludes that the decline of the LFPR cannot be explained by economic cycles alone. Chapter 4 documents the literature's consensus of how demographic trends explain a large part, but not all, of the decline. Among such demographic trends, the most important is the aging of the Baby Boomers, a large cohort that neared ages at which retirement is typical (60 or 65 and above) in the early 2000s. The literature concluded demographic factors can explain between half and two-thirds of the decline in the overall LFPR.

Chapter 4 analyzes the literature on the evidence for the contribution of each of several factors on the decline in the LFPR. These are factors affecting the participation rates of individuals. The importance of some of these factors may vary for different subpopulations. Therefore, the first section of the chapter presents the trends in the LFPR for subpopulation groups, defined by the interaction of gender, age groups, education, and race. We also introduce the existing explanations and estimations carried on in the literature in a systematic way through a "matrix," summarizing the evidence on how each factor affected each of the subgroups.

We divided the analysis of these factors into three groups. First, in Section 4.2 we analyze the factors that have affected the labor supply curve of the population. These include factors that have made it more difficult to work (such as health conditions), those that may have made it less attractive to work due to the availability of other sources of income (either through social programs or other sources of family income), and those that make alternative activities more productive (such as studying) or more attractive (leisure).

There is a rich literature on some of these effects. An example of this are the studies documenting the effect of social programs such as Social Security Disability Insurance, for which there is strong

evidence. But in most cases, the existing research does not quantify how much impact *changes* in the program have had on the decline of the LFPR, instead focusing on the marginal impact. This is the case for several factors analyzed. In other cases, such as the opioid crisis, suggestive evidence may explain an important share of the decline in participation, but there is not much evidence on its causality. For other factors, while their immediate importance is well established, the root cause is not. As an example, the LFPR of the young has been declining for two reasons: more potential workers are staying in school for longer durations, and these students are less likely than in the past to participate in the labor force while attending school. This fact is well documented, and some studies hypothesize this may be driven by a delayed reaction to the increased returns to education occurring since the 1980s. However, it is not well established whether this growth in enrollment is indeed brought on by the increased return to schooling or other causes.

Section 4.3 analyzes factors operating through the market wage, either through shifts in the labor demand curve or policies affecting the wage directly (such as minimum wages). The decline in wages for some subpopulations make it less attractive for them to work. Thus, events affecting some subgroups' wages also affected employment and participation rates. We review the evidence showing technological advances and changes in international trade reduced employment and labor force participation rates in geographic areas where the labor markets were more vulnerable to them.

A number of factors particularly affect the LFP of women. Because the literature is wide-reaching and covers many factors, we present them separately in Section 4.4. While the increasing participation rate of women contributed to the rise in the LFPR during most of the 20th century, after the 1990s it leveled off and stagnated – even declining recently. Though stagnation was expected at some point, the leveling off and decline occurred at a rate lower than in other developed nations, such as Canada and many countries in Western Europe. The literature reviewed here clearly documents this. Some studies investigated the role of public policy (such as lower maternal benefits), but the evidence was short of conclusive. There is evidence of a number of other factors, including the labor market's continuing gender inequality, that likely contributed to this. We list these factors and argue these would be important areas for future research.

In Chapter 5, we summarize and assess the strength of the evidence presented for the most important factors behind the decline in the LFPR, and use this to determine where there are “research gaps.” The literature has produced robust answers to some of the questions on the decline in LFP. Among them is that the decline in the LFPR is due to trends, rather than being a purely cyclical phenomenon. It is also well established that demographic change, including the aging of the population, can explain at least half of the decline in the LFPR. Among the gaps identified are the following: the extent to which the opioid epidemic is causally affecting the LFPR; the reasons behind increased school enrollments and lower participation rates of students; translating the effects of trade and technology on employment in local labor markets and specific industries to the national economy; and the effects of the declining minimum wage on overall participation rates. Future research on these “gaps” would allow a more complete understanding of the decline in participation and provide useful knowledge to inform policy decisions.

2. Trend versus Cyclical Factors

The steeper part of the LFPR's recent decline coincided with the financial crisis and subsequent Great Recession. Thus ensued a discussion within the economics literature, aimed at teasing out the extent to which the decline was a result of the economic recession itself as opposed to secular factors. In the rest of the article, we refer to these factors as "cyclical" versus "trend" factors.

Under certain circumstances, labor force participation may be cyclical. During downturns, the worsening of employment options and conditions drive potential workers out of the labor force. This effect, known in the literature as the "discouragement" channel, leads to a procyclical profile of LFP. However, the "added worker effect" – when additional household members decide to join the labor force due to dire economic conditions – works in the opposite direction, generating countercyclical movements in LFP if it is the predominant effect (Mankart and Oikonomou, 2017). Nucci and Riggi (2018) measured a procyclical component in the LFP in the U.S. during the Great Recession, which they did not find in previous recessions. They used a theoretical framework to understand which effect might become predominant, concluding a dominant "discouraged worker" effect produce a procyclical behavior of the LFP during the last recession, arguing this was consistent with a low degree of real wage rigidities in the U.S.

Several studies conducted during the early 2010s applied decomposition techniques to tease out the influence of cyclical and secular factors. Early on, the literature concluded a large part of the LFPR's decline between 2007 and 2011 was due to "trend" factors; therefore, we should not expect the LFPR to return to the high levels of pre-2007. The studies of this literature aimed to separate the cyclical and trend factors via a decomposition technique, which often is of the Beveridge-Nelson Decomposition (BND) type. This was the case of Van Zandweghe (2012), who applied the BND by regressing the "current" changes of LFPR against its past readings, as well as past values of the unemployment rate (as the cyclical indicator). This model yielded the "trend" component of the LFPR, while the "cyclical component" was obtained by subtracting the trend component from the actual value of the LFPR. Van Zandweghe found the LFPR decline from 66 percent in 2007 to 64.1 percent in 2011 could mostly be attributed to the trend factors: 0.8 percentage points of this decline were the work of cyclical factors, and 1.1 percentage points due to the trend factors. Aaronson et al. (2014) update and extend their previous work (Aaronson et al., 2006.b) by not only analyzing the impact of persistent trends among demographic groups but also estimating the cyclical weakness of the LFPR. Additionally, they estimate a model of LFP combining demographic trends with business cycle influences. They conclude that most of the decline in the LFPR since 2007 is due to ongoing structural influences, like persistent trends, rather than to cyclical weakness.

In addition, some articles, such as Aaronson et al. (2010), Daly et al. (2012), and Fujita (2011), studied the role of extending benefits to the unemployed, a decision made by the federal government to dampen the negative impacts of the crisis. They found the extension in benefits increased the unemployment rate, and hence prevented the LFPR from falling, because some of the additional job seekers – the unemployed – otherwise would have been out of the labor force.

Erceg and Levin (2014) studied the implications of a strong cyclical component in LFP for conducting monetary policy. Looking at data on participation of prime-age males, they were the only instance in this literature to argue cyclical factors accounted for most of the recent decline in the LFPR for this group after the Great Recession. But this view has been contested by subsequent literature, including by noting the continuing decline of the LFPR after the recession ended. According to the NBER Business Cycle Dating Committee, the recession started in December 2007 and ended in June 2009.¹ The unemployment rate peaked at 10 percent in October 2010, then has declined over the next eight years to 3.7 percent in October 2018 – the lowest level seen since December 1969. In contrast, the LFPR continued declining well past the end of the recession to a low of 62.3 percent in September 2015, after which it stabilized. It seems likely that even in the tight labor market of 2018, the LFPR will not reach the highs experienced in the early 2000s (67.2 percent in January 2001 and 66.4 percent in January 2007), as much of its decline was not ultimately due to the recession (though the recession may have helped accelerate its fall). Along these lines, Fernald et al. (2017) argued if cyclical factors were the most important in explaining the non-demographic change in LFP, then by the middle of 2016, the LFP rate should have returned to a normal or near-normal range because the cyclical component was gone by mid-2016.

Having established that the decline in LFP is more than purely cyclical, the next chapters focus on the “trend factors.” In Chapter 4, we review the evidence on the extent to which the decline in LFP is due to “demographic trend factors” – namely, the reduction in the relative size of demographic groups with typically high LFPRs, such as working-age men (or an increase in the relative size of groups with typically low LFPRs, such as those older than 65). In Chapter 5, we review the evidence on the importance of “behavioral trend factors,” which are those affecting a given demographic group’s likelihood of participating in the labor force.

3. Demographic Trends and the Remaining Puzzle

Demographic trends are important drivers of changes in the LFPR. In particular, changes in the shape of the population-age pyramid explain an important part of the overall trends in the U.S. participation rates over the last century. When a larger fraction of the population is composed by people in their “prime working age,” the overall LFPR tends to be higher. Thus, as young Baby Boomers grew into working-age adults, the LFPR rose. But as they continued aging and became closer to and well into retirement ages, the overall population pyramid became wider at the top, which pushed down the overall LFPR. This aging of the population explains a large part of the decline in the population’s overall participation rate.

To appreciate how demographic change operates, consider the following example: Nearly all the men ages 35-44 participated in the labor force (92.5 percent in 1997). However, this group’s numbers are declining; between 1997 and 2017, its population share dropped by more than a tenth,

¹ The website for the Business Cycle Dating Committee at the National Bureau of Economic Research is <http://www.nber.org/cycles.html>

from 9.6 percent to 8.5 percent. On the other hand, relatively few among those aged 65 and older participate in the LF – but its share has been growing. In 1997, 17.1 percent of men and 8.6 percent of women for a total of 15.7 percent of the population; by 2017; they comprised 19.4 percent. This results in a reduction in the overall LFP.

The U.S. Bureau of Labor Statistics produced forecasts of the LFPR, using trends for the population's demographic characteristics and assuming the participation rate within each group remains constant (Toossi, 2013). This exercise forecast a further decline of the LFPR until at least 2022, highlighting the potential importance of current demographic trends even under the assumption demographic groups do not change their participation.

The literature has proposed different methodologies to measure the contribution of demographic trends. Juhn and Potter (2006) studied the evolution of LFPR between 1969 and 2004. They decomposed changes in the aggregate LFPR into changes in each demographic group's LFPR by fixing the population weights to their shares in 1979. They concluded changes in population weights accounted for very little of the change in the aggregate LFPR in that period. This is not entirely surprising considering the evolution of LFPR was not monotonic over those years, unlike the demographic trends. Accounting for these changes in demographic trends, other papers like Aaronson et al. (2006.b) and Fallick and Pingle (2007) attempted to identify – by decomposing deviations of the aggregate LFPR from its historical mean as a function of deviations of population shares and demographic group participation rates from their respective historical averages – how each group's evolution in participation rates and population shares contributes to the evolution of the aggregate LFPR. The decomposition in Fallick and Pingle (which is more complete than Juhn and Potter's) indicated the evolution in population shares accounts for most of the evolution in the aggregate LFPR. Aaronson et al. (2006.b) concluded a cyclical component explains the evolution of LFPR in 2000-02 while demographic trends explained the rest until 2005. Hotchkiss (2009) decomposed changes in the aggregate LFPR during 1950-2008 into demographic-group changes in both labor force participation behavior and population shares. She concluded changes in population shares accounted for most of the observed behavior of LFPR in that period.

More recently, Krueger (2017) decomposed changes in aggregate LFP into changes in LFP rates within demographic groups versus changes in the relative size of each of the demographic groups (which have different LFP rates). He presented the following results: Holding LFP rates within each demographic group constant at their 1997 levels, the change in the weights in each demographic group would drop the LFPR from 67.1 percent in 1997 to 65.6 percent in 2017. That is, according to this exercise, without demographic change, the LFP rate would have declined only by 1.5 percentage points (or slightly more than a third of the 4.3 percentage points of the overall fall). The same exercise can be done after fixing the weights at their 2017 levels. In this case, the drop would have been from 63.3 percent to 62.8 percent, only half a percentage point. If the demographic groups in 2017 had the same weights as in 1997, the current LFP rate would be 65.6 percent instead of 62.8 percent. That is, it would be 1.5 percentage points lower than the 1997 level, (rather than 4.3 percentage points lower). In the range of Krueger's analyses, the demographic change factor accounts for between half and two-thirds of the decline.

Similarly, Aaronson et al. (2012) found a slightly smaller but still important role for demographic factors. They focused on the 1999-2011 period (somewhat different than Krueger), which may

explain part of the dissimilar findings. They concluded demographic factors explain about 50 percent of the decline. Similar conclusions are found in Abraham and Kearney (2018), who undertook a similar analysis but focused on the employment-to-population ratio, concluded “population aging has had a notable effect on the overall employment rate over this period, but within-age-group declines in employment among young and prime age adults have been at least as important.”

There is a broad consensus on this in the literature, as this analysis requires relatively few assumptions. Considering the analyses in these studies, examining only demographic shifts leaves unexplained more than a third and up to one-half of the decline in the LFPR. It is worth noting the vast majority of these analyses do not account for racial or ethnic breakdowns, educational attainment, or marital status. These dimensions usually differentiate groups with different labor supply behaviors and present distinct trends over time. This is an important limitation of these decomposition analyses.

Demographic changes do not represent the whole picture. Within each demographic group, there have been changes in LFP rates – and these changes are not always in the same direction. For instance, the LFP rate of teenagers and young adults has significantly declined, whereas the participation rate of older men and women has stayed the same or even increased. These changes are a result of a number of factors, the “behavioral factors,” which we review in the following chapter.

4. Factors that Affect the Individual Participation Rates

Conceptually, the labor force consists of all people willing to work at the going wage offered to someone with their skills. Empirically, this is operationalized by including in the labor force all of those who either work or who state they are willing to work and have looked for work in the survey reference period. (That is, both the employed or unemployed.) We can divide the factors affecting participation in two groups: those affecting the aggregate labor supply curve (i.e., how many people are willing to work for a given wage) and those causing movements along the supply curve. Broadly speaking, factors affecting the supply curve are those affecting the attractiveness of not working. For example, an increase in the generosity or availability of programs for those who do not work, such as disability benefits, can shift the labor supply curve to the left as fewer people remain willing to work at a given wage. Factors causing movements along the supply curve include those shifting the demand for workers, and policies intervening in wage setting, like changes in the minimum wage.

Hence, we analyze separately the literature dealing with factors that may have shifted the labor supply curve and movements along the supply curve. Both types of factors usually affect only subgroups of the population. For example, changes in Social Security retirement benefits would affect the labor supply of the elderly; meanwhile, factors affecting the going wage in

manufacturing would affect more strongly the LFP decisions of men than of women. Thus, it is useful for the reader to keep perspective of the trends in LFPRs for the groups and how each factor may have affected them. We discuss these trends in Section 4.1 below. In Section 4.2, we analyze the literature on the factors that would affect labor supply in a direct way, and in Section 4.3 we analyze those that would mostly affect LFP through their effect on wages. Finally, Section 4.4 discusses the factors primarily affecting the participation decisions of women. Though these factors could have been integrated in one of the preceding sections, we include them as a separate section because the literature is wide and covers many potential explanations.

4.1. Trends in LFP within Population Groups and the Factors Affecting Them

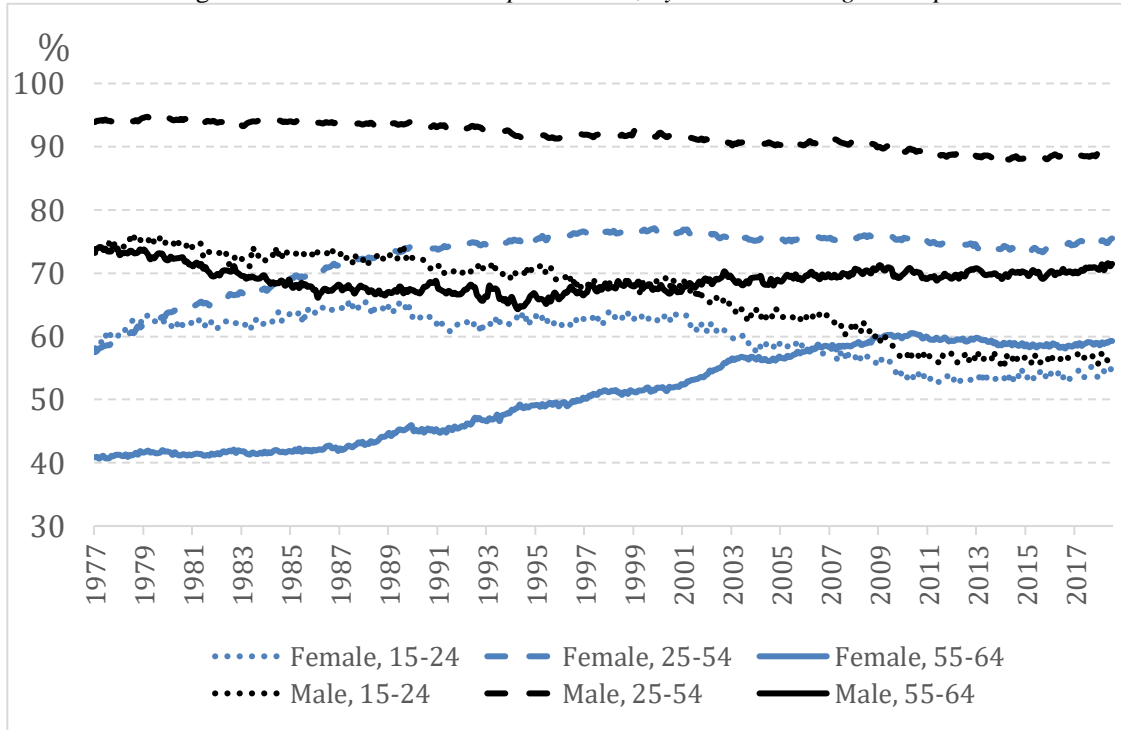
In addition to the changes in the size of the demographic groups, described in the previous chapter, the overall decline in the LFPR is a combination of trends differing within specific groups. For example, though overall LFP peaked close to the year 2000, prime-aged male LFP peaked in 1948 and has been slowly declining ever since – but that drop was counteracted by female LFP, which increased steadily and at a faster pace throughout the second half of the 20th century, rising from 29 percent in 1948 to 60 percent in the mid-1990s (Falzone, 2017).

Figure 2 shows the changes in the LFPR of six broad demographic groups, determined by the interaction of gender with the age-groups: young (18-25), prime working-age (26-54), and 55 and older. The clear trends are the stark reduction in participation for prime working-age men and the youth of both genders, and the sudden reversal in trend for prime-age women. Between 2000 and 2017, the LFPR of young men dropped from 68.1 percent to 56.3 percent, and for young women fell from 63.2 percent to 54.1 percent. Though the group with the highest participation rate still is prime-age working men, it too showed a steady, albeit less dramatic, decline in this period, going from 91.5 percent to 89.1 percent. The nature of the observed decline may be different for this group than the rest, as Coglianesse (2018) finds that men who temporarily leave the labor force in between jobs represent 20–40% of the decline in the participation rate of prime age men between 1984 and 2011. The author argues that these men take short breaks from participation, showing up as out of the labor force in the data, but are in fact continuously attached to the labor force.

The LFPR of prime working-age women rose to 77 percent around 1997, remained stable there until around 2000, then fell to 75.2 percent in 2017. Even without considering the decline, it would be important to analyze the lack of increase. In some ways, the lack of growth of the FLFPR contributes to the overall decline of the LFPR, ending a run of many decades when the increased participation of women raised the overall participation rate and compensated for the decline among other groups. It also marks a break from other developed countries, where the FLFPR continued to climb during these last 20 years. Importantly, the trends in LFPR for married and single women have been different: The LFPR of married women peaked around the mid-1990s, while for single women this happened around 2000. A number of studies reviewed in this chapter delve into factors that have particularly affected the leveling-off and subsequent decrease of the FLFPR.

On the other hand, the increase in the LFPR of adults ages 55 and over – from 30.9 percent in 1997 to 40 percent in 2017 – is remarkable and of interest to this review, too,² as it has helped soften the reduction in the population-wide reduction in LFPR. In particular, during the last two decades the LFPR of adults age 65 and older increased from almost 12 percent to a little more than 19 percent. Some of the studies reviewed in this chapter provide insights into the causes behind that pattern as well.

Figure 2. Labor Force Participation Rate, by Gender and Age Groups.

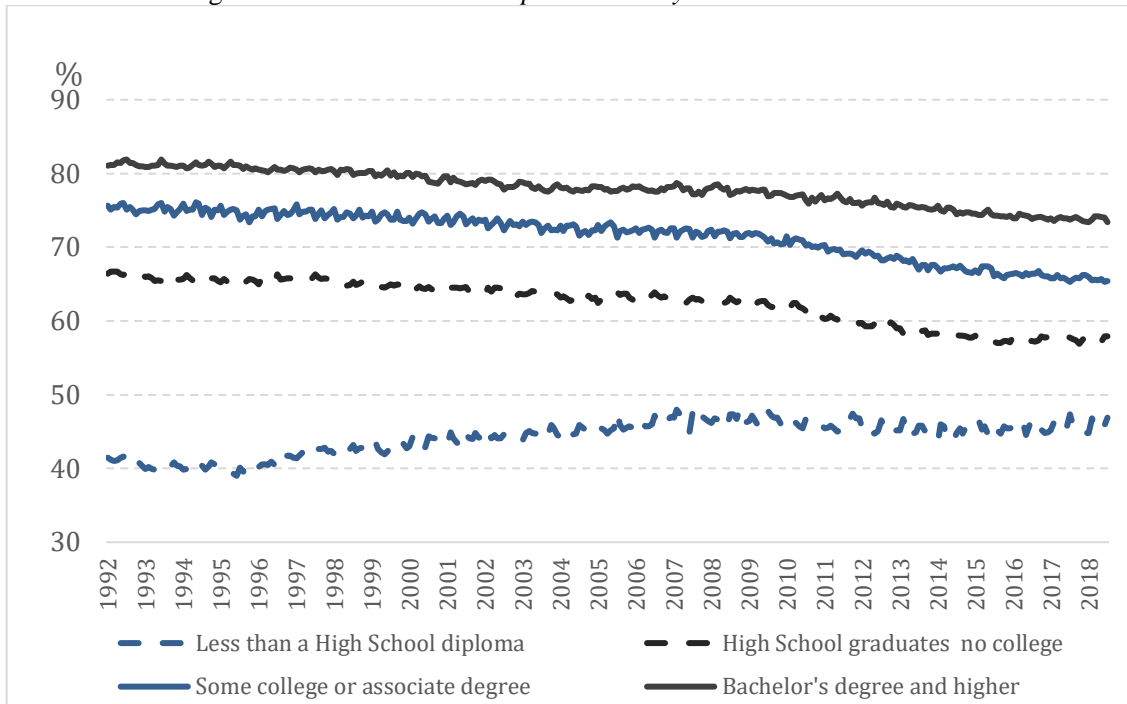


Source: OECD, "Main Economic Indicators - complete database", Main Economic Indicators (database), <http://dx.doi.org/10.1787/data-00052-en> (Accessed on August 18, 2018)

Even within gender and age groups, the LFP has evolved differently by educational attainment, race, and ethnicity. Analyzing these groups separately provides hints of the potential causes of the declines. Figure 3 shows the evolution of LFPR for different groups defined by education level. In general, workers with a high school education or greater have steadily decreased their LFP over the last 20 years. Conversely, the LFP of the least educated was increasing until the Great Recession in 2007, and has mostly plateaued after that.

² Source: Bureau of Labor Statistics.

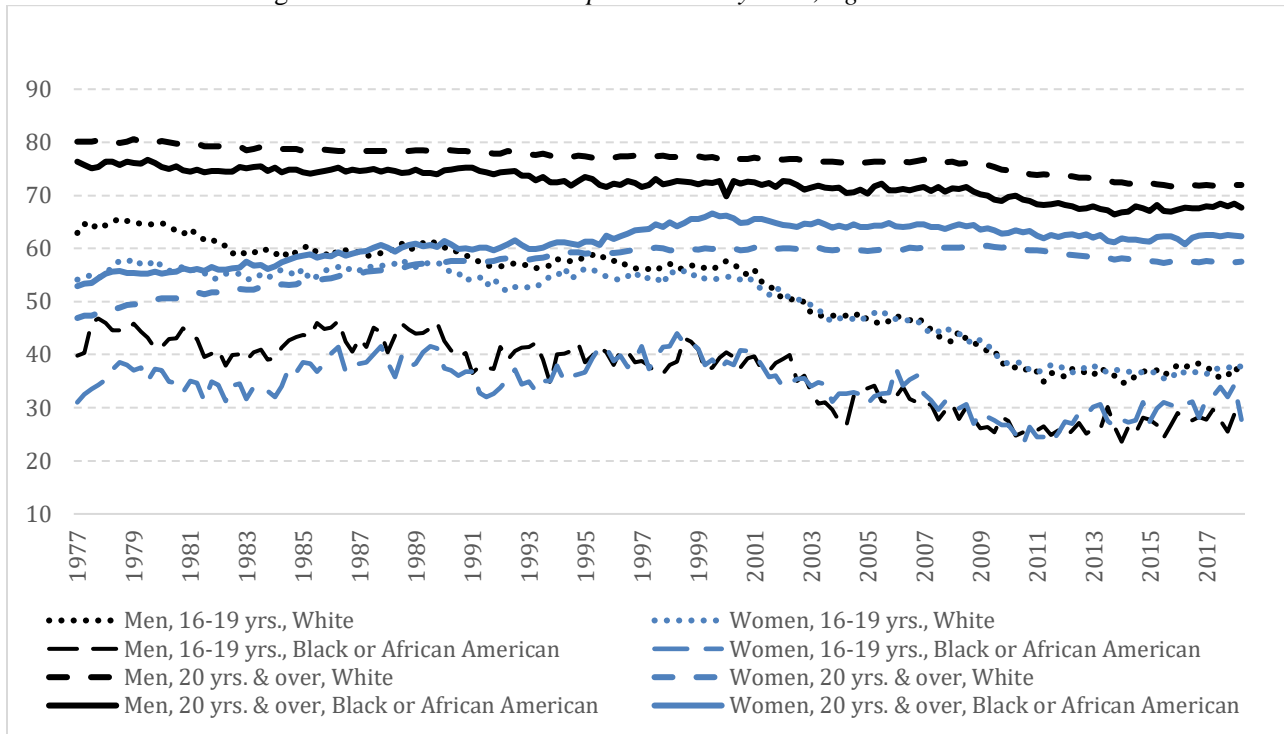
Figure 3: Labor Force Participation Rate by Educational Attainment



Source: Bureau of Labor Statistics, Labor Force Statistics from the Current Population Survey

Figure 4 shows the LFPR of different racial and ethnic groups, within gender/age categories. The LFP of the youngest blacks always has been lower than that of whites; however, since 2011 it seems to have recovered from the downward trend a little better than the LFP of white teens. Even though the gender differences for teenager LFP are smaller than for older workers, there are a few differential behaviors. In particular, the LFP of teenage black females has almost caught up with that of teenage white females, while that of teenage black males is still lower than for teenage white males. For older workers, though, the races have dissimilar gender differences. The LFP of black women is higher than whites', and the gender gap for blacks is smaller. The trends, however, have remained somewhat similar across racial groups for prime-age workers.

Figure 4: Labor Force Participation Rate by Race, Age and Gender



Source: Bureau of Labor Statistics, Labor Force Statistics from the Current Population Survey

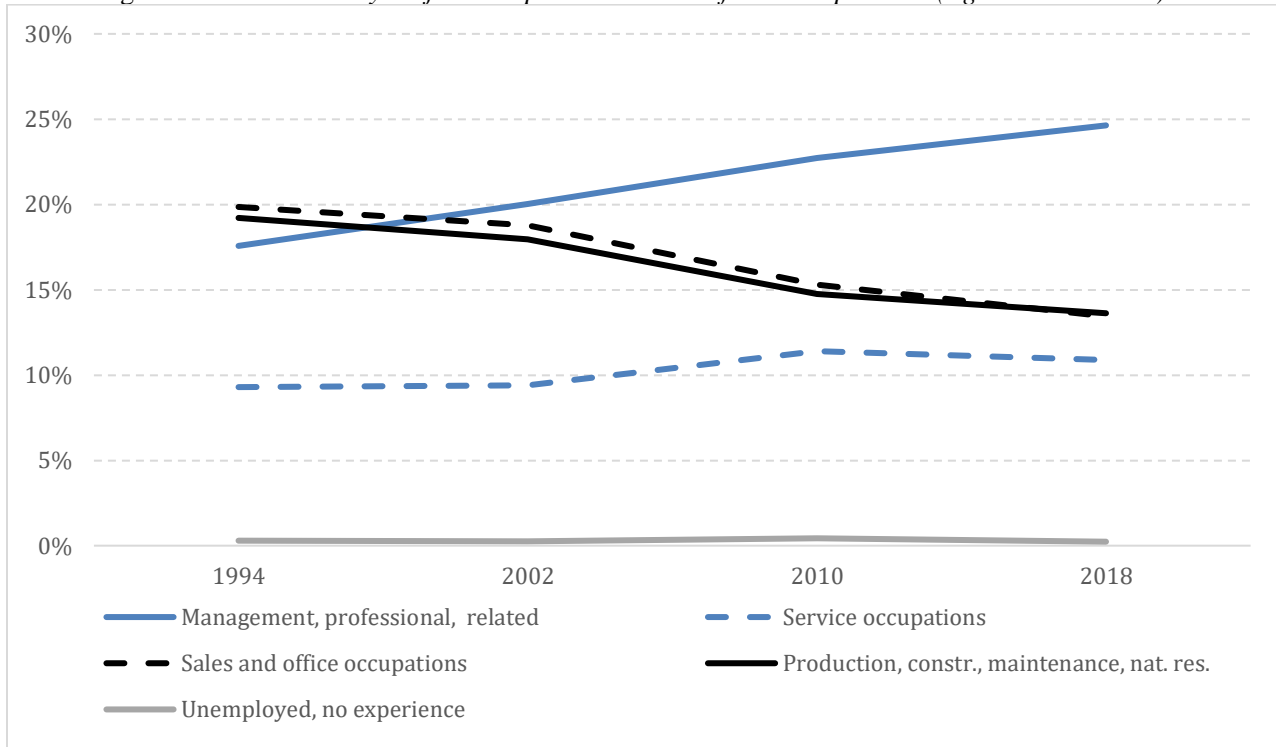
That these subgroups' LFPRs have evolved so differently points to diverse reasons affecting the behavior of each group. This highlights the importance of analyzing the impact of the factors separately, as their effects are heterogeneous. For instance, technological advances in the second half of the 20th century may have, overall, raised women's LFP by reducing the time needed to do domestic work (Greenwood et al., 2005) and by expanding the service sector (Rendall, 2018). But for men, technological changes may have had no effect – or perhaps even negative effects for some sub-groups due to dropping wages. (Acemoglu and Restrepo, 2018, argued automation is more of a substitute for middle-aged workers).

Another way of looking at different subgroups is to consider the evolution of participation by industries or occupations of the workforce. The observed occupation or industry of a worker depends on the workers' education and skills, but it also depends on the productive structure of the economy. Therefore, these are persistent but not time-invariant characteristics of workers, as they can switch occupation or industry between jobs. Most job transitions occur within occupations (around 80%) and switching comes at a cost because human capital is occupation specific (Kambourov and Manovskii, 2009). Figure 5 presents the evolution of the labor force in each major occupation group as a share of civilian noninstitutionalized adults (ages 16 and older) since 1994.³ The size of the workforce in managerial, professional and service occupations increased in absolute terms and also relatively to the adult population in that period. Conversely, the workforce

³ This a way to capture the relative importance of trends in different occupations for the overall LFPR evolution. The adult population not participating in the workforce cannot be categorized in occupations, thus no measure of LFPR by occupation exists.

in sales, production, manufacturing, construction and related occupations decreased in absolute and relative size. The relative increase in the labor force share of service and managerial and professional occupations (1.6 and 7.1 percentage points respectively) did not compensate for the decrease in the labor force share of sales and production, manufacturing and construction occupations (6.4 and 5.6 percentage points respectively). These changes resulted from different factors affecting both the labor supply (like education) as well as labor demand (like international trade), discussed in Chapter 4.4

Figure 5: Labor Force by Major Occupation as Share of Adult Population (Ages 16 and Older)



Source: Bureau of Labor Statistics, Labor Force Statistics from the Current Population Survey

4 We looked at a similar characterization by industry. This only reflected the shrinkage of the manufacturing sector and the expansion of the service sector, discussed in Section 4.3. This chart is available upon request.

Table 1 summarizes the factors proposed in the literature as important in explaining different groups' LFPR, and it indicates which groups are likely to be the most affected. Clear examples of these are Social Security retirement benefit policy changes, which affected the older groups more strongly, while other policies, such as family leave and changes to divorce laws, have affected the LFPR of women.

Table 1. Summary of the literature as it relates to each of the identified factors

Other Trend Factors	Men			Women		
	Young	Prime	55 and older	Young	Prime	55 and older
Demographic Trend Factors						
As reviewed in Section 2, the most complete and recent studies estimate that demographic changes, including the aging of the population and “retirement” of the Baby Boomers, explain between 50% and 65% of the decline of the LFP since the millennium.						
Factors shifting the Labor Supply Curve						
Health/the opioid crisis		X	x		X	x
Changes in Social Security retirement benefits			X			X
SSDI and other programs		X			X	
Increases in education levels	X (-)		x (+)	X (-)		x (+)
Increase in education enrollments	X			X		
Technology and leisure	X					
Household income and wealth effects			X		X	x
Scarring (long-term impacts of unemployment spells)		x	x		x	x
Factors affecting participation through movements along the Supply Curve						
Trade	x	X	x	x	x	x
Technological change	x	X	x	x	x	x
Minimum wage	X			X		
Criminal records	X	X				
Gender labor market differences				X	X	X

Note: Xs mark demographic groups expected to be most affected by given factor. Used to denote groups to be more strongly and less strongly affected are capital X and lowercase x. For cases where the impact of a factor is expected to differ across demographic groups, (+) Indicates the factor had a positive effect on the LFPR of that group, while (-) indicates a negative effect on LFPR.

4.2. Factors that Affect the Labor Supply Curve

In this subsection, we review the evidence for how some factors may have affected the labor supply of people in different population groups. Labor supply is affected by the attractiveness of work in comparison to alternative time uses, such as studying, being a full-time homemaker, or enjoying more leisure.

Among the factors affecting labor supply, a prominent role is played by health. Coinciding with the decline in LFP is a worrying trend of reduction in life expectancy among large population groups (Case and Deaton, 2015), and thus a connection is hypothesized. Possibly related is a trend of increasing numbers of people receiving disability benefits, or benefits from similar programs.

This trend could be caused by the same decline in health, but also may be due to changes in the programs affecting who qualifies for benefits. (For instance, von Wachter et al., 2011, argued it has become relatively easier to obtain disability benefits based on conditions that are difficult to diagnose, such as back pain or depression).

In addition, it is important to investigate the causes affecting the decline in the LFP of youth as this group exhibits the sharpest decline.

4.2.1. Health and the Opioid Crisis

Health problems typically make working difficult or make it less attractive, and hence any worsening of the health of working-age adults can potentially reduce LFPRs. There is a large literature looking at how different health conditions affect labor market outcomes in general. However, there is not much research looking at the effects of recent health trends on participation in the U.S. In this section, we discuss studies of two major health trends in recent years.

The first, affecting adult Americans – especially white non-Hispanics – are health issues related to the recent opioid crisis. This increase in opioid addiction has resulted in increasing mortality rates for adults ages 45-54 (Case and Deaton, 2015, 2017). Krueger (2017) performed a regression analysis, leveraging county-level differences in opioid prescription rates, to show the opioid crisis and reductions in LFP have become intertwined. If the estimation in this analysis could be interpreted as causal, the results would indicate that the observed increase in opioid prescriptions could account for somewhere between 20-25 percent of the observed decline in LFP. Offering similar results is a comparable specification with self-reported health status as an additional control.

A possible interpretation of the data is that the spread of opioid addiction has caused men to drop out of the labor force. However, it also may be possible that part of the statistical association is explained by the reverse: The reductions in participation are causing an increase in addiction. One limitation of this analysis is that it may be leaving out possible confounders that influence both opioid usage and labor force participation, such as increases in the prevalence of pain.

Addiction in general, and opioid abuse in particular, potentially explain an important part of the reduction in the LFPR of the largest groups of the workforce. Aliprantis and Schweitzer (2018) used geographic variation in opioid prescription rates at the county level to discover opioid availability decreases LFP. (They addressed reverse causality concerns by using the Great Recession as an instrument for weakened labor demand.)

A second health aspect affecting labor supply is related to the rising share of Americans affected by disability. Webber and Bjelland (2015) constructed a measure of disability accounting for under- and over-reporting concerns in survey data, using it to measure the share of U.S. adults with work disabilities. They found at least 4.8 million individuals ages 25-64 in 2006 recently had left the LF due to disabilities limiting their ability to work, reducing the number of men and women in the labor force by at least 3 and 2 percentage points, respectively, which is sensibly more than previous estimates in the literature.

Prevalence of disability increases with age, so a growing population of seniors implies an increased need for resources to care for individuals with disabilities. In the U.S., informal caregiving still is very prevalent, and for elderly parents, their adult children are the most common type of care providers. Van Houtven et al. (2013) studied the consequences of informal caregiving in the U.S. for LFP, finding gender asymmetries in their effects: Caregiving reduces the likelihood that non-retired men are employed for pay (and no such effect on non-retired women), while being a caregiver makes it more likely for women to retire, but not for men.

Most research looking at the impact of disability on LFP also considers beneficiaries of the Social Security Disability Insurance program (SSDI). In the following subsection, we discuss the research looking at changing policies in access to disability benefits, including SSDI.

4.2.2. Changes to SSDI, Social Security Retirement, and Other Social Programs

When people are directly asked their reasons for being out of the labor force, most say it is due to retirement or disability. Fujita (2014) analyzed the reasons given for nonparticipation available in the Current Population Survey (CPS) microdata. Fujita discovered about 65 percent of the decline in LFP for working-age population between 2000 and 2013 is due to retirement and disability (according to survey respondents' self-reports). Nonparticipation due to retirement declined between 2000 and 2010, then increased during the rest of the study period, while nonparticipation due to disability increased steadily since the year 2000. In 2013, 17 percent of individuals in the working-age population were out of the labor force because of retirement, while almost 6 percent were out of the labor force because of disability. Given these magnitudes, it is not surprising a considerable volume of research has been conducted analyzing the consequences of changes in Social Security retirement and disability benefits.

Changes to Social Security Retirement Benefit Rules and Trends in Pension Plans

As discussed earlier, the LFPR among older adults has increased. One hypothesis is that this is the result of changes in eligibility and generosity of Social Security retirement benefits.

The Social Security Amendments of 1983 introduced two important alterations in the program's rules likely to affect the recent labor market behavior of older cohorts: increasing the Social Security Delayed Retirement Credit (DRC) and raising the Full Retirement Age. The Delayed Retirement Credit boosts Social Security benefit payments for each month the recipients delay receiving benefits after age 65, hence it provides incentives to work longer. The reform in 1983, effective in 1990, increased the Full Retirement Age – gradually for different cohorts – thus reducing lifetime benefit. Another change in legislation took place in 2000, when the Senior Citizens Freedom to Work Act abolished the Social Security earnings test for those between the full retirement age and age 70, meaning that high earners in those ages who decided to remain working no longer would be subject to benefit withholding. These changes modified the incentives around retirement decisions, and we summarize here the literature investigating their impact.

The increase in the Social Security Delayed Retirement Credit often is used as a “natural experiment” to study the indirect impact of this incentive on employment or retirement decisions. (Social Security benefits claiming is independent from retirement decisions, but some individuals may want to work longer if they choose to delay their benefit claiming.) Pingle (2006) studied the

effect of this policy change on employment of older men from the 1980s through 2003. The evidence suggested large effects from this policy change, as the estimates indicated each percentage point increase in the DRC raised the employment rate of men age 65 to 69 by a similar percentage point.

Mastrobuoni (2009) used cohort discontinuities to analyze the effect of the increase in the Full Retirement Age on the timing of retirement. He found that, on average, two months of increase in the Full Retirement Age resulted in an additional month of labor force participation. In line with this but with a completely different methodology, İmrohoroğlu and Kitao (2012) estimated, using a calibrated general equilibrium model of overlapping generations, that a two-year raise in the Social Security “normal retirement age” would imply an increase in the labor supply of 6.1 percentage points for those aged 60-69, after accounting for a graying population and the government budget constraint.

Gustman and Steinmeier (2009) analyzed the combined effect of these changes in Social Security benefits rules, which were phased in from 1992 to 2004. They found about one-sixth of the increase in labor force participation between 1998 and 2004 for married men aged 65-67 was due to changes in Social Security.

Blau and Goodstein (2010) studied the effects of changes to Social Security retirement benefit rules in periods both earlier and contemporaneous to the focus of this study. They found that a small portion of the decline experienced by the LFPR of older men in the 1960-80s period could be attributed to the increased generosity of Social Security retirement benefits, whereas later policy changes – such as the increase in the Full Retirement Age and the introduction of the Delayed Retirement Credit – could have led to the recent increase in the LFPR of older adults. In 1985, the LFPR of men aged 65-69 was 24 percent; by 2005, that had increased to more than 33 percent. The authors estimated between 25-50 percent of this increase was the result of the additional indirect incentives to work longer given by the changes in Delayed Retirement Credit and the Full Retirement Age. Additionally, they argued, changes in the education composition of the older male population, towards more schooling, could help explain a share of this increase in recent years. In line with these findings, Gelber et al. (2018) found that the slowdown in the growth of Social Security benefits in the mid-1980s accounts for more than one-quarter of the continued increase in older women’s employment taking place since then.

Another somewhat recent change in trends regarding retirement benefits is that annuity-based Defined Benefit plans are less prevalent while account-based Defined Contribution plans now are the norm. Bairoliya (2019) argued this recent change in the pension landscape has been accompanied by a reversal in the declining trend of older workers, resulting in increased labor force participation by the elderly over the last 30 years.

Taken together, these results indicate changes in Social Security retirement benefit rules have significantly impacted the labor supply decisions of older workers. This phenomenon has partially compensated for the declining LFP of other age groups, thus helping moderate the overall reduction in LFP.

Social Security Disability Insurance (SSDI)

The SSDI program has grown considerably over time, with a notable acceleration in the last few years, while the employment of disabled workers has steadily declined. The SSDI program creates work disincentives: The value of the disability benefit produces a negative income effect on labor supply (i.e., the additional income may hinder the incentives to work). And because beneficiaries lose benefits if they earn above the substantial gainful activity level (for more than a nine-month Trial Work Period), there is a negative substitution effect on labor supply as well, as working more may reduce the benefits. Both effects imply SSDI should reduce labor supply. An additional disincentive to work arises because SSDI recipients become eligible for Medicare after a two-year waiting period. As Medicare largely eliminates the value of employer-provided health insurance, it also removes an important work incentive for certain workers. The literature has used different approaches to estimate SSDI's effects on LFP over time.

Autor and Duggan (2003), to identify the impact of SSDI on the LFP of low-skilled workers, used differential time variation in average benefits across geographical regions. They estimated that SSDI and labor market conditions jointly have an effect on LFP. Chen and van der Klaauw (2008) used a regression-discontinuity (RD) approach, exploiting discontinuities in the disability determination rule, to isolate the effect of SSDI on the labor supply of men and women in the 1990s. They found that the LFPR of beneficiaries would have been at most 20 percentage points higher had they not received benefits.

Von Wachter et al. (2011) used administrative information on SSDI application and receipt from 1981 to 1999, and earnings before and after the time of application from 1978 to 2006. As a control group, they used the sample of rejected disability applicants. Given that rejected applicants are expected to be healthier than accepted applicants, the estimated counterfactual LFP response is used to construct an upper bound for the impact on the LFP of beneficiaries. They attributed the acceleration in growth of the SSDI program in the last few years to two main factors: 1. Employment opportunities for lower-skilled people have continued to decline. 2. Changes in the eligibility process made it easier to obtain SSDI benefits based on conditions difficult to clearly identify in medical terms alone, such as back pain or depression. They argued those reasons not only contributed to an increase in the number of SSDI beneficiaries, but also changed the characteristics of the pool of applicants. Both applicants and new beneficiaries have become younger, have less severe health impairments, and are more likely to be women. Thus, they concluded, the labor supply response to SSDI receipt may be larger in recent years than what it was a couple of decades ago.

The identification approach in Maestas et al. (2013) is different: as a source of variation in allowance, assignment of disability examiners at the initial stage of the DI application process. The estimation used administrative data on applications in 2005-06 and administrative annual earnings records between 1995-2009. They found that among the 23 percent of applicants at the margin of program entry, employment would have been 28 percentage points higher had they not received benefits.

Using administrative data as well, French and Song (2014) identified the effects of SSDI by comparing those who are denied benefits to those granted benefits but otherwise are similar. Using

a sample from applications in the 1990s, they estimated 26 percent of SSDI recipients would be working three years after the ruling if they were not receiving benefits.

Gelber et al. (2017) identified the effect of SSDI cash benefits on beneficiaries' earnings and employment in the four years after SSDI allowance, doing so by exploiting a discontinuous change in the marginal replacement rate due to how the benefits formula depends on two earnings thresholds. This implies their sample was different from the one in the studies mentioned previously. They found that SSDI allowance decreases earnings. The estimation results are suggestive of a negative effect on employment, consistent with other work, but they were not robust across different specifications in the paper.

An additional negative effect of SSDI application on LFP occurs because application to the program implies taking time out of the labor force while waiting for the decision. Autor et al. (2016) used information on exogenous variation on decision times to measure how processing times affect employment and earnings of SSDI applicants. Accounting for this, they found that the SSDI program reduces subsequent employment of all applicants by an average of 6.7 percentage points in the short run. The effect is persistent, resulting in an average decrease of 3 percentage points after six years. Making use of different identification strategies, this literature agrees in the qualitative assessment that marginal SSDI recipients would be more likely to participate in the labor force if they were not receiving these benefits.

It is worth noting that SSDI rolls have increased over this period, and the beneficiaries make up about 4 percent of the overall working-age population. Using, for example, the upper bound of a 20 percentage-points effect on participation from Autor et al. (2016), or the 28 percentage points from Maestas et al. (2013), this would imply total LFPR would increase by around one percentage point without the SSDI program. However, this is a very loose upper bound for the effect of *changes* in the program, as the SSDI program predates the period of LFPR decline, not to mention an increase in the number of beneficiaries would occur naturally due to the aging of the population. While important, it is clear that changes in the SSDI program cannot explain more than a small fraction of the decline in the LFPR not attributable to demographic change.

Given the consensus on the negative effect of the SSDI program and program changes on LFPR, it would be useful for future research to calculate the extent to which changes in this program have contributed to the overall trend versus separate negative effects on LFP derived from possible deteriorating health trends in the population.

U.S. Department of Veterans Affairs' Disability Compensation (DC) Program

Since 2001, the Department of Veterans Affairs' Disability Compensation (DC) program has grown substantially, at least partly due to the liberalization of the medical eligibility criteria and an increase in the average benefits paid. Veterans represent only around 6 percent of the U.S. adult population, but the behavior of this specific group can shed light on how social programs affect labor supply behavior. Autor et al. (2016) used administrative data to study the impact of the DC program, looking at a reform which affected only a subset of veterans (hence allowing for a comparison group). They found that benefit receipt reduced veterans' labor force participation by 18 percentage points. Coile et al. (2015) showed the labor force participation rate of veterans "has

been declining over time in a way that coincides loosely with the growth of the DC program.” They reported a rise in the number of beneficiaries from 2.3 million in 2000 to 3.7 million in 2013 (which gives an upper bound of 1.4 million people leaving the LF due to the increased generosity of the medical eligibility criteria), though the authors prefer an estimate that 55 percent of new DC recipients (which amounts to about 800,000 people) would be working in the absence of the program. This is a conservative appraisal compared to the estimates used in Autor et al. (2016) and the studies of SSDI cited above. The rest of the increase in the nonparticipation of veterans may be explained by an increase in the disability rates due to injuries in the recent conflicts in Afghanistan and Iraq, among other causes.

Cash Programs

Groves (2016) looked at welfare-reform policies directed toward increasing LFP of low-skilled mothers, and argued these changes contributed to the decline of labor supply by young, low-skilled male workers in 1989-2002. Throughout the 1990s, states rolled out the new, federally-mandated Temporary Aid to Needy Families cash assistance program, which included work requirements, time limits on benefits, and work incentives to encourage low-skilled single women with children to enter the labor force. This paper exploited the timing of the welfare reforms to show these policies had positive impacts on the LFP of young single mothers, yet also had the unintended consequence of increasing labor force exit by young, low-skilled single men.

4.2.3. Changing Education Levels

Participation rates differ across education groups. Thus, as the level of education rises in the population, we could expect the overall LFPR to move towards the rate observed for the more educated. This type of effect can be uncovered through decomposition analyses similar to those employed in the studies of demographic factors reviewed in Chapter 4.

As we showed in Figure 2, the oldest group in the population has shown an increased LFPR, and this may be partly explained by Baby Boomers having significantly higher education levels than their preceding cohorts, and educated people tend to work more at advanced ages. Blau and Goodstein (2010) found that increased educational attainment among the recent cohorts of 65-age-olds contribute to the rise in the LFPR of that group.

On the other hand, Falzone (2017), when analyzing all age groups, found no effect of changes in education on male LFP. This result is derived from the fact that LFP rates declined relatively uniformly across all levels of educational attainment.

4.2.4. Changing Education Enrollment

The group with the most rapidly declining LFP is that of young workers. This decline coincides with higher education enrollments, as more young adults are staying in school longer. This suggests that the strong decline in LFP for this group could actually be for a “good reason,” in that the education being attained may lead to higher productivity in the future.

One hypothesis is that part of the decline in LFP of young adults could be attributed to the recession, as school enrollments have been shown to be strongly cyclical. Indeed, the CEA (2014)

concluded that “analyzing the cyclical patterns in the enrollment rate itself reveals that the dynamics of enrollment between 2007 and 2014 are largely in line with the expected path given the counter-cyclical nature of enrollment in the past.” However, as with the other cyclical factors studied in Section 3.2, the decline in LFP and rise of education enrollments for this group both predate and continue after the recession, making this explanation incomplete at best.

Given the increase in wage inequality since the 1980s (see Section 4.3), it is likely that the increase in education enrollments is in part a response to the increasing returns to schooling that come about through higher wages for high-skilled individuals, but also through a reduction in wages for non-college workers. Aaronson et al. (2006.a) examined the secular decline in teen (16- to 19-year-olds) employment dating back to the mid-1980s and hypothesized teens are responding to the rise in returns to college by enrolling in school. They could explain a large share of the decline up until the year 2000, but they found school enrollment only accounts for less than 10 percent of the decline in teen LFP between the 2000-05.

Fujita’s previously-cited study on the self-reported causes for nonparticipation found that, for individuals ages 16-24, nonparticipation due to schooling increased after 2000. In 2013, around 5 percent of all nonparticipant working-age adults listed schooling as the main reason for their nonparticipation.

A detailed breakdown of the trends reveals increased enrollments by themselves do not account for the totality of the reduction in LFPR for the young. Examining participation rates among those in and out of school reveals the LFPR for those in school has been trending downward (CEA, 2014). That is, students have become less likely to be working or looking for work while enrolled in school.

Our literature searches have not revealed research addressing why the LFPR of students has gone down. It could be due to factors discussed in this document, including any of those affecting wages (Section 4.3) or the labor supply curve. Additional explanations could include changes in the demands from education programs, changes in the types of financing available, etc. This is an important topic for further research.

4.2.5. *Technology and Leisure (Video Games)*

Technology appears in the literature as affecting LFP mostly through its effect on wages, by reducing the labor demand for low-skilled workers, or, more specifically, technology replacing humans at executing routine tasks (see Section 4.3.2). However, at least two papers looked at a very different effect of technology: namely, how it can alter the labor supply curve by making leisure more attractive.

Aguiar et al. (forthcoming) and Krueger (2017) analyzed the possibility that technological advances have made videogaming more enjoyable, and hence not working has become more attractive, particularly for young men. Using time-use data, both studies documented a substantial increase in the time spent on gaming. Aguiar et al. (forthcoming) estimated a system of demand equations that includes leisure as a consumption category. They found improvements in technology can explain about half of the increase in leisure since 2004.

Krueger (2017) analyzed time-diary and self-reported wellbeing data to test the premise of young men enjoying gaming more than other forms of leisure. He found that young men do indeed show more positive affect when playing video games (though also more stress) than while engaging in other leisure activities such as watching TV, which is consistent with people choosing to spend more time on that. They also tend to play video games with friends. While this evidence is not proof that gaming has made leisure more attractive, it is at least consistent with that hypothesis.

In their review of the factors behind the decline in the employment rate, however, Abraham and Kearney (2018) expressed skepticism about these results. They stated the results by Aguiar and coauthors can be explained by reverse causality, also pointing out there is no explanation about why innovations in video game technology have made them more enjoyable to the young and not to older (over 30) men. They suggested any explanation would need other concurrent factors to help explain increased leisure among the young, such as a change in social norms making it more acceptable for the young (but not for older men) to play video games instead of working.

4.2.6. Household Income and Wealth Effects

A small literature looks at possible sources of intra-household income and wealth effects as factors influencing recent developments in LFP behavior. Zhao (2018) used an incomplete-markets model of the household to measure the wealth effects of the housing crisis, specifically on workers nearing retirement. That paper argued that the wealth effect of the unexpected fall in housing prices during the financial crisis of 2007-09 increased the LFP of homeowners ages 50-65 immediately after the shock and caused them to delay retirement. The author notes the retirement probability of renters in the same age group is not correlated with housing prices at that time.

A side effect of older women working longer is the impact on their partners' labor supply decisions. On one hand, the increased LFP of older women implies income effects within the household that could lower the LFP of the husbands. Yet, if shared leisure is valued at the household level, then husbands may decide to increase their LFP in response. Schirle (2008) stated about one quarter of the increase in LFP of older men (ages 55-64) since the mid-1990s corresponds to the relatively high labor force participation rate of their wives in that cohort. These findings would indicate that for men in this cohort, the shared leisure effects dominate any income effects associated with their wives' participation. The negative effect of intra-household income effects on prime-age married women's labor supply decisions studied by Albanesi and Prados (2017) is discussed under Section 4.4.

4.2.7. Immigration

Immigration potentially affects the overall LFPR in both in direct and indirect ways. First, immigrants' willingness to participate in the labor force may be higher (or lower) than that of natives. That is, their labor supply curve, or willingness to work at any given wage, may be different than that of the average native. Indirectly, immigration could affect wages, and, through that channel, impact the labor force participation decision of native workers.

The direct effect could potentially be substantial but in a direction opposite to the overall trends of the LFP: Immigrants tend to have higher LFPR than natives, because a smaller proportion of them are close to retirement age and prime-working age immigrants tend to have a higher LFPR. The

CEA (2014) found foreign-born prime-age men participate at higher rates than those born in America and their participation rate has risen over the two decades following 1994. (It increased by 1.4 percentage points while the LFPR of natives fell by 4.4 percentage points over the same period.) Therefore, immigration has served directly to moderate the decline in the overall LFPR.

The indirect effect would occur through a reduction on the equilibrium market wage following the shift in labor supply due to the inflow of foreign workers. This negative impact on the going wage would tend to reduce the participation rate. The final equilibrium effect on LFP would depend on the size of the labor supply shift and the labor demand's wage elasticity. This effect would go in the direction of decreasing LFPR, but it is likely small or null for two reasons. First, an empirical negative effect on natives' wages has not been established (Card, 2012). On the contrary, many studies using a variety of techniques found no negative impact of immigration on native wages (Card, 2001, Card and Lewis, 2007, Peri, 2016). However, some did find effects on certain subgroups (Borjas, 2013), namely, those who have similar skills as the immigrants and so are substitutes in the production process. If low-skilled labor is complementary with medium- and high-skilled labor, the same process would raise demand for workers with different (i.e., higher) skills, hence raising wages for those workers. This would counteract at least part of the negative effect on LFP. Some low-skilled workers may change occupations and experience a positive wage effect (Foged and Peri, 2016). However, even the impact on those with similar skills as the immigrants has been contested (Peri and Yasenov, 2018). Furthermore, Peri et al. (2015) found positive externalities of high-skilled immigrants, as innovation in the economy increases, raising overall productivity which may result in more labor demand and positive employment effects.

In conclusion, there is strong evidence towards immigration having had a positive direct effect on the overall LFPR by moderating the overall decline, whereas the sign and magnitude of the indirect effect are ambiguous and uncertain. Our review did not find any attempt to estimate the overall impact of immigration on the national LFPR or to study the aggregate impact of any changes in immigration trends. This would be a good direction for future research.

4.2.8. Labor Market Frictions

The search-matching literature offers theoretical insights and empirical assessments of the relevance of market frictions in affecting worker' labor decisions. Search and matching macro models with three states (employed, unemployed, and out of the labor force) formalize the relevance of market frictions to understand the determinants of labor supply. In these models, the presence of a friction in the form of time-consuming job search implies a fixed cost associated with the decision to participate in the labor force and it generates job hoarding by workers to avoid the irreversible loss of the search time investment (Garibaldi and Wasmer, 2005). Pries and Rogerson (2009) additionally assume shocks to participation costs. As a consequence, workers with more variable participation costs will, in presence of search costs, exhibit the greatest flows between participation and non-participation that have the lowest participation rates.

This literature has studied how payroll taxes and unemployment insurance policies affect the size of the labor force, as well as differences between the US and Europe (Garibaldi and Wasmer, 2005; Kim, 2008, and Chen and Lai, 2015). Models of this kind could be used to measure the effects of changing labor market policies on the long-term evolution of the LFPR in the last two decades. However, the focus of most of this literature is on the business cycle implications of labor market

frictions.⁵ An exception to this pattern, Mankart and Oikonomou (2016) study the changing trend in added worker effect (the increase in the probability that a married woman joins the labor force when her husband becomes unemployed). They find that changes in labor market frictions help explain the observed rise in this effect between 1985 and 2015, along with changes in the gender gap and the evolution of female labor supply.

Elsby et al. (2019) decompose labor market flows into and out of three states (employment, unemployment and non-participation) to study cyclical versus secular trends in labor force participation. According to their results, two-thirds of the substantial trend decline in male labor force participation can be traced to rising rates of labor force exit, with the remaining third accounted for by trend declines in labor force entry. Among women, while declines in rates of labor force exit dominate the trend rise in female participation during the 1990s, the trend decline since the Great Recession has instead been dominated by declines in female labor force entry.

4.2.9. Long-Term Impacts of Unemployment Spells

Whether cyclical fluctuations may have long-term impacts on some people is related but distinct from our discussion in Chapter 3 on the secular vs. cyclical nature of the reduction in LFP during the recession. This may occur because people who became unemployed during the recession may have lost skills during the time they were not working, especially considering the increase in long spells of unemployment during the Great Recession. By the first quarter of 2012, the average duration of unemployment jumped from the long-term average of around 15 weeks to more than 35 weeks (Farber, 2017). Regardless of their actual skill losses, employers perhaps were concerned about such skill losses and were less willing to hire them. For those who became unemployed during the recession, worse job prospects may have translated into a persistently lower LFPR for many years.

Research in the search and matching literature offers insights into the dynamics and effects of skill loss during long unemployment spells. In these models, when worker skills are assumed to decline while unemployed, search effort becomes less effective as the unemployment spell progresses (Pavoni and Violante, 2007) and long-term unemployment emerges as an endogenous phenomenon (Coles and Masters, 2000). Related research shows that, in frictional markets, longer unemployment spells imply persistent lower wages in the future because of the human capital losses (Ortego-Martí, 2016, and Tjaden and Wellschmied, 2014).

This channel affects labor flows and can end up affecting labor participation decisions, by discouraging workers. Krueger et al. (2014) find that the prospects of the long-term unemployed worsen the they remain unemployed, and that longer unemployment spells make it more likely that a worker becomes marginally attached to the workforce or ends up withdrawing from the labor force. When they do exit the labor force, the unemployed tend to say that they no longer want a job, suggesting that many labor-force exits could be enduring. Fujita (2014) argued more workers dropped out of the labor force due to discouragement during and after the Great Recession, and currently there are more discouraged workers than before the recession. He estimated 30 percent

⁵ In fact, Rogerson and Shimer (2011) suggest that search frictions are unlikely to cause secular trends such as the changes in LFPR.

of the decline in LFPR between 2007 and 2011 was due to the increase in discouraged workers. Jones and Riddell (2019) argue that around 2.8 percentage points of the observed decline in LFP by 2017 was due to an increase in the size of the group of marginally attached workers.

Farber (2017) discussed a recent rich literature demonstrating that workers who are displaced from their jobs due to plant closings suffer permanent negative employment effects (Jacobson et al., 1993; Davis and von Wachter, 2011; Song and von Wachter, 2014). The findings of this literature highlight the potentially serious employment consequences of the high job-loss rate during the Great Recession, including very low rates of re-employment and difficulty finding full-time employment. Farber (2017), using the Displaced Workers Surveys (DWS), further investigated the incidence and consequences of job loss between 1984 and 2016. Not surprisingly, he found job loss rates were high during the downturn followed by low rates of re-employment, and job losers had a particularly difficult time finding new full-time work. He found that of full-time job losers by 2009, only 30 percent regained full-time employment within a year. Furthermore, the adverse employment experience of full-time job losers continued beyond the Great Recession: Workers losing jobs during the recession had lower employment rates two and even four years later.

These studies, however, only suggest a direct effect of job loss on re-employment prospect (“scarring”). They do not provide direct evidence it is the lapse of unemployment itself reducing their employment prospect. Some researchers have aimed to address the question directly through the use of “audit studies,” in which they sent out fictitious resumes to real job openings and randomized the characteristic of interest stated on the resume. In this case, they sent out resumes of job applicants with either employment gaps or not, or with gaps of different duration, then measured the callback rates for the different groups. Most of these studies did not find a strong relationship. Nunley et al. (2017) and Farber et al. (2016) did not find an effect on callback rates of unemployment gaps of different durations for young educated and older workers respectively, though Kroft et al. (2013) did discover a negative effect for young workers.

Barnichon and Figura (2016) argued that a key aspect of the secular changes in the U.S. labor market is the change over time of the nonparticipation pool’s composition. They found a strong decline in desire to work among those out of the labor force (measured as the share of nonparticipants who want a job) since the second half of the 1990s, then argued this decline explains the downward trend in LFP. They noted this decline in desire to participate is present across demographic groups. Also, they learned this labor supply shift can account for 1.75 percentage points of the decline in participation, whereas demographic factors account for an additional 1.5 percentage points. They suggested three possible interpretations for this negative labor supply shift: 1. A reduction in the added-worker effect driven by the strong wage growth in the second half of the 1990s, especially at the top deciles of the wage distribution; 2. a higher emphasis on education, perhaps partly in response to a rising high school and college wage premium; and 3. a change in preferences.

Economic turbulence at the macroeconomic level translates into restructuring at the firm level (for example, when activity shifts from manufacturing to service sectors or when they incorporate new technologies). This causes variations in the rates of skill loss among workers and may be particularly damaging for older workers because skill accumulation is a time-consuming process.

Lalé (2018) calibrated a general equilibrium life-cycle model with labor market frictions to account for the impact of the interaction between economic turbulence and institutions on men's LFP. In this setting, the secular decline in LFPR of older male workers (ages 55-64) is consistent with an increase in economic turbulence, given the institutional setting. However, an increased level of economic turbulence does not seem to generate significant changes in the LFPR of prime-age males.

Overall, it is not clear the extent to which scarring or loss of skill due to long unemployment spells might have significantly affected long-term trends in participation. Krueger et al. (2014) and Lalé (2018) are the closest studies we found to aiming to quantify the potential magnitude of the contribution of this type of long-term effects on the overall recent evolution of the LFPR. Although these effects were longer lasting than the duration of the recession, we also would expect them to be temporary, as the negative effects dissipate when cohorts affected by the recession exit the working ages. We envision future research in this area to go in at several directions: First, it would be possible to estimate the upper bounds of the potential contribution of scarring to the overall trend of LFP (by estimating the total number of people lost jobs and who eventually exited the labor force, the duration of the exit of the LF, then comparing these exit rates with those occurring during other parts of the business cycle). A second direction of research could look into further establishing whether there is a causal connection between unemployment duration and reemployment scarring. Lastly, the literature on labor market frictions and skill loss during unemployment provides a theoretical framework and empirical benchmarks for additional research in this area.

4.3. Factors that Directly Affect Wages and Labor Demand

Moffit et al. (2012) showed that stagnating and declining wages for a large sector of the population is associated with the decline of employment and participation rates. Thus, it is natural to hypothesize that many of the factors behind the decline in LFP are those resulting in lower wages for certain groups.

The factors reviewed in this section have been intensely discussed in the literature attempting to explain the rise in income inequality in the U.S. since the 1980s, as these factors imply a reduction in the relative demand for low-skilled workers (or for subgroups, e.g. manufacturing workers) versus demand for high-skilled workers. Thus, to the extent these factors are responsible for a reduction in (relative) wages of groups of workers, they also may be responsible for a reduction in these workers' LFP.

A difficult question to answer from the literature, but important to address, is whether any identified reduction in a group's LFP caused by the decline in that group's relative wage is associated with an increase in the LFP of the group whose relative wage rose. For example, if increased imports result in a relative reduction of wages for low-skilled workers in manufacturing (versus high-skilled workers or workers in the service industry) and lead to reduced labor supplied by men who would have worked in that sector, is that effect counterbalanced by increases in labor supply of high-skilled workers or women in services?

As described in Table 1, some factors directly affecting wages and labor demand are thought to alter prime-aged men's participation the most. The reason for this is that these factors have affected mostly manufacturing jobs. An exception is minimum wage laws, often believed to affect adolescents and young workers the most (as they usually are among the lowest earners). However, as we describe in the summary of some studies below, general equilibrium mechanisms have extended these effects to non-manufacturing sectors and move women's employment too.

4.3.1. International Trade

There are several studies of the effects of trade on labor markets in areas with predominant industries directly impacted by competition with imports. These studies found substantial effects on local labor markets, as defined by commuting zones.⁶ Autor et al. (2013), to estimate the local effect of trade on employment outcomes, exploited the growth of China's economy in combination with baseline levels of industry shares. They found the commuting zones affected by trade because they housed industries competing with imports from China experienced a significant reduction in employment and labor force participation. In their preferred specification, Autor et al. (2013) estimated exposure to Chinese imports increased (involuntary) unemployment and nonparticipation by 0.52 percentage points.

Pierce and Schott (2016) employed a differences-in-difference strategy, comparing manufacturing industries that were more (vs less) affected by China's accession to the World Trade Organization in 2001. They found substantial employment losses in the most affected industries.

Acemoglu et al. (2016) took the analysis further by adding to the count of jobs lost by the ascension of Chinese manufacturing those lost through industry linkages; that is, a reduction in employment caused by lower demand for intermediate inputs. They combined this analysis with the result in Autor et al. (2013) of no reallocation across commuting zones, to estimate increased trade pressures from China resulted in an overall reduction in employment by 2.37 million jobs between 1999-2007. This study does not quantify how much of the reduction translates into unemployment versus out of the labor force, but given the relatively low unemployment rate at the end of that period, it is possible that most of this exit from employment was to out of the labor force.

Abraham and Kearney (2018) extrapolated these results to the effects of Chinese imports between 1999 and 2016, by assuming the increase of imports over the extended period had the same effect as in the Autor et al. and Acemoglu studies. They estimated Chinese imports are associated to 2.65 million jobs lost over the period.

However, from our perspective, these findings cannot be interpreted in terms of whether there has been an overall impact on changes in trade on America's LFPR, because general equilibrium mechanisms could run counter to these estimates. By construction, and as pointed by the authors themselves, differences-in-difference studies of industries, as in Pierce and Schott, provided estimates relative in nature, and cannot be used to estimate economy-wide effects. The same

⁶ Commuting zones are geographical units defined by the strength of commuting ties, largely corresponding to metropolitan areas.

happens with cross-regional studies: Declines in employment in affected commuting zones may have been counteracted by increases in employment in “control” commuting zones.⁷

The effects of trade on the economy, employment, and wages is an important discussion topic in economics. However, most studies only look at partial effects of international trade, perhaps focusing on trade’s effect on employment in a given industry (manufacturing) or in given regions (those most affected by trade). An important avenue for future research would be convincingly extrapolating the implications of these effects to estimates for the country’s overall LFP.⁸

4.3.2. Technology

Improvements in technology and automation have reduced the relative demand for low-skilled workers, particularly in manufacturing and jobs entailing routine tasks. This has led to a reduction in the relative wages for these workers. Lower wages make working less attractive and hence may lead to a reduction in the size of the labor force.⁹

Despite technology often competing with certain kinds of workers, resulting in reduced wages and lower employment in those jobs, technological change also increases wages and demand for other types of jobs, thus not necessarily reducing total labor force participation. Autor and Dorn (2013) studied the effects of the advent of computers and the substitution of routine jobs. This technological advance caused employment losses (and wage reductions) in middle-skill occupations involving routine tasks that could be replaced by the computerization. However, this also caused an increased in demand for high-skilled workers (who became more productive as their labor is complementary to computers), and for low-skilled labor in the service sector (as their labor is not subject to automation, plus the demand of which grew due to the overall increase in the economy’s productivity). Thus, the reductions in both employment and wages in middle-skilled occupations are counteracted by the increase in employment and wages at both low- and high-skilled occupations. Autor et al. (2015), using an approach similar to their research of two years earlier, estimated the effect of automation. Surprisingly, they found an effect on wages but not on employment, suggesting that relocation of employment as a result of these shocks has been different than with trade.

Acemoglu and Restrepo (2018), meanwhile, focused on one specific form of technological innovation: industrial robots. They found that commuting zones in 1990 housing a larger share of industries subject to robotization experienced, in the subsequent decades, a relative decline in their employment-to-population ratio. At the rate of robotization in the U.S., their results imply an average reduction of employment-to-population ratio of 0.34 percentage points

⁷ Another example of a general equilibrium effect that would run counter to these estimates is the following: the inflow of cheaper imports from trade raises disposable income which raises demand for other goods (and potentially raise employment in the industries that produce them).

⁸ A further question about the employment effect of trade is their duration: the extent to which the employment of individuals (or newer cohorts) go back to pre-shock levels. The literature finds persistent effects, but even these may dissipate after longer periods.

⁹ In a previous subsection, we reviewed research showing some technological advances can affect labor supply by making videogaming more enjoyable, and hence not working more attractive, particularly for young men.

Blank and Shierholz (2007) found a decline in the gender gap in low-skilled workers' participation, attributing it to the differential impact of changes in returns to education and experience across gender. They estimated that lower returns to education and experience could account for part of the decline in LFP of young men between 1979 and 2003, while women were less affected by the lower returns to education and saw an increase in the returns to experience.

4.3.3. Minimum Wage

The minimum wage is the labor market regulation receiving the most attention in the labor economics literature. In the simple microeconomic model taught in introductory courses, an increase in the minimum wage would tend to increase LFP even in cases where its effect on employment is negative: a minimum wage (if binding) raises the wage, with more people becoming willing to work at the going wage – but not everybody finds a job, thus creating unemployment. The hike in the number of unemployed is larger than the reduction of employed, and so total LFP (employed + unemployed) increases. However, if the market is not competitive, as in a monopsony, wages are set lower than the marginal productivity of labor, and minimum wages have the effect of raising both wages, employment and labor supplied.

An extensive literature has looked at the effects of changes in minimum wage laws on employment and unemployment for affected populations. A consensus has not been reached about the impact on employment or LFP. Since the classical work of Card and Krueger (1994), other research efforts have found no impact of minimum wages on employment. In contrast, recent work argues the minimum wage has an impact on earnings after accounting for the dynamic aspects of the labor market (Meer and West, 2016). Case studies of recent local increases, such as the increase of the minimum wage in Seattle, found negative employment effects only when raised beyond a certain level (Jardim et al., 2017)

However, there are no comprehensive studies looking at the secular impact on the overall LFPR in the economy. The real value of the U.S. federal minimum wage decreased sharply during the 1980s and has remained at a much lower level since then.¹⁰ While we did not find studies quantifying this, the effect of the recent increases in the real minimum wage is not likely to have substantially contributed to the overall decline in the LFPR because: 1. it is binding only for a minority of workers; 2. most raises have been made from historically low levels, and hence are unlikely to have had strong negative effects on employment, as most estimates have found; and 3. they may have made some people unemployed (and thus remaining in the labor force).

4.3.4. Criminal Records

The CEA (2014) analysis shows the decline in LFPR of prime-age black males has been larger than the decline in LFPR of white males for all education groups. Black men also are the group with highest incarceration rates (Freeman, 2003). Incarceration rates of blacks increased through large parts of the 20th century, and thus researchers have hypothesized of a link between these two trends. Tougher sentencing policies since the 1970s caused an unprecedented rise in incarceration rates concentrated among younger men. Between 1979 and 2003, the male incarceration rate rose from 254 men in prison per 100,000 in the population to 846 per 100,000. Less-skilled men were

¹⁰ Some states have recently raised their minimum wages.

disproportionately affected by these changes. Raphael (2006) indicated the net effect of these changes is to reduce LFP among the non-incarcerated in the most affected groups (i.e., less-skilled, minorities, young men).

The effects of incarceration are likely to be persistent. Not only is a person unable to work while incarcerated, but it is also harder to find a job after being released due having a criminal record. In addition, some studies found evidence that a criminal record may hinder the employment prospects of black men more strongly than of white men (Pager, 2003). This strengthens the notion of increases in incarceration rates perhaps contributing to the reduction in black men's LFPR.

Western and Pettit (2000) and Holzer et al. (2005) conducted regression analyses, finding incarceration rates responsible for a quarter or more of the decline in participation among black males, and for at least half of those between ages 25 and 34.

4.4. Factors that Affect Mostly the LFP of Women

Women became increasingly more likely to work during most of the 20th century. For every age group, female LFPR rates grew during this time. This was a major influence behind the overall LFP rate increase since the 1960s and up to the late 1990s, peaking in the year 2000.

However, the current share of prime-aged women in the labor force is about the same as it was in the 1990s, and lower than at the turn of the millennium. The stagnation of the FLFPR contributes to the overall decline of the population participation rate, as it marks a break from many decades where the increased participation of women raised the rate even against a negative trend for prime-aged men. In addition, the "plateauing" of FLFP is unexpected given both the continued increase in educational levels of newer cohorts of working-age women (Kuziemko et al., 2018), plus the continued growth in FLFP (albeit slower-paced) in other countries (Albanesi and Prados, 2017, Blau and Kahn, 2013).

The literature specifically addressing the evolution of women's LFP is large and diverse, looking at a large number of potential factors, but mostly concerned with the historical increase in FLFP. In the following subsections, we analyze the evidence (or lack thereof) on some contributors to this trend reversal in FLFP (though, of course, part of the explanation of the reversal likely lies with the factors affecting both genders, and are discussed in the rest of the subsections). We analyze the literature on factors that may have operated through the workplace by making work less amenable for women (for example, the advent of "just-in-time" production and the proliferation of flexible-hours contracts in the service industry) and factors making family and household responsibilities more demanding and/or relatively attractive (such as the increase in the costs of childcare and/or changes in the cultural norms towards spending time with them).

4.4.1. Policies Specifically Affecting Women

Blau and Kahn (2013) used data on participation across developed countries and find that female participation in the U.S. is lagging with respect to the other countries. They argue that America's lack of family-friendly policies explains roughly a quarter of the comparative decline in the U.S. women's participation between 1990 and 2010.

On the other hand, unilateral divorce laws were pointed out by Olivetti and Rotz (2018) as potential explanations for older women working later into their lives. They find that these laws were associated with cross-cohort differences in the probability of divorce over the lifecycle and that exposure to unilateral divorce late in life significantly increased the probability of full-time employment for women, and significantly decreased retirement wealth. The mechanism suggested by this finding is that women who divorced unexpectedly later in life are working longer remedially because they are less likely to have engaged in precautionary human capital investment and might have to work longer to increase her assets prior to retirement.

In this vein, Voena (2015) studied the effect on household behavior of the introduction of unilateral divorce laws imposing an equal division of property. Exploiting state variation in these laws, she found that unilateral divorce with equal division of property decreased the LFP of women who were married at that time of the change in laws.

Brusentsev (2006) looked at the evolution of FLFP associated with marital status and family composition. The paper noted an increase, beginning in 1993, in the LFP of never-married mothers with young children. On the contrary, married women were less likely to participate in the work force after that year. This behavior of the LFP of single mothers could be a result of the tax reform which expanded the Earned Income Tax Credit. Indeed, this is in line with Eissa et al. (2008), who noted the increased LFP of single mothers since the early 1990s and show that the LFPR of single mothers increased in response to the tax reforms in 1986, 1990, 1993, and 2001, which increased benefits for low-income taxpayers.

4.4.2. Other Factors Affecting Female Labor Force Participation

4.4.2.a Cultural Trends

Cultural norms and social attitudes about working women have changed over the 20th century, and Fernández (2013) argued this was a crucial factor for the evolution of female labor supply. The diffusion of new cultural norms over time and cohorts generates a trajectory in FLFPR that predicts a slowdown after the large increase experienced between 1950 and 1990. This is a plausible factor behind the observed plateauing of the female LFPR. However, this mechanism does not account for the trend reversal observed over the last couple of decades.

4.4.2.b Increase in Child Care Costs

Kuziemko et al. (2018) showed parental expenditures, in both time and money, has increased since the 1990s. The cost of child care has jumped by 65 percent since the early 1980s. In surveys, mothers report more pressure to breast-feed, do enriching activities, and provide close supervision. This is true especially for women with college degrees (whose share of the total workforce has also increased). This may be a contributing factor on the share of women who stop working after giving birth.

4.4.2.c Gender Wage Inequality

Albanesi and Prados (2017) documented the break in trend of married women's LFP, which occurred in the mid-1990s. They noted that LFP of prime-aged married women stopped increasing at that point, and it declined even for highly educated women. The paper showed that the skill

premium for full-time, full-year workers increased faster for men than for women beginning around 1993, and argued that the household income effects caused by this gender differential in the skill premium increase are enough to explain around 60 percent of the observed slowdown in LFP of women married to husbands with a college degree. This applies even allowing for time trends in the wives' disutility from work and accounting for the consequences of human capital depreciation due to being out of the labor force.

4.4.2.d Taxation

The literature suggests that taxation may be hampering married women's labor force participation. Because the U.S. tax system taxes the household income instead of individuals', secondary earners usually pay a high marginal tax – which depends on the primary earner's income level – on their earnings. This characteristic of income taxation mostly affects married women's decision to participate in the labor market because in the U.S. women are usually secondary earners in their household. Moreover, empirical estimations indicate that women have larger labor supply elasticities than men,¹¹ which makes their participation decisions very sensitive to marginal taxes.

Guner et al. (2012a, 2012b) apply this logic to analyze potential reforms to the U.S. tax system (proportional income tax and a switch from joint to separate filing for married couples) and find that those reforms would increase FLFP. A few papers measured the importance of taxes to explain labor supply differences across countries (Chakraborty et al., 2015, Bick and Fuchs-Schündeln, 2018, Bick et al., 2019). No research has explicitly explored the quantitative importance of the tax structure in female LFP in the period after 2000.¹²

4.4.2.e “Just in Time” Production and Irregular Working Hours

Goldin and Katz (2011) described the rise of work arrangements where employees are requested to be “on call” and can be summoned to work within short notices. This type of arrangement can be particularly difficult for mothers, as they need to be able to plan around childcare, etc. Though this likely is important for some workers, we found no study empirically quantifying its effect.

4.4.2.f Older Cohorts

Goldin and Katz (2018) looked at the somewhat new phenomenon of American women working through their sixties and even into their seventies. The participation of women at older ages started increasing in the late 1980s (before the turnaround in older men's LFP and the economic downturns of the 2000s). The increased LFP of older women was part of the general increase in that cohort's LFP. They argued that cohort effects are mainly a function of educational advances and greater prior work experience. But LFPR of the most recent cohorts in their forties are lower than those of previous cohorts. This could imply that, in the near future, female participation at older ages could stagnate or even decrease. But several other factors, like educational attainment

¹¹ Blundell and MaCurdy (1999) and Keane (2010) offer comprehensive surveys of the estimates.

¹² Kaygusuz (2010) applies this reasoning to the tax reform in 1986, which led to lower income taxes for households to explain part of the rise in female LFP in the 1990s. Kleven et al. (2009) show the quantitative relevance of this channel for the U.K.

and employment continuity, will be operating in an opposing direction, leading them to conclude that women are likely to continue to work even longer.

Lahey (2018) highlighted that older black women, those currently aged 50-72, have lower employment than similar white women in those same cohorts, despite having had higher employment when they were middle-aged and younger. Earlier cohorts of older black women also worked more than their white counterparts. It is unexpected that white women's employment should surpass that of black, given that black women historically have shown a stronger attachment to the workforce. Lahey explored potential reasons for the difference in racial employment rates over time, finding that education, marital status, having a child at home, home ownership, geography, and changes in welfare and SSI do not explain this difference. However, she discovered that changes in occupation, industry, limitations in activities of daily living, and motor skills can explain part of it.

5. Discussion

To conclude, we summarize what we believe to be the most important areas where the research questions are well studied and have been answered with a high degree of confidence, versus where there are important research gaps. In addition to listing the gaps, we identify research directions that may be pursued. In some cases, these research directions have been suggested by the reviewed studies while in other cases they are our own suggestions.

A research gap may be important for different reasons. The first and more obvious is that a given factor is understudied and has the potential for explaining a large share of the decline. This includes, for example, the health and opioid crisis, which may turn out to explain an important share of the phenomenon but has only a few studies that have addressing the problem of causality. A second reason is that the topic may be of interest for its direct relevance to policy. This is the case, for example, of the research on Social Security and welfare programs. In addition to being able to account for a fraction of the decline, it has attracted (and will likely continue to attract) much research given that understanding their impacts is important for policy decision-making.

Cyclical versus Secular Factors

The literature on whether the decline in LFPR is secular or cyclical is extensive and has reached the robust (in our opinion) conclusion that most of the decline is due to secular trends, although the last recession may have induced structural changes in the labor force. The latter point constitutes a research gap. Though we review some studies of the “scarring” phenomena in Section 4.2.8, it is not clear the extent to which scarring or loss of skill due to unemployment spells may significantly affect long-term employment or participation. Furthermore, we did not find studies quantifying the potential magnitude of these long-term effects on the overall LFP participation rates.

Demographic Change

The literature has robustly established that population aging and other trends in demographic changes in the U.S. account for at least half of the decline in LFPR, and possibly up to two-thirds. In addition to there being a broad consensus around this point, the analysis from which this is derived is straightforward and requires very few assumptions, giving high credence to the finding. The main finding is explained by population aging, which has meant the share of working-age individuals older than 55 has grown during the last couple of decades. Because retirement becomes more likely as workers age, this phenomenon in itself generates a decline in the overall LFPR.

While the main finding is clear, it would be possible to conduct related research in the following two directions: First, decompositions could be expanded to other characteristics, such as immigration status (see Section 4.2.7), which could increase the explanatory power of the decomposition. In addition, Feroni et al. (2018) argued for refining the interpretation of labor supply shocks, in particular by disentangling demographic factors from nonparticipants' declining desire to work.

Factors Affecting the Labor Supply Curve

The literature identifies recent health trends, in particular the opioid epidemic, as a potentially important factor explaining the decline in LFP. The literature establishes correlation, but there is scant evidence on the direction of causality. Research filling that gap is necessary. Although it is not easy to do so, finding instrumental variables – such as in the recent working paper by Aliprantis and Schweitzer – can prove fruitful.

Given its direct linkage to public policy, there has been much interest and research on studying the impacts of Social Security and welfare programs. The impacts of programs like Social Security retirement benefits, Social Security Disability Insurance and Veterans Affairs' DC program have been well studied. Researchers have come up with many strategies to determine the impacts of these programs, and, though with some differences, have estimated an impact of the programs on employment probability of about 30 percent. While most studies estimate the impact of Social Security programs, more investigation is needed into changes in eligibility and benefits rules contributing to trends in employment and participation. Research here would be useful, in particular for the case of Disability Insurance as it covers a very large and fast-growing number of Americans.

In a model with labor market frictions, unemployment insurance and other labor market policies have theoretical potential to affect the size of the labor force, as mentioned in Section 4.2.8. It would be worth exploring the quantitative relevance of changes in these policy in the last couple of decades – especially around the time of the Great Recession – in contributing to the evolution of the LFPR. Additionally, the literature on skill loss during unemployment points to an additional channel which can impact the LFPR in the long term, especially after the jobless recoveries that have been observed in the U.S. since the 1990s.

The group experiencing the strongest decline in participation is that of young adults. The studies reviewed show this can be traced partly to higher rates of enrollment in schools but, more importantly, to lower proportions of students who also work. The explanation for higher

enrollment rates may lie in the increase in the returns to schooling seen in the last few decades. The reasons for lower participation rates among students, however, is an important research gap. Understanding these reasons would allow us to explain a significant share of the decline in the LFPR among youth.

Factors that Affect Labor Demand or Regulate Wages

A large literature has investigated changes in trade and improvements in technology as potential causes of increased wage inequality. Thus, these same factors potentially are important to explaining trends in labor force participation. Recently, there have been influential studies on the effects of trade and technology. These papers share similar methods, comparing geographic areas with characteristics that made them more (versus less) vulnerable to trade or technology shocks. This literature finds substantial effects of trade on employment, suggesting, for example, China's rise in international trade has resulted in a reduction of 2.4 million jobs (Autor et al., 2013). A similar approach applied to technology finds no overall effect, with automation reducing wages and employment in "middle-skilled" occupations but increasing it in low-skilled services not subject to automation and in high-skilled occupations. On the other hand, recent work focusing on one specific innovation, industrial robots, found an important effect by which the latest advances in this area reduced employment by about 0.34 percentage points.

Though the research is compelling, there is no consensus on the impact of technological change on the long-run behavior of LFP. Moreover, most results arise from local estimations, thus more research is needed to translate them into what they imply for employment and LFPR for the country as a whole. In this analysis, it is important to consider the general equilibrium effects of changes in sectoral labor demand, as sectoral shifts in economic activity and ensuing economic growth may increase demand for labor in a different sector and location. A macroeconomic approach may be useful for this purpose.

Factors that Mainly Affect Female Participation

More research is needed to understand the current behavior of the LFP of prime-aged women (Why did it decrease across education groups?) as well as the future trends in FLFP. Women still are increasing their investments in education – but this is not translating into a higher LFP. It would be useful to quantify by how much policies affect these trends. Additionally, an aging population indicates an increased need for caregiving resources. Because women remain more likely than men to be in charge of caregiving for relatives, this phenomenon could have implications for trends in female LFP.

Other Research Gaps

Several factors have been shown to affect the LFP of different subgroups, but what has not been measured is the aggregate impact on the secular trend over the last couple of decades. It would be especially interesting to compute a decomposition of the relative importance of each factor. The approach in Abraham and Kearney (2018) takes a step in this direction with respect to changes in employment: From the studies that they judge more credible for each factor reviewed, they use the estimated impacts of the respective factor and conduct a back-of-the-envelope calculation of how many fewer employed persons can be attributed it. To decompose the changes of LFP into different

influences, it would be useful to include the broader set of factors affecting the LFPR identified in this review, or even use a structural approach to incorporate the factors. Additionally, a general equilibrium setting would allow to account for the indirect effects of changing trends and policies.

References

- Aaronson, D., Davis, J., & Hu, L. (2012). “Explaining the Decline in the U.S. Labor Force Participation Rate.” *Chicago Fed Letter*, No. 296, Federal Reserve Bank of Chicago
- Aaronson, D., Mazumder, B., & Schechter, S. (2010). “What is Behind the Rise in Long-Term Unemployment?” *Economic Perspectives*, 34(2), 28–51.
- Aaronson, D., Park, K.-H., & Sullivan, D. G. (2006.a). “The Decline in Teen Labor Force Participation.” *Economic Perspectives*, Q1, 2–18.
- Aaronson, S., Cajner, T., Fallick, B., Galbis-Reig, F., Smith, C., & Wascher, W. (2014). “Labor Force Participation: Recent Developments and Future Prospects.” *Brookings Papers on Economic Activity*.
- Aaronson, S., Fallick, B., Figura, A., Pingle, J., & Wascher, W. (2006.b). “The Recent Decline in The Labor Force Participation Rate and Its Implications for Potential Labor Supply.” *Brookings Papers on Economic Activity*, 2006(1), 69–134.
- Abraham, K., & Kearney, M. (2018). “Explaining the Decline in the U.S. Employment-to-Population Ratio: A review of the evidence” (NBER Working Paper No. 24333). Cambridge, Mass.: National Bureau of Economic Research.
- Acemoglu, D., Autor, D., Dorn, D., Hanson, G. H., & Price, B. (2016). “Import Competition and the Great US Employment Sag of the 2000s.” *Journal of Labor Economics*, 34(S1), S141–S198.

- Acemoglu, D., & Restrepo, P. (2018). “Demographics and Automation.” (NBER Working Paper No. 24421). Cambridge, Mass.: National Bureau of Economic Research.
- Aguiar, M., Bils, M., Charles, K. K., & Hurst, E. (forthcoming). “Leisure Luxuries and the Labor Supply of Young Men.” *Journal of Political Economy*.
- Albanesi, S., & Prados, M. J. (2017). “Slowing Women’s Labor Force Participation: The Role of Income Inequality.” *Mimeo*.
- Aliprantis, D., & Schweitzer, M. E. (2018). “Opioids and the Labor Market”. (Federal Reserve Bank of Cleveland Working Paper No 18-07). Federal Reserve Bank of Cleveland.
- Autor, D.H, & Dorn, D. (2013). “The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market.” *American Economic Review*, 103(5), 1553-97.
- Autor, D. H., Dorn, D., & Hanson, G. H. (2013). “The China Syndrome: Local Labor Market Effects of Import Competition in the United States.” *American Economic Review*, 103(6), 2121–2168.
- Autor, D. H., Dorn, D., & Hanson, G. H. (2015). “Untangling Trade and Technology: Evidence from Local Labour Markets.” *The Economic Journal*, 125(584), 621–646.
- Autor, D. H., & Duggan, M. G. (2003). “The Rise in the Disability Rolls and the Decline in Unemployment.” *The Quarterly Journal of Economics*, 118(1), 157–206.
- Autor, D. H., Duggan, M., Greenberg, K., & Lyle, D. S. (2016). “The Impact of Disability Benefits on Labor Supply: Evidence from the VA’s Disability Compensation Program.” *American Economic Journal: Applied Economics*, 8(3), 31–68.
- Bairoliya, N. (2019). “Pension plan heterogeneity and retirement behavior.” *European Economic Review*, 116, 28-59.

- Barnichon, R., & Figura, A. (2016). "Declining Desire to Work and Downward Trends in Unemployment and Participation." *NBER Macroeconomics Annual*, 30(1), 449–494.
- Bick, A., Brüggemann, B., Fuchs-Schündeln, N., & Paule-Paludkiewicz, H. (2019). "Long-term changes in married couples' labor supply and taxes: Evidence from the US and Europe since the 1980s." *Journal of International Economics*, 118, 44-62.
- Bick, A., & Fuchs-Schündeln, N. (2018). "Taxation and labour supply of married couples across countries: A macroeconomic analysis." *The Review of Economic Studies*, 85(3), 1543-1576.
- Blank, R. M., & Shierholz, H. (2007). "Exploring Gender Differences in Employment and Wage Trends Among Less-Skilled Workers." *Working and Poor: How Economic and Policy Changes Are Affecting Low-Wage Workers*, 23.
- Blau, D. M., & Goodstein, R. M. (2010). "Can Social Security Explain Trends in Labor Force Participation of Older Men in the United States?" *The Journal of Human Resources*, 45(2), 328–363.
- Blau, F. D., & Kahn, L. M. (2013). "Female Labor Supply: Why Is the United States Falling Behind?" *American Economic Review*, 103(3), 251–256.
- Borjas, G. J. (2003). "The labor demand curve is downward sloping: Reexamining the impact of immigration on the labor market." *The Quarterly Journal of Economics*, 118(4), 1335-1374.
- Brusentsev, V. (2006). "Evolution of Female Labor Force Participation in the United States: 1967 to 2003." *International Advances in Economic Research*, 12(3), 358–373.
- Bullard, J. (2014). "The Rise and Fall of Labor Force Participation in the United States." *Federal Reserve Bank of St. Louis Review, First Quarter*, 96(1), 1–12.
- Card, D. (2001). "Immigrant Inflows, Native Outflows, and the Local Labor Market Impacts of Higher Immigration." *Journal of Labor Economics*, 19(1), 22–64.

- Card, D. (2012). “Comment: The Elusive Search for Negative Wage Impacts of Immigration.” *Journal of the European Economic Association*, 10(1), 211-215.
- Card, D., & Krueger, A. B. (1994). “The Economic Return to School Quality: A Partial Survey” (Working Paper No. 713). Princeton University, Department of Economics.
- Card, D., & Lewis, E. G. (2007). “The Diffusion of Mexican Immigrants During The 1990s: Explanations and Impacts.” In *Mexican immigration to the United States* (pp. 193–228). University of Chicago Press.
- Case, A., & Deaton, A. (2015). “Rising Morbidity and Mortality in Midlife Among White Non-Hispanic Americans In The 21st Century.” *Proceedings of the National Academy of Sciences*, 112(49), 15078–15083.
- Case, A., & Deaton, A. (2017). “Mortality and Morbidity in the 21st Century.” *Brookings Papers on Economic Activity*, 2017, 397.
- Chen, B. L., & Lai, C. F. (2015). Effects of labor taxes and unemployment compensation on labor supply in a search model with an endogenous labor force. *Journal of Macroeconomics*, 43, 300-317.
- Chen, S., & van der Klaauw, W. (2008). “The Work Disincentive Effects of the Disability Insurance Program in the 1990s.” *Journal of Econometrics*, 142(2), 757–784.
- Coile, C., Duggan, M., & Guo, A. (2015). “Veterans’ Labor Force Participation: What Role Does the VA’s Disability Compensation Program Play?” *American Economic Review*, 105(5), 131–136.
- Coglianesse, J. (2018). “The rise of in-and-outs: Declining labor force participation of prime age men.” Harvard University, *mimeo*.

- Coles, M., & Masters, A. (2000). "Retraining and long-term unemployment in a model of unlearning by not doing." *European Economic Review*, 44(9), 1801-1822.
- Council of Economic Advisors. (2014). "The Labor Force Participation Rate since 2007."
- Daly, M. C., Hobijn, B., Şahin, A., & Valletta, R. G. (2012). "A Search and Matching Approach to Labor Markets: Did the Natural Rate of Unemployment Rise?" *Journal of Economic Perspectives*, 26(3), 3–26.
- Davis, S. J., & von Wachter, T. M. (2012). "Recessions and the Cost of Job Loss." *Brookings Papers on Economic Activity*, Fall 2011.
- Eissa, N., Kleven, H. J., & Kreiner, C. T. (2008). "Evaluation of Four Tax Reforms in the United States: Labor Supply and Welfare Effects for Single Mothers." *Journal of Public Economics*, 92(3–4), 795–816.
- Elsby, M., Hobijn, B., Karahan, F., Koşar, G., & Şahin, A. (2019). "Flow origins of labor force participation fluctuations." *AEA Papers and Proceedings* (Vol. 109, pp. 461-64).
- Erceg, C. J., & Levin, A. T. (2014). "Labor Force Participation and Monetary Policy in The Wake of The Great Recession." *Journal of Money, Credit and Banking*, 46(S2), 3–49.
- Fallick, B., & Pingle, J. (2007). "A Cohort- Based Model of Labor Force Participation" (*Finance and Economics Discussion Series* No. 2007-09). Federal Reserve Board.
- Falzone, J. S. (2017). "Labor Force Participation and Educational Attainment in the United States." *International Advances in Economic Research*, 23(3), 321–332.
- Farber, H. S. (2017). "Employment, Hours, And Earnings Consequences of Job Loss: US Evidence from the Displaced Workers Survey." *Journal of Labor Economics*, 35(S1), S235–S272.
- Farber, H. S., Silverman, D., & von Wachter, T. (2016). "Determinants of Callbacks to Job Applications: An Audit Study." *American Economic Review*, 106(5), 314–318.

- Fernald, J. G., Hall, R. E., Stock, J. H., & Watson, M. W. (2017). "The Disappointing Recovery of Output After 2009." *Brookings Papers on Economic Activity*. Spring 2017, 1-58.
- Fernández, R. (2013). "Cultural Change as Learning: The Evolution of Female Labor Force Participation over a Century." *The American Economic Review*, 103(1), 472–500.
- Foged, M., & Peri, G. (2016). "Immigrants' Effect on Native Workers: New Analysis on Longitudinal Data." *American Economic Journal: Applied Economics*, 8(2), 1–34.
- Froni, C., Furlanetto, F., & Lepetit, A. (2018). "Labor Supply Factors and Economic Fluctuations: Labor Supply Factors and Economic Fluctuations." *International Economic Review*, 59(3), 1491–1510.
- Freeman, R. B. (2003). "Can We Close the Revolving Door?: Recidivism vs Employment of Ex-Offenders in the U.S." *Urban Institute Reentry Roundtable*. Urban Institute.
- French, E., & Song, J. (2014). "The Effect of Disability Insurance Receipt on Labor Supply." *American Economic Journal: Economic Policy*, 6(2), 291–337.
- Fujita, S. (2011). "Effects of Extended Unemployment Insurance Benefits: Evidence from the Monthly CPS." (Working Paper No. 10–35). Philadelphia: Federal Reserve Bank of Philadelphia.
- Fujita, S. (2014). "On the Causes of Declines in the Labor Force Participation Rate." *Research Rap Special Report, Federal Reserve Bank of Philadelphia*, 6.
- Garibaldi, P., & Wasmer, E. (2005). "Equilibrium search unemployment, endogenous participation, and labor market flows." *Journal of the European Economic Association*, 3(4), 851-882.
- Gelber, A., Isen, A., & Song, J. (2018). "The Role of Social Security Benefits in the Initial Increase of Older Women's Employment: Evidence from the Social Security Notch." In C. Goldin &

- L. F. Katz (Eds.), *Women Working Longer: Increased Employment at Older Ages* (pp. 239–268). University of Chicago Press.
- Gelber, A., Moore, T. J., & Strand, A. (2017). "The Effect of Disability Insurance Payments on Beneficiaries' Earnings." *American Economic Journal: Economic Policy*, 9(3), 229–261.
- Goldin, C., & Katz, L. F. (2011). The cost of workplace flexibility for high-powered professionals. *The Annals of the American Academy of Political and Social Science*, 638(1), 45-67.
- Goldin C, Katz LF. (2018) "Women Working Longer: Facts and Some Explanations." In: *Women Working Longer: Increased Employment at Older Ages*. Chicago: University of Chicago Press ; 11-54.
- Greenwood, J., Seshadri, A., & Yorukoglu, M. (2005). "Engines of liberation." *The Review of Economic Studies*, 72(1), 109–133.
- Groves, L. H. (2016). "Welfare Reform and Labor Force Exit by Young, Low-Skilled Single Males." *Demography*, 53(2), 393–418.
- Guner, N., Kaygusuz, R., & Ventura, G. (2012a). "Taxation and household labour supply." *The Review of Economic Studies*, 79(3), 1113-1149.
- Guner, N., Kaygusuz, R., & Ventura, G. (2012b). "Taxing women: A macroeconomic analysis." *Journal of Monetary Economics*, 59(1), 111-128.
- Gustman, A. L., & Steinmeier, T. (2009). "How Changes in Social Security Affect Recent Retirement Trends." *Research on Aging*, 31(2), 261–290.
- Holzer, H. J., Offner, P., & Sorensen, E. (2005). "Declining Employment Among Young Black Less-Educated Men: The role of incarceration and child support." *Journal of Policy Analysis and Management*, 24(2), 329–350.

- Hotchkiss, J. L. (2009). "Changes in the Aggregate Labor Force Participation Rate." *Economic Review, Federal Reserve Bank of Atlanta*, 94(4), 1–6.
- İmrohoroğlu, S., & Kitao, S. (2012). "Social Security Reforms: Benefit Claiming, Labor Force Participation, and Long-run Sustainability." *American Economic Journal: Macroeconomics*, 4(3), 96–127.
- Jacobson, L. S., LaLonde, R. J., & Sullivan, D. G. (1993). "Earnings Losses of Displaced Workers." *The American Economic Review*, 685–709.
- Jardim, E., Long, M. C., Plotnick, R., Van Inwegen, E., Vigdor, J., & Wething, H. (2017). "Minimum Wage Increases, Wages, and Low-Wage Employment: Evidence from Seattle." (NBER Working Paper No. w23532). Cambridge, Mass.: National Bureau of Economic Research.
- Jones, S. R., & Riddell, W. C. (2019). "Unemployment, Marginal Attachment, and Labor Force Participation in Canada and the United States." *Journal of Labor Economics*, 37(S2), S399-S441.
- Juhn, C., & Potter, S. (2006). "Changes in Labor Force Participation in the United States." *The Journal of Economic Perspectives*, 20(3), 27–46.
- Kambourov, G., & Manovskii, I. (2009). "Occupational mobility and wage inequality." *The Review of Economic Studies*, 76(2), 731-759.
- Kaygusuz, R. (2010). "Taxes and female labor supply." *Review of Economic Dynamics*, 13(4), 725-741.
- Keane, M.P. (2010) "Taxes and female labor supply: a survey." Working Paper No. 160, University of Technology Sydney.

- Kim, S. B. (2008). “Unemployment Insurance Policy with Endogenous Labor Force Participation.” *Journal of Economic Theory and Econometrics*, 19(4).
- Kleven, H. J., Kreiner, C. T., & Saez, E. (2009). “The optimal income taxation of couples.” *Econometrica*, 77(2), 537-560.
- Kroft, K., Lange, F., & Notowidigdo, M. J. (2013). “Duration Dependence and Labor Market Conditions: Evidence from a Field Experiment.” *The Quarterly Journal of Economics*, 128(3), 1123–1167.
- Krueger, A. B., Cramer, J., & Cho, D. (2014). “Are the long-term unemployed on the margins of the labor market?” *Brookings papers on economic activity*, 2014(1), 229-299.
- Krueger, A. B. (2017). “Where Have All the Workers Gone? An Inquiry into the Decline of the U.S. Labor Force Participation Rate.” *Brookings Papers on Economic Activity*, (Fall 2017), 1–59.
- Kuziemko, I., Pan, J., Shen, J., & Washington, E. (2018). “The Mommy Effect: Do Women Anticipate the Employment Effects of Motherhood?” (NBER Working Paper No.24740). Cambridge, Mass.: National Bureau of Economic Research.
- Lahey, J. N. (2018). “Understanding Why Black Women Are Not Working Longer.” In *Women Working Longer: Increased Employment at Older Ages*, 85.
- Lalé, E. (2018). “Turbulence and the employment experience of older workers.” *Quantitative Economics*, 9(2), 735-784.
- Maestas, N., Mullen, K. J., & Strand, A. (2013). “Does Disability Insurance Receipt Discourage Work? Using Examiner Assignment to Estimate Causal Effects of SSDI Receipt.” *American Economic Review*, 103(5), 1797–1829.

- Mankart, J., & Oikonomou, R. (2016). "The rise of the added worker effect." *Economics Letters*, 143, 48-51.
- Mankart, J., & Oikonomou, R. (2017). "Household search and the aggregate labour market." *The Review of Economic Studies*, 84(4), 1735-1788.
- Mastrobuoni, G. (2009). "Labor Supply Effects of the Recent Social Security Benefit Cuts: Empirical Estimates Using Cohort Discontinuities." *Journal of Public Economics*, 93(11–12), 1224–1233.
- Meer, J., & West, J. (2016). "Effects of the Minimum Wage on Employment Dynamics." *Journal of Human Resources*, 51(2), 500–522.
- Moffitt, R. A., Davis, S. J., & Mas, A. (2012). "The Reversal of the Employment-Population Ratio in the 2000s: Facts and Explanations." *Brookings Papers on Economic Activity*, 201–264.
- Nucci, F., & Riggi, M. (2018). "Labor Force Participation, Wage Rigidities, and Inflation." *Journal of Macroeconomics*, 55, 274–292.
- Nunley, J., Pugh, A., Romero, N., & Seals, R. A. (2017). "The Effects of Unemployment and Underemployment on Employment Opportunities." *Industrial and Labor Relations Review*, 70(3), 642–669.
- Olivetti, C., & Rotz, D. (2018). Changes in Marriage and Divorce as Drivers of Employment and Retirement of Older Women. *Women Working Longer: Increased Employment at Older Ages*, 113.
- OECD (2020), Labour force participation rate (indicator). doi: 10.1787/8a801325-en (Accessed on 14 August 2020)
- Ortego-Martí, V. (2016) "Unemployment history and frictional wage dispersion." *Journal of Monetary Economics*. 78, 5-22.

- Pager, D. (2003). "The Mark of a Criminal Record." *American Journal of Sociology*, 108(5).
- Pavoni, N., & Violante, G. L. (2007). "Optimal welfare-to-work programs." *The Review of Economic Studies*, 74(1), 283-318.
- Peri, G., Shih, K., & Sparber, C. (2015). "STEM Workers, H-1B Visas, and Productivity in US Cities." *Journal of Labor Economics*, 33(S1), S225–S255.
- Peri, G., & Yasenov, V. (2018). "The labor market effects of a refugee wave: Synthetic control method meets the Mariel boatlift." *Journal of Human Resources*, 0217_8561R1.
- Pierce, J. R., & Schott, P. K. (2016). "The Surprisingly Swift Decline of US Manufacturing Employment." *American Economic Review*, 106(7), 1632-62.
- Pingle, J. F. (2006). "Social Security's Delayed Retirement Credit and The Labor Supply of Older Men." (*Finance and Economics Discussion Series*.) Federal Reserve Board.
- Raphael, S. (2006). "The Socioeconomic Status of Black Males: The Increasing Importance of Incarceration." In A. J. Auerbach, D. E. Card, & J. M. Quigley (Eds.), *Public policy and the income distribution*. New York: Russell Sage Foundation.
- Rendall, M. (2018). "Female Market Work, Tax Regimes, and the Rise of the Service Sector." *Review of Economic Dynamics*, 28, 269–289.
- Schirle, T. (2008). "Why Have the Labor Force Participation Rates of Older Men Increased since the Mid-1990s?" *Journal of Labor Economics*, 26(4), 549–594.
- Song, J., & von Wachter, T. (2014). "Long-term Nonemployment and Job Displacement." In *Jackson Hole Economic Symposium Conference Proceedings Kansas City Federal Reserve Board*.
- Tjaden, V., & Wellschmied, F. (2014). "Quantifying the contribution of search to wage inequality." *American Economic Journal: Macroeconomics*, 6(1), 134-61.

- Toossi, M. (2013). "Labor Force Projections To 2022: The Labor Force Participation Rate Continues to Fall." *Monthly Lab. Rev.*, 136, 1.
- U.S. Bureau of Labor Statistics, Labor Force Statistics from the Current Population Survey; <https://www.bls.gov/cps/tables.htm>.
- U.S. Bureau of Labor Statistics, Population Level [CNP16OV], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/CNP16OV>.
- Van Houtven, C. H., Coe, N. B., & Skira, M. M. (2013). "The Effect of Informal Care on Work and Wages." *Journal of Health Economics*, 32(1), 240–252.
- Van Zandweghe, W. (2012). "Interpreting the Recent Decline in Labor Force Participation." *Economic Review, Federal Reserve Bank of Kansas City, Q 1*, 5–34.
- Voena, A. (2015). "Yours, Mine, and Ours: Do Divorce Laws Affect the Intertemporal Behavior of Married Couples?" *American Economic Review*, 105(8), 2295–2332.
- von Wachter, T., Song, J., & Manchester, J. (2011). "Trends in Employment and Earnings of Allowed and Rejected Applicants to the Social Security Disability Insurance Program." *American Economic Review*, 101(7), 3308–3329.
- Webber, D. A., & Bjelland, M. J. (2015). "The Impact of Work-Limiting Disability on Labor Force Participation: the impact of work-limiting disability on labor force participation." *Health Economics*, 24(3), 333–352.
- Western, B., & Pettit, B. (2000). "Incarceration and Racial Inequality in Men's Employment." *ILR Review*, 54(1), 3–16.
- Zhao, B. (2018). "Too Poor to Retire? Housing Prices and Retirement." *Review of Economic Dynamics*, 27, 27–47.

Appendix A: Literature Searches

For this review, we searched for recent literature investigating the causes of the recent decline in the LFPR. Because the decline started after 2000, we limited our search to studies dated at least five years after that (2005). We conducted database searches of the academic literature using Google Scholar and EconLit. We complemented this with a search of gray literature in the websites of research institutes (such as Brookings Institution, RAND, etc.) and public-sector institutions (such as the Federal Reserve Banks). The searches were made inclusive by using keywords such as “Labor Force Participation” and “Workforce,” including both published as well as unpublished studies. From the titles retrieved, we selected those stating in the abstract or introduction stated they investigated a potential cause of changes in LFPR or quantified the impact of one of its factors. After an initial review of the literature, we identified the list of factors affecting LFPR addressed by the literature. To locate as many relevant studies as possible, we conducted further database searches using terms relevant for each of the “factors.”

A.1. Search Terms

To get the lay of the land, we began with a non-complex Google Scholar search on “labor force participation,” which resulted in more than 2 million results. After this initial and informal review, we established formal parameters for the literature searches. The parameters for our database searches were of the kind: "labor force participation" AND (declin* OR fall OR change) AND "United States.”

For a more robust understanding of the factors affecting the participation rates of individual demographic groups, we ran searches in EconLit for papers including keywords from those factors (e.g., “opioid” and “health” for the opioid crisis) in their abstracts in addition to the term “labor force participation.” From the initial searches relevant for each factor, we also reviewed papers for words and phrases that could be useful as search terms for that factor.

A.2. Results

We ran these advanced searches through a number of databases (including ArticleFirst, EconLit, JSTOR, Social Science Index and others). For each search, we produced a list with all the titles and abstracts. The results from EconLit and JSTOR were the most relevant. The second step consisted of reviewing each of the titles from which a list was selected for full evaluation. This preliminary review of results began with a screening of the title. If the title did not convey enough information for us to decide whether to include the paper in our literature, we screened the abstract; in some cases, we screened the full article.

We created a database with the articles resulting from the search parameters imposed on JSTOR and EconLit. Of these, almost a half did not meet the criteria for inclusion in the literature review. The database tracks the file, article title, author, database and reviewer assigned for each article. For those articles included in the review, the database tracked the section of this report for which each article is most relevant.

Additionally, we also followed a “snowballing” process: tracking relevant research papers that did not show up in the complex literature searches describe above, but which were referenced by a number of the articles we reviewed. We selected relevant articles from the reference lists of papers included in the review, then studied the reference list of those papers for supplementary resources to include in the database.

Appendix B: Topics comparison with Abraham and Kearney (2018)

In Table B.1, we compare the areas covered in our study with those covered in Abraham and Kearney (2018), and highlight the differences.

The focus of the Abraham and Kearney (2018) paper is on employment, while ours is on labor force participation. While there is great overlap in the factors that affect these two outcomes, some factors can theoretically affect these two outcomes differently. For instance, minimum wages would cause an increase in labor force participation but a reduction in employment (the wedge between these two created by unemployment). Another source of the differences in covered areas is the scope of the two papers. A goal in Abraham and Kearney (2018) is to produce an “evidence-driven ranking of factors,” whereas our study provides a description of the available research and identifies potential research gaps. Some of the factors that affect only subsets of the population that have not experienced major drops in employment rates are hence excluded in Abraham and Kearney (2018) but included in this paper. An example of this is Social Security retirement benefits. Finally, we note that Abraham and Kearney (2018) include a short description of two topics, “occupational licensing” and “mobility” for which we did not find any literature that would suggest either empirically or theoretically to have aggregate effect on labor force participation, and hence were not included in our review. Finally, since Abraham and Kearney (2018) conducts some original calculations, they are included as part of the review under the relevant sections.

Table B.1. Comparison of areas included in this paper and in Abraham and Kearney (2018)

Area	This paper	Abraham and Kearney (2018)
Trade	Section 4.3.1	Increased Competition from China
Technology	Section 4.3.2	Technology
Changes to SSDI	Section 4.2.2	Federal Disability Insurance Programs
Social Security retirement benefits	Section 4.2.2	Not included
Other social programs	Section 4.2.2	SNAP, Health, Earned Income Tax Credit, they also discuss Supplemental Security Income

		program within their “Federal Disability Insurance Programs” section, Health Insurance.
Family friendly policies	4.4.1	Family-friendly policies: child care and paid parental leave
Trends in social norms affecting female labor force participation	4.4.2a	Not included
Childcare costs	4.4.2.b	Not included
“Just in time” production	4.4.d	Not included
Health/Opioid use	4.2.1	Opioid use
Immigration	4.2.7	Immigration
Minimum Wages*	4.3.3	Minimum wages (important to note that minimum wage is one case where the effect on employment is different from the effect on participation, as the traditional neoclassical model predicts minimum wages would result in reduced employment but increased unemployment and participation rates)
Occupational licensing	Not included	Occupational licensing
Mobility	Not included	Mobility
Incarceration/criminal records	4.3.4	Incarceration
Education level trends	4.2.3	Not included
Education enrollment	4.2.4	Not included
Unemployment spells	4.2.8	Other institutional frictions