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ABSTRACT

To better understand the tight post-pandemic labor market in the US, we decompose the decline in aggregate hours worked into the extensive (fewer people working) and the intensive margin changes (workers working fewer hours). Although the pre-existing trend of lower labor force participation especially by young men without a bachelor's degree accounts for some of the decline in aggregate hours, the intensive margin accounts for more than half of the decline between 2019 and 2022. The decline in hours among workers was larger for men than women. Among men, the decline was larger for those with a bachelor's degree than those with less education, for prime-age workers than older workers, and also for those who already worked long hours and had high earnings. Workers' hours reduction can explain why the labor market is even tighter than what is expected at the current levels of unemployment and labor force participation.

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Throughout 2022, US labor markets remained stubbornly tight, despite the Federal Reserve raising interest rates rapidly in an effort to cool demand and tame inflation. The latest unemployment rate stood at 3.7 percent as of November 2022. The demand for workers is unusually strong, with the vacancy rate hovering near 7 percent, a historically high level.[1] The tightness of the labor market has often been attributed to the decline in the labor force participation rate—see the references in Section 1.3. Indeed, the participation rate as of November 2022 is nearly 1 percentage point below its pre-pandemic level in 2019. But is this the whole story?

The aggregate hours worked of an economy can fall because fewer people work (extensive margin) or because those who work reduce their hours (intensive margin). In this article, we decompose the change in aggregate hours worked since 2007 into the extensive margin changes and the intensive margin changes, and compare their relative importance.

Our main findings are as follows.

- The negative impact of the Great Recession on aggregate hours worked and the ensuing slow recovery through 2019 materialized almost exclusively along the extensive margin. However, of the 3 percent decline in annual hours worked *per person* (including those who do not work) between 2019 and 2022, more than half is accounted for by the intensive margin. That is, focusing only on the extensive margin (lower employment and participation rates) will underestimate the total decline in labor supply by more than half.

- The decline in labor force participation is a continuation of a trend that existed before the pandemic. The most striking fact is the lower participation of young male cohorts without a bachelor's degree, whose participation rate is up to 7 percentage points below that of older cohorts at the same age. The Great Recession seems to be casting a very long shadow, even on those who were in their teens when it happened.

- The decline in hours worked *per worker* (excluding those who do not work) between 2019 and 2022 was larger for men than for women. Among male workers, the decline was larger for those with a bachelor's degree than those with less education, and for prime-age workers than older workers. Furthermore, the hours declined by more for workers who already worked longer hours and had higher earnings.

- Circumstantial and direct evidence indicates that the hours reduction among workers is voluntary. In addition, although the reduction may have been caused by the pandemic situation, it is expected to persist.

[1] The vacancy rate is defined as the number of job openings divided by the sum of employment and job openings.

Two labor market phenomena were popularized following the pandemic: the Great Resignation in 2021 and Quiet Quitting in 2022, both of which appear in the title of this article. Although some of the people who quit as part of the Great Resignation did exit from the labor force (extensive margin), many others simply found a new job, possibly with an employer offering more flexible work arrangements and less demanding hours (intensive margin), as well as better pay.[2] Those who engage in Quiet Quitting do not actually quit or leave the labor force, but stop idolatrizing work and seek more work-life balance, including fewer hours (intensive margin). Our analysis helps us understand the role of both phenomena in the tightening of the labor market.

The rest of the paper is organized as follows. Section 1 covers the trends in unemployment, vacancies, and labor force participation, and discusses how the participation rates changed over time across various demographic groups. In Section 2, we decompose the changes in annual hours worked into the extensive and the intensive margins, and compare their relative importance across demographic groups. We further discuss the significant decline in hours along the intensive margin between 2019 and 2022 in a broader context. Section 3 offers a summary and discusses the policy implications of our findings.

1 Unemployment and Labor Force Participation

1.1 Trends in Unemployment and Vacancies

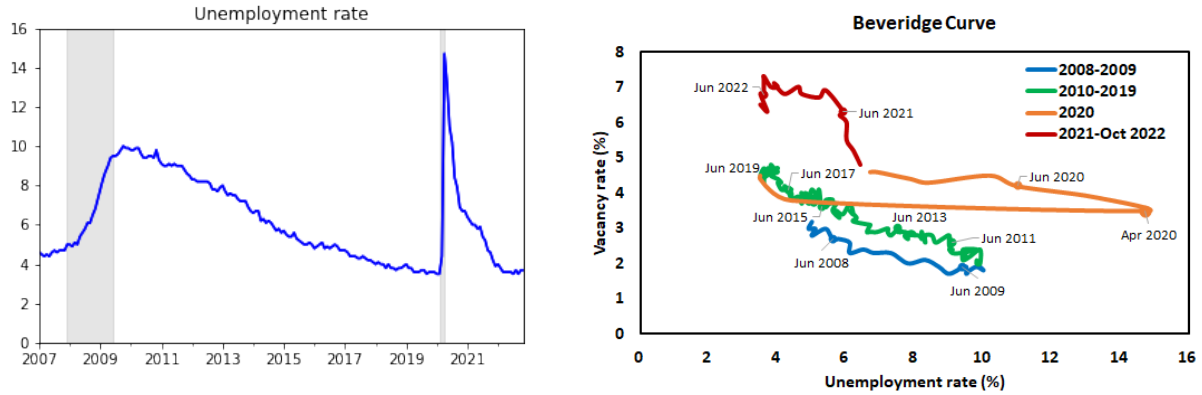


Figure 1: Unemployment Rate and the Beveridge Curve (Vacancies vs. Unemployment)

The left panel of Figure 1 is the seasonally-adjusted unemployment rate since 2007. It shows the impact of the Great Recession and the slow recovery that followed. By contrast,

[2]For this reason, the Planet Money blog of the National Public Radio called The Great Resignation "the Great Renegotiation." (`https://www.npr.org/sections/money/2022/01/25/1075115539/the-great-resignation-more-like-the-great-renegotiation`)

the recovery from the pandemic lockdown was swift, with the unemployment rate falling from the April 2020 peak of 14.7 percent to below 4 percent in 20 months.[3]

The right panel plots the vacancy rate against the unemployment rate, which is known as the Beveridge curve. The vacancy numbers are from the Job Openings and Labor Turnover Survey by the Bureau of Labor Statistics. It shows an overall negative relationship between vacancies and unemployment. It confirms that the vacancy rates of 2022 are historically high, even when the low unemployment rate is factored in. In the past, when unemployment rates were below 4 percent, vacancy rates were around 4 percent.[4] The US labor market at the end of 2022 was even tighter than what is expected at the near record-low unemployment rate.[5]

1.2 Trends in Labor Force Participation

Whereas the demand for labor bounced back stronger during and after the pandemic, the supply of labor slackened.

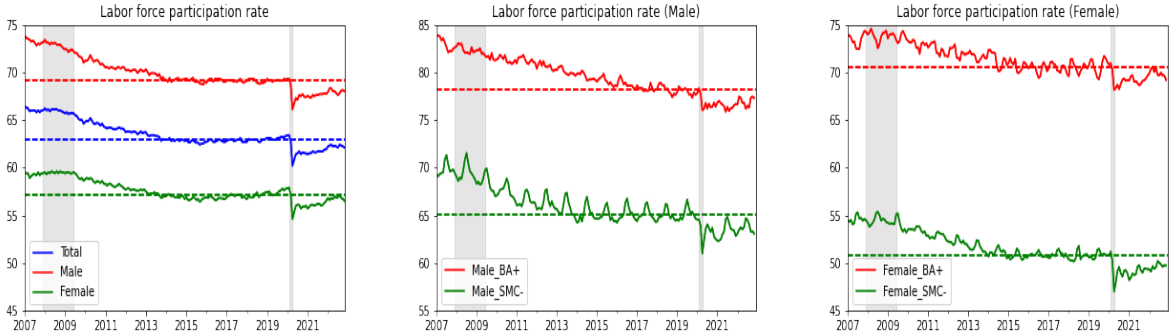


Figure 2: Labor Force Participation Rate

Figure 2 shows the participation rate, which is the percentage of the civilian noninstitutional population 16 years and older that is working or actively looking for work. The left panel shows the aggregate participation rate and also the participation rates by gender (all seasonally adjusted). The dashed lines are the respective pre-pandemic average between 2017 and 2019. The aggregate participation rate fell steadily after the Great Recession till

[3]By comparison, after the Great Recession, it took 6 full years for the unemployment rate to fall from the October 2009 peak of 10 percent to the pre-recession level of below 5 percent. The rapid decline after the lockdown is explained by "recall" unemployment (Buera et al., 2021; Hall and Kudlyak, 2022; Lee et al., 2021).

[4]Under the lockdown in April 2020, the unemployment rate shot up without much of a fall in vacancies. As unemployed workers were recalled to their previous employers, unemployment fell rapidly without much of a rise in vacancies.

[5]Domash and Summers (2022) made a similar point about the labor market at the end of 2021.

2014, from 66 percent in July 2007 to 62.9 percent in January 2014. Although the downward trend was arrested, the participation rate never recovered.[6] When the pandemic hit and the economy went into lockdown, the participation rate jumped down to 60.2 percent. Since then, it has risen steadily, but its level of 62.1 percent in November 2022 is still 0.8 percentage point lower than the pre-pandemic level, the average between 2017 and 2019 represented by the horizontal dashed line.

The same panel shows that men and women have different levels but similar time trends. One difference is that, between July 2007 and January 2014, men's participation rate fell by 3.9 percentage points, compared with women's 2.3. In addition, a closer inspection shows that the gap between the current and the pre-pandemic participation rates is larger for men than for women. Men's and women's participation rates in November 2022 of 68 and 56.5 percent are 1.1 and 0.7 percentage point lower than the respective average between 2017 and 2019.

The other two panels of Figure 2 show the participation rates by education for men (center panel) and women (right panel). Those with a four-year college degree or more are in the BA+ (more than or equal to bachelors) category, and the rest are in the SMC- category (less than or equal to some college). These figures are not seasonally adjusted, so they exhibit more short-run fluctuations. For both men and women, the two education groups have different levels but similar time trends. One noticeable difference is that, for men, the SMC- group's participation has stronger seasonality than the BA+ group's, but for women it is the other way around. What is relevant for our purpose is the gap between the current and the pre-pandemic participation rates for each group. For men, the participation rate of the less educate in November 2022 is 2 full percentage points lower that their pre-pandemic average. This gap is 0.9 percentage point for the more educated men. Women show the opposite pattern. The gaps are 1.1 and 1.4 percentage point, respectively, for the less educated and the more educated women.[7]

Next, we examine the pattern in participation rates over the life cycle. To emphasize how the age profile of participation rates differ across cohorts, we do the following. We select five birth cohorts: those born in 1966-67 (ages 55-56 in 2022), 1976-77 (ages 45-46), 1981-82 (ages 40-41), 1986-87 (ages 35-36), and 1991-92 (ages 30-31). We use the participation rates over the life cycle of the 1966-67 cohort as the baseline, and for each of the other four cohorts, we calculate how much their participation rates deviate from the 1966-67 cohort's at any given age. The result is Figure 3, where the horizontal axis is age and the vertical

[6]The peak participation rate was 67.3 percent recorded during the first three months of 2000.

[7]Because the participation rates by education are not seasonally adjusted, these gaps are not directly comparable with the numbers discussed in the preceding two paragraphs.

axis is the deviation in participation rate from the 1966-67 cohort's. The four lines end at the respective cohort's age in 2022. Since each cohort's age is different in any given calendar year (i.e., age = current year - birth year), with a square we denote 2008 (Great Recession) and with a diamond 2020 (Covid-19 Lockdown). The left panel is for men and the right panel is for women.

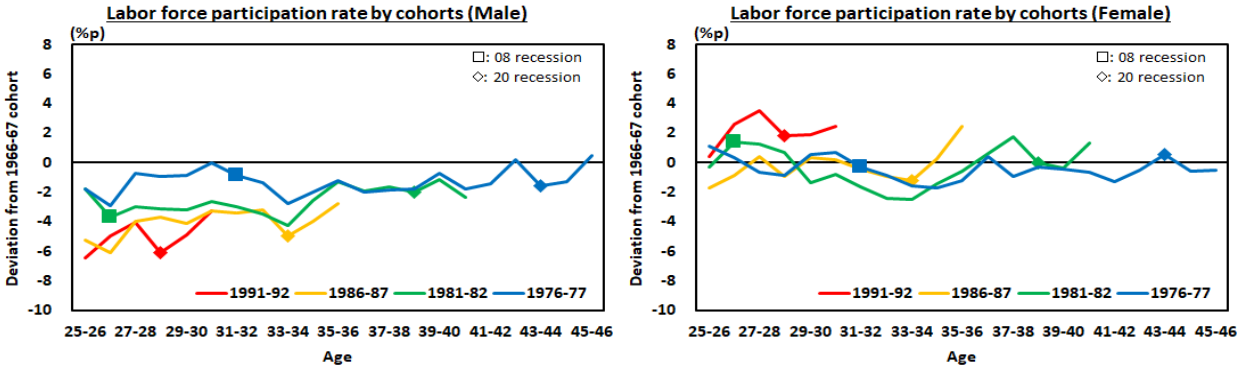


Figure 3: Participation Rates over Life Cycle, Deviation from the 1966-67 Cohort's

What strikes first is that successive younger male cohorts' participation rates are significantly lower than older male cohorts' at the same age. The 1981-82 and the 1976-77 cohorts' experience shows the long shadow cast by the Great Recession, denoted with squares. Where their age profiles of participation rates fell significantly from the 1966-67 cohort's coincides with the Great Recession, and there is no full recovery.[8] The 1991-92 and the 1986-87 cohorts, who experienced the Great Recession at even younger ages (16-17 and 21-22, respectively, not shown in the figure), have even lower participation rates in their late 20s and early 30s, which are on average 5 percentage points lower than the 1966-67 cohort's at the same age. For all cohorts, the pandemic lockdown shows only temporary effects.

On the other hand, younger female cohorts' participation rates hew closely to the 1966-67 cohort's over the life cycle, in spite of the Great Recession. If anything, the youngest cohorts have higher participation rates than older cohorts at the same stages of the life cycle.

The lower participation rates of younger male cohorts are especially puzzling, since younger cohorts tend to have more education, and more educated people are more likely to participate, as seen in Figure 2. 35.3 percent of the men in the 1991-92 cohort are in the BA+ category, compared with 30.2 percent of the men in the 1966-67 cohort. Women show a much larger difference in educational attainment across cohorts. The fraction in the BA+ category is 42.1 percent for the 1991-92 cohort and 31.7 percent for the 1966-67 cohort. This may explain the slightly higher participation rates of the younger female cohorts.

[8]The 1976-77 cohort seems to recover at ages 42-43, but this is only because the baseline cohort, 1966-67, is hit with the Great Recession at these ages.

To understand the role of education in the difference in participation rates across cohorts, we construct the analogue of Figure 3 separately for the two education groups.

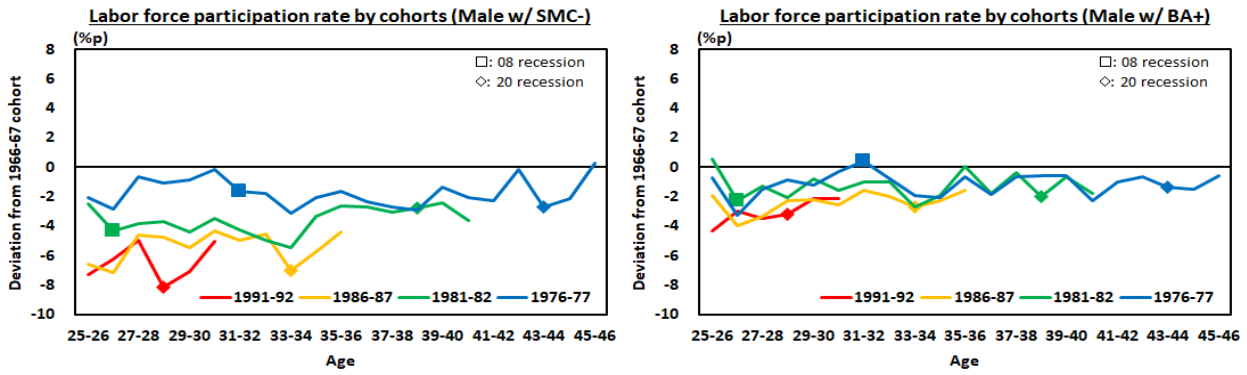


Figure 4: Participation Rates over Life Cycle, Deviation from the 1966-67 Cohort's

In the left panel of Figure 4, we plot the deviation of the participation rates of younger male cohorts in the SMC- category from those of the 1966-67 cohort in the SMC- category. In the right panel, we do the same for those in the BA+ category. It is clear that the lower participation rates of younger male cohorts are largely driven by those with less education. Compared with the SMC- group of the 1966-67 cohort, the SMC- group of the 1991-92 and the 1986-87 cohorts has participation rates that are on average 7 percentage points lower. While the BA+ group of younger cohorts also has lower participation rates than the BA+ group of the 1966-67 cohort, the gap is smaller, 3 percentage points on average.

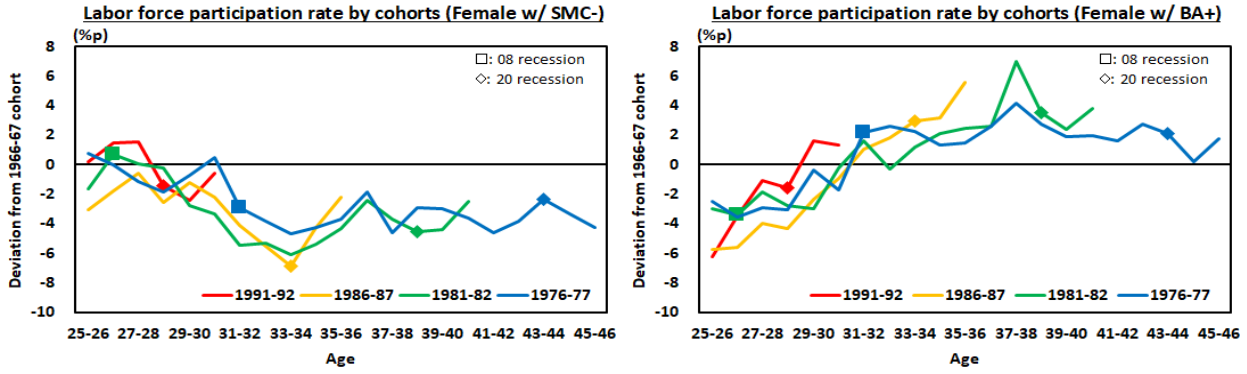


Figure 5: Participation Rates over Life Cycle, Deviation from the 1966-67 Cohort's

Figure 5 is for women, the left panel for the SMC- group and the right for the BA+ group. The two education groups paint very different pictures. For the less educated, younger female cohorts have lower participation rates than the 1966-67 cohort, after they turn 30. To the contrary, the BA+ group of younger cohorts has higher participation rates than the BA+ group of the 1966-67 cohort, after they turn 30. These opposing patterns of the two education

group roughly offset each other, generating the flat pattern around zero in the right panel of Figure 3.

1.3 Discussions on Labor Force Participation

The participation rate as of November 2022 is nearly 1 percentage point lower than the pre-pandemic period (2017-19) average. Our analysis of the data shows that this lower participation rate is more attributable to young men without a four-year college degree than to any other group.

Much has been written about the low participation rate during and after the economic recovery from the Covid-19 pandemic. Faria e Castro (2021) and Forsythe et al. (2022) pointed to the wave of earlier retirements by older workers. Goda and Soltas (2022) found that workers with a week-long Covid-related absence were more likely to leave the labor force the following year, which contributed to a 0.2 percentage point decrease in the participation rate through June 2022.

However, our finding emphasizing the low participation rates of less educated young men suggests that the effect of the pandemic was temporary, and that the current participation rate reflects certain trends that have been ongoing for some time. This last point is related to Cooper et al. (2021) and Hobijn and Şahin (2022), who show that the claims of missing workers are exaggerated, because of the downward trend in participation that was already present before 2020. They point to population aging in general as the cause of the trend, whereas we emphasize the low participation rates of young male cohorts.

2 Extensive and Intensive Margins

The slack in the labor supply can arise not only from fewer people working or looking for jobs (lower participation rates) but also from workers working fewer hours. The former is the extensive margin and the latter is the intensive margin. In this section, we more formally analyze how the change in aggregate hours worked of a population can be decomposed into the extensive and the intensive margin changes.

2.1 Data and Methodology

For population weights, worker characteristics, employment status, and actual hours worked, we use the Current Population Survey (CPS) from January 2007 to November 2022, taking yearly averages of the monthly data. We restrict our analysis to the civilian noninstitutional population 25 years and older. We do not utilize the panel dimension of the CPS. The appendix has more details on the data.

We divide the entire sample period into three sub-periods: 2007–2013, 2013–2019, and 2019–2022. The first period is the impact and the sluggish recovery from the Great Recession. The middle is the second phase of the recovery from the Great Recession and a "new normal" leading up to the Covid-19 pandemic. The last period is the recovery from the pandemic.

We decompose the changes in aggregate hours worked into the intensive and the extensive margins following Blundell et al. (2011). The total hours worked of a group change from one year to the next when the number of people in the group (population weight) changes, the fraction of people in the group who work (employment rate) changes, or the average hours worked of those who work changes. Since the number of people in a given demographic group is stable in the short run, we drop this channel from our analysis and focus on the other two channels. The extensive margin is the change in employment rate multiplied by the average hours worked of those who worked in the current year. The intensive margin is the change in average hours worked of those who worked, multiplied by the employment rate in the previous year.[9] The formal definition of the intensive and the extensive margin changes is in the appendix.

2.2 Result

We start with the changes in annual hours worked per person of the entire population. Note that annual hours per person is computed as the product of average annual hours per worker and employment rate, so those who did not work are included in this calculation. Between 2007 and 2013, the annual hours worked per person decreased by 16 hours each year on average, which means over the 6 years the annual hours worked per person fell by 96 hours. Since the annual hours worked per person was 1,208 in 2007, this is a 7.9 percent decline of annual hours. Of the 16 hour per year decline, the vast majority, 14, comes through the extensive margin (i.e., fall in employment rate) and the rest through the intensive margin (i.e., reduction in hours worked per worker). This is consistent with the rise in unemployment in Figure 1 and the fall in participation in Figure 2 between 2007 and 2013. This is shown as the left bar in Figure 6.

The middle bar in Figure 6 shows the recovery in annual hours worked per person between 2013 and 2019. The 9 hour per year increase is mostly through the extensive margin, but the 54 hour increase in annual hours worked per person did not fully offset the 96 hour decline

[9] As explained in Blundell et al. (2011), this procedure picks the lower bound of the intensive margin change and the upper bound of the extensive margin change. An alternative is to construct the extensive margin by multiplying by the average hours worked of the previous year and to construct the intensive margin by multiplying by the employment rate of the current year, which gives the upper bound of the intensive margin and the lower bound of the extensive margin. The decomposition results are similar either way.

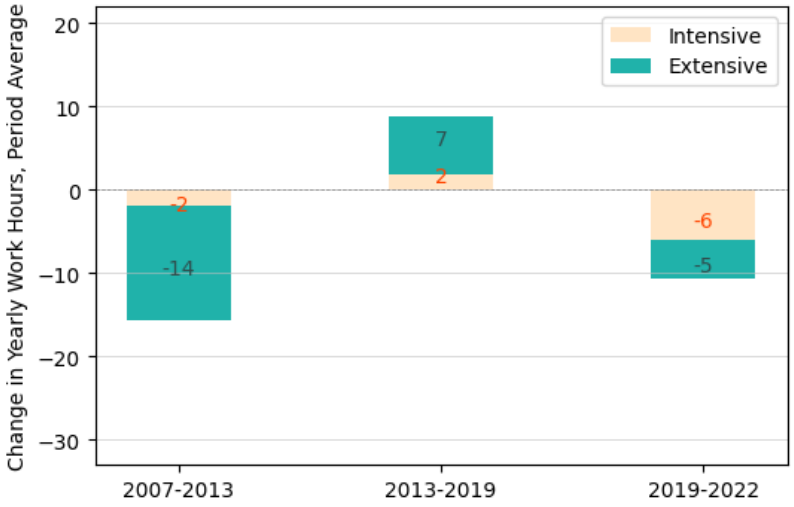


Figure 6: Decomposition of Change in Aggregate Hours Worked

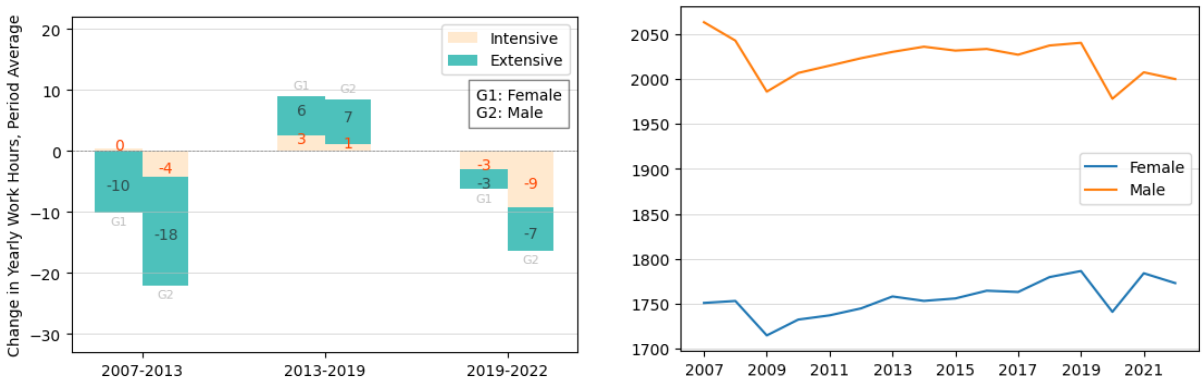
Note: The vertical positions of the orange and the blue bars are the changes in annual hours worked per person through the intensive and the extensive margins, respectively. The numbers are the average change per year over the given period, so the total change can be computed by multiplying each number by the period length.

in the previous 6 years. This is consistent with the fact in Figure 2 that the participation rate never went back to its level prior to the Great Recession.

The right bar shows the change in annual hours worked per person between 2019 and 2022, which is meant to capture the impact and the recovery from the Covid-19 pandemic. The 11 hour decline per year over the 3 years translates into a 33 hour drop in annual hours worked per person. It obliterated more than half of the 54 hour increase recorded during the preceding 6 years. What stands out is that the majority of the decline came through the intensive margin rather than the extensive margin. That is, focusing only on the extensive margin as we did in Section 1, one will miss more than half of the hours worked decline since 2019.

In the left panel of Figure 7, we repeat the decomposition, but separately for men and women. During the first period, men recorded more than double the fall in annual hours worked than women. The recovery during the second period was more even between men and women. In both periods, most of the adjustments occurred along the extensive margin. During the last period, it was again men who experienced a much larger drop in annual hours worked per person. For both men and women, the drop along the intensive margin was at least as large as along the extensive margin.

The right panel shows the annual hours worked per worker (i.e., excluding those not working) for men and women since 2007. Working men log longer hours than working women,



(a) Decomposition by Gender

(b) Trend in Annual Hours per Worker

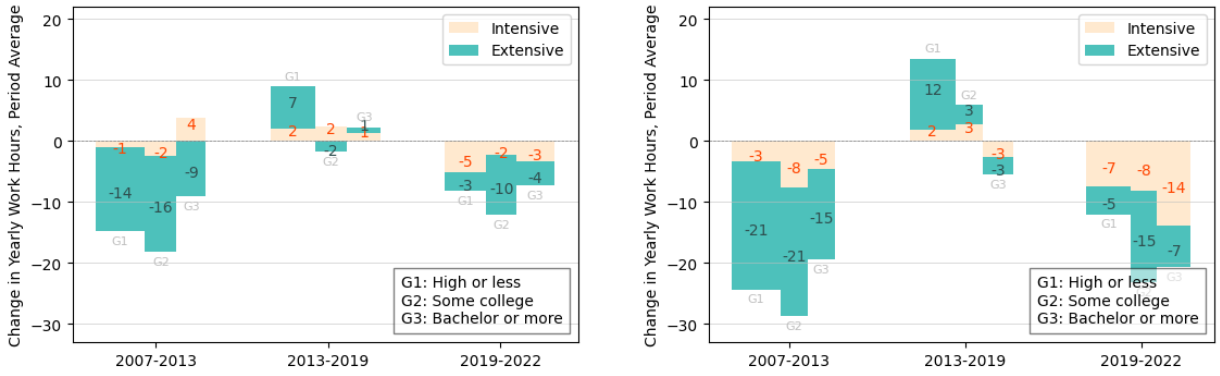
Figure 7: Decomposition of Change in Aggregate Hours Worked by Gender

Note: The vertical positions of the orange and the blue bars are the changes in annual hours worked per person through the intensive and the extensive margins, respectively. The numbers are the average change per year over the given period, so the total change can be computed by multiplying each number by the period length. The widths of the bars are proportional to the population weight of each group at the beginning of the period.

but the drop in hours since 2019 is much larger for men than for women. In addition, we see that working women's hours actually increased since 2007, unlike working men's.

As in Section 1, we further group men and women by educational attainment. Unlike in Section 1, however, we have three education groups: those with a high school degree or less; those with some college education but no bachelor's degree; and those with a bachelor's degree or more. The results are shown in Figure 8. The first sets of bars in the left (women) and the right (men) panels show that, between 2007 and 2013, high school and some college groups experienced larger declines in annual hours worked than college graduates, with nearly all adjustments occurring at the extensive margin. The middle sets of bars show that the recovery between 2013 and 2019 was strongest for women and men with a high school degree or less, again mostly through the extensive margin. The right sets of bars show divergent patterns between women and men between 2019 and 2022. For women, the drop in annual hours worked per person was similar across all three education groups, although it was largest for the some college group. For men, the drop is much larger for the some college group and the bachelor's degree or more group than for the high school or less group. Furthermore, men with a bachelor's degree or more recorded the largest drop along the intensive margin, which is double their drop along the extensive margin.

We can also do the decomposition across age groups. For both men and women, we construct four age groups: ages 25 to 39; 40 to 54; 55 to 64; and 65 or older. Unlike in Section 1.2, where we followed cohorts over time, we group people by their age in the given

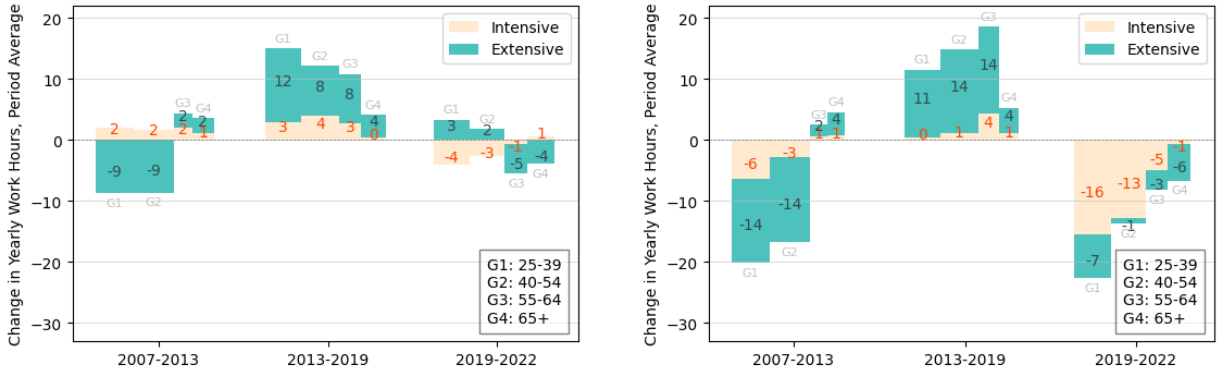


(a) Women by Education

(b) Men by Education

Figure 8: Decomposition of Change in Aggregate Hours Worked by Education and Gender

Note: The vertical positions of the orange and the blue bars are the changes in annual hours worked per person through the intensive and the extensive margins, respectively. The numbers are the average change per year over the given period, so the total change can be computed by multiplying each number by the period length. The widths of the bars are proportional to the population weight of each group at the beginning of the period.



(a) Women by Age

(b) Men by Age

Figure 9: Decomposition of Change in Aggregate Hours Worked by Age and Gender

Note: The vertical positions of the orange and the blue bars are the changes in annual hours worked per person through the intensive and the extensive margins, respectively. The numbers are the average change per year over the given period, so the total change can be computed by multiplying each number by the period length. The widths of the bars are proportional to the population weight of each group at the beginning of the period.

year. During the first period, 2007–2013, as shown by the left sets of bars in both panels of Figure 9, annual hours worked per person fell the most for the first two age groups of women and men (prime-age women and men), mostly along the extensive margin. Surprisingly, older workers increased their annual hours worked along the extensive and the intensive margins, albeit modestly.[10] During the second period, the annual hours worked per person grew robustly for all age groups except for the 65 or older group, both for women and men. Again, most of the rise occurred along the extensive margin. One difference is that, for women, the annual hours of the youngest group (25-39) grew the most, whereas for men, it was those aged 55-64 that increased their hours the most.

The final period, 2019–2022, shows very different patterns between women and men. For prime-age women, the annual hours move in opposite directions along the extensive and the intensive margins, resulting in negligible net changes. For older women, the annual hours fell, almost exclusively along the extensive margin. Between 2019 and 2022, the fall in annual hours per person fell the most among prime-age men, most of it along the intensive margin.

In summary, the 2019–2022 period is unique in that the majority of the changes in annual hours worked per person occurred through the intensive margin rather than the extensive margin. In earlier periods, the intensive margin changes were negligible. During this period, the intensive margin decline was more pronounced for men than women, especially men with a bachelor's degree or more and in prime ages (25–54). Put together with the result from Section 1, we find that both the intensive and the extensive margin declines in annual hours were larger for young men during this period. By education, the extensive margin decline was larger for men without a bachelor's degree, but the intensive margin decline was larger for men with more education.

2.3 Decline of Hours Worked among Male Workers

The result of our decomposition for the 2019–2022 period emphasizes the reduction in hours by those who work. In this section we examine how the distribution of annual hours among those who work changed over time. Since the intensive margin changes were more pronounced for men than for women, we only consider men in this section.

In Table 1, we report selected percentiles of the annual hours worked distribution among men who worked in a given year. Because people report weekly hours, which we then multiply by 52, the values cluster to certain integers. For example, in all four years, the 25th percentile and the median are 2,080 hours of work during the year. Nevertheless, it is clear that those who work very long hours cut back on their hours between 2019 and 2022, evidenced by

[10] The increased employment rate of older workers in the early stages of recovery from the Great Recession is consistent with the evidence discussed in Aum et al. (2017).

Percentile	Year				Changes		
	2007	2013	2019	2022	2007 - 2013	2013 - 2019	2019 - 2022
10th	1,248	1,248	1,248	1,248	0	0	0
25th	2,080	2,080	2,080	2,080	0	0	0
50th	2,080	2,080	2,080	2,080	0	0	0
75th	2,392	2,340	2,340	2,236	-52	0	-104
90th	2,912	2,860	2,860	2,600	-52	0	-260

Table 1: Percentiles of Annual Hours Worked

the significant hours reduction at the 75th and the 90th percentiles, but not at the median. In 2019, one had to work for at least 2,860 hours to rank in the top 10 percent of workers working longest hours. In 2022, he needed to work "only" 2,600 hours to win this dubious honor.

We can also examine the reduction in annual hours across the earnings distribution. For each year, we construct earnings deciles and compute the average hours worked of male workers in each decile. The result is in Figure 10.

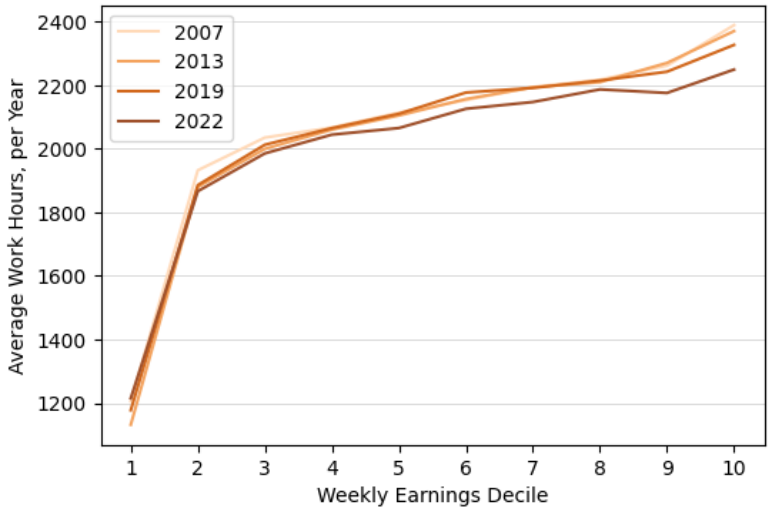


Figure 10: Average Annual Hours Worked across Earnings Deciles

Note: Each point represents the average annual hours worked of the male workers in each earnings decile.

We make two observations. First, the average hours worked in a given earnings decile remained fairly stable between 2007 and 2019. Second, the average annual hours worked between 2019 and 2022 declined in all deciles except the lowest two, but declined more at the higher end of the earnings distribution. Male workers in the ninth and the top deciles of the 2022 earnings distribution worked 67 and 77 fewer hours than those in the respective

earnings decile in 2019.

In summary, it is male workers working long hours and earning more that reduced their annual hours worked between 2019 and 2022.

2.4 Discussions on Hours Decline

One natural question is whether this reduction in hours among those who work is voluntary or involuntary. Both circumstantial and direct evidence indicates that it is voluntary. The tight labor markets with high vacancy rates in Section 1.1 suggest that workers would have opportunities to work more hours if they so chose. More important, Faberman et al. (2022) provided direct survey evidence revealing a sharp decline in people's desired work hours during the Covid-19 pandemic that persisted through the end of 2021. Our analysis shows that workers indeed reduced their work hours at least through the end of 2022.

The fact that it lasted through 2022 suggests that the hours reduction cannot be explained by such pandemic-period factors as sickness (Ham, 2022), fear of infection (Aum et al., 2021), or child care needs during school closures (Garcia and Cowan, 2022). While determining the cause of the hours reduction is beyond the scope of this paper, we conjecture that shifts in preference toward more work-life balance, manifested by the Quiet Quitting phenomenon, is an important factor. The pandemic may have motivated people to re-evaluate their life priorities and also gotten them accustomed to more flexible work arrangements (e.g., work from home), leading them to choose to work fewer hours, especially if they can afford it. Our finding that the hours reduction is larger for those in the right tail of the hours and the earnings distributions supports this interpretation.

In this view, the reduction in hours worked may well persist. And that would not be a perverse outcome. The US stands out among advanced economies in terms of annual hours worked per worker. According to the OECD, the average US worker worked 1,791 hours in 2021. This is significantly higher than the corresponding number from other advanced economies: Canada (1,685), Japan (1,607), the UK (1,497), France (1,490), and Germany (1,349), for example.[11] In this context, if anything, there is room for hours worked per worker to further decline in the US.[12]

[11] The OECD countries with higher annual hours worked per worker than the US are, in descending order, Mexico (2,127), Costa Rica (2,073), Colombia (1,964), Chile (1,915), Korea (1,915), Greece (1,872), and Poland (1,830). The richest among them is Korea, but even its GDP per capita is only two-thirds of the US's.

[12] To provide a historical background, the annual hours worked per worker fell from over 2,000 in the 1950s to 1,770 in 1982, after which it exhibited neither downward nor upward trends.

3 Concluding Remarks

Widespread worker shortages are what defined the tight labor market of 2021 and 2022. The 1 percentage point decline in the labor force participation rate between 2019 and 2022 is definitely part of the story, but this article shows that it is not the whole story. In fact, more than half of the decline in aggregate hours worked occurred through the intensive margin: Those who worked reduced their hours.

The lower participation rate is to a large extent a continuation of a trend that existed since the Great Recession, especially the lower participation of younger male cohorts without a bachelor's degree. The reduction in hours among workers is a new phenomenon induced by the pandemic, but available evidence suggests that it will likely stay with us. The reduction in hours was larger for prime-age male workers with a bachelor's degree. It was also larger for those male workers who already worked longer hours and earned more.

A lesson for researchers and policymakers is that one must pay attention to hours worked of workers, in addition to the employment or participation rate, to have an accurate assessment of the labor market conditions. In the current labor market, focusing only on unemployment and labor force participation will lead to a significant under-estimation of the tightness of the labor market, which echoes the conclusion of Domash and Summers (2022) and Faberman et al. (2022) about the labor market of 2021. Related, Bick et al. (2022) emphasize the importance of the hours margin in growth accounting exercises and in the projection of potential labor supply.[13]

While we made some conjectures based on available evidence as to why workers reduced their hours and whether they will continue to do so, these remain open questions. In addition, it will be fruitful to have a better understanding of the lower labor force participation of younger male cohorts, both its causes and consequences. These important topics are left for future research.

[13] In their analysis of data from 18 European countries and the US between 1997 and 2019, they document a downward trend in hours per worker and an upward trend in employment rate in most countries. They construct a model that rationalizes these divergent trends.

Appendix

A Note on Data

Hours Worked We use AHRSWORK1 in IPUMS-CPS (Flood et al., 2022). This is the actual number of hours the respondent reported working at his/her main job last week.

Earnings Figure 10 uses EARNWEEK in IPUMS-CPS. This is how much the respondent usually earned per week at their current job, before deductions.

Employment Status "Employed" includes both those employed and at work last week, and those employed but not at work, for example due to sick leave in the EMPSTAT variable in IPUMS-CPS.

B Definition of Intensive and Extensive Margins

We closely follow the method of Blundell et al. (2011). A period is a year and indexed by t, and groups are indexed by $j = 1, ..., J$. q_{jt} is the population share of group j.

Hours *per person* for each group j in year t, H_{jt}, is the product of hours *per worker* h_{jt} and employment rate p_{jt}: $H_{jt} = h_{jt}p_{jt}$. Aggregate hours per person, H_t, is the population-weighted sum of hours per person of each group: $H_t = \sum_{j \in J} q_{jt} H_{jt}$.

The structural effect due to the change in the composition of population is: $S_t = \sum_{j \in J} H_{jt}[q_{jt} - q_{j,t-1}]$.

The change in hours per person of group j, using the population weight of period $t-1$, is: $\Delta_{jt} = q_{j,t-1}[H_{jt} - H_{j,t-1}]$. The total change across all J groups is then $\Delta_t = \sum_{j \in J} \Delta_{jt}$. By construction, $H_t - H_{t-1} = S_t + \Delta_t$.

To obtain the desired decomposition, assume linearity and that the intensive margin has the same sign as the change in hours per worker from the previous period ($\Delta h_{jt} = h_{jt} - h_{j,t-1}$). Then we have

$$I_{jt} = p^I_{jt} \Delta h_{jt} \quad \text{and} \quad E_{jt} = h^E_{jt} \Delta p_{jt} \ ,$$

where $\Delta p_{jt} = p_{jt} - p_{j,t-1}$, and the extensive margin follows from the identity $\Delta_{jt} = q_{j,t-1}(I_{jt} + E_{jt})$.

There are two alternatives for p^I_{jt}: $p_{j,t-1}$ and $p_{j,t}$, corresponding to $h^E_{jt} = h_{j,t}$ and $h_{j,t-1}$ respectively. That is,

$$\Delta_{jt} = q_{j,t-1}[p_{jt}\Delta h_{jt} + h_{j,t-1}\Delta p_{jt}] \quad \text{and} \quad \Delta_{jt} = q_{j,t-1}[p_{j,t-1}\Delta h_{jt} + h_{j,t}\Delta p_{jt}] \ .$$

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