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UNDERSTANDING THE ECONOMIC IMPACT OF COVID-19 ON WOMEN

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ABSTRACT

The impact of the pandemic on the employment, labor supply, and caregiving of women is assessed. Compared with previous recessions, that induced by COVID-19 impacted women’s employment and labor force participation more relative to men. But the big divide was less between men and women than it was between the more- and the less-educated. Contrary to many accounts, women did not exit the labor force in large numbers, and they did not greatly decrease their hours of work. The aggregate female labor force participation rate did not plummet. The ability to balance caregiving and work differed greatly by education, occupation, and race. The more educated could work from home. Those who began the period employed in various in-person “service” occupations and establishments experienced large reductions in employment. Black women were more negatively impacted beyond other factors considered and the health impact of COVID-19 is a probable reason. The estimation of the pandemic’s impact depends on the counterfactual used. The real story of women during the pandemic concerns the fact that employed women who were educating their children, and working adult daughters who were caring for their parents, were stressed because they were in the labor force, not because they left.

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The economic downturn that resulted from our self-induced COVID coma has had economic effects different from those of any other recession or national crisis in US history. This time really has been different. Never before have we needed to shut down the economy to get it running again.[1] Never before have those working on the frontlines been asked to bring danger back into their homes, not even in the history of our military. Never before in peacetime, have the caring sectors of education and health been as intertwined with the economic sectors of production and services. And, never before has a recession impacted women in a host of ways more than it has impacted men.

It seems safe to say that no one was untouched by the pandemic. But much of the deepest economic impact and personal pain was experienced by women. Many were caregivers for their own children and parents; some worked as aides for other people. Their jobs put them on the front lines in hospitals, nursing homes, and grocery stores. Others worked in restaurants, hospitality, retail, and personal service, and saw their workplaces shuttered.

These women are of all types. But those who were most impacted were the mothers of school-aged and younger children, Black and Hispanic women, single moms, and adult daughters who cared for parents. They may bear the marks of the pandemic for some time.

Women today are almost half of the total US labor force (47% just prior to March 2020).[2] It is because of their great importance to the labor force that issues of caring and K-12 education took on greater significance during the pandemic and were seen as a means of restarting the economy. For the same reasons, uncertainty about the economic recovery was driven by the possibilities that schools and daycares would not fully open in the fall 2021 and that parents would be fearful of sending their children to schools and care facilities. At the same time, it is because the vast majority of women 25 to 54 years old are in the labor force—76% were in 2019—and half of them have children younger than 18 years old—that the care and education of children have been paramount to them.

The only previous time in US history that childcare was viewed as essential to the economic health of the nation was during WWII. In 1940, only 18% of married women were in the labor force and the overwhelming majority of Americans (both men and women) agreed with the statement that: "A pre-school child would likely suffer if the

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[1] The Great Influenza of 1918 was not accompanied or followed by an economic recession of any magnitude, possibly because World War I was an economic boost or because the economy was not placed in as extreme a coma as ours has been. In addition, the virus may have more rapidly mutated to a less virulent form, ultimately transitioning to an endemic seasonal flu.

[2] The fraction female of the labor force by hours worked is less than 47% since working women of all ages report working for pay 10% fewer hours than do working men (the same figure holds for those 25 to 54 years old), using all months in 2019 and the "hours usually worked per week at all jobs" variable, truncating at 84 hours.

mother worked for pay." But, in 1942 firms across the nation encountered obstacles fulfilling contracts for war production. Firms entreated the federal government for the means to increase the labor supply of an untapped reserve—mothers.

The federal government responded by redeploying funds from the 1940 Lanham Act to set up thousands of nursery schools for children 2 to 6 years old and provide after-school programs for older children. The policy appears to have done the trick. By 1944, 55% of the wives of servicemen were in the labor force.[3]

Even in ordinary times, the care of children uses far more hours of mothers than of (custodial) fathers, and that is true even if both are college graduates and are fully employed. Thus, even though school and daycare closings during the pandemic have had disproportionate impacts on most parents, the absolute time demands on mothers were extraordinary. By the estimates I will later offer, childcare (including education) time increased from 8.7 hours per week, before the pandemic, to 17.3 hours, early in the pandemic, to around 22.4 hours, by fall 2020, for college-graduate women (who were full-time workers with elementary school-aged children in two-parent households). Childcare hours of custodial fathers also greatly increased early in the pandemic. But the increased hours of childcare of working women created an exceedingly heavy load (even weightier when ordinary housework is included).

The pandemic had resulted in considerable burdens and stresses from its dual impact on people's health and jobs. The closing of schools and daycares, the furloughing of nannies and housecleaners, and the reduction of home healthcare workers intensified the time demands on mothers and other women. Even though work from home was safer, it was filled with interruptions prompting some to cleverly dub WFH as "Work from Hell."

It is no wonder that in the first year of the pandemic, especially in its first six months, news media and policy reports were jam-packed with alarming headlines. "Pandemic could scar a generation of working mothers," and "Pandemic will 'take our women 10 years back' in the workplace."[4] A McKinsey-LeanIn Report that surveyed "more than 40,000 employees from 47 companies" issued a dire set of predictions, concluding that "One in four women are [sic] considering downshifting their careers or leaving the

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[3] According to official estimates, about 26% of all women (15 years and older) were in the labor force in 1940. But by 1944 (from estimates implicit in Goldin 1991), the female labor force rapidly increased to 40% of those 18 years and older. It subsequently fell to 30% by 1947, about as rapidly as it had increased. But it then quickly began its secular rise, reaching 34.5% by 1951. There has been no other time in US recorded history of so rapid a change in female labor force participation. We do not yet know whether the Lanham nursery schools impacted later female labor supply. On the role of mobilization rates on women's labor supply, see Goldin and Olivetti (2013).
[4] Patricia Cohen and Tiffany Hsu, *New York Times*, June 30, 2020; Amanda Taub, *New York Times,* Sept. 26, 2020.

workforce due to the impact of Covid-19," and "One in three mothers may be forced to scale back or opt out." These prophecies became part of a media echo-chamber, repeated again and again as if they had actually occurred.[5]

Even in March 2021, as vaccines were just entering arms of the under 65-year-old crowd in most states, the news media continued to emphasize the reduction in women's employment and a future in which these reductions would be made permanent. "Pushed out by the pandemic: Women struggle to regain a footing in the U.S. job market." "In one year, coronavirus pandemic has wreaked havoc on working women."[6]

Some even offered the disturbing possibility that: "Female workforce participation has already dropped to 57%—the lowest level since 1988," implying that the pandemic reduced female labor force participation by 33 years of growth, even though there was almost no sustained growth in the rate during those three decades. That headline was replayed across media outlets for months.[7] The enormous impact by race was also noted: "Taken together, the coronavirus proved to be a double whammy for Black women, robbing them of their jobs as well as threatening their health."[8] There was, unfortunately, considerable truth to that.

In the spring of 2021, we took off our masks and breathed in deeply, thinking we were on a straight road to economic recovery and health. We are less certain of that now, even as schools, daycares, businesses, and offices have reopened. As the nation's labor force is slowly shifting to a "new normal," it is prudent to look back and assess damage while exploring the potential for positive change.

In the year that has followed, many researchers have examined the facts behind these headlines.[9] Although there is some variation in the findings, a consensus has

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[5] McKinsey-LeanIn, *Women in the Workplace Study 2020*, Sept. 2020. The comment from the McKinsey-LeanIn report that "one in four women" or "one in three mothers" was contemplating leaving the workforce or cutting back was repeated in numerous news reports (e.g., CNN, August 2020; ABC News, Sept. 30, 2020; CNBC March 1, 2021). Few, if any, also cited the remark from the McKinsey-LeanIn Study that "one in five" men was also considering cutting back or leaving the workforce. None inquired whether the prediction had any validity.

[6] Jonnelle Marte and Aleksandra Michalska, *Reuters*, March 5, 2021; Tim Smart, *US News,* March 8, 2021.

[7] *Fortune,* Feb. 2021. Also, "More than 2.3 million [women] have left the workforce since February 2020, bringing their labor participation rate to levels not seen since 1988" (CNBC, March 1, 2021). "Now, 56% of American women are working for pay, the lowest level since 1986" (Claire Cain Miller, *New York Times,* May 17, 2021).

[8] Tim Smart, *US News*, March 8, 2021.

[9] The literature on the gendered features of the pandemic recession is now extensive and I will cite much of it. But I would like to acknowledge some of the pioneers in the literature who wrote on the subject as early as March 2020. Alon et al. (2020a) was probably the first and emphasized telecommuting, childcare, and family structure. That piece was followed by Alon et al. (2020b), and

developed around the economic impact of the pandemic on women and the veracity of these stories. I will summarize the main findings, explain some differences, and add a few additional considerations. My intention is to clarify the impact of the pandemic on women rather than evaluate the differential impact of the pandemic on women relative to men and relative to other recessions, a task capably accomplished by others.[10]

The consensus that has emerged regarding the actual economic impact of the pandemic on women generally includes the following five points, which are developed more fully below.

1. Female labor force participation greatly increased in the half year preceding the pandemic making judgments about changes after the pandemic began dependent on the starting point and the assumed counterfactual. The claim that the female labor force participation rate was rolled back to levels not seen for more than thirty years does not consider the fact that female labor force participation had been flat for some time, and male labor force participation actually decreased. The female labor force participation rate, for those 25 to 54 years old, was about 75% in the early 1990s and has not been much different in more recent years. In fact, the rate was 75.6% before the pandemic in November 2018 and was 75.6% in November 2021 (the last available month at the time of this writing).[11]

2. Compared with previous recessions, the one induced by COVID-19 impacted women's employment and labor force participation somewhat more relative to men's and thus deserves the moniker "she-cession." But the big divide is less between men and women and more between the more-educated and the less-educated. Although educational differences have been present in other recessions, the ability of the educated to work remotely and more safely should have exacerbated educational differentials relative to those in typical recessions.

3. Childcare time in families with school-aged and younger children probably doubled around the start of the pandemic. That for custodial fathers probably more than doubled for the first several months after March 2020, in part because their hours began at a lower level than those of custodial mothers. Childcare time for mothers probably increased further as some workplaces reopened in fall 2020 and custodial fathers reduced their childcare hours, yet schools did not remain open everywhere.

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then by a revealing work, Alon, et al. (2021), using comparable data for six countries (US, Canada, Germany, the Netherlands, Spain and the UK) exploring the impact of COVID-19 across nations with different social insurance systems. Heggeness (2020) was among the earliest to recognize the importance of leave taking on the employment figures.

[10] See Albanesi (2021) and Albanesi and Kim (2021).

[11] See source for Figure 1.

4. Labor market outcomes for women with young children were more affected than for others, but all women were greatly impacted by the pandemic. The employment and labor force participation of mothers with school-aged and younger children varied by the mother's level of education and the year and season during the pandemic. An important finding is that employed mothers, by and large, did not leave the labor force despite their greatly increased time demands due to school and daycare closings and those who remained employed did not downshift as much as had been thought. But caregivers of children, the elderly, and the sick were burdened in a multitude of ways that became part of the media's headline stories.

5. Occupation and industry mattered considerably to women's employment. Prior to the pandemic, and relative to men, women were disproportionately employed in establishments, such as restaurants, beauty salons, child daycare services, and home health care services, that were shuttered in many states at the start of the pandemic. And, even after they could open, these businesses had reduced demand, and many had permanently closed their doors. Race and ethnicity mattered to women's employment and labor force status independent of the age of their youngest child, occupation, and education.[12] Why that is the case may concern social disparities in COVID-19 health outcomes and the greater exposure of their jobs to disease transmission.

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1. The pandemic's impact on female labor force participation rates and the run-up before the pandemic: What is the correct counterfactual?

I will begin the elucidation of the impact of the pandemic on women with a discussion of female labor force participation rates. The existence of a sharp and unparalleled, in recent history, run-up in participation prior to the pandemic will influence the choice of a hypothetical to understand the impact of the pandemic.

The claim that the female labor force participation rate fell during the pandemic is not incorrect. But the implication that female labor force participation plummeted from a much higher level before the pandemic to one that was extremely low during the pandemic is highly mistaken.

First off, the 57% figure provided in the accounts is for all women 16 years and older. Although that is a customary way of expressing the data, and is done for historical consistency, it is not a meaningful age group to use. However, even using the 16 years and older group, the statistic for women fell by only -1 percentage point (pp) from April 2019,

[12] I am not making an claim that race and ethnicity mattered any more in the pandemic recession than in any previous one.

when it was 57.1%, to April 2021, when it was 56.1%. The same statistic fell by -1.4 pp for men, from 69.0% to 67.6%.[13]

The reason that recent participation rates for women take us back many decades is that women's participation rates have not changed much during the past thirty years, and, for some demographic groups, they actually decreased.[14] But, men's participation rates have fallen almost every year since at least the 1960s.

Labor force participation rates may make more sense for a group of workers who are post-school, pre-retirement, say 25 to 54 years old as depicted in Figure 1 for the period from 1970. The labor force participation rate for women expressed in this manner shrank a bit from 0.755 in April 2019 to 0.748 in April 2021, comparing data for the same months both before and after the pandemic began, using the approximate month of the many media reports on the statistics. That is, the rate declined by just -0.7 pp. That for men, using the same age group, fell by -1.4 pp, considerably more.[15] Comparing, say, November 2018 to November 2021 (the latest month for which data exist at the time of this writing) gives a mere -0.2 pp decrease for women and a -0.1 pp decrease for men. The reason for using 2018 for this calculation rather than 2019 concerns a critically important run-up in women's labor force participation.[16]

As is clear in Figure 1, the January and February 2020 labor force participation rate numbers for women are distinct outliers across a long period (see the enlarged portion of Figure 1). The figure for January 2020 is 0.769. Out of the 383 monthly numbers from January 1990 to November 2021, just 10 exceed the January 2020 figure of 0.769 and seven equal that figure, including that for December 2020. The February 2020 figure is 0.768.[17]

The increase in female labor force participation rates in the early 2010s was a return to a more normal era after the, apparently, delayed response of the female labor force to the Great Recession. By around September 2019, female labor force participation rates were at about their level from before the Great Recession. Then came a boom in

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[13] Data are seasonally adjusted from FRED (Federal Reserve Bank of St. Louis, Economic Research Division) https://fred.stlouisfed.org LNS11300002 series for women and LNS11300001 for men.
[14] For data on the female labor force in general, see Goldin and Mitchell (2017). For information on the increase in female participation for those 55 years and older, see Goldin and Katz (2018).
[15] The 1.4 pp number is coincidentally the same as noted previously.
[16] Using 2019 gives a decrease of 1.2 pp for women and exactly the same for men.
[17] The failure of the aggregate participation rate to return to its pre-pandemic levels has been explored in Cooper, et al. (2021), which emphasizes the aging of the population since November 2017 in decreasing aggregate participation rate, rather than the run-up in participation by women. The run-up within various age groups of women is evident in their data, but they emphasize the aggregate impact of changing shares of older workers.

women's entry to the workforce.

Female labor force participation rates soared from late fall 2019 to early winter 2020, when the economy had exceptionally low unemployment. We may never know whether that increase in women's participation would have persisted, in the absence of the pandemic, or whether it would have ended up being another transitory blip.

We can, however, discern who entered the labor force in the period of run-up and what happened to the recent entrants during the pandemic. If those who entered largely remained in during the pandemic, then the increase might have been sustained. But if those who entered largely dropped out in the next several months, then the run-up consisted primarily of women who were marginally attached to the labor force. Comparisons with January 2020 would give an overstatement of the hypothetical impact of the pandemic in the absence of the run-up.

The answer is that a substantial fraction of those who entered in the period immediately preceding the pandemic left during it. It is to be expected that recent entrants are, on average, less attached. But, this group was large and somewhat less attached than in more ordinary times.

Consider, first, a simple descriptive summary of who entered just before the pandemic. According to the monthly Current Population Survey (CPS), not seasonally adjusted, the increase in participation among all women 20 to 54 years old from April 2019 to December 2019 was 1.86 pp.[18] But, among those 20 to 29 years old who were not college graduates and had a child 0 to 4 years old, it was 6.32 pp. Therefore, the increase in labor force participation in the second half of 2019 was greatest among less educated, young women with young children.[19]

To explore further, I use the longitudinal feature of the monthly CPS to understand the demographic characteristics of the women who entered the labor force just before the pandemic began and which, among them, remained in the labor force during the pandemic. The answer is that the new entrants were distinctive in the ways just described. In addition, they left the labor force during the pandemic at far greater rates than those who had not recently entered. It seems plausible, therefore, that the January and February 2020

[18] I use 20 years old as the lower bound here, and going forward, because I would like to make certain to include parents with very young children. Beginning with 25 year olds would exclude too many parents of infants and toddlers.
[19] This is not to say that college graduate women did not also have increased participation. It was just greater for other groups. For example, among college graduate women 25 to 34 years old with a child less than 5 years, the increase from December to April was 3.69 pp but was 5.59 pp for the same among those without a college degree.

figures are anomalous.

Each of the CPS respondents takes part in the 4-8-4 CPS rotation, during which they are interviewed four straight months and then another four months after an eight month hiatus. I first find all women 20 to 54 years old who entered the labor force any time from April 2019 to February 2020. Each must have been interviewed at least twice in that period and been observed "out" of the labor force and then "in." In addition, because they must have been last observed to have been "in" the labor force on or before February 2020, they would likely have been "in" the labor force at the start of the pandemic, in March 2020. Each of these women must also have had at least one observation in the pandemic period to determine if she remained "in" the labor force or left during the pandemic. The collection of the women who meet these conditions is termed Group 1.

As a control, I next identify women 20 to 54 years old who were always "in" the labor force when interviewed between April 2019 and February 2020. They must have had at least one observation in the pre-pandemic period and another during or after March 2020 to observe their pandemic experience. That collective is termed Group 2.

Therefore, Group 2 women are always "in" the labor force when observed after April 2019 but before March 2020, whereas Group 1 women enter the labor force at some point before the pandemic begins. Both groups are observed before and after the pandemic.

The results of the exercise, given in Table 1, show that Group 1 and Group 2 were, not surprisingly, rather different demographically. The women of Group 1 were less educated, were younger, and had more young children. Of real importance, 43% of Group 1 left the labor force at least once after March 2020, whereas just 12% of Group 2 did.[20]

An important implication of these findings is that the impact of the pandemic measured as a simple comparison of employment or labor force participation in a month after March 2020 with the same statistic in January or February 2020 will produce a larger estimate than one that differences from a month in, say, 2018. The simple difference leads to estimates that are overstated relative to an ideal counterfactual.

In addition, the simple comparison of a pandemic month with one in early 2020 conflates seasonal changes with the impact of the pandemic.[21] In what follows, I will make

[20] Recent entrants would be expected to be less attached to the labor force than the more established ones. I created a placebo pandemic in March 2018 and constructed two groups equivalent to those just described and for an equal set of months. Among the Placebo Group 1 women 38% left the labor force at least once, but just 9% of Placebo Group 2 did. The impact is a bit smaller than in the treatment period. The big difference is the relative size of the recent entrants.
[21] The seasonality issue arises from the use of the micro-CPS data to look at subgroups, instead using the BLS seasonally-adjusted data or constructing them.

comparisons with the same month or season in a pre-pandemic period that occurs before the 2019 run-up in female labor force participation.

I will demonstrate that the comparison with winter 2019/2020 yields larger estimates of the labor force participation and "at work" rate declines for women in every season, but not for men, and that the estimates are larger for the less educated. Although I use months or seasons in 2018 as a standard, there are very few differences using 2019 as the reference year.

2. Impact of the pandemic and the recession on women relative to men: Was the pandemic recession a "she-cession"?

There are several ways to estimate the impact of the pandemic, each constructing a counterfactual concerning what employment or labor force participation would have been in the absence of COVID-19. The most reasonable estimate of what a group would have been doing in the absence of the pandemic is what the group had been doing in the same month in a previous, more normal, year. As just explained, using a period that preceded the run-up in women's labor force participation eliminates a potential spurious component, and differencing on the same month removes seasonality.[22]

I have grouped months by season and perform a simple difference from the season in question to the same season in 2018. I use the seven season-years from spring 2020 to fall 2021. Figure 2 shows the results for women and men 20 to 54 years old by education (college graduate versus not) for employment, defined as being "at work" in part A and labor force participation in part B.[23]

The fraction of the population "at work" excludes those who were out of the labor force or unemployed or who stated they had a job but were not at work in the relevant CPS week. The latter category generally includes workers on short-term leave or vacation but the group increased substantially during the pandemic. Thus, the most conservative estimate, and one that has become conventional in work on the pandemic, excludes the group from the "at work" population.

In absolute levels, the fraction "at work" declined significantly in spring 2020 for all groups but considerably more for the less educated. The fraction at work decreased by more than -8 pp for both male and female college graduates but by about -17 pp for the

[22] Counterfactual estimates that difference each month show no relative increase by gender during the summer, suggesting seasonality is a major factor. Price and Wasserman (2021) explore why data for college graduate women show summer seasonality in employment and the possibility that K-12 teachers hired on 12-month salaries report they are not "at work" in the summer.
[23] The results are not much different if the 25 to 54 year old group were used. I employ the 20 to 54 year old group for consistency with later results that add the impact of young children.

non-college graduate group. The decrease had lessened a year later in spring 2021 when it was -1 pp for male and just -0.5 pp for female college graduates. It was -6 pp and -4 pp for males and females in the non-college graduate group.

Because men's "at work" base is larger than women's the relative decrease was larger for women. For the college graduate group the magnitudes relative to the base levels are 9.45% for men and 10.35% for women for spring 2020 and 1.31% for men and just 0.61% for women in spring 2021. For the non-college graduate group the relative magnitudes are larger: 21.2% for men and 26.5% for women in spring 2020 and 7.2% for men and 6.5% for women in spring 2021.

The (absolute) decrease in the fraction "at work" for college graduate men was approximately the same as for college graduate women 20 to 54 years old for all seasons and was actually lower for women in the most recent three. Female non-college graduates were a bit more negatively impacted in some seasons relative to males but not in others.

There doesn't seem to be a large difference in "at work" losses by gender in absolute terms using the counterfactual provided in Figure 2A. Rather, the large differences are by education. College graduates experienced half the decline in the fraction "at work" than did those with less education from spring 2020 to fall 2020. From winter 2020 to fall 2021, the less-educated group recovered somewhat less and had deficits in "at work" of around -4 pp.

Using, instead, the method that differences from winter 2019/20 (see Appendix Figure 1), produces larger changes in "at work" for women in every season. But there are few differences among men, as should be expected since the run-up occurred among women, not men. Furthermore, the absolute declines in "at work" for women are much higher in the summer months since the seasonal effect is not eliminated by this form of differencing.[24]

The difference in the two methods for the less-educated women is 1.34 pp averaged across all seasons. That for more-educated women is larger because of summer seasonality and is 1.11 pp excluding the summer months. These are large differences and amount to about a 20% greater decline among less-educated women relative to the method that differences by the same season. I should note that using the 2019 as the reference year, rather than 2018, does not produce substantially different results (see Online Appendix

[24] Counterfactual estimates that difference each month show no relative increase by gender during the summer, suggesting seasonality is a major factor. Price and Wasserman (2021) explore why data for college graduate women show summer seasonality in employment and the possibility that K-12 teachers hired on 12-month salaries report they are not "at work" in the summer.

Figures 1A and 1B).[25]

But even using the method that probably overstates the economic impact of the pandemic and incorrectly credits seasonal changes to it, the most apparent disparity is still between the more- and less-educated. For women, the decrease in "at work" for the non-college graduate group is almost twice what it is for college graduates, disregarding the summer months. Similar differences exist by education for men.

Differences for labor force participation rates, computed identically to those for "at work," are also much smaller by gender than are the differences by education (see Figure 2B). For college graduates, labor force participation rates by spring 2021 were about the same as they were in 2018, and that is true for both men and women. In fact, men had slightly larger decreases than did women. For the non-college graduate group, decreases were considerably greater and the differences between men and women are not large except in the most recent seasons shown. For fall 2021, the latest season for which we currently have data, women were behind by -1.3 pp. relative to 2018 and men were behind by -0.6 pp. Earlier in the pandemic and through spring 2021, the college graduate group was far more shielded than those without a college degree.

As was the case for the "at work" differences, labor force participation rate declines using the difference from winter 2019/2020 are considerably larger for every season for women, but not for men (compare Figure 2B with Appendix Figure 2). The differences for some seasons are quite large and reflect the seasonality issue raised before.

There are several takeaways. One is that education produced a very big divide, gender less so. Another is that the counterfactual that is used changes the answers substantially. Many who have differenced from January or February 2020 probably did not realize the potential biases from doing so particularly regarding the issue of seasonality.[26]

Education inoculated workers from the economic impact of the pandemic long before the vaccine was developed. The reason that was the case can be seen in Figure 3, which graphs the answers to a CPS question, first asked in May 2020, on whether workers teleworked or worked for pay from home at any time during the previous four weeks

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[25] The largest difference for the less educated women between the 2019 and 2018 reference years is 1.7 pp in the summer months. The average difference is just 0.6 pp.

[26] Many papers report changes in employment and labor force rates using the difference from Jan. or Feb. 2020 or using one as a reference month. These include Couch, Fairlie, and Xu (2022) although the paper also differences by month; Furman, Kearney, and Powell (2021); and Bauer, Estep and Yee (2021), as well as Bauer, et al. (2021). Hansen, Sabia, and Schaller (2022), in research that uses the Safegraph data, give a time series that difference from January 2020 as motivation. Luengo-Prado (2021) generally differences from February 2020 but sometimes by month in the previous year.

because of the pandemic.[27]

Working remotely aided workers to have safer jobs that could be done from home and it enabled their firms and institutions to continue in operation. About 62% of employed college graduate women and college graduate men in May 2020 were working from home at least part of the time due to COVID-19. But, among those without a college degree, just 25.3% of employed women and 13.7% of employed men were working from home in May 2020. The CPS question was whether the person had worked remotely at all during the previous four weeks because of COVID-19, so the total fraction working at home would have been somewhat greater.

By fall 2020 about 42% of the college graduate group continued to work from home, whereas around 13% of the non-college graduate women and just 7% of non-college graduate men did. In September 2021, around a quarter of college graduate women worked remotely at least part of the time, but less than 10% of the non-college graduate women did and about only one in 20 of the non-college men did.[28]

Interestingly, the fraction working remotely due to COVID-19 shot up in January 2022 for all education groups because of the Omicron variant (see Online Appendix Figure 2). At that time, 29% of all college graduates (male and female) were working from home due to COVID-19, which was an increase of 33% from the previous month, December 2021.

It was C. Nicole Mason, president and chief executive of the Institute for Women's Policy Research, who first used the moniker "she-cession," a wordplay on the "man-cession" nickname for the 2008 recession.[29] There are many reasons why this recession was bound to be different.

State mandates at the start of the pandemic shut down or limited the density of many in-person services, such as those provided by restaurants, bars, hair salons, and retail stores. The travel and hospitality industries had greatly reduced demand. Jobs in these sectors had seemed more immune to past cyclical downturns and other vagaries of the economy, such as the China trade shock and automation, than those in the goods-producing sectors. Prior to March 2020, women were more than 60% of employees in these sectors and occupations (see Online Appendix Note 1: Occupations Coded as "Service."). Men were in

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[27] Dingel and Neiman (2020), at the start of the pandemic and before the CPS question was asked, produced estimates regarding which occupations could probably be done remotely.
[28] To approximate an estimate that includes remote work in the absence of the pandemic, one can add to the CPS data an estimate of the usual fraction who worked remotely using ATUS data for 2017 and 2018. That would add about 10 pp (8 pp) to the college graduate male (female) numbers, and 2 pp (3 pp) for non-college graduate males (females).
[29] "[W]e should go ahead and call this a 'shecession.' Alicia H. Dasgupta, "Why Some Women Call This Recession a 'Shecession,' " (*New York Times*, May 9, 2020), quoting C. Nicole Mason.

the more cyclically-sensitive industries, such as manufacturing and construction.[30]

But, the pandemic produced both a he- and a she-cession. Relative to previous recessions, women have been harder hit. But the largest differences in pandemic effects on employment are found between education groups rather than between genders within educational groups.

The other reason the pandemic should have impacted women more than men is that the care sectors—K-12 schooling, daycares, and eldercare—were also shut down or made remote. With limited in-person schooling, childcare, and eldercare services, mothers and adult daughters disproportionately filled the gap. The economic changes that we can observe in labor force participation and "at work" rates are only part of the time demands on parents and especially women. These are a main reason why the pandemic recession has been different from any other. I turn now to the home front.

3. Childcare hours for working parents in the pandemic's first year: Did childcare hours double initially and how did hours change by fall 2020?

When schools closed, daycares were shuttered, nannies were sent packing, and grannies were sequestered, childcare demands on parents soared. The same is true for adult children, disproportionately the daughters, who cared for elderly parents when home healthcare aides could no longer work and when residents were removed from toxic nursing homes.

A problem in assessing just how much caring time increased is that all the facts are not yet known and may never be known for a large enough group. The American Time Use Survey (ATUS) stopped during the pandemic, and although it commenced again in May 2020, the sample size from the early pandemic period is small.

The good news is that several surveys were executed in the US and Europe during the pandemic and some were continuing surveys that had existed before the pandemic. But samples vary regarding whether both parents were present, whether they worked, if they worked remotely, the ages of the children, and what gets included in "childcare" hours.

By piecing together the evidence from the ATUS, available before the pandemic, with surveys in the US and Britain during the pandemic for which sufficient consistency exists, it does appear that childcare hours doubled in families of working parents in the immediate aftermath of the lockdown in spring 2020. Not only did the childcare hours of mothers increase, but also the share of the total done by (custodial) fathers increased, at

[30] See, e.g., Albanesi and Kim (2021).

least for a while.

For a consistent sample before and during the pandemic, I consider college-graduate, employed (different sex) parents who have at least one resident child younger than 18 years and who live together. The reason I have chosen college graduates is that each would have had a high probability of being able to work remotely at home during the pandemic and much of the survey evidence concerns those who worked at home. In addition, the college graduate group would have had a high probability of maintaining their jobs during the pandemic and many of the surveys consider only those who were employed.

I have used the ATUS to compute pre-pandemic childcare hours of (custodial) mothers and fathers by the age of their youngest child regardless of the number of children.[31] The blue bars in Figure 4 give the (weekly) childcare hours of the mothers "Before the COVID Era" (BCE), as gleaned from the ATUS for 2010 to 2019 to obtain a large sample. The fraction of total parental childcare hours that mothers did is given above the bars. Before March 2020, college-graduate employed mothers were doing around 60% of total childcare hours (not including housework, laundry, food prep and cleanup, the addition of which would increase the fraction since these women in the ATUS did around 70%).

The green bars in Figure 4 denote childcare hours of mothers "During COVID" (DC) in spring 2020, when almost 90% of US school-age children were in school only remotely and most childcare facilities were shuttered. The data come in part from Andrew et al. (2020) because that study extended time budget results from the pre-pandemic era and provides changes in hours with the pandemic. The authors find that childcare hours for (custodial) fathers increased by about 1.9 times and by 1.54 times for mothers.

Many of the details of their sample families are consistent with the one I am using from the ATUS, but some are not. In addition, the ATUS requests the actual time period, but the survey used in Andrew et al. (2020) allocates a task to a block of time, independent of the actual time spent at it. Increasing the ATUS childcare time by the fractions in the study, resulted in time use that seemed a bit low given home schooling reported in other surveys. I added four hours per week for parents with a youngest child 6 to 12 years and two hours for those with a youngest child 13 to 17 years old for consistency with higher totals in other surveys.[32] That produced the data for the DC period.

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[31] I use the main activity and do not add secondary childcare time (for those less than 13 years), which allocates all main activity time to childcare if it contains any secondary childcare time.
[32] Even with the added hours, the totals are far less than those in Adams-Prassl, et al. (2020), which gives a whopping 6.1 hours per workday for mothers (and 4.8 hours for fathers) of children 4 to 15

Since many of these households had both parents at home full time (they are both college graduates), parental sharing increased. Consequently, the fraction of childcare performed by mothers fell, even as total parental childcare hours doubled and as the childcare hours of mothers increased by around 1.7 times (more than the 1.54 number because of the additional child-education hours).

In September 2020, we moved into the "After COVID but during COVID" (AC/DC) era that has persisted (but from which we may soon emerge). Draconian pandemic restrictions were partially lifted, some offices allowed workers to return, others demanded they do. Daycare centers were allowed to open in most states, although some had already gone out of business. Schools in many large districts did not fully open, and some that had opened, blinked on and off. The Gray bars give estimates of childcare hours in fall 2020.

The Gray bars, for the AC/DC period, contain underlying data that is somewhere between those in the BCE and DC bars. The assumptions are that total childcare levels decreased for the youngest children more than for the school-aged children since daycare was generally open more than were elementary, middle, and high schools. Custodial fathers are assumed to have returned to their pre-pandemic levels of childcare; mothers are assumed to have taken up the entire difference.[33]

There was probably no net gain for working mothers in the move from the DC (spring 2020) to the AC/DC world in fall 2020/winter 2021. What they gained from partial and often-sporadic school and daycare openings, they likely lost from less parental help at home as more men than women went back to their offices and worksites, or worked more intensively on their jobs from home. In consequence, mothers' total childcare hours remained about the same, but their share of the total increased.

The statement by many that parents of young and school-aged children doubled their childcare time overnight in spring 2020 is likely correct.[34] Mothers greatly increased their housework and care hours, and even if their childcare hours may not have fully doubled, the sheer number of hours became an enormous burden, especially for those with

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years old. But, Carlson, Petts, Pepin (2021) interviewed 1,025 US parents of at least one biological child and asked about changes in housework and childcare after COVID-19 restrictions. They found (using CPS weights) that the vast majority said that they did about the same with just 27% of mothers and 36% of fathers saying they did more childcare. Sevilla and Smith (2020) interviewed 2,782 in the UK, again with a before and after question and find large increases in childcare time. A BCG (2020) survey asked about the combination of childcare and household tasks and finds a doubling after the pandemic for working parents, but provides no information on child ages.

[33] The assumptions used are in the notes to Figure 4.

[34] "*Parents' Chores and Child Care Almost Double during Pandemic*," by Lucy Meakin (*Bloomberg Technology & Ideas*, May 21, 2020), based on data from a BCG (Boston Consulting Group) survey (2020) conducted from March 20 to April 3, 2020, referring to both childcare and housework time.

full-time jobs. Custodial fathers' childcare time also increased and probably more than doubled, having started out at lower levels than mothers'. There was greater sharing among parents as time burdens increased for both.

The shift back to the office and job-site left mothers in fall 2020 with a larger fraction of childcare time even if the total number of their childcare hours remained the same. Much of the frustration expressed by mothers about childcare in the AC/DC era, concerned the fact that schools in parts of the US had not yet reopened and in other parts had reopened with some uncertainty. But many fathers had returned to the office or to their jobs full time, long before mothers could.

I mentioned earlier that the ATUS resumed in May 2020 and is currently available to December 2020 (the ATUS pandemic period). Because sample sizes are small, I have used all cohabiting individuals with a child younger than 18 years, classified in the child groups given in Figure 4. The ATUS also provides data for a pre-pandemic period (January 2019 to February 2020) using the same weights as in the pandemic months.

Using data for the non-summer pandemic months shows that relative to the pre-pandemic period, educational care of children increased and accounted for all of the increased childcare time.[35] For example, women with a spouse and a youngest child 3 to 5 years old claimed to be spending 16.0 hours/week caring for them before the pandemic and 18.2 hours/week during the pandemic. Educational childcare, included in the total, increased from 2.2 to 5.9 hours. Therefore additional educational time exceeded the total childcare hours increase. Similarly for the 6 to 12 year old group, the total increase was from 9.1 to 10.4 and education time increased by more, from 1.0 to 3.7 hours. Fathers during the pandemic report increased childcare time with their newborns by about 25% (from 12.6 to 15.9 hours).

But, the total increase in childcare time among all ATUS parents is far less than in other studies. Whereas total parental time doubled using the assumptions underlying Figure 4, the pandemic ATUS gives a puny increase of around 12% for those with children younger than 13 years. It is likely that the reason childcare time does not increase more using the ATUS concerns the distinction between primary and secondary childcare time. Secondary childcare time allocates all time in a non-childcare task to childcare if any is spent watching or helping children. With more parents at home, secondary childcare time

[35] Sample sizes are quite small and few cells exceed 50 observations. I have used data for the same months in 2019 as in 2020 (May, September to December).

must have greatly increased.[36] Whether the childcare time of parents has declined must wait for more surveys and, possibly, more months (years) of the ATUS.

4. Impact of the pandemic on women: How did employment and labor force participation change for mothers by the age of their youngest child and for women without residential children?

Relative to other national economic crises, the pandemic produced more stresses and setbacks for women. The reasons are several. Women were disproportionately in the more vulnerable jobs and their time as caregivers for children and others greatly expanded. How their labor force participation rates and fraction "at work" varied by the age of their youngest child is given in Figures 5 and 6. The data demonstrate, once again, that those with a college degree weathered the storm far better than those who lacked one, in part because they could (and did) work remotely. Note that, as before, differences are taken from a particular season in 2018 to one during the pandemic to avoid using a period during the run-up in women's labor force participation as well as to adjust for seasonality.[37]

Beginning first with the changes in labor force participation rates given in Figure 5, decreases were relatively small for the college graduate group, except for those with teenaged children at the start of the pandemic. In fact, college graduate women with infants and toddlers had increased participation rates relative to 2018, particularly after winter 2020. Working at home may have opened doors and options for them. Note that there was even an immediate increase, which may have resulted from having both parents working at home (recall that the pandemic ATUS showed that fathers increased their time with infants). Perhaps new mothers who would have left the labor force, decided to remain in.

Not so for similar mothers without a college degree for whom work at home was often not an option, for their spouses as well, and new jobs that could be done with added childcare demands were less available. In fact, non-college women with a youngest child less than five had decreased labor force participation rates in summer and fall 2021, while the college graduate group experienced the opposite.

For all non-college graduate women with children less than 18 years old, labor force rates remained 2 to 4 pp (or more) below their 2018 levels even by fall 2021, the last season for which we currently have data.[38]

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[36] See Bauer, Estep and Yee (2021) for data on primary and secondary childcare time from the ATUS for the pandemic period.
[37] As noted before, the use of 2019 as the reference year does not greatly change the results. See Online Appendix Figures 1A and 1B.
[38] Other researchers have also found that the role of children differed for college and non-college women and that occupation was more important for the non-college group (viz., Alon, et al. 2021;

Labor force participation is a bellwether of future employment, whereas unemployment is a measure of current harm and income loss. Leaving the labor force means having to reenter employment. That is why the possibility that women's participation had substantially decreased during the pandemic has been so concerning and may be why the McKinsey-LeanIn survey responses were accorded great attention and filled headlines with dire predictions. But the evidence is clear. Women did not leave employment at the extensive margin.

I'll demonstrate the point quite simply. The labor force participation rate for all college graduate women, 25 to 34 years old, in fall 2021 was 85.5% and it had been 85.4% in fall 2018. It had actually increased. For those with children, the figures are 78.2% in fall 2021 and 77.2% in fall 2018. Once again, the rate increased.

Using, instead, the hardest hit months in 2020 (April and May), the labor force participation rate was 82.7% and was 84.0% for the same months in 2018. It fell by -1.3 pp. Using the 2018 base, implies that 1 in 65 college graduate women in that age group had exited the labor force. For those with a child, it was 73.6% in 2020 (again just April and May) and 74.3% in 2018 (same months). In that case about 1 in 100 had left.

For the entire non-college graduate group 25 to 34 years old, the numbers are 69.7% for fall 2021 and 70.8% for fall 2018, a decline of just -1.1 pp. For the worst months of the pandemic, spring 2020 (just April and May as before), the labor force participation rate was 66.1% and it was 70.9% for spring 2018, producing a decline of -4.8 pp, a lot more than for the college graduate group. For those with children, the labor force participation rate was 61.5% in spring 2020 but was 65.9% in spring 2018, a decline of -4.4 pp.

Even the largest decrease, for the hardest hit group—non-college graduates in spring 2020—meant that about 1 in 15 had exited the labor force. These figures, while lamentable, are a far cry from the one in four and the one in three statistics cited in the McKinsey-LeanIn survey and broadcast widely and persistently by the media.

The McKinsey-LeanIn survey, although substantial in size, consisted of employees who occupied six job levels: executives, senior VPs, VPs, senior managers, managers, and entry-level office and corporate employees, such as customer service reps.[39] These are occupational titles of a highly-educated, occupationally-elite group. The one in four, and one in three numbers, in this widely cited survey, seem even more ludicrous.

Luengo-Prada 2021). Although not shown, Black female college graduates fared relatively well, but those without a college degree had larger declines than their white counterparts.

[39] McKinsey & Company LeanIn (2020), p. 59.

Many reports, including the survey just cited, mentioned a scaling back in hours by women, especially mothers. In addition to a reduction in labor force participation, the pandemic could also have impacted the intensive margin through a change in hours. Among college graduate women 25 to 34 years old who were "at work" a year or less before March 2020 and remained "at work" a year later after the pandemic struck, 32% reported some reduction in hours (see Table 3, pre-pandemic to pandemic column). But 27% of those in the same demographic group reported a reduction in hours before the pandemic (pre-pandemic to pre-pandemic), also across a year for which they were "at work" at the start and the end (therefore 41% reported no change in hours). Not surprisingly, workers report changes in their hours in non-pandemic times as well as in pandemic times.

Therefore, 5% (32% – 27%) or 1 in 20 college graduate women 25 to 34 years old who were at work both before and after the pandemic decreased their hours at the start of the pandemic relative to an ordinary period of an equivalent length. For those without a college degree it was 6% (33% - 27%) or 1 in 17. It should be noted that the fraction of the college graduate group who increased hours during the pandemic is almost identical to what it was before the pandemic among those "at work." I will discuss the construction of the sample used in Table 3 in the next section.

The belief that more-educated women would drop out of the labor force persisted despite evidence to the contrary. In large part, the notion remained because mothers and other caregivers were stressed and increasingly made that known to reporters who were also often mothers and were stressed. But, the reporters and their sources were strained and frazzled because they *didn't* drop out of the workforce. Employed women who were helping to educate their children, and working adult daughters who were caring for their parents, were stressed *because* they were in the labor force, not because they had left.[40] The real story of women during the pandemic is that they remained in the labor force. They stayed on their jobs, as much as they could, and persevered.

Findings for "at work" rates can be seen in Figure 6, which gives results using a counterfactual similar to that on labor force participation. Deficits were substantial at the start of the pandemic for all women, even those without young children. But they were, as before, especially large for non-college graduate women, often double those of the college graduate group. The college graduate group managed to make up considerable ground across the pandemic whereas others often lost ground (as occurred for the 0 to 4 year old group) or made little headway (as for the 14 to 17 year old group).

For the most recent months, college graduate women with children had an employment deficit relative to 2018 of only around -1 pp, but the non-college group with

[40] Garcia and Cowan (2022) finds that school closures had little impact on whether parents worked at all but did impact the intensive margin among the lower-educated parents.

children had a deficit around -5 pp. For much of the pandemic period, however, even the non-college group without residential children had about the same employment deficits as those with young and school-aged children.[41] But by fall 2021, the group without residential children (or with those older than 17 years) had largely returned to work, whereas non-college graduate women with younger children continued to lag.

Some of the lag in the "at work" numbers can be seen in the continued high unemployment rates for the lesser educated group. Among women 25 to 34 years old without a college degree, 6.9% were still unemployed in fall 2021. Even though that is substantially lower than the 10.2% number they experienced in fall 2020, it is higher than the 5.6% figure from fall 2018.

An important point for both college and non-college women is that even women without residential children fared poorly for much of the pandemic and that was particularly true for lower-educated women through winter 2020. But like the previous analysis, the big divide in employment recovery was less about children and more about education and the ability of women to have jobs that were protected in more ways than one. I will unpack this further in the next section.

5. Putting it all together: What were the separate impacts of children, education, occupation, race, and marital status on employment transitions before, at the inception of, and during the pandemic?

To explore the joint roles of the various forces already discussed, such as parenthood, occupations, education, and race, in the pandemic period, I created an additional extract using the longitudinal feature of the monthly CPS. The data track individuals from exactly one year to the next for the same month. The age group used is 20 to 54 years old to include more women with young children.

Due to the panel structure of the CPS in which individuals are interviewed for four consecutive months and an additional four months after an eight-month hiatus (the 4-8-4 structure), the individuals in the extract would have been interviewed in month 1 in year t and month 5 in year (t + 1), or month 2 in year t and month 6 in year (t + 1), and so forth using CPS-month notation. In creating the data set in this fashion, I observe the same individual in the same month but a year later. Some will traverse the period before the pandemic, some will begin before the pandemic but be interviewed again after it began, and others will have data from within the pandemic period. These are the data that were used in Table 3 on changes in hours of work.

[41] I use the term "residential" children rather than "dependent" children, because they are identified as the child of a mother or father because they are living in the household.

The full period I explore begins in January 2018 and extends to November 2021. There are three possible pandemic phases:

(1) Within the pre-pandemic period, that is pre-pandemic to pre-pandemic (termed pre-pre; 43% of observations), with t from January 2018 to February 2019, so that an individual can be tracked across January 2019 to February 2020, (t + 1), just before the pandemic began;

(2) Pre-pandemic to pandemic, with t from March 2019 to February 2020, so that an individual can be tracked from March 2020 to February 2021, (t +1), all beginning before the pandemic and ending during the pandemic (termed pre-pan; 35% of observations);

(3) Within the pandemic period, with t from March 2020 to November 2020, so that an individual can be tracked from March 2021 to November 2021, (t + 1), all occurring during the pandemic (termed pan-pan; 23% of observations). The last year, month of the data used is November 2021.

The resulting extract produces the dependent variable in eq. (1), $\Delta y_{i,t}^{m}$ which is the change in either "at work" or labor force participation for individual i in month m for year t relative to the same month a year later in (t + 1). It is defined here as a (1, 0) variable for which the individual is either (in, in) = 1 or (in, out) = 0. Thus, I restrict the sample to begin with individuals "at work" or in the labor force. I will discuss only the "at work" results since those on the labor force are similar in kind and smaller in magnitude. The setup ensures that information on the individual's prior occupation is available even if the person exited employment or the labor force by (t + 1).

The variables included in eq. (1) are all indicator variables and are intended to gauge the separate strength over the pandemic periods of a set of variables that covary, such as education, race, parental status, age, and occupation:

$$
\begin{aligned}
(y_{i,t}^{m} - y_{i,t+1}^{m}) = {} & \Delta y_{i,t}^{m} \\
& = \alpha + \sum_{\varphi = 1}^{2} [\beta \times I(\varphi)] + \gamma I^{i,t}(C) + \delta I^{i}(E) + \theta I^{i,t}(O) + \rho I^{i}(R) + \mu I^{i,t}(M) \\
& + \eta I^{i}(X) + \lambda + \kappa + \epsilon_{i,t} \qquad eq. (1)
\end{aligned}
$$

The value of β gives the role of each of the pandemic phases (φ) relative to the pre-pre group. Main effects are given by indicators for youngest child's age in five bins (C), where no residential children (grouped with residential children older than 29 years) is omitted; an indicator for college graduate (E); an indicator for pandemic-impacted occupations (O) mainly in the service sector and defined in Online Appendix Note 1; indicators for Black and Hispanic (R); and an indicator for unmarried or unpartnered (M).

All main effects (C, E, O, R, M) are interacted with the two pandemic phases pre-pan and pan-pan, as is the interaction between marital status and a youngest child less than five years. X is a set of indicators for the individual's age in five-year bins, λ is a set of year dummies, and κ are season dummies, defined in the table notes. (Online Appendix Table 1 provides summary statistics.)

The regression in Table 2 includes only women, although a pooled regression is later discussed. Col. (1) of Table 2 contains the main effects and an interaction of the pandemic phases with "college graduate." The interaction with college graduate reinforces the results from the cross-section data (discussed above) showing that more-educated women were substantially inoculated from job loss. The shift into the pandemic (pre-pan) decreased the fraction at work among all women by -0.104, but college graduate women experienced less than half that reduction (-0.104 + 0.0589).

Interactions of the pandemic phases with the age of the youngest child are added in col. (2). Relative to the omitted group, only those with the youngest and high school-aged children have an additional impact from the shift into the pandemic. The finding that children have little added impact as the pandemic spread should not be too surprising given that women with no residential children (either no children or no younger children at home) had as large or larger employment shortfalls throughout the pandemic, with the exception of the most recent months (see Figure 6). Although this finding is strongest for the less educated, it also holds for the college graduates. All women were greatly impacted by the pandemic.

Col. (3) adds interactions with the two race and ethnic groups and also with a set of occupations and industries, called "service," that were often shut down at the start of the pandemic and have continued to be greatly impacted. About 18% of all employed women in the pre-pre sample (2018 and early 2019) were in these occupations, 27% of the non-college graduate group were, and 33% of Black non-college graduate women were. These were important occupations especially for the less-educated women and for Black women, in particular.

Women in these service occupations and industries have always experienced greater employment instability, as can be seen in the main effect. But they experienced an even greater negative shock in the transition to the pandemic. Similarly, Black and Hispanic women have always experienced larger instability of employment than white women, but the change going into the pandemic was an additional effect, separate from having been employed in one of the more-impacted occupations, having children of various ages, and so forth.[42] Col. (4) adds interactions with the variable "no spouse," for which the interactions identify being a single mother. The sign and magnitude demonstrate that a reason the youngest children had a large impact was because many had single moms.

The main takeaways are illustrated in Figure 7. The descent into the pandemic period greatly impacted all women and the fraction "at work" fell by -7.2 pp, although college graduate women were partly protected and cushioned the fall by 4 pp. Having a youngest child less than five years produced a negative impact of -2.1 pp and having the youngest be 5 to 13 years old reduced "at work" by -1 pp. The largest changes were experienced by those who began in one of the occupations I have termed "service," as they suffered an additional decline of -7.9 pp.[43] Given all the included variables, Black women experienced yet an additional -2.4 pp and Hispanic women a -1 pp decline.[44]

There is little additional effect during the pandemic period (pan-pan) among those who began that phase "at work." All women (using col. 3) had a decrease of -4.3 pp, there was no added cushion for the college graduates. Workers in the "service" occupations had an additional -1.6 pp decrease in "at work."

The US Census Household Pulse Survey data provide complementary evidence about why Black women were impacted by the pandemic recession beyond the variables included in the regression. The data demonstrate that the health of Black women and of those in their households were key factors.[45] Respondents were asked the most important reason they were not employed. Black women, 25 to 44 years old with children younger than 18 years, were far less likely than similar white women to say they could not work because they were caring for children. But they were more likely to have been laid off or furloughed, and far more likely to have said they were sick with COVID or caring for someone who was as reasons for non-employment.

Among those without children younger than 18 years, 34% of Black women were either ill (with COVID or another ailment), caring for someone, or feared getting ill at work, whereas 22% of white women gave these reasons. The data for surveys from Dec. 2021 to Jan. 2022 reveal the damage Omicron has done, especially in the Black community. Among

[42] I also ran a version (not shown) with the race variables but not the occupation variable and then compared with (col. 3), showing that race and occupation are orthogonal in this analysis.
[43] Including a full set of two-digit occupation dummies does not reduce the protective role of being a college graduate in the pre-pan phase.
[44] Prado (2021) also finds that occupation was more important than children in mother's employment.
[45] The US Census Household Pulse Survey data were designed to provide rapid evidence on the impact of COVID on individuals. The micro-data are used in this paragraph for Sept. 29 to Oct. 11, 2021 and Dec. 29, 2021 to Jan. 10, 2022. See https://www.census.gov/programs-surveys/household-pulse-survey/datasets.html.

25 to 44 year old women, 10% of white women, but 20% of Black women, said that COVID had kept them out of work.

This paper began with the finding that the "at work" and labor force rates for men and women were about equally impacted in absolute value during the pandemic and that the largest differences were by education. I also noted that the impact of having a youngest child at particular ages varied by season and year of the pandemic and that race was an additional factor.

Combining men and women in an analysis similar to that from eq. (1) with the full range of interactions does not add much to the discussion from the previous analysis, which used data from repeated cross sections (results are given in Online Appendix Table 2). Both men and women had a decline of -6.1 pp in the fraction "at work" going into the pandemic. Given the covariates, women had an additional decrease in their fraction "at work" of -1.4 pp but women with a college degree were 1.4 pp less impacted than similar men (all college graduates experienced a 2.6 pp boost). Thus, lower-educated women were the ones who did less well than their equivalently-educated male counterparts. Differences by race and ethnicity were substantial in the pandemic phase, but differences by gender do not reveal much in addition. The same is true for the "service" occupations. Figure 8 summarizes the results.

What about the role of children? Women with children 0 to 4 years were -2.7 pp more impacted in the pre- to pandemic phase than were men with residential children in those ages, and those with 5- to 13-year-olds were -1.9 pp more.[46]

An additional word must be said about which men are in the comparison group. Many who have contributed to the literature on the impact of the pandemic have looked at differences between men and women by the age of their youngest residential child. The list of papers is long, yet few have recognized that the CPS does not identify fathers. Men (and women) who do not reside with children may still have and care for children. In fact, according to the US Census more than 30% of all children younger than 18 years who reside with a woman (generally their mother) do not live with their father.[47] But their fathers live somewhere. Thus men without children in their household are often fathers, albeit non-custodial ones.

In discussing results from estimations that use child ages and interactions with gender, one must identify the individuals as residential parents or guardians. As such, the

[46] Couch, Fairlie, and Xu (2022) find a similar effect for the 0 to 4 year olds.

[47] See https://www.census.gov/library/stories/2021/04/number-of-children-living-only-with-their-mothers-has-doubled-in-past-50-years.html, which gives the fraction of children living with one parent.

comparison is not to those without children, but rather to those without residential children. The findings are that women with a youngest child less than five had reduced "at work" rates in the year they went into the pandemic relative to men with residential children less than five. Similarly for those with the youngest five to 13 years, although the effects are considerably smaller.

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The pandemic was "she-cession" relative to other recessions and relative to the January (or February) 2020 figure. But gender differences month by month in employment outcomes, relative to pre-pandemic level, are not large. The big differences are by education rather than gender, and that makes it more similar to previous recessions.

Mothers greatly increased their time spent in childcare during the pandemic, but custodial fathers did as well. Female labor force participation in the US did not plummet to its lowest level since the last 1980s. It had been low for some time relative to growth seen during the period in comparable nations. With the exception of older women, the female labor force participation rate in the US has not increased in three decades. It decreased during the pandemic, but actually by less than it did for men.

Far more mothers, and other women who are caregivers, have been stressed, frustrated, and anxious because they did *not* leave their jobs than have been forced to exit the workforce or cut back on their hours. Black women who were not college graduates were hardest hit in terms of their employment and labor force participation.

As noted earlier, the fraction who had decreased hours in the pre- to pandemic phase is larger than in the other phases. But it is not much larger and a substantial group increased their hours. In addition, the fraction with decreased hours was generally a bit smaller, not larger, for the group with children. Changes in the intensive margin were not substantial going into the pandemic (starting pre-pandemic and ending in the pandemic) relative to equivalent changes in a more normal period (ending pre-pandemic).

What accounts for the excessive statements in the popular press, even from veteran writers who know the territory well? One reason is that individual experiences reported in the news are those containing the most adversity. Another is that surveys (such as that done by McKinsey-LeanIn) captured the stresses and frustrations of the moment.

It is precisely the mothers who did not drop out, who expressed the greatest anxieties about their future careers. Because these women still had jobs, they worried about their current productivity and whether they could do enough to merit the raise or promotion, make partner or tenure.[48] They have been torn between being a good parent and doing their own jobs, an issue that predated the pandemic but has been magnified. Finally, the CPS—the primary data source that I and many others have used—reveals nothing about what individuals do with their time spent not at work and their mental wellbeing.[49]

Looking Ahead

There is the possibility that we will emerge on the other side of darkness with benefits. The cost of workplace flexibility will probably fall as workers, firms, managers, clients, and customers use what they have learned during lockdown to work more effectively as we open up.[50] If a contract can be signed without the expensive trip to Tokyo or Beijing, parents of young children will benefit from less travel time, and firms will profit from lower costs. Given the current division of household labor, mothers will reap the greatest returns and will be able to take on the more lucrative positions that once required considerable time away from home and were outside the realm of possibility for many.

Work-at-home, Zoom meetings, telemedicine, teletherapy, tele-workouts, and tele-everything may have taught us how to work efficiently without travel, overnight stays, and in-person meetings. A reduction in the cost of temporal and geographic flexibility may be part of a silver lining to the pandemic for women.

Surveys from late spring 2021 found that the majority of workers did not want to return to the office and job site five days a week and would rather continue working at home one or two days.[51] The most recent Gallup poll found that just 9% of workers want to return in person full time and the majority (54%) would like a hybrid model (of course,

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[48] Deryugina et al. (2021) surveyed academics from May to July 2020 and showed that research time decreased for all parents, but more for mothers. Flaherty (2020) used Elsevier journal data for the early pandemic months showing that publications of women generally lagged those of men.
[49] Zamarro and Prados (2021) use the Dornsife data on household division of labor and mental health measures among parents.
[50] "Flexibility" is a multi-dimensional concept that involves both temporal and geographic flexibility. It often means the ability for workers to control their hours in terms of the number and the moment in time. It can also mean the ability of employees to work from home as well as in a different geographic place than that of the workplace.
[51] Barrero, Bloom, and Davis (2021), using survey data, estimate that 20% of full workdays will be WFH after the pandemic ends, whereas 5% were before. They also estimate productivity boosts that will show up in conventional productivity measures, and that there will also be cost savings from less commuting that will not. Bloom et al. (2015) measure productivity increases from telecommuting. Emanuel and Harrington (2021) demonstrate negative selection to telework but also productivity boosts given negative selection. Both papers concern call centers, which generally do not have enhanced productivity and creativity from group interactions.

these are workers who can work remotely).[52] The BLS, in February 2022, reported that of the 34.5% of establishments that increased telework for some or all employees, 60.2% expected to maintain increased telework when the pandemic recedes.[53] The Survey of Working Arrangements and Attitudes found, as of January 2022, that workers who could work from home believed their employer will have them work remotely around two days a week after the pandemic ends.[54] That should be a plus for those with caregiving demands.

Many corporate leaders have been bullish on workplace flexibility. Last year's headlines on the subject were almost universally positive.[55] More recent headlines show less certainty and concern over productivity and fairness in a workplace that will be fractured by time and space. Flexibility is multidimensional, involving geography and time. Workers not only want to work in different cities and at home; above all, they want to work "their" hours.[56]

We are two years into the pandemic, and we do not yet know how it will play out for women. If, in the "new normal," men go to the office five days a week and women go to the office three days a week and work from home two days, women won't be part-timers in terms of hours, but they will be part-timers in terms of face-time and colleague-time in the office. Women will do the client-facing meetings on Zoom, and men will go to Zürich to close the deal. The work enclave may be useful in the short run, but, like its part-time hours equivalent, it may not come with the same bonuses, pay increases, and promotions.

Until more workers take advantage of work flexibility in all its forms, women who take the amenity could pay a career price in the long run. They may not lose as much as when they worked part-time, and they may not lose as much as when they changed jobs and firms to enhance their work flexibility. All depends on whether the pandemic will soften the greediness of work by making flexible jobs more productive, reducing the premium from the greedier jobs, and lowering the penalty from the more flexible ones.[57]

In addition, the gains to women from added flexibility will depend on keeping schools and daycares open. Even among the fortunate who could work from home during the worst of the pandemic, productivity appears to have been related to their parental

52 Cited in *Forbes* (Feb. 4, 2022) but the Gallup Panel was for May/June 2021.
53 See BLS release (Feb. 9, 2022), https://www.bls.gov/news.release/covid2.nr0.htm
54 Barrero, Bloom, and Davis (2021) and https://wfhresearch.com for the most recent data.
55 "Flexibility: Every corporation's most important strength … no longer a novel concept" (*Forbes*, March 1, 2021); "How the pandemic changed us: Our fastest rising priority is job flexibility" *LinkedIn News*, April 14, 2021); "There are early signs that remote work can help level the playing field" (McKinsey-LeanIn, *2020 Women in the Workplace*).
56 Katherine Bindley and Chip Cutter, "Workers Care More About Flexible Hours Than Remote Work," *Wall Street Journal* (Jan. 25, 2022).
57 For more on "greedy work" and a historical perspective, see Goldin (2021b).

status. Recent studies, cited previously, have shown that mothers with academic jobs issued fewer working papers during the pandemic and published fewer journal articles than did fathers with academic jobs and female colleagues without school-aged children. But the worst hit women in terms of health concerns and job security have been those who could not work from home. They disproportionately served others in hospitals and grocery stores, had incomes and education levels that were low, and had children with the least access to remote learning technology. They won't gain as much from the "new normal."

We know considerably more about what happened to workers and in workplaces during the past two years. We still know little about what will happen and what the shape of the "new normal" will be for women.

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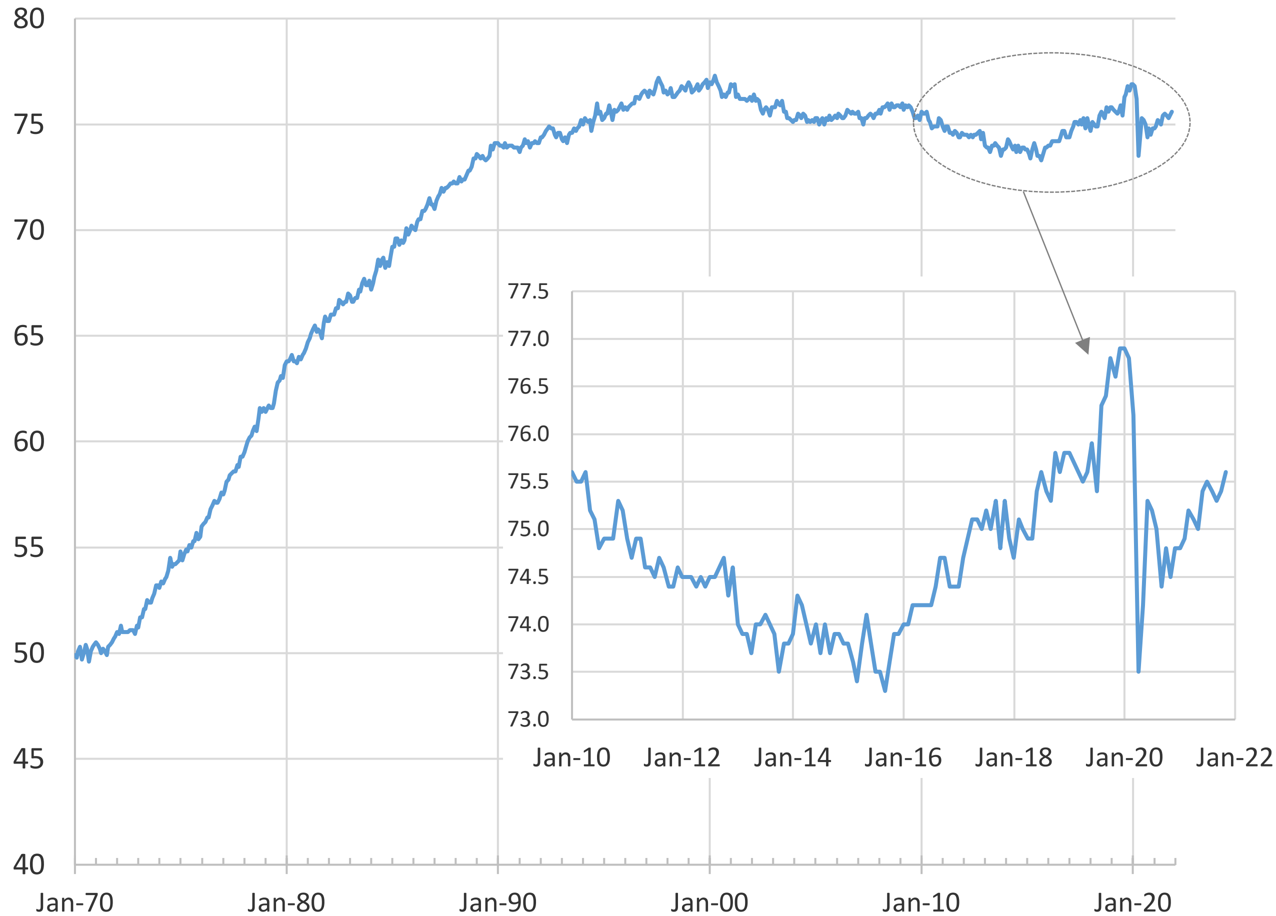
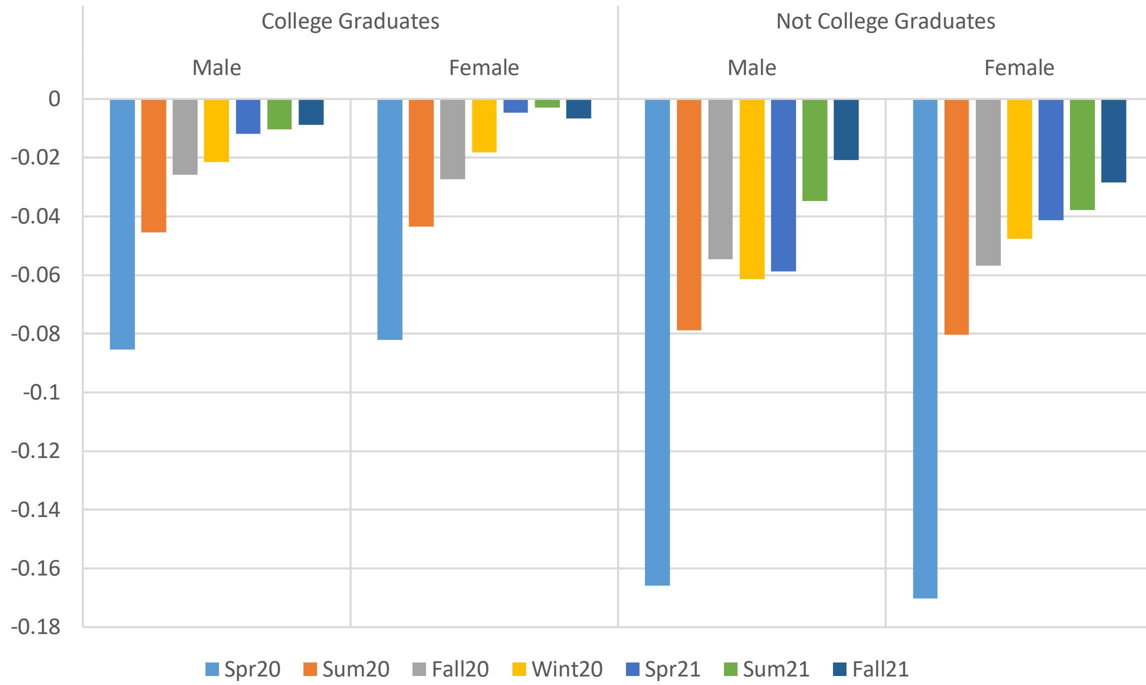
Figure 1: Female Labor Force Participation Rate, 25 to 54 Years Old, Jan. 1970 to Nov. 2021: Monthly, Seasonally Adjusted



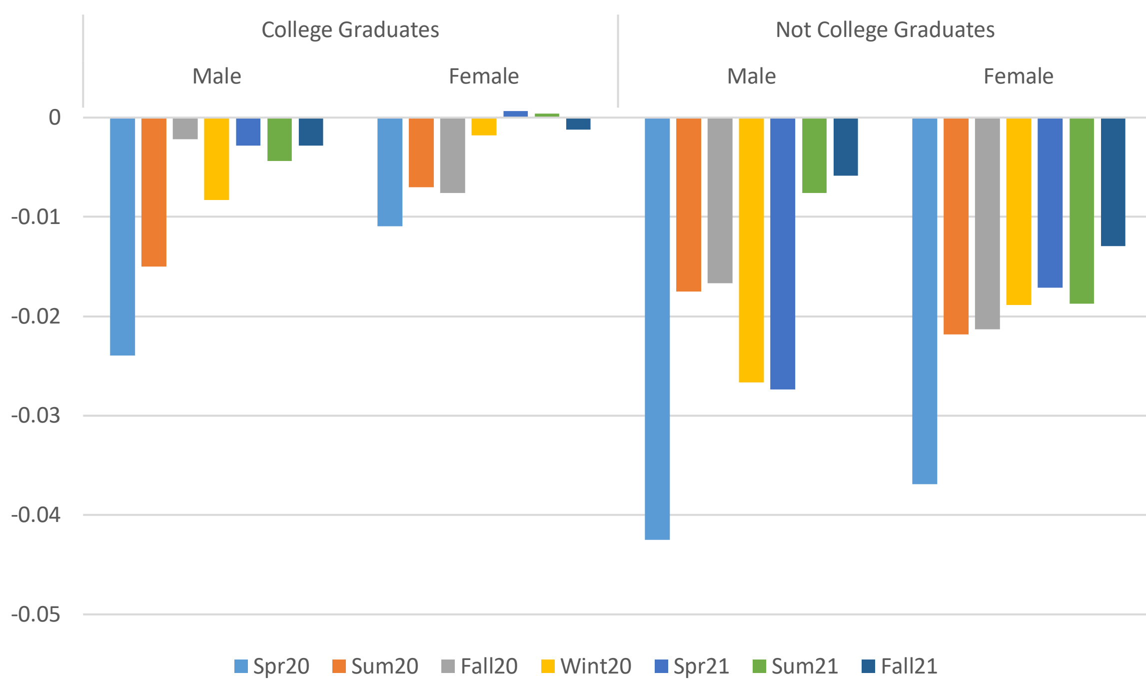
Source: BLS.gov, series id: LNS11300062, seasonally adjusted, civilian labor force participation rate, 25 to 54 years, women.

Figure 2: “At Work” and Labor Force Changes (Season 2020/21 – Season 2018/19) for 20 to 54 Years Old: By Education Level and Sex

Part A: “At Work” Changes



Part B: Labor Force Participation Rate Changes



Source: CPS Monthly from IPUMS.org.

Notes: The value given, for "at work" and the labor force participation rate, differences from the same season in 2018. Seasons are defined as spring (March-May), summer (June-August), fall (September-November), winter (December 2018 to February 2019). But spring 2020 excludes March 2020 and so does the comparison season in 2018.

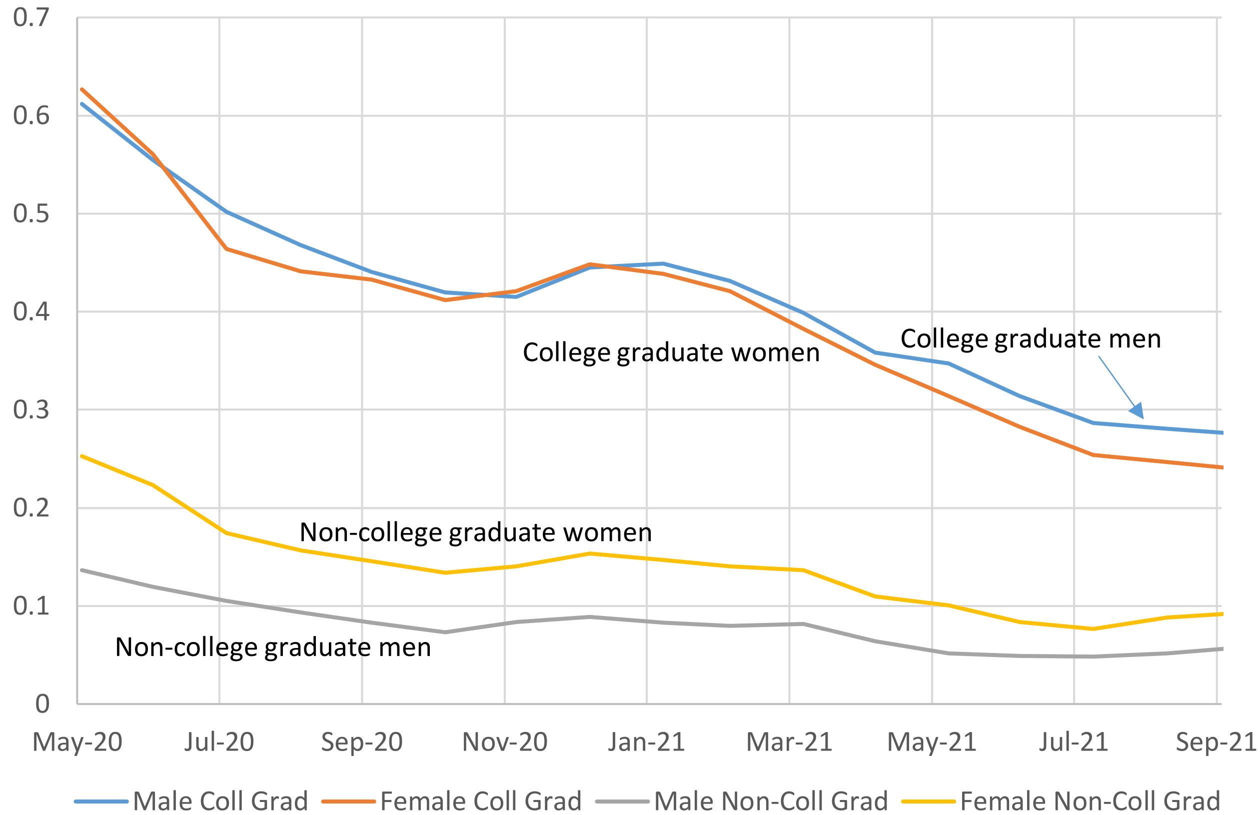
"At work" excludes individuals who stated that they had a job but were not at work that week. That category is often high during the summer when many workers take vacation and it could also indicate a parental or medical leave But at the outset of the recession it was a work status given by many who were furloughed.

The base numbers for "at work" in 2018 are:

	College Graduate		Not College Graduate	
Season: Months/Year	Male	Female	Male	Female
Spring I: April-May 2018	0.9025	0.7924	0.7837	0.6420
Spring II: March-May 2018	0.8985	0.7886	0.7811	0.6366
Summer: June-August 2018	0.8708	0.7356	0.7771	0.6317
Fall: September-November 2018	0.8961	0.7981	0.7824	0.6487
Winter: December 2018-Feb. 2019	0.8962	0.7979	0.7725	0.6400

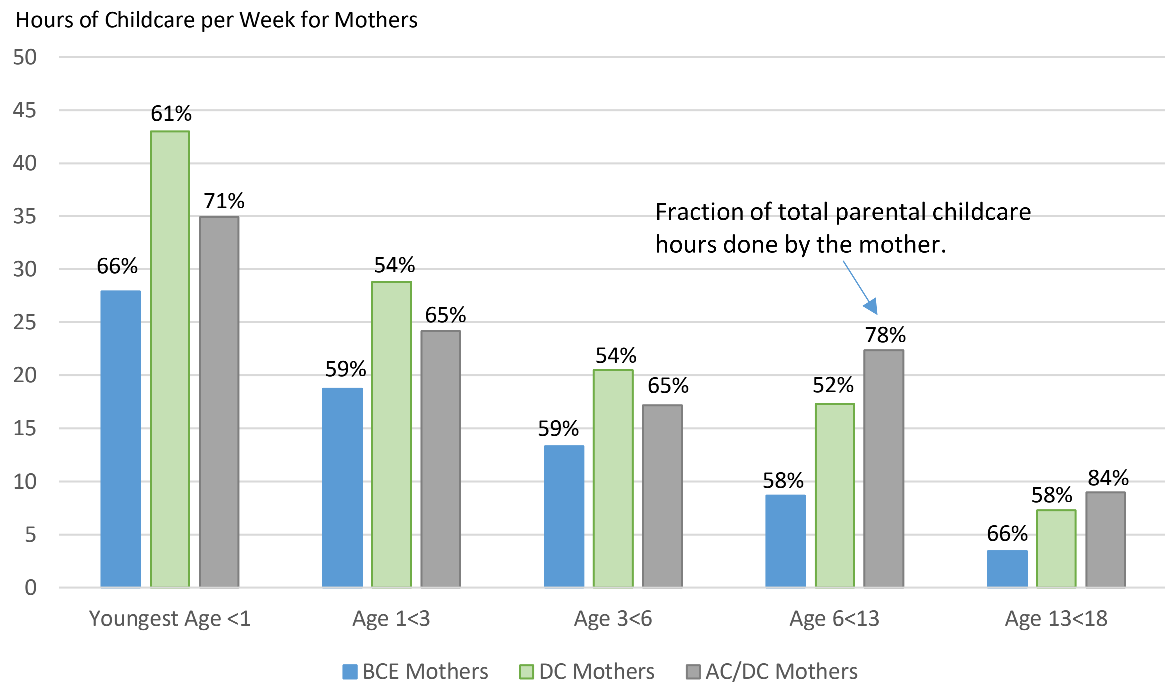
Note: Spring I is for the comparison with 2020 when March is excluded and Spring II is for the comparison with 2021when March is included.

Figure 3: Fraction of Employed Men and Women Who Worked Remotely, May 2020 to September 2021: 25 to 54 Years Old by Education



Source and Notes: CPS Monthly Surveys. The full question, asked since May 2020, is: "At any time in the last 4 weeks, did you telework or work at home for pay because of the coronavirus pandemic?" (The question was asked of people 16 years or older who were employed at the time of the survey.) The data were available in the IPUMS to September 2021. See Online Appendix Figure 2 for the full series by education level for men and women combined from BLS tabulations from May 2020 to January 2022.

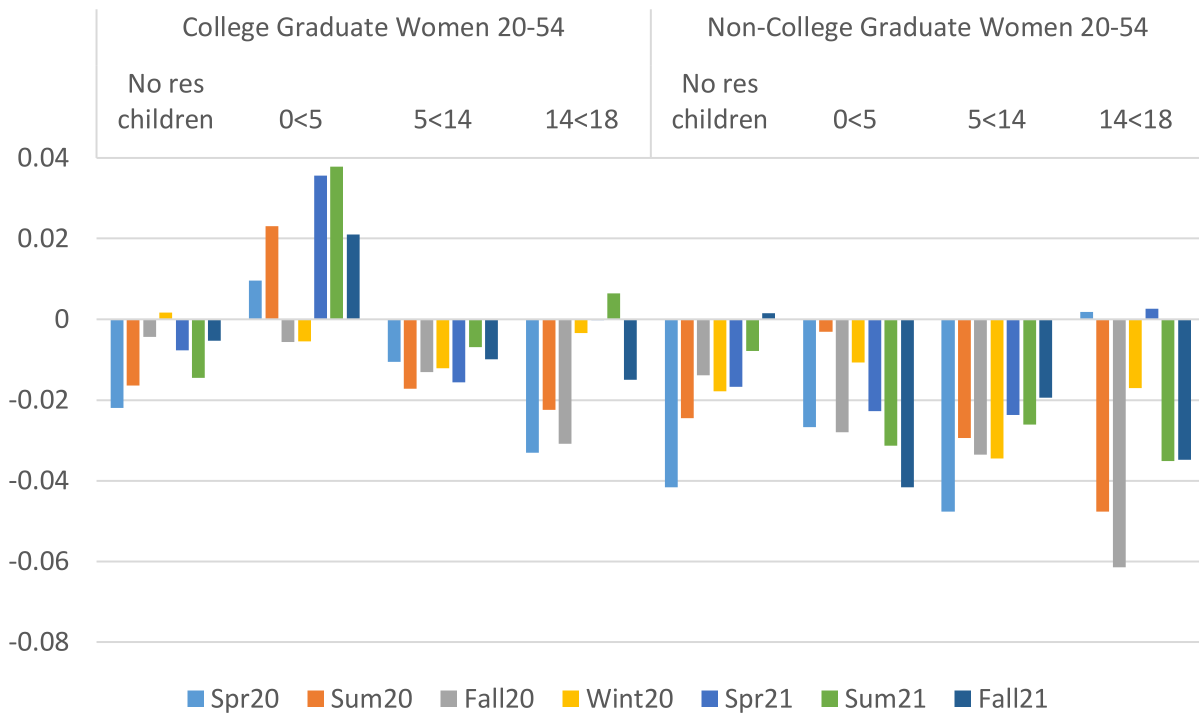
Figure 4: Childcare Hours of College-Graduate, Employed Women with College-Graduate Employed Husbands, by the Age of Their Youngest Child



Sources: BCE Mothers: ATUS, 2010-2019; DC: Andrew, et al. (2020).

Notes: BCE = Before COVID Era; DC = During COVID; AC/DC = After COVID and During COVID. BCE hours come from a sample of women in the ATUS who were currently employed, college graduates with at least one child less than 18 years old and a husband who was also a college graduate and currently employed. Daily childcare amounts are multiplied by seven. Childcare includes all types of care including educational. All days of the week are included. Numbers above the bars are the fraction of total parental childcare hours provided by the mother. DC hours are estimated by increasing BCE hours by 1.54 for mothers and 1.9 for fathers, which are the ratios from Andrew et al. (2020) and then adding four additional hours per week (per parent) when the youngest child is age 6<13 and two hours when the youngest is 13<18. AC/DC hours for the couple are an average of BCE and DC hours, but fathers are given only BCE childcare hours under the assumption that they are back at work full-time. Mothers are assumed to be doing the rest of the childcare. The average is one-quarter the difference between BCE and DC hours for children <6 years, but three-quarters for those 6<18 years.

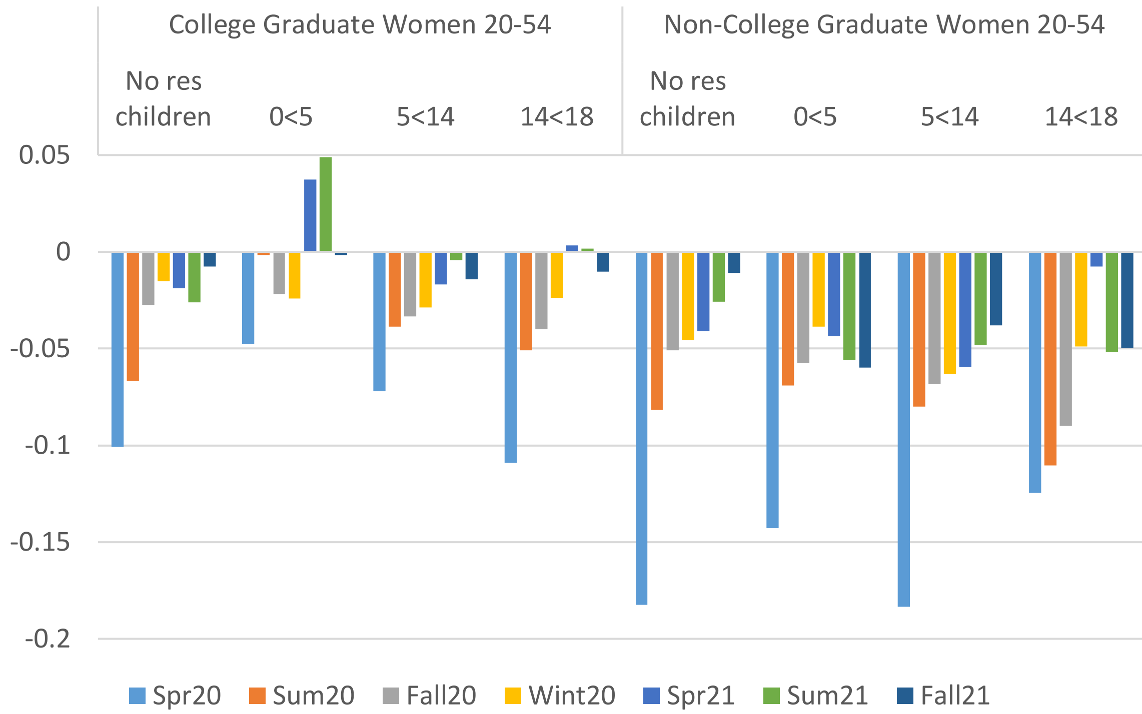
Figure 5: Labor Force Participation Changes (Season 2020/21 – Season 2018/19) for Females 20 to 54 Years Old: By Education Level and Age of Youngest Child



Source: CPS Monthly, IPUMS.

Notes: Months included in each season are given in Figure 2. "Res children" refers to residential children less than 30 years old. A woman with no residential children could have children. Information for women with residential children 18 to 29 years was omitted from the figure.

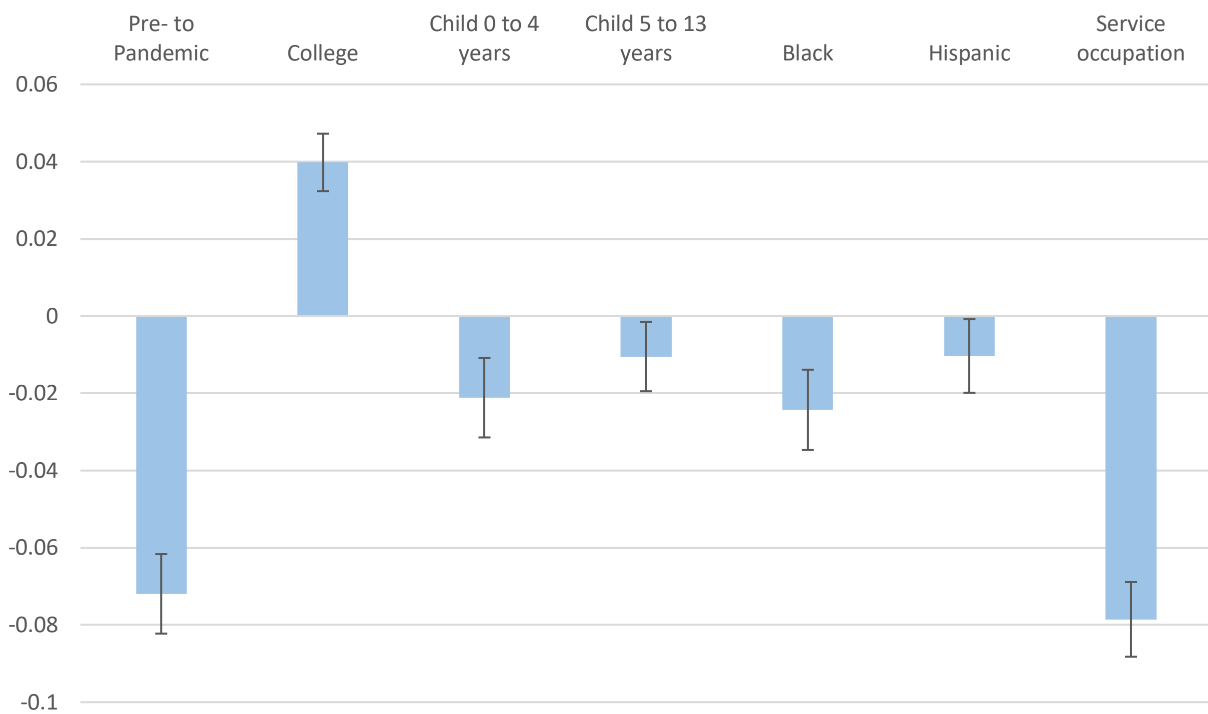
Figure 6: "At Work" Changes (Season 2020/21 – Season 2018/19) for Females 20 to 54 Years Old: By Education Level and Age of Youngest Child



Source: CPS Monthly, IPUMS.

Notes: Months included in each season are given in Figure 2. "Res children" refers to residential children less than 30 years old. A woman with no residential children could have children. Information for women with residential children 18 to 29 years was omitted from the figure.

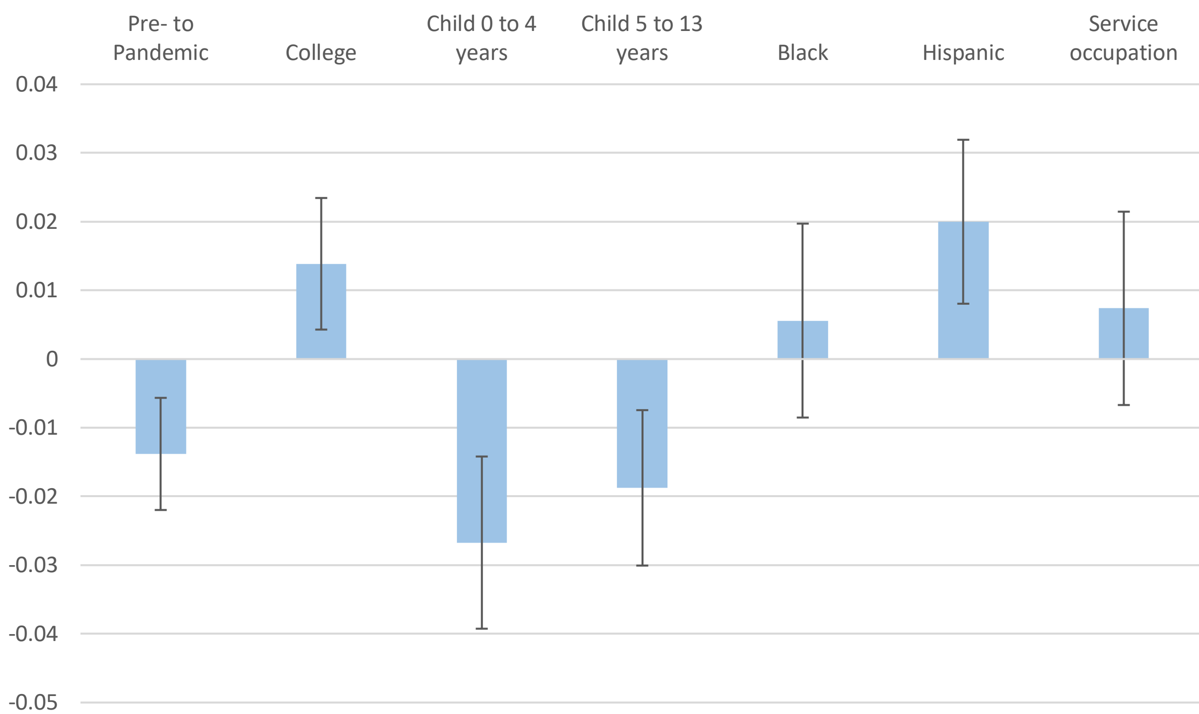
Figure 7: Impact of the Pandemic on "At Work" Rates of Women 20 to 54 Years Old by Education, Child Ages, Race, and Occupation



Source: Table 2, col. (3). 95% confidence intervals are shown.

Notes: "Pre-pandemic" refers to those employed from March 2019 to February 2020 and the shift to "pandemic" refers to whether these individuals remained "at work" or not a year later (March 2020 to February 2021). All bars indicate the strength of the interaction of the variable listed with the pre- to pandemic period indicator, given as the main effect in the first bar. Child variables refer to the age of the youngest child in the household. "Service occupation" are a group of occupations, as well as some in industries, that were generally closed down or limited at the start of the pandemic. Since all individuals were employed at the start of the period considered, the occupation refers to that in the pre-pandemic period.

Figure 8: Impact of the Pandemic on "At Work" Rates of Women Relative to Men 20 to 54 Years Old by Education, Child Ages, Race, and Occupation



Source: Online Appendix Table 2, col. (3). 95% confidence intervals are shown.

Notes: The coefficient is the interaction of gender with the variable given and the pandemic phase, "Pre- to Pandemic." See Table 2 or Figure 7 for pandemic phase definitions.

Table 1: Characteristics of Women Who Entered the Labor Force in the Year before the Pandemic versus Those Always In

	Women 20 to 54 Years	
	Group 1 Entered the Labor Force (from Apr. 2019 to Feb. 2020 and remained in to March 2020)	Group 2 Always in the Labor Force (when observed from Apr. 2019 to Feb. 2020)
College graduates	0.326	0.452
With no children	0.518	0.478
With children 0 < 5 years	0.198	0.154
With children 5 < 14 years	0.166	0.216
Ages 20 to 29	0.401	0.287
Left labor force March 2020 to last month observed	0.427	0.120
Number of observations	1,045	21,534

Source: CPS Linked Monthly Sample. See Online Appendix Note 2 for details on the construction.

Notes: Given the design, the initial interview could have occurred from April 2019 to January 2020 and the last interview from July 2020 to April 2021. As an example, consider an individual who began her CPS interviews (month 1) in May 2019 when she was out of the labor force. In July (month 3) she entered the labor force and remained in for August (month 4). We see her again eight months later in May 2020 (her month 5) during the pandemic and she would remain in the rotation until August 2020. She would be included in Group 1 because she began out of the labor force but entered before the pandemic. She can then be observed after the pandemic. Group 2 women are always observed in the labor force in the pre-pandemic period.

Table 2: Annual Changes in "At Work" for Women 20 to 54 Years, Jan. 2018 to Nov. 2021

	Women 20 to 54 Years, at Work in Year t, Month m Dependent variable: Change in at Work from Year t, Month m to Year $(t+1)$, Month m (0, 1)			
	(1)	(2)	(3)	(4)
Respondent's age				
20 to 24	-0.0788***	-0.0788***	-0.0787***	-0.0849***
	(-23.21)	(-23.23)	(-23.19)	(-24.37)
25 to 29	-0.0182***	-0.0182***	-0.0180***	-0.0219***
	(-5.92)	(-5.91)	(-5.86)	(-7.04)
30 to 34	-0.0154***	-0.0153***	-0.0152***	-0.0180***
	(-5.02)	(-4.99)	(-4.97)	(-5.86)
35 to 39	0.00991**	0.0100***	0.0104***	0.00775*
	(3.28)	(3.32)	(3.43)	(2.55)
40 to 44	0.00887**	0.00895**	0.00941**	0.00798**
	(3.02)	(3.05)	(3.21)	(2.72)
45 to 49	0.00935***	0.00944***	0.00968***	0.00915**
	(3.34)	(3.37)	(3.46)	(3.27)
Youngest child's age				
0 to 4 years	-0.0277***	-0.0194***	-0.0197***	-0.0137***
	(-11.40)	(-5.37)	(-5.46)	(-3.65)
5 to 13 years	-0.00870***	-0.00631*	-0.00547	-0.00141
	(-3.94)	(-1.97)	(-1.71)	(-0.43)
14 to 17 years	0.00815**	0.000809	0.00215	0.00551
	(2.67)	(0.18)	(0.48)	(1.20)
18 to 29 years	0.00654*	0.00533	0.00721	0.00984*
	(2.05)	(1.14)	(1.55)	(2.09)
College graduate	0.0173***	0.0169***	0.0242***	0.0256***
	(6.98)	(6.80)	(9.43)	(9.92)
Black	-0.0205***	-0.0205***	-0.00920*	-0.0129***
	(-8.77)	(-8.76)	(-2.56)	(-3.54)
Hispanic	-0.0311***	-0.0311***	-0.0298***	-0.0309***
	(-14.61)	(-14.61)	(-9.23)	(-9.56)
Service occupation	-0.0562***	-0.0562***	-0.0253***	-0.0263***
	(-25.45)	(-25.46)	(-7.71)	(-7.98)
Start year is 2018	-0.0298***	-0.0298***	-0.0298***	-0.0298***
	(-4.69)	(-4.69)	(-4.69)	(-4.69)
Start year is 2019	-0.0334***	-0.0335***	-0.0333***	-0.0334***
	(-8.05)	(-8.06)	(-8.03)	(-8.05)
Spring	-0.0185***	-0.0186***	-0.0186***	-0.0186***
	(-6.64)	(-6.65)	(-6.67)	(-6.68)
Summer	-0.0236***	-0.0236***	-0.0237***	-0.0239***
	(-8.39)	(-8.38)	(-8.44)	(-8.51)
Fall	0.00825**	0.00826**	0.00828**	0.00819**
	(2.98)	(2.98)	(2.99)	(2.96)
Pre-pandemic to Pandemic	-0.103***	-0.0994***	-0.0719***	-0.0714***
	(-23.14)	(-20.34)	(-13.70)	(-12.21)

Pandemic to Pandemic	-0.0463***	-0.0480***	-0.0425***	-0.0418***
	(-6.47)	(-6.42)	(-5.47)	(-5.02)
Pre- to Pan × College	0.0576***	0.0582***	0.0398***	0.0385***
	(16.10)	(16.22)	(10.49)	(10.08)
Pan to Pan × College	0.00925*	0.00973*	0.00633	0.00512
	(2.28)	(2.39)	(1.48)	(1.19)
Pre- to Pan × 0<5		-0.0218***	-0.0211***	-0.0130*
		(-4.15)	(-4.01)	(-2.14)
Pan to Pan × 0<5		-0.00374	-0.00365	0.00356
		(-0.63)	(-0.61)	(0.52)
Pre- to Pan × 5<13		-0.00859	-0.0105*	-0.0103*
		(-1.87)	(-2.28)	(-2.14)
Pan to Pan × 5<13		0.00237	0.00142	0.00143
		(0.45)	(0.27)	(0.26)
Pre- to Pan × 14<18		0.0141*	0.0107	0.0104
		(2.15)	(1.64)	(1.56)
Pan to Pan × 14<18		0.0107	0.00950	0.00918
		(1.42)	(1.27)	(1.20)
Pre- to Pan × 18<30		-0.00174	-0.00419	-0.00458
		(-0.26)	(-0.62)	(-0.66)
Pan to Pan × 18<30		0.00789	0.00647	0.00595
		(1.03)	(0.85)	(0.77)
Pre- to Pan × Black			-0.0243***	-0.0229***
			(-4.57)	(-4.24)
Pan to Pan × Black			-0.0133*	-0.0118
			(-2.16)	(-1.89)
Pre- to Pan × Hispanic			-0.0103*	-0.00969*
			(-2.13)	(-1.99)
Pan to Pan × Hispanic			0.00859	0.00920
			(1.55)	(1.66)
Pre- to Pan × Service occupation			-0.0786***	-0.0781***
			(-15.92)	(-15.79)
Pan to Pan × Service occupation			-0.0164**	-0.0155**
			(-2.79)	(-2.64)
No spouse				0.0147***
				(3.78)
Pre- to Pan × No spouse				0.000470
				(0.09)
Pan to Pan × No spouse				0.000856
				(0.18)
Pre- to Pan × No spouse × 0<5				-0.0304***
				(-3.70)
Pan to Pan × No spouse × 0<5				-0.0311**
				(-2.95)
Constant	0.963***	0.962***	0.951***	0.944***
	(166.22)	(163.60)	(159.65)	(153.71)
Number of observations	174,226	174,226	174,226	174,226

* p<0.05, ** p<0.01, *** p<0.001

Source: Linked monthly CPS. See Online Appendix Note 3 for details of the construction.

Notes: Dependent variable is (0, 1) and indicates whether a respondent who was "at work" in year t, month m was also "at work" in the same month in year (t + 1). All observations begin "at work." The period is divided into three phases: (1) Before pandemic (beginning January 2018 to February 2019); (2) Pre-pandemic to pandemic (beginning March 2019 to February 2020); and (3) Pandemic to pandemic (beginning March 2020 to November 2020). The last year, month of the data is November 2021. "No spouse" include individuals not currently married or partnered. Omitted variables: Age: 50 to 54 years; Children: none resident or resident child is older than 29 years; Education: not a college graduate; Race: white; Starting Year: 2020; Season: winter; Phase: Before pandemic. Service occupations are those that were most impacted at the start of the pandemic or were in industries that were most impacted; they are listed in the Online Appendix Note 1.

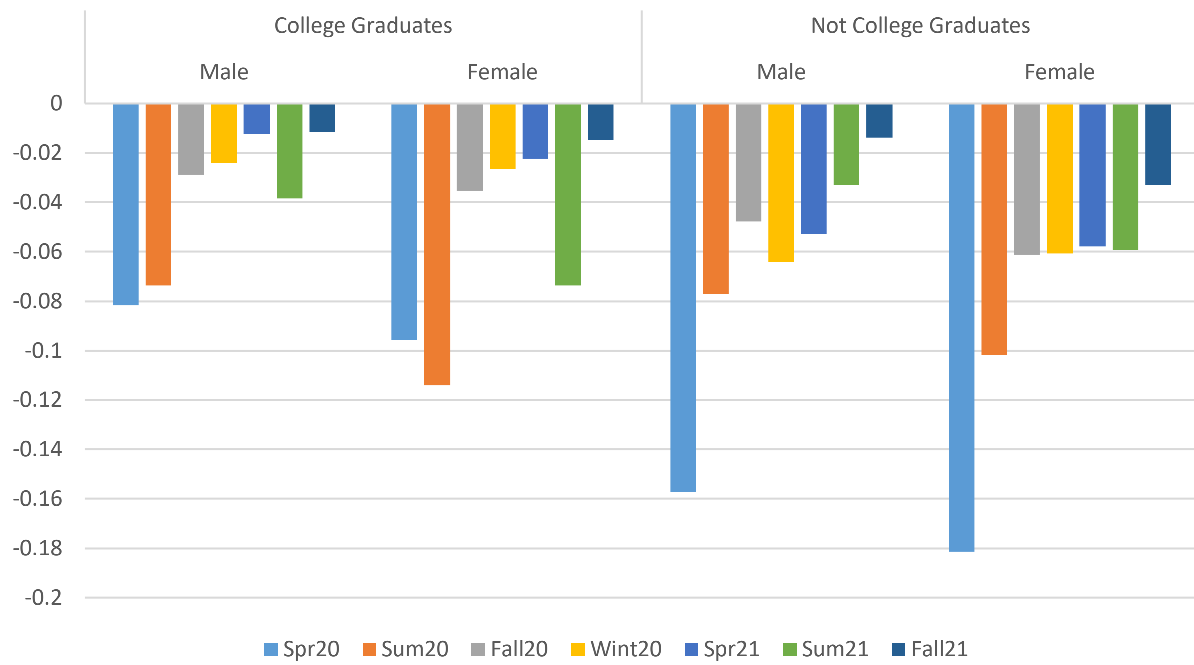
Table 3: Share of Group with Changes in Hours Worked during Three Pandemic Phases (All Were "At Work" at Start and End of Phase)

	Pandemic Phase		
Women	Pre-Pre	Pre-Pan	Pan-Pan
	Decrease in Hours		
College Graduate			
25 to 34	0.267	0.322	0.246
25 to 54	0.280	0.326	0.255
25 to 54, with child < 13 years	0.257	0.297	0.228
Not College Graduate			
25 to 34	0.269	0.328	0.246
25 to 54	0.271	0.333	0.249
25 to 54, with child < 13 years	0.265	0.326	0.266
	Increase in Hours		
College Graduate			
25 to 34	0.257	0.227	0.307
25 to 54	0.272	0.244	0.309
25 to 54, with child < 13 years	0.262	0.243	0.320
Not College Graduate			
25 to 34	0.306	0.267	0.337
25 to 54	0.294	0.252	0.340
25 to 54, with child < 13 years	0.330	0.272	0.342

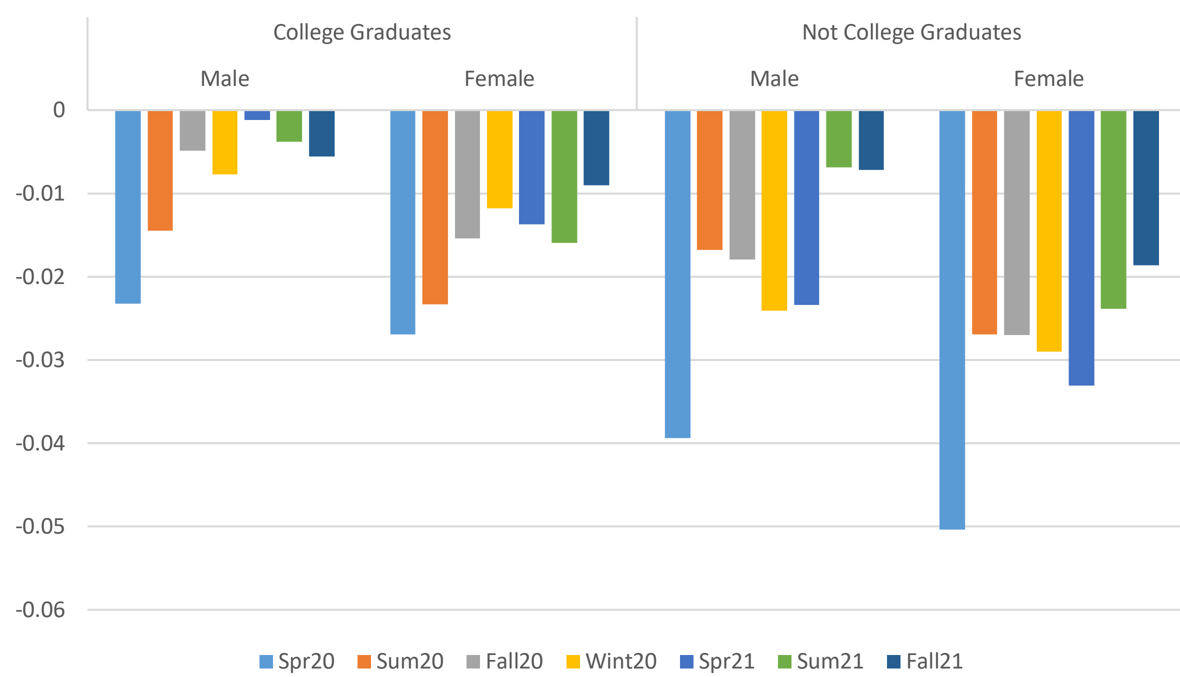
Source: Linked monthly CPS. See Online Appendix Note 3 for details on the data construction. See text and notes to Table 2 for definitions of the pandemic phases.

Notes: "Pre-pre" indicates that the period is entirely before March 2020; "pre-pan" indicates that the period traverses March 2020; "pan-pan" means that the period is entirely after February 2020. The numbers in the table are the fraction with a decrease or increase in hours, with no change being the omitted group. The sample is restricted to those who were employed in both t and $(t + 1)$. Actual hours on all jobs are differenced between start month and end month a year later if the respondent was "at work" in both periods.

Appendix Figure 1: "At Work" Changes (Season 2020/21 – Winter2019/20), 20 to 54 Years Old: By Education Level and Sex



Appendix Figure 2: Labor Force Participation Changes (Season 2020/21 – Winter 2019/20), 20 to 54 Years Old: By Education Level and Sex



Sources and Notes: See Figure 1.

Online Appendix to
"Understanding the Economic Impact of COVID-19 on Women"
Claudia Goldin (Harvard University)
Version of 19-Apr-22

Online Appendix Note 1. Occupations Coded as "Service"

This list of occupations and industries are those for which employees were impacted beginning in April 2020 across a large number of states with mandates for cessation of or limited business. To create the list, I examined reopening plans for seven large states, across the regions (CA, FL, IL, MA, NY, PA, TX). The establishments mentioned in almost all reopening plans included retail, restaurants, bars, nightclubs, movie theaters, casinos, museums, professional sports, gyms, fitness clubs, salons, barbershops, and places of worship. Some plans also included construction and manufacturing, and many mentioned reduced density in offices. Health facilities were also mentioned but with less detail.

Most of the occupations and industries I have included on the list are those in the establishments just listed and are called "service" in this paper because most are in the service sector. As noted, some businesses (e.g., construction, some in manufacturing) that were initially impacted resumed in many states in late spring or early summer and are not included. I have also not included some in the health sector (e.g., dentistry) because they always had emergency service and resumed operations in most states by May or June.

Occupations, and those in industries, coded as "service" are those that were most impacted by the pandemic at its start. These include all employees in NAICS/SIC codes:

8680 Restaurants
8690 Drinking places
8970 Barber shops
8980 Beauty salons
8990 Nail salons and other personal care services

In addition, SOC codes for the following occupations are included, some of which overlap with those already coded through industries:

4000 to 4160 (food preparation)
4330 to 4655 (personal services; e.g., hairdressers; manicurists; theater attendants; childcare workers; personal care aides; fitness instructors)
4760: Retail salespersons
3600: Home health aides

To get consistent occupations for the 2018 to 2021 years, I used occ2010. But I identified certain key occupations in occ2020 that were impacted, such as home health aides (personal care aides = 3602 in occ2020 but 4610 in occ2010), that were treated differently in occ2010. Similarly, "nursing, psychiatric, and home health aides" are in 3601 in occ2020, but 3600 in occ2010. I have tried to include all independent of the changed codes. Among all employed women in 2018, 19% of them had an occupation included in the listed "service" group and the figure is 28% for women without a college degree.

Online Appendix Note 2: Constructing CPS linkages to evaluate the role of the increased female labor force from April 2019 to February 2020 on the impact of the pandemic

Purpose of the linkage construction: A data set was created to ascertain which women entered the labor force during the low unemployment economy of late 2019 to early 2020, prior to the pandemic, and whether the new entrants remained in the labor force after the pandemic began. The individuals are then followed for as long as the longitudinal part of the CPS allows. For example, if a woman in Dec. 2019 was out of the labor force in Month 1 of her CPS interview and then entered the labor force in Jan. 2020 (in her Month 2), she could be followed for two additional months to March and again, eight months later, starting in Dec. 2021 until March 2021. The new entrants can be compared with individuals who began the same period in the labor force. In addition, data for previous years are explored by creating a placebo pandemic in March 2018 to explore differences in the new and existing labor force participants between the actual and the placebo pandemic.

Details of the linkage: The two initial periods (2019-2020 and 2017-2018) were treated identically; only one will be used in the example. Observations were linked using *cpsidp* and validated through the IPUMS validation file of longitudinal data through *race, sex, age,* and having at least two observations.

In order for the IPUMS validation file to allow matches of at least two observations and up to eight, the validation file was edited such that instead of *age_total_match, sex_total_match*, or *race_total_match* being exactly equal to *expected_obs*, the condition was expanded to greater than or equal to *expected_obs*, with the number of expected observations being two. Observations failing this validation are indicated by the variable "exclude."

To identify labor force transitions, *lfpchanged* was generated to indicate if the labor force participation status of an individual changed from one month to another, where *lfpchanged* equals 1 if an individual entered, and -1 if an individual left. Next, a flag for each month/year was created (ex: April_flag to indicate April 2019). Using the month/year flag and the lfpchanged variable, two new variables were constructed to indicate if the individual entered or left the labor force (ex: April_entered and April_left).

Using the *month_entered variables, a new indicator called April_February_enter was generated to flag individuals who entered the labor force sometime between April 2019 and February 2020. As the *month_entered variable only flags the single month observation where there was a transition, egen max was used to append the existence of a transition into the labor force to all observations of each individual. The variable was named *AprilFebruaryenterall*. The following conditions were stipulated: (1) regardless of when the person entered the labor force, the last observation recorded on or before February 2020 must have indicated that the person was still in the labor force, and (2) the CPS data for these individuals had to contain at least one observation in the "pandemic" period, defined as March 2020 and beyond.

To check if they were still in the labor force, egen and lastnm(*lfp*) were used for each *cpsidp*, and this was called *checklast*. The procedure was then extended to all observations, so that *checklastall* flagged all observations of an individual who was in the labor force in their last observation. To ensure there was at least one observation in the pandemic period, an indicator was created for observations from the pandemic (March 2020 and beyond) and was extended to all observations of the individual (*pandemicall*).

Using the three criteria: (1) the individual entered the labor force sometime between April 2019 and February 2020, as indicated by *AprilFebruaryenterall*, (2) the last observation recorded on or before February 2020 must have indicated that the person was still in the labor force, as indicated by *checklastall*, and (3) the individual must have had at least one observation in the "pandemic" period, as indicated by *pandemicall,* created the "Group1" sample.

Next, women were identified who were always in the labor force between April 2019 to February 2020, meaning they had no identified labor force status change, and who also had at least one observation month in the pandemic period.

To do so, a variable *inlfp* was created, defined as 1 if an individual was recorded to be in the labor force during the pre-pandemic period. Next, egen and min were used to identify individuals who were always in the labor force from April 2019 to February 2020, and then that variable was added to all observations for that individual. The final variable was called *alwaysinall.* Using *alwaysinall*, *pandemicall*, and *aprilfeball*, "Group2" was created, including all individuals who were always in the labor force between April 2019 to February 2020.

For these two groups, a variable called *pandemic_transitions* was created to count the number of times individuals moved in and out of the labor force during the pandemic. To do so, the absolute values of lfpchange were summed. As such, *pandemic_transitions* would = 0 if no change, 1 if the individual left (as all individuals start the pandemic by being in the labor force), 2 if the individual left and then entered, and so forth.

The 2017 to 2018 placebo construction follows exactly the same procedure, except using the dates of April 2017 to February 2018 as the transition period, and March 2018 and beyond as the "pseudo-pandemic" period.

Finally, the separate 2019 to 2020 and 2017 to 2018 files were created through append. There are some duplicate observations that can be separated using "newvar", where newvar = 0 indicates the 2019 to 2020 group and newvar = 1 indicates the 2017 to 2018 group. While the observations may be duplicates, the group to which they belong may be different given the different timelines. For example, an observation from May 2019 may indicate an individual's labor force transitions in the 2019-2020 group but could be an individual during the "pseudo pandemic" period for the 2017-2018 group.

Online Appendix Note 3: Constructing CPS linkages by month across years to traverse before the pandemic (pre-pre), into the pandemic (pre-pan), and during the pandemic (pan-pan).

Purpose of linkage creation: To follow the labor force participation and at work status of individuals from one year to the next before the pandemic, into the pandemic, and during the pandemic.

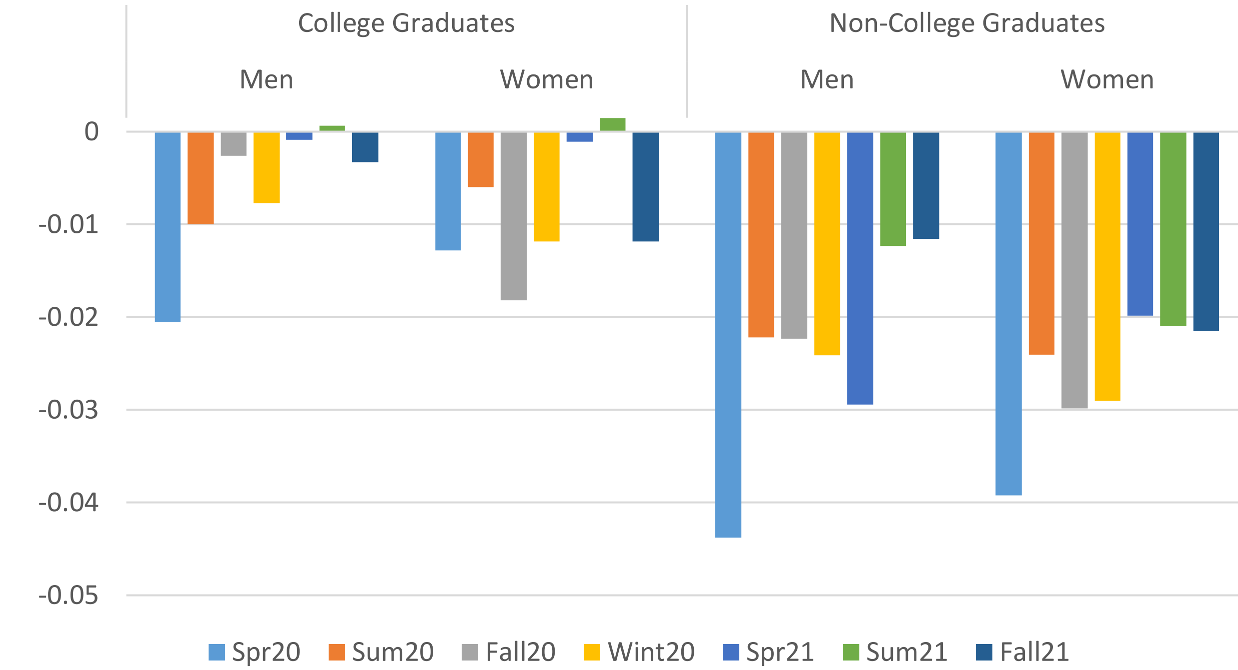
Details of the linkage: The monthly CPS was used with individuals aged 18-55 (later limited to 20 to 54) from January 2018 to November 2021, the last month CPS data were available at the time of this writing from the IPUMS. Observations were linked using *cpsidp* and validated through the IPUMS validation file of longitudinal data through *race, sex, age,* and having at least two observations. In order for the IPUMS validation file to allow matches of at least two observations and up to eight, the validation file was edited such that instead of *age_total_match, sex_total_match*, or *race_total_match* being exactly equal to *expected_obs*, the condition was expanded to greater than or equal to *expected_obs*, with the number of expected observations being two.

In order for each observation to contain the data for each person/month, the entire dataset was first divided into two, with one half containing observations from mish 1-4 and the second half containing observations from mish 5-8. For the second half of the dataset, all variables were renamed to contain an added _2.

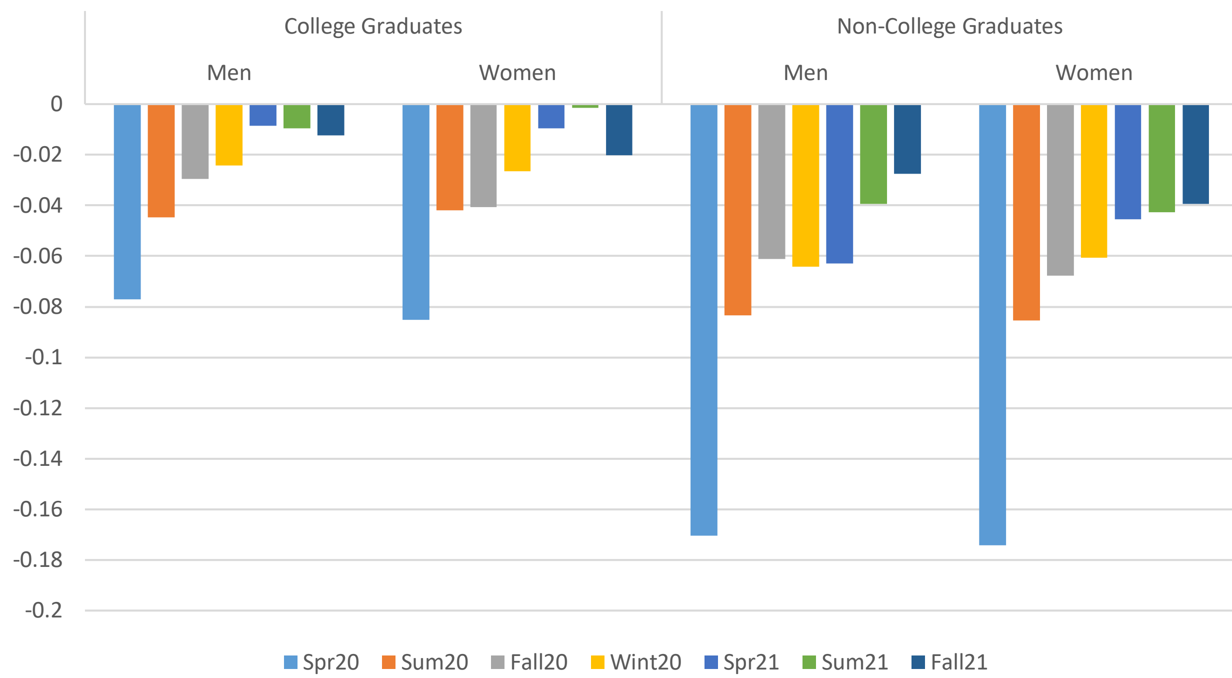
The two halves of the dataset were merged using cpsidp and month as unique identifiers. Only observations where _merge == 3 were kept, as this would be a full match of person/month across the observation period of the CPS. Transitions were identified using egen and diff between *occ*, *lfp*, and *empstat*.

Online Appendix Figure 1: Labor Force and "At Work" Changes (Season 2020/21 – Season 2019) for Males and Females 20 to 54 Years Old: By Education Level

A. Labor Force Participation Using Season 2019 as the Reference

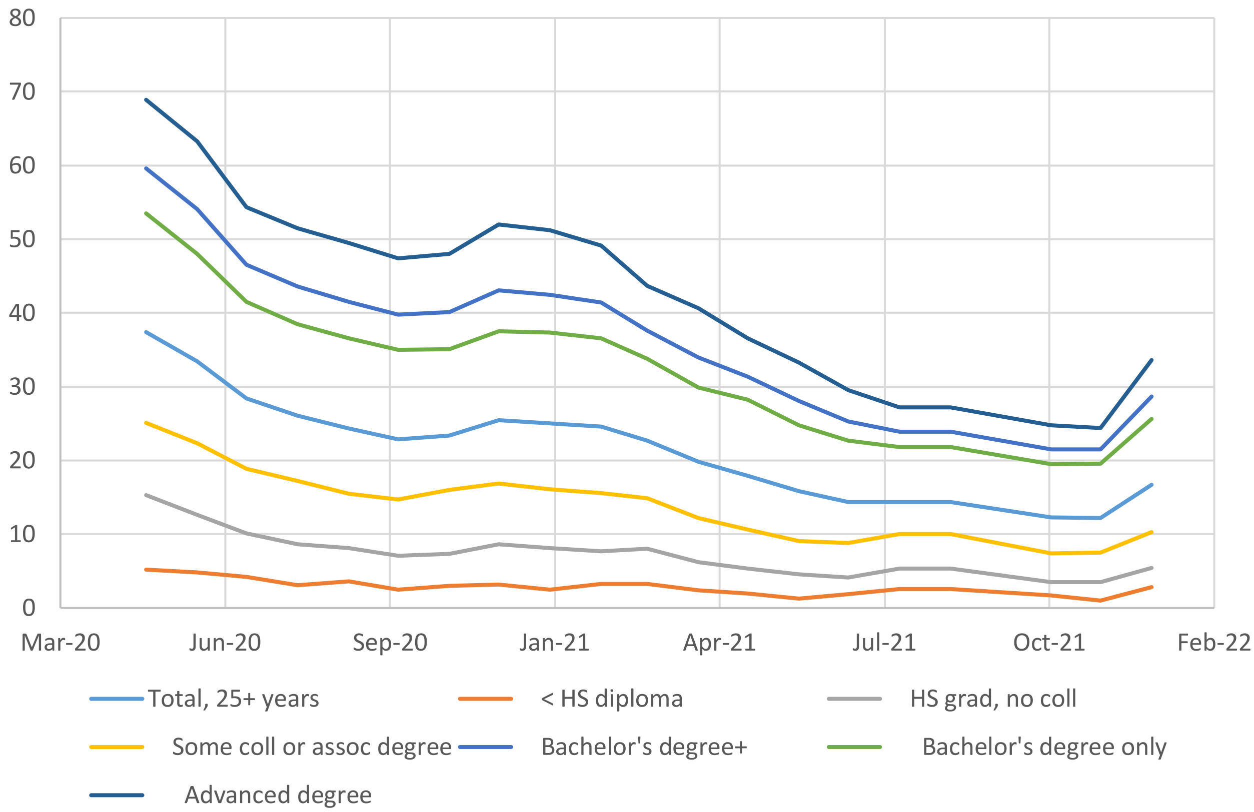


B. "At Work" Using Season 2019 as the Reference



Source: CPS Monthly, IPUMS.org
Notes: See notes to (text) Figure 2; replace the words "Season 2018" with "Season 2019."

Online Appendix Figure 2: Working Remotely among Men and Women by Education: May 2020 to January 2022

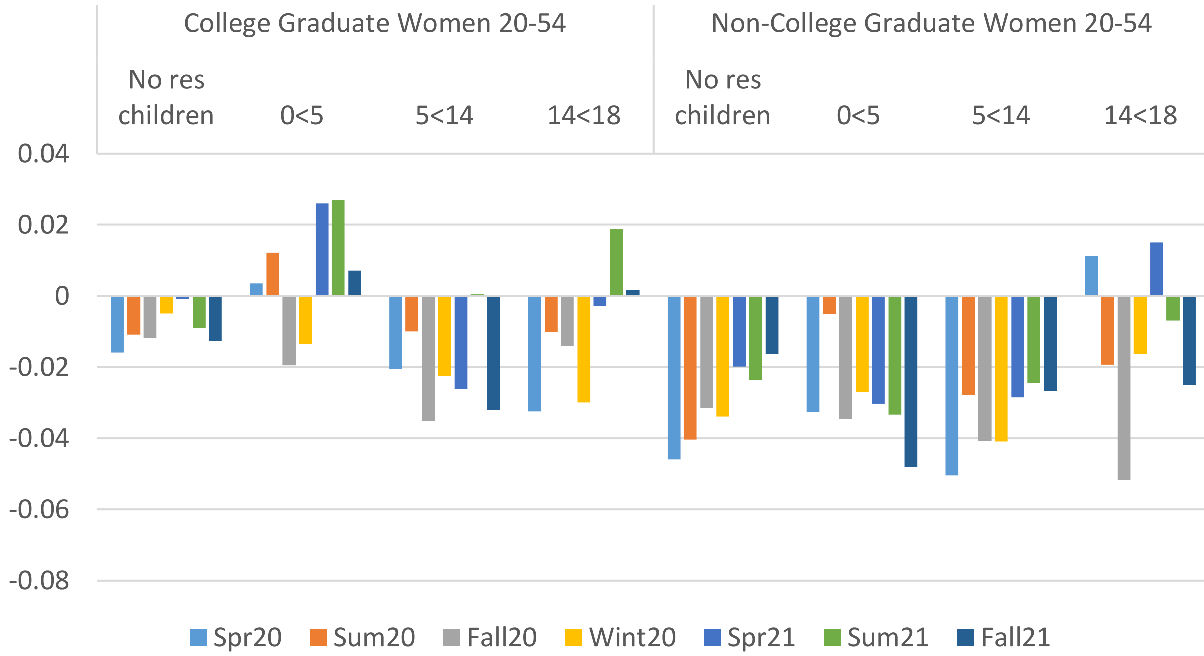


Source: CPS Monthly Surveys. https://www.bls.gov/cps/effects-of-the-coronavirus-covid-19-pandemic.htm#data

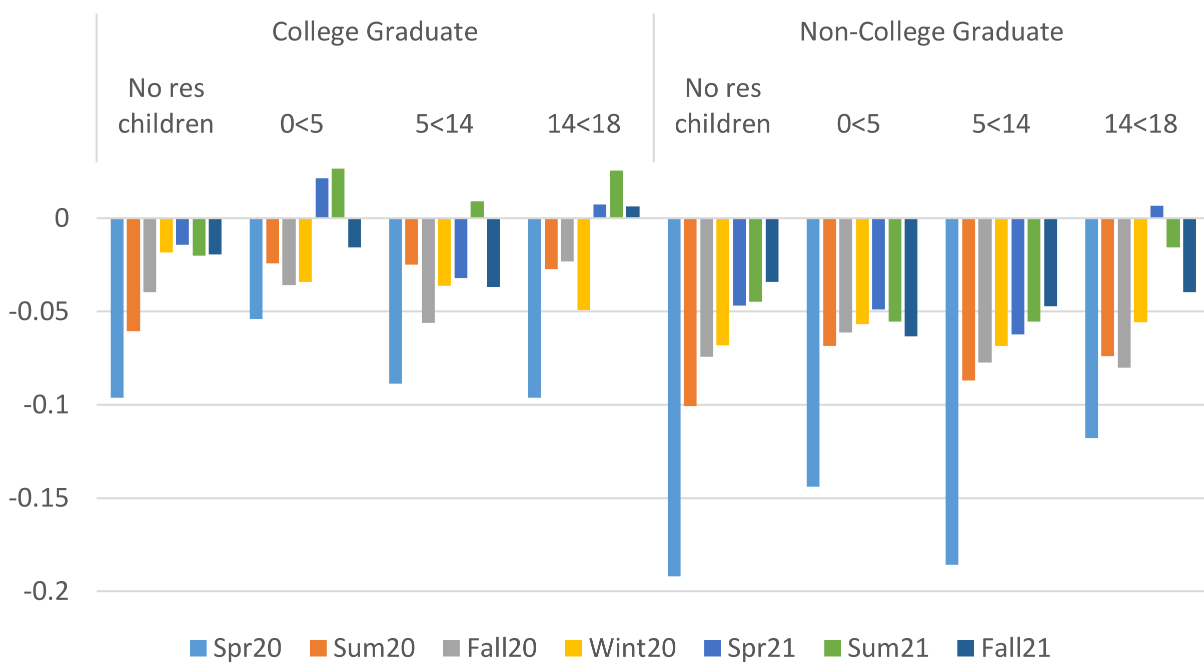
Notes: Tabulations from BLS are used because, at the time of this writing, the IPUMS had the question only to September 2021. The full question, asked since May 2020, is: "At any time in the last 4 weeks, did you telework or work at home for pay because of the coronavirus pandemic?"

Online Appendix Figure 3: Labor Force and "At Work" Changes (Season 2020/21 – Season 2019) for Females 20 to 54 Years Old: By Education Level and Age of Youngest Child

A. Labor Force Participation Using Season 2019 as the Reference



B. "At Work" Using Season 2019 as the Reference



Source and Notes: CPS Monthly, IPUMS. See notes to Figure 5.

Online Appendix Table 1: Summary Statistics for Variables (All 0, 1) in Table 2, col. (3) Regression of Annual Changes in "At Work" for Women 20 to 54 Years, Jan. 2018 to Nov. 2021

Variable	Mean	Standard Deviation
Dependent variable: At Work Change	0.8748	0.3309
Respondent's age group		
20 to 24 years	0.0978	0.2970
25 to 29	0.1362	0.3430
30 to 34	0.1449	0.3520
35 to 39	0.1507	0.3578
40 to 44	0.1510	0.3581
45 to 49	0.1587	0.3654
Youngest child's age		
0 to 4 years	0.1539	0.3608
5 to 13	0.2251	0.4176
14 to 17	0.0881	0.2835
18 to 29	0.0826	0.2752
College graduate	0.4678	0.4990
Black	0.1304	0.3368
Hispanic	0.1712	0.3767
Service occupation	0.1634	0.3697
Start year is 2018	0.3654	0.4815
Start year is 2019	0.3469	0.4760
Spring	0.2484	0.4321
Summer	0.2371	0.4253
Fall	0.2677	0.4428
Pre-pandemic to pandemic	0.3464	0.4758
Pandemic to pandemic	0.2281	0.4196
Number of observations	174,226	

Notes: The sample is constructed so that all respondents begin the period "at work." The length of the period is one year and "at work change" is 0 if the individual leaves work and 1 if the individual remains "at work." Women 20 to 54 years old are included. The period is January 2018 to November 2021. Individuals can traverse three possible phases: pre-pandemic to pre-pandemic (all months before March 2020); pre-pandemic to pandemic (one month before March 2020 and one after February 2020); pandemic to pandemic (all months after February 2020. (See notes to Table 2.)

Online Appendix Table 2: Annual Changes in “At Work” for Women and Men 20 to 54 Years, Jan. 2018 to Nov. 2021

	Men and Women 20 to 55 Years, at Work in Year *t,* Month *m* Dependent variable: Change in at Work from Year *t*, Month *m* to Year (*t* + 1), Month *m* (0, 1)		
	(1)	(2)	(3)
Female	-0.0300***	-0.0315***	-0.0170***
	(-19.31)	(-20.09)	(-6.11)
Respondent’s age			
20 to 24	-0.0685***	-0.0686***	-0.0683***
	(-30.33)	(-30.40)	(-30.30)
25 to 29	-0.00593**	-0.00587**	-0.00488*
	(-2.95)	(-2.93)	(-2.43)
30 to 34	-0.00344	-0.00332	-0.00226
	(-1.76)	(-1.70)	(-1.16)
35 to 39	0.0123***	0.0125***	0.0126***
	(6.39)	(6.51)	(6.56)
40 to 44	0.00850***	0.00890***	0.00848***
	(4.52)	(4.73)	(4.51)
45 to 49	0.00889***	0.00926***	0.00888***
	(4.93)	(5.14)	(4.93)
Youngest child’s age			
0 to 4 years	-0.00167	0.000215	0.0203***
	(-1.03)	(0.09)	(6.77)
5 to 13 years	0.00389**	0.00244	0.0104***
	(2.60)	(1.15)	(3.64)
14 to 17 years	0.0144***	0.00687*	0.00724*
	(6.87)	(2.21)	(2.34)
18 to 29 years	0.0123***	0.0102**	0.00994**
	(5.50)	(3.11)	(3.04)
College graduate	0.0352***	0.0222***	0.0206***
	(32.69)	(13.44)	(9.08)
Black	-0.0305***	-0.0181***	-0.0299***
	(-19.04)	(-7.38)	(-8.48)
Hispanic	-0.0186***	-0.0115***	0.00221
	(-14.03)	(-5.69)	(0.81)
Service occupation	-0.0526***	-0.0201***	-0.00935*
	(-33.26)	(-8.50)	(-2.52)
No spouse	-0.0100***	-0.00994***	-0.00848***
	(-8.21)	(-8.17)	(-6.93)
Start year is 2018	-0.0247***	-0.0247***	-0.0247***
	(-6.04)	(-6.03)	(-6.06)
Start year is 2019	-0.0267***	-0.0263***	-0.0265***
	(-10.03)	(-9.89)	(-9.95)
Spring	-0.0153***	-0.0155***	-0.0157***
	(-8.50)	(-8.63)	(-8.73)
Summer	-0.0160***	-0.0165***	-0.0166***
	(-8.86)	(-9.12)	(-9.21)
Fall	0.0105***	0.0104***	0.0103***

	(5.86)	(5.82)	(5.77)
Pre-pandemic to Pandemic	-0.0634***	-0.0620***	-0.0605***
	(-22.05)	(-18.37)	(-16.45)
Pandemic to Pandemic	-0.0369***	-0.0372***	-0.0363***
	(-8.06)	(-7.45)	(-6.90)
Pre- to Pan × female	-0.0135***	-0.0104***	-0.0138***
	(-5.88)	(-4.46)	(-3.32)
Pan to Pan × female	-0.00158	-0.000337	-0.00203
	(-0.61)	(-0.13)	(-0.43)
Pre- to Pan × College		0.0327***	0.0261***
		(13.41)	(7.79)
Pan to Pan × College		0.00691*	0.00753*
		(2.52)	(2.00)
Pre- to Pan × 0<5		-0.00444	0.00724
		(-1.36)	(1.68)
Pan to Pan × 0<5		-0.00180	-0.000512
		(-0.49)	(-0.11)
Pre- to Pan × 5<13		0.00102	0.00982*
		(0.34)	(2.40)
Pan to Pan × 5<13		0.00421	0.00672
		(1.24)	(1.45)
Pre- to Pan × 14<18		0.0172***	0.0164***
		(3.87)	(3.68)
Pan to Pan × 14<18		0.00509	0.00497
		(1.00)	(0.98)
Pre- to Pan × 18<30		0.00139	0.000890
		(0.30)	(0.19)
Pan to Pan × 18<30		0.00751	0.00719
		(1.42)	(1.36)
Pre- to Pan × Black		-0.0276***	-0.0296***
		(-7.66)	(-5.70)
Pan to Pan × Black		-0.0130**	-0.0119*
		(-3.12)	(-1.97)
Pre- to Pan × Hispanic		-0.0212***	-0.0304***
		(-6.99)	(-7.53)
Pan to Pan × Hispanic		0.0000687	-0.00719
		(0.02)	(-1.57)
Pre- to Pan × Service occupation		-0.0817***	-0.0855***
		(-23.16)	(-15.58)
Pan to Pan × Service occupation		-0.0176***	-0.0217**
		(-4.17)	(-3.28)
0<5 × female			-0.0445***
			(-10.38)
5<13 × female			-0.0147***
			(-3.81)
College × female			0.00304
			(0.92)
Black × female			0.0224***
			(4.59)
Hispanic × female			-0.0320***
			(-7.87)

Service occ × female			-0.0163***
			(-3.39)
Pre- to Pan × 0<5 × female			-0.0267***
			(-4.18)
Pan to Pan × 0<5 × female			-0.00334
			(-0.46)
Pre- to Pan × 5<13 × female			-0.0188**
			(-3.25)
Pan to Pan × 5<13 × female			-0.00565
			(-0.86)
Pre- to Pan × College × female			0.0139**
			(2.84)
Pan to Pan × College × female			-0.00124
			(-0.23)
Pre- to Pan × Black × female			0.00560
			(0.78)
Pan to Pan × Black × female			-0.00104
			(-0.12)
Pre- to Pan × Hispanic × female			0.0200**
			(3.28)
Pan to Pan × Hispanic × female			0.0159*
			(2.31)
Pre- to Pan × Service occ × female			0.00738
			(1.03)
Pan to Pan × Service occ × female			0.00565
			(0.66)
Constant	0.968***	0.967***	0.960***
	(256.32)	(249.86)	(239.68)
Number of observations	365,539	365,539	365,539

* p<0.05, ** p<0.01, *** p<0.001

Source and *Notes*: See Table 2.

Online Appendix Table 3: Summary Statistics for the Repeated Cross-Section Sample, January 2018 to November 2021

	Female	Male
Variables (all 0, 1)		
College graduate	0.3997	0.3355
Black	0.1469	0.1312
Hispanic	0.1978	0.2088
At Work	0.6773	0.7946
In labor force	0.7468	0.8623
Age of youngest child		
Child 0<5	0.1736	0.1476
Child 5<14	0.2055	0.1644
Child 14<18	0.0730	0.0529
Child 18<30	0.0723	0.0474
Seasons Winter 2018/19 to Fall 2021		
Winter 2018/19	0.0639	0.0639
Spring 2019	0.0426	0.0426
Summer 2019	0.0639	0.0639
Fall 2019	0.0639	0.0639
Winter 2019/20	0.0637	0.0637
Spring 2020	0.0425	0.0425
Summer 2020	0.0637	0.0637
Fall 2020	0.0637	0.0638
Winter 2020/21	0.0637	0.0638
Spring 2021	0.0636	0.0637
Summer 2021	0.0636	0.0638
Fall 2021	0.0636	0.0638
Age of respondent		
20-24	0.1411	0.1443
25-29	0.1520	0.1558
30-34	0.1493	0.1510
35-39	0.1452	0.1445
40-44	0.1356	0.1336
45-49	0.1367	0.1338
50-54	0.1400	0.1370
Observations	1,179,291	1,115,331

Notes: Means for the seasons are illustrative and do not exhaust the sample. Winters include December of the previous year and January and February of the following one. Spring of 2019 excludes March for the comparison with 2020.