How Adaptive Labor Markets Shift the Labor Supply of New Parents

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Abstract

Adaptive technologies and flexible work schedules change employment dynamics and work-related costs to employers and employees. We estimate the average treatment effect on the treated (ATT) of exposure to changes in the adaptation of work-from-home technologies on the intensive and extensive margins of parental labor supply following child birth. Using two-year panel data from the Current Population Survey (CPS) and an exogenous shock, we estimate these effects on employment outcomes. We find that leave take-up increases for mothers and fathers of infants, 3.8 and 2.5 percentage points, respectively. Fathers decrease the average time they spend working by 1.1 weekly hours, driven by parental leave take up. We see no change in mothers' hours worked conditional on staying employed. Being exposed to the use of adaptive technologies and flexible work schedules increase mothers' labor force participation by more than half a percentage point. We provide suggestive evidence that this increase is at least partially driven by telework flexibilities. As workplace norms allow more adaptive technologies and flexible work schedules, new mothers stay attached to the labor force and new fathers take up parental leave. If employers lean into these adaptive technologies and flexible work schedules, they can tackle some of the most stubborn gender-related work inequalities today, the gender wage gap and motherhood penalty.

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Introduction

In 2020 an accelerated push towards adaptive technologies changed expectations of how, when, and where we work (Barrero et al. 2023). While the service sector experienced massive temporary layoffs and a slower adaptability to stay-at-home measures, other sectors, primarily those in white-collar office work, quickly innovated remote work adaptability and schedules allowing more flexibility in achieving productivity outcome measures. These changes influenced worker expectations and created more fluid boundaries around work schedules. They adjusted worker productivity and allowed workers to more easily combine work and non-work-related tasks.

Many firms transitioned to a work-from-home (WFH) and alternative work structure during stay-at-home policies. This allowed workers more flexibility, especially around the engagement and timing of their work hours. This flexible acceleration in the dynamics of how employer productivity and outcomes are met had advantages for family caregivers, who often have significant nonpaid care responsibilities within their homes. They could more effectively balance work with non-work tasks, increasing the probability that they stayed engaged in the labor force (Heggeness 2021). For example, workers could more easily write a report or engage in a staff meeting while simultaneously washing a load of clothes and running their dishwasher after lunch. This has become increasingly important for employees who are unpaid family caregivers because since the 1980s, most working- and middle-class households require at least two incomes for survival (Boushey 2016).

This flexibility provided parents a lifeline to engage in paid work while also tackling increased family care responsibilities as daycares and schools physically closed. Inoue et al. (2023) found that an extra WFH day per week leads male workers to spend on average 5.6% more

time with family and 6.2% more time on housework. WFH is more common in industries where workers are better educated and better paid (Bartik et al. 2020), so there may be heterogenous effects of how a changing work culture impacts the labor outcomes of people who added an infant to their home shortly after the pandemic started.

As the world transitioned into different stages of the pandemic, more companies established complete or hybrid WFH as a new normal. When surveyed, employers reported that after the COVID-19 pandemic (phrased in the survey as in 2022 and later) they expected workers to WFH for about 20% of their full workdays, an increase from the 5% which was reported prior to the pandemic (Barrero et al. 2021). The necessity of WFH forcing the adoption of WFH technologies translated into about two thirds of workers reporting an improved perception of WFH due to their pandemic experiences (Barrero et al. 2021). This has lowered the actual and social cost of working-from-home for employees who elect to continue working remotely after the pandemic. Workers like having the option to work from home, so much so that they report being willing to accept a pay cut of around 7% on average to retain the ability to WFH for two or three days after the pandemic (Barrero et al. 2021). There is suggestive evidencethat the COVID-19 pandemic may signify a persisting change in office culture.

Over the past century, fertility and labor force participation patterns have evolved, often influenced by changing social norms and life altering technological innovations in reproductive health and educational attainment (Goldin & Katz 2002; Bailey 2006; Bailey 2013; Heggeness 2025). Advances in birth control and reproductive health span the past 70 years, accelerated by the development of the pill as a major form of contraception first for married women but eventually expanding to all (Goldin & Katz 2002; Bailey 2006; Bailey 2013; Goldin 2021; Meyer et al. 2021).

Individuals often consider the economic consequences of pregnancy and childbirth within the context of family and financial planning. The decision to expand a household by adding an infant often includes discussions around how much said child will cost in the first year, but also in the first five years and even over one's lifetime. These calculations are often compared with the household's ability to economically support the addition of said child.One recent estimate puts the lifetime cost of raising a child to age 18 at $310,605 or around $17,000annually (Bhattarai, Keating, and Hays 2022). To complicate matters, the same calculations find that a family earning between $25,000-50,000 is expected to spend around $10,000 on childcare whentheir child is between the ages of zero and two – a time when those considering adding to the family might feel the least economically stable to provide such an immediate and large financial investment. Today couples have more frequently opted out of having children as a life milestone, and as a group they have become common enough to have their own title: dual income, no kid (DINK) relationships (Lee 2023).

Families deciding to expand by adding a child often make tough short-term choices between working for pay and staying home to take care of the infant in its first months and year of life when the cost and accessibility of outside care is often financially unattainable. Driving factorsin fertility decisions includes both whether (paid) maternity leave and childcare is available and, if available, affordable. The past few decades have seen improvements in parental leave policieswithin the United States. The U.S. Congress passed the Family and Medical Leave Act (FLMA) in 1993, guaranteeing up to 12 weeks (around 3 months) of unpaid job-protected leave to a large swath of the U.S. workforce (Shabo 2023). Between 2014 and 2023, the number of state laws requiring paid leave increased from three to 14 (including Washington D.C.) (National Partnershipfor Women and Families 2023). Regardless of having access to paid

parental leave, households often consider how paid work patterns will change or shift and for whom within the home in response to the birth of a new child. This is particularly salient for women, who often disproportionately engage in unpaid domestic work in the home and often become the primary caregiver of new infants (Hess, Ahmed, and Hayes 2020). As women's educational attainment continues to rise, the opportunity cost of having a child increases. Technological advancements in how businesses engage workers today can help bridge that gap.

In general, mothers spend more time in childcare than fathers with one study finding that mothers spend 49.8 hours per week on childcare compared to fathers who spend on average 31.4 hours per week (Raley et al. 2012). If restricted to the typical working hours (weekdays between 8am and 6pm), women provided about 70% of childcare regardless of employment status (Alon et al. 2020). When disaggregating childcare, Raley et al. (2012) did find a positive relationship between a wife's employment status and hours worked, and the husband's time spent on solo childcare, physical care of the child, and managerial care of the household. However, Raley et al (2012) also found a negative relationship between the father's employment and time spent on childcare.

The COVID-19 pandemic and the subsequent school lockdowns expanded how much childcare parents of young children were responsible for by about 40 hours per week – the equivalent of full-time job (Sevilla & Smith 2020). How parents divided the additional childcare depended largely on who continued to work during the pandemic. If mothers stopped working during the pandemic, they did twice as much childcare as their partner; while if the father stopped working, the parents shared childcare responsibilities equally (Andrew et al. 2020). Among families where both parents continued to work, mothers spent around an additional hour on childcare each workday (Adams-Prassl et al. 2020). Sevilla and Smith (2020) found that there

was a slight narrowing of the childcare gap between mothers and fathers, but regardless of employment status, during COVID mothers on average did 63.6% of the childcare. Thus, if both parents continue to work during the pandemic due to increased flexibility, there is likely a greater chance for burn out among mother, especially mothers of young children.

To identify if the pandemic-induced change in work culture had an impact on the labor force outcomes of parents of infants, we use the panel design of the Current Population Survey (CPS). We use the CPS 4-8-4 monthly interview pattern to construct a panel of individuals who introduced an infant into theirhousehold between the first and second year in which they were surveyed. We run several fixed effects difference-in-differences models on the panel data to estimate a robust set of effects of the impact of having an infant at the onset of the pandemic. We then focus on the changes of women's labor force participation and examine whether the changes were driven by different types of labor market transitions around the time of a childbirth. Finally, we provide preliminary evidence of the effect of more flexible work policies by using the CPS's COVID-19 telework questions to estimate similar difference-in-differences models around having an infant and teleworking due to COVID-19.

We find leave take-up increased for both new mothers and fathers of infants but was more prominent among new fathers. We saw no change in the hours worked for mothers, while fathers decreased their overall hours worked. Partially due to social norms, before the pandemic fathers maximized work hours and minimized leave. Because of this, we are not surprised to see a decrease of fathers' work hours at the same time as there is an increase in leave take-up. Mothers increased leave take-up, on the other hand, appears to have been absorbed by more mothers staying in the labor force. Our results provide suggestive evidence that the increase in labor force participation of new mothers was driven by telework flexibilities due to COVID-19, and we believe this, in

combination with the fact that women are generally more likely to work less hours on average, explains why we see no change in new mothers' hours worked. Our results suggest that COVID-19 work-from-home policies may have begun a change in work culture which encouraged more newmothers to stay attached to the labor force and more new fathers to take leave.

This paper contributes to an already existing robust literature on fertility and labor supply by taking advantage of external shocks in workplace norms and culture that drove many employers to adopt flexible work-from-home policies. We expand this literature using an exogenous shock to understand how parents of infants interacted with the labor force during the first stage of the pandemic compared to prior year data before the pandemic, and we attempt to shed light on additional questions like, does increased flexibility and the comingling of home and work environments shift new parents' interactions with the labor force when caring for an infant and, if so, how? Are the changes primarily along the extensive or intensive margins and are there differences between mothers and fathers?

Background

COVID19's Impact on Fertility

When the COVID-19 pandemic and subsequent recession began in March 2020, the prevailing thought among demographers and economists was that fertility and birth rates would decline. Prior studies have found that during recessions, there is a decrease in births as people delay having a child until their incomes and job prospects improve (Currie & Schwandt 2014, Black et al. 2013). A counter argument was that birth rates would increase due to increased access to WFH and adults spending hours couped up with one another in their homes, and while overall birth rates decreased in the United States, there was a "baby bump" during the COVID-19

pandemic that was specific to US-born mothers (Bailey et al. 2023). Births in 2020 and early into 2021 did fall, but the decrease was driven primarily by reduced conceptions prior to the pandemic (Kearney & Levine 2023, Bailey et al. 2023). Trends from the total fertility rate for US women suggest that conceptions began to increase sharply as early as March 2020 and stay at that elevated level until at least March 2021 (Bailey et al. 2023). The increase in fertility appears to be driven by women under age 25 and first-time mothers, which together may indicate that some younger women decided to start their families earlier than originally planned (Bailey et al. 2023). Among other women, the most pronounced increase in fertility was among women ages 30-34 and women with a college education, but women with less than a college education did not experience the same increase in conceptions (Bailey et al. 2023).

There are several theories for why the "COVID baby bump" occurred. First, the increase in fertility from March 2020 on could be due to social distancing measures that were highly encouraged during this time. People, especially those cohabitating with a significant other, may have taken advantage of the pandemic lockdown to have more sex or increase childbearing during a time when a baby's first month could be combined with work from home. There is some evidence that locations that undergo similar forced isolation events such hurricanes (Evans et al. 2010) or bomb threats (Rodgers et al. 2005) experience an increase in fertility.

A second theory is that the stimulus checks that were distributed during the pandemic may have loosened the budget constraints for some families (Bailey et al. 2023). This change in the budget constraint may have encouraged some families on the margin to have a child. Finally, there is some thought that the reduction of in-person employment that accompanied the pandemic reduced the opportunity cost of having a child. As mentioned above, often one parent takes some form of leave or exits the laborforce entirely after the birth of a baby

making the opportunity cost of having a child high. If the COVID-19 pandemic shifted the culture around work (e.g. allowing for more flexible hours, enabling work-from-home or telework positions), there is a possibility that the parent no longer must reduce their labor force participation on either the extensive or intensive margin, which wouldlower the opportunity cost of having a baby.

Maternity Leave Policies and Labor Supply

There is a pending question in the literature about the effect of maternity leave on women's willingness and ability to stay attached to the workforce. In the short-term, paid parental leave appears to be beneficial for mothers. When parental leave laws, whether paid or unpaid, are implemented there is an increase in both mothers' extensive (Han & Waldfogel 2009, Baum & Ruhm 2016, Bailey et al. 2019, Rossin-Slater 2017) and intensive (Rossin-Slater, Ruhm, Waldfogel 2013, Baum & Ruhm 2016) leave-take up. Studies have shown that paid parental leave increases the probability that mothers return to work a year after birth (Baum & Ruhm 2016) and increases the hours worked for employed mothers (Rossin-Slater, Ruhm & Waldfogel 2013). Around the time of birth there is an increase in weeks spent with a job and a decrease in weeks spent looking for work (Byker 2016) indicating that new mothers are substituting a labor-market separation with a time spent on job-protected leave. Overall, in the short term, paid parental leave increases women's, specifically young women's, labor force participation rate (Byker 2016, Das & Polacheck 2015).

Paid parental leave seems to adversely affect mothers in the long run and young women overall. Mothers that take advantage of paid parental leave see large declines in employment and wages in the decade after their period of leave (Bailey et al. 2019). Longer periods of maternity

leave negatively impact earnings, employment, and career advancement (Rossin-Slater 2017, Olivetti & Petrongolo 2017, Ruhm 1998). Whether or not they take leave, all young women in the economy are affected by paid family leave policies. After the implementation of paid family leave in California, there was a relative increase in young women's unemployment rate (Das & Polacheck 2015) as employers potentially engaged in statistical discrimination. After paid parental leave is implemented, young women are also less likely to receive employer-arranged training and to be promoted (Puhani & Sonderhof 2011, Thomas 2021). These adverse effects led Blau & Khan (2013) to argue that due to the lack of universal paid parental leave US women tend to work in higher level positions and are less likely to work part-time than women in other counties.

Paternity Leave Policies and Childcare

Far less work has studied the impact of access to paid parental leave for fathers which likely reflects the prevailing societal norms that fathers do not take leave after adding an infant to the household. After California instituted a paid family leave policy in 2004, more fathers did take leave, but still at a much lower rate than mothers (Bartel et al. 2017). For fathers that did take leave, the paid family leave policy increased leave length by anywhere between 2-3 days (Baum & Ruhm 2016) to 1.5 weeks (Bartel et al. 2017). However, Baum and Ruhm (2016) found that the effect of the paid family leave policy dissipated quickly, with no significant effect occurring beyond the seventh week after birth. To encourage more fathers to take leave, several countries around the world have instituted paid family leave policies that restricts a portion of the leave for just fathers, and families who choose not to take the leave lose that time. The so-called "daddy month(s)" have been found to increase the share of fathers who take leave and to increase the amount of leave that fathers take (Ekberg et al. 2012, Tamm 2019, Perivier & Verdugo 2024).

Several studies show the lasting impact that can occur when fathers take leave after the birth of an infant. After the "daddy month" policy went into effect in Sweden mothers and fathers were more likely to equally shared the care of sick children (Duvander & Johansson 2018), and fathers who took more leave days were more likely to report sometimes having solo care of the children, spent more time with their children, and were more engaged in childcare tasks both physical and emotional. (Haas & Hwang 2008). Fathers who took advantage of Germany's "daddy month" policy were also found to spend 1.2 additional hours per week with their families and an additional 0.5 hours per weekend on housework (Tamm 2019). In the United States, Nepomnyaschy & Waldfogel (2007) found that father who take more than 2 weeks of paternity leave were more likely to be involved in direct childcare tasks 9 months later. Thus, these studies suggest that when fathers take parental leave there are lasting impacts on the division of childcare and housework in the household. However, it is also possible that the fathers who are more likely to take leave after the birth of an infant are in general more likely to spend more time in household production.

This paper extends this prior literature by examining what happens to labor supply of both mothers and fathers right around the time of a fertility event when major shifts in employer expectations for work location occurred. We extend prior research examining fertility and birth rates during the pandemic to further study the impact births during that time had on parental labor supply. Our results are unique in that we focus on both parents – mothers and fathers – and examine differences and similarities in their behavior in response to labor market shocks in how we work.

Data and Methods

To identify a more precise sample of parents whom we observe in year one without an

infant and then observe in year two with an infant, we use with the Integrated Public Use Microdata Series Current Population Survey – Merged Outgoing Rotation Group (IPUMS CPS-MORG). The IPUMS CPS-MORG takes advantage of the CPS's 4-8-4 sampling methodology[4] and allows for a more robust analysis studying the same individuals over time where we can observe the addition of an infant into the household from year one to year two. In addition, following the same individuals over time reduces changes or effects due to an underlying shift in sample dynamics and allows us to have more certainty that what we are observing is due to the adaptive work environment of the pandemic. Everyone in the survey receives a unique identifying number, and we use the unique identifiers to link individuals across months creating a panel dataset with demographic and socioeconomic information from the same individual for the same four-month rotations within two consecutive years.

We construct a new variable to indicate whether a person had a new birth between the end of their first year's interviews and the end of their second year's interviews. Because we cannot know the precise timing of a new childbirth, we use the information from the first interview in the first and second years to determine the addition of an infant into the household in the second year. In doing so, we observe parents' employment changes as closely as possible to the birth of a new child. We use multiple CPS variables – the age of an individual's youngest child in the household, the number of children under age 5 in the household, and the total number of all their own children in the household. We restrict the sample to respondents who appear both in the household's year one and year two interviews.

Using the CPS two-year panel data, we create a multi-wave sample of respondents between the ages of 25 to 45 for the years 2017 through 2021. The panel datasets represent two

[4] Households in the CPS are interviewed for four consecutive months in the first year, not interviewed for eight consecutive months, and interviewed again for four more consecutive months in the second year.

cohorts. First, the 2017-2018 cohort which had their first-year interviews between January 2017 and February 2019 and second-year interviews between January 2018 and February 2020. This cohort serves as a pre-pandemic baseline for the work experiences of parents with new infants. The other group is a 2019-2020 cohort (the pandemic cohort) who had their first-year interviews between March 2019 and May 2021 and their second-year interviews between March 2020 and May 2022. The Pandemic cohort experienced their postpartum time after the onset of the COVID-19 pandemic in March 2020. They could have uniquely used the pandemic shock, shelter-in-place, and work-from-home to jointly inform or alter their employment experiences and/or fertility decisions. The comparisons between these two cohorts show differences of employment trajectories during the postpartum period before and after the pandemic.

In addition, we construct a 2015-2016 cohort who had their first-year interviews between January 2015 and February 2017, and their second-year interviews between January 2016 and February 2018. We use this cohort in robustness checks with the 2017-2018 cohort. Under the assumption that the pandemic increased the ability to balance work and paternity, we expect to see differences in labor market activities from the pandemic cohort in comparison to the 2017-2018 cohort but not for the 2017-2018 cohort in comparison to the 2015-2016 cohort. To the extent we see this phenomenon among new mothers and fathers, we call it *pandemic parental leave*. Inaddition, given assumptions that women's employment situations are affected by maternity morethan men, we would expect to see more notable changes in the female sample than in the male sample.

We use a difference-in difference fixed effect model to estimate the impact of more flexible work-from-home environments on labor market activities. Individual fixed effect models allow us to partial out the unobserved differences between individuals that might affect the outcomes of

interests. Our main outcome variables include labor force participation, which highlights changes at the extensive margin of labor supply. We also examine leave take up and hours worked, which highlights changes on the intensive margin. Labor force participation and leave take up are both dichotomous variables. We use linear probability models with year-month included in the base model. Demographic controls include citizenship status, education, marital status, and whether the individual is in school. Subsequent models also include employment controls with27 occupations and 10 industries. All models cluster standard error at the state level. Our panel difference-in-differences equation is:

$$y_{imt} = \beta_0 + \beta_1 NewBirth_i + \beta_2 PandemicCohort_{mt}$$

$$\beta_3 (NewBirth_i \times PandemicCohort_{mt}) + \delta \boldsymbol{X}_{imt} + \lambda \boldsymbol{E}_i + \alpha_i + \alpha_t + u_{imt}$$

where y_{imt} is our outcome of interest (labor force participation, leave take-up, and hours worked) in year 2. $NewBirth_i$ indicates that the individual added an infant 1 year or younger to their household between year 1 and year 2. $PandemicCohort_{mt}$ indicates that the individual's second four interviews were during March 2020-May 2022. $\boldsymbol{X}_i$ is a vector of demographic controls including age group, marital status, citizenship status, education level, an indicator for current school attendance. $\boldsymbol{E}_i$ is a vector of employment variables that control for 27 occupation groups and 10 industry groups. α_i and α_t are individual and year-month fixed effects respectively. Our coefficient of interest is β_3 which measures the average treatment effect on the treated (ATT) of having an infant during the pandemic on each studied labor outcome.

Analysis

Descriptive Statistics

Table 1 shows descriptive statistics for parents with a new birth for Pre-Pandemic Cohort

and Pandemic Cohort. For parents with new birth, the pandemic cohort's labor force participation is 1.8 ppts higher for mothers compared to pre-pandemic mothers, but it is 0.8 ppt lower for fathers. Parentswith infants have increased their leave take up during the pandemic: 3.9 ppts higher for mothers and 2.2 ppts higher for fathers. There is also a slight decrease in work hours for parents with infants during the pandemic. We also notice that there is a slight shift of mothers with infants and mothers with an added birth towards older women and more educated women, which we expect to see in a panel since the sample is aging overtime.

CPS Panel Results

Table 2 shows the results for labor force participation from fixed-effect linear probability models using the IPUMS CPS-MORG panel. We start by discussing the female sample results. With year-month and demographics as the base controls, column (1)indicates that having a new birth was associated with slightly over 9 ppts decline of mothers' laborforce participation for both cohorts. The interaction between new birth and the pandemic cohort suggests that mothers in the pandemic were nearly 3 ppts more likely to be in the labor force compared to the 2017-2018 cohort. Column (2) includes employment controls. Since most mothers who were out of the labor force do not have occupation or industry information, adding employment controls resulted in a R-square of 96.89%. However, we still obtained marginally significant coefficients in Column 2 that indicate the negative impact of new birth and the positive impact of the pandemic environment for mothers' labor force participation. In the male sample, however, we do not observe any changes of labor force participation brought by new births or the pandemic across model specifications. These results indicate that, in terms of labor force participation, only women experienced a decrease in labor force participation due to childbirth and the pandemic offered an

opportunity for them to increase labor force attachment during their postpartum period.

Table 3 shows the results for leave take-up from our difference-in-differences fixed-effect linear probability models. For simplicity, we dropped the observations that are out of the labor force or unemployed so that leave take is a dichotomous variable with "at work" being the reference category. Coefficients size and significance levels were consistent across models, which suggests that the impact of a new birth and its interaction effect with the pandemic cohort were not explained away by inclusions of demographic characteristics or employment attributes. In column (2), a new birth was associated with 19 ppts higher probabilities of mothers taking leaves for both cohorts. The pandemic cohort was 3.8 ppts (p <0.05) more likely to take leave relative to the 2017-2018 cohort. In column (4), fathers of infants were generally 2 ppts more likely to take leave with a new child, but fathers of infants in the pandemic cohort were 2.5 ppts (p <0.001) more likely to do so compared to fathers in the 2017-2018 cohort. Taken together, both women and men increased their leave take-up after the birth of a new child, and mothers and fathers in the pandemic cohort were more likely to take leave than the 2017-2018 cohort. However, relatively speaking, fathers in the pandemic cohort were twice as likely (i.e., 2.5 ppts more likely than 2 ppts) to take leave and mothers were only 20% (i.e., 3.8 ppts morelikely than 19 ppts) more likely to take leave.

Table 4 shows the difference-in-differences estimation results for hours worked in the prior week from fixed-effect models. For individuals who did not work last week because of taking leave, being unemployed, or being out of the labor force, their work hours were coded to zero. Coefficients do not vary greatly by model specifications for the female and male samples. Column (2) shows that women on average reduced their weekly work hours by 8.5 hours after a new birth, but there was no cohort difference in the magnitude of hours reduction. Column (4) shows that

men on average reduced their weekly work hours by 1.5 hours after a new birth, and fathers in the pandemic cohort had an additional one-hour reduction in weekly work hours compared to fathers in the 2017-2018 cohort.

Related to Table 3, the additional reduction of work hours for fathers in the Pandemic cohort reflects the significant increase in leave take up. However, since mothers in the Pandemic cohort did not increase their leave take to the same extent as their male counterparts, changes in weekly hours worked are not as obvious for mothers in the pandemic cohort. Table A.1 restricts the sample to "at-work" observations for those with positive work hours. Results show ageneral reduction of 2.9 hours associated with a new birth but no cohort differences for women; for men, there are 0.5 hours reduction in weekly work hours after controlling demographic and employment characteristics and no cohort differences. Tables A.1 identifies that for those who continue to work after childbirth, only mothers reduced their work hours while fathers work same hours as before childbirth. The results in Table A.1 provide additional evidence that the cohort difference in work hours for the male sample reflects fathers' increased leave take up.

Labor Market Transition for Mothers with New Birth

Next, focusing on women's increasing labor force participation, we examine whether such trend was driven by women continuing to stay in the labor market, or by women reentering the labor market after a new birth during the pandemic. Using information from respondents' last time interviewed during their first four interviews and last time interviewed during their second four interviews, we create four types of labor market transitions over a maximum of 16-month time span: (1) from out of the labor force to out of the labor force; (2) from out of the labor force to in the labor force; (3) from in the labor force to out of the labor force; and (4) from in the labor

force to in the labor force.

In a simple difference-in-difference design, we apply multinomial logistic regression to estimate the effect of "new birth" on four labor market transition patterns, and we compare whether such effect differ for mothers with a new birth in the pandemic cohort relative those in the pre-pandemic cohort. In Table 5, Panel A shows that the pandemic cohort is 1.3 percentage point less likely to be transitioning from in the labor force to out of the labor force when having a new birth, compared to those in the pre-pandemic cohort. This shift adds more evidence to the *pandemic parental leave* phenomenon as it shows that the pandemic allows women who had a childbirth to stay better attached to the labor market during their postpartum period. Panel B and Panel C show that such shift is driven by women with a bachelor's degree. In Panel D, there is no significant difference between the two robustness check cohorts (2017-2018 cohort compared to 2015-2016 cohort).

Robustness Checks of Main Results

Figure 1 provides robustness checks for the panel analyses by drawing comparisons between the 2017-2018 cohort relative to the 2015-2016 cohort. Since there were no large scale shifts of work arrangements such as telework for both cohorts, we expect to see no cohort differences in the effect of a new birth on parents' labor market activities. From the left to the right, it displays the additional effect of new birth on the Pre-Pandemic cohort relative to the 2015-2016 cohort on labor force participation, leave take-up, and work hours. As expected, the interaction between a new birth and the 2017-2018 cohort was not statistically significant, demonstrating that there was no difference between the cohorts. These robustness checks buttress our argument on the phenomenon of *pandemic parental leave* by showing that the statistically

significant cohort differences in the effect of a new birth were particular to the comparisons between the 2017-2018 and the pandemic cohort but not to the comparisons between the 2017-2018 cohort to the 2015- 2016 cohort.

Supplemental Analysis of Covid Telework on Leave Take Up and Hours Worked

Tables 6 and 7 provide additional evidence of this phenomenon we have coined *pandemic parental leave*, describing the ways in which new mothers and fathers of infants interacted with the labor market and employers during the pandemic. Between May 2020 and September 2022, the CPS asked respondents whether they teleworked for pay *due to* the COVID-19 pandemic.[5] Because this question was only asked for those who were actively employed, we focusonly on examining two labor market outcomes related to telework: leave take up and hours worked.

We again use a difference-in-differences estimation design with the cross-sectional format of the CPS to identify the effect having a child under age two has on leave take up and hours worked for those who teleworked due to the pandemic.[6] With an assumption that telework provided parents with more flexibility to balance work with childcare, we might expect to see parents of children under two, especially mothers, take less leave and work a higher number of hours if they telework because they can more efficiently interchange work time with childcare

[5] "Due to the COVID-19 pandemic" could mean very different things for people. It could mean that the person was teleworking because they had COVID-19, or another member of their family had COVID-19. It could mean they had been exposed to COVID-19 and were quarantining. It could mean their entire office had transitioned to remote work because of the pandemic, regardless of whether they themselves had COVID-19 or had been exposed. It could mean they were teleworking because they did not have childcare or eldercare for family members due to the pandemic.

[6] We use under age two as a cutoff instead of under the age of one because data on the age of very young children is often imprecise with respondents making more errors in age reporting than older children (Oppenheim-Mason and Cope 1987; Yadav et al. 2020).

time. To obtain unbiased estimates, we used person weights and obtained robust, clustered standard errors using individual identifiers.

In Table 6, conditional on being employed, there is consistent negative interaction effect (6.6 ppt) for mothers, showing that mothers of infants did take less leave in a teleworking environment compared to mothers of infants in a non-teleworking environment. For both men and women, telework was associated with a lower probability of leave take up and having a child under age two was associated with a higher probability of leave take up. Conditional on working (i.e., having positive work hours the prior week), there is a consistent positive interaction effect for mothers' hours worked (Table 7), which suggests that mothers of infants who teleworked were able to work more hours than their non-teleworking counterparts. However, there was no statistically significantinteraction effect for fathers in terms of leave take up and hours worked.

Telework was associated with higher work hours for mothers and lower work hours for fathers, while having a child under age two was associated with fewer hours worked only for mothers. Even though we include controls for broad occupational and industrial groups, the statistically significant interaction effect could still be a reflection that teleworking jobs provided better leave options or teleworking jobs were better protected from the pandemic shock so that workers did not suffer a reduction or cut in hours worked. Regardless of the selection into telework, the pandemic made telework a widely adopted work fashion that appears to benefit parents' ability to engage with the labor market during the pandemic.

Discussion

The strong recovery of women's employment after COVID-19 is part of the long-term trends of women's rising employment due to women's increasing education (Goldin 2021;

Brookings 2024). Our research shows that the post-pandemic recovery could be partially attributed to what we call *pandemic parental leave,* which occurred when a more flexible work environment due to teleworking and WFH that arose out of the pandemic closures and stay-at-home orders. Labor market shifts and workplace dynamics enabled parents with infants, especially mothers, to continue working. Employment protection acts during the pandemic made it easier for parents to take leaves during this time (U.S. Department of Labor 2020). The fact that teleworking mothers took less leave and worked more hours than non-teleworking mothers indicates that mothers of infants managed to work and provide childcare simultaneously in a telework environment. With the option to telework, it was likely that mothers with the birth of a new child thought they could return to work and simultaneously balance childcare for their infant with work-from-home. The challenging labor market during the pandemic also suggested that the decision to take leave was economically driven. Finding another job was likely more difficult during the pandemic, and these decisions were probably driven jointly with changes to a partner's employment.

As for fathers, our research showed that they were twice as likely to take leave after childbirth during pandemic months compared to the previous cohort. The high probability of fathers taking leave during the pandemic was likely a reflection of fathers becoming increasingly engaged with childcare as workplace norms shifted. With the closure of childcare centers and schools moving online, fathers were taking more leave to cover childcare responsibilities. Taken together, while mothers' leave take up was more likely to be economically driven, fathers' increased leave take-up signaled a cultural shift of fatherhood and employer expectations of fathers in the workplace.

Conclusion

This paper provides an innovative use of the CPS panel structure to study the impact of childbirth on parental labor supply. To our knowledge, no prior research has used a CPS panel to study changes in parental employment after the birth of a child. Our study shows the potential of using the CPS' unique 4-8-4 survey methodological design to uncover changing patterns in men and women's employment shortly after the birth of a child.

We find that both mothers and fathers of infants increase leave take up during pandemic months. For fathers, who already have high labor force participation rates, increases leave take-up resulted in an overall reduction of work hours. The same was not true for mothers. We investigated further the dynamics of mothers' labor supply by investigating whether increased labor force participation coincided with the potential for telework and the adaptive technologies that accompanied the transition to WFH. We found suggestive evidence that while more mothers took leave from work following the birth of an infant, overall hours worked did not change because of the increase in labor force participation of mothers in combination with mothers who teleworked due to COVID-19 taking less leave.

Our results shed light on the complexities of work and family for both mothers and fathers today and raise concerns over the benefits and potential risks of mothers' ability to telework after birth. On the one hand, accelerating mothers' labor supply post birth provides more economic agency and bargaining power to mothers within the household. On the other hand, mothers who try to balance too much risk burnout. Multitasking care of an infant with remote work could have damaging effects on mothers' mental health and wellbeing in both the short and long-run. Further research, such as using time use data to understand how parents and specifically mothers who telework and care for children simultaneously balance their time spent

at work and in their caregiving role, is needed to investigate how the labor market is changing for parents today and whether increased flexibilities given by employers is helping or hindering women's labor supply and economic agency.

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Tables and Figures

Table 1: Descriptive Statistics

	Women with New Birth		Men with New Birth	
	Pre-Pandemic Cohort (2017-2018)	Pandemic Cohort (2019-2020)	Pre-Pandemic Cohort (2017-2018)	Pandemic Cohort (2019-2020)
Ages 25-30	34.0%	32.0%	26.3%	24.5%
Ages 31-35	42.1%	41.7%	40.5%	40.9%
Ages 36-40	18.9%	21.1%	26.1%	26.6%
Ages 41-45	5.0%	5.2%	7.1%	8.0%
White	69.4%	67.9%	72.5%	74.2%
Black	6.8%	7.8%	5.7%	6.2%
American Indian	1.1%	0.9%	1.0%	0.8%
Asian	7.9%	6.9%	7.1%	6.1%
Hispanic	12.8%	13.7%	11.4%	10.8%
Hawaiian, mixed race	2.1%	2.7%	2.3%	1.9%
High school or less	20.5%	22.0%	26.4%	26.4%
Some college	12.6%	12.0%	15.2%	16.1%
Associates degree	12.2%	9.3%	11.0%	9.7%
Bachelor's degree	33.0%	32.8%	29.0%	29.4%
Advanced degree	21.7%	23.8%	18.5%	18.5%
Citizen	89.2%	90.7%	89.9%	90.7%
Never married	13.3%	11.7%	10.2%	8.1%
Married	81.1%	84.3%	87.3%	89.5%
Previously married	5.6%	4.0%	2.5%	2.4%
Currently in school	3.5%	2.5%	6.9%	5.6%
In labor force	64.3%	66.1%	96.8%	96.0%
Among employed % on leave	20.7%	24.6%	3.9%	6.1%
Total hours worked last week	17.49	16.49	38.44	36.03
Number of Individuals	1,729	1,655	1,578	1,521
Number of Observations	5,679	5,263	5,219	4,868

Note: Reported percentage is the global mean across observations for each group.

Table 2: Impact of a New Birth During the Pandemic on Labor Force Participation

	Women		Men	
VARIABLES	(1)	(2)	(3)	(4)
New Birth	-0.0932***	-0.0106***	0.0026	0.0000
	(0.0070)	(0.0023)	(0.0039)	(0.0010)
New Birth × Pandemic Cohort	0.0295***	0.0063*	-0.0046	-0.0015
	(0.0106)	(0.0031)	(0.0057)	(0.0015)
Demographic Controls	Yes	Yes	Yes	Yes
Employment Controls	No	Yes	No	Yes
R-squared	0.8006	0.9689	0.7517	0.9584
Number of Individuals	67,924		63,095	
Number of Observations	483,432		449,472	
Dependent Variable Mean	0.768		0.908	

Note: Each model includes year-month fixed effects and individual fixed effect. Demographic controls include education, citizenship, marital status, and school status. Employment controls include 27 occupations and 10 industries. Cohort coefficient is omitted due to year and month controls. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3: Impact of a New Birth During the Pandemic on Leave Take-Up

	Women		Men	
VARIABLES	(1)	(2)	(3)	(4)
New Birth	0.1899***	0.1897***	0.0202***	0.0202***
	(0.0129)	(0.0129)	(0.0032)	(0.0032)
New Birth × Pandemic Cohort	0.0378**	0.0381**	0.0247***	0.0247***
	(0.0168)	(0.0168)	(0.0069)	(0.0069)
Demographic Controls	Yes	Yes	Yes	Yes
Employment Controls	No	Yes	No	Yes
R-squared	0.3118	0.3121	0.2442	0.2442
Number of Individuals	54,344		56,930	
Number of Observations	353,944		384,009	
Dependent Variable Mean	0.0450		0.0258	

Note: Sample only includes those individuals who are employed. Each model includes year-month fixed effects and individual fixed effect. Demographic controls include education, citizenship, marital status, and school status. Employment controls include 27 occupations and 10 industries. Cohort coefficient is omitted due to year and month controls. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 4: Impact of a New Birth During the Pandemic on Hours Worked

	Women		Men	
VARIABLES	(1)	(2)	(3)	(4)
New Birth	-8.4659***	-6.5435***	-1.3770***	-1.4465***
	(0.4685)	(0.3966)	(0.2881)	(0.2933)
New Birth × Pandemic Cohort	0.0467	-0.5171	-1.1939***	-1.0565**
	(0.5588)	(0.4750)	(0.4419)	(0.4304)
Demographic Controls	Yes	Yes	Yes	Yes
Employment Controls	No	Yes	No	Yes
R-squared	0.7383	0.7797	0.6745	0.7078
Number of Individuals	67,924		63,095	
Number of Observations	483,432		449,472	
Dependent Variable Mean	26.40		35.44	

Note: Each model includes year-month fixed effects. Demographic controls include education, citizenship, marital status, and school status. Employment controls include 27 occupations and 10 industries. Cohort coefficient is omitted due to year and month controls. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 5: Marginal Effects of a New Birth During the Pandemic on Labor Force Transitions

VARIABLES	Out → Out (1)	Out → In (2)	In → Out (3)	In → In (4)
Panel A: Full Sample				
New Birth × Pandemic Cohort	-0.010	0.002	-0.013**	0.021
	(0.014)	(0.009)	(0.006)	(0.018)
Panel B: Bachelor's or Higher Degree				
New Birth × Pandemic Cohort	-0.015	-0.011	-0.013*	0.039*
	(0.014)	(0.013)	(0.007)	(0.021)
Panel C: High School to Associate's Degree				
New Birth × Pandemic Cohort	0.005	0.014	-0.010	-0.008
	(0.020)	(0.014)	(0.009)	(0.023)
Panel D: Robustness Check				
New Birth × 2015-2016 Cohort	0.011	-0.004	0.008	-0.015
	(0.011)	(0.008)	(0.006)	(0.013)

Note: Estimates and standard errors are marginal effects from a multi-logit regression. Multi-logit regression includes race, age, age-squared, education, citizenship, marital status, number of children, year, month, and state controls. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6: Impact of Telework on Leave Taking

	Mothers			Fathers		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Telework	-0.0332***	-0.0391***	-0.0356***	-0.0141***	-0.0143***	-0.0129***
	(0.0020)	(0.0022)	(0.0023)	(0.0015)	(0.0016)	(0.0017)
Infant	0.1004***	0.0906***	0.0907***	0.0108***	0.0111***	0.0113***
	(0.0043)	(0.0047)	(0.0047)	(0.0018)	(0.0020)	(0.0020)
Telework × Infant	-0.0656***	-0.0631***	-0.0620***	-0.0018	-0.0014	-0.0007
	(0.0059)	(0.0059)	(0.0059)	(0.0032)	(0.0032)	(0.0032)
Year/Month/State	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	No	Yes	Yes	No	Yes	Yes
Employment Controls	No	No	Yes	No	No	Yes
R-squared	0.0375	0.0398	0.0500	0.0050	0.0055	0.0092
Observations		129,239			147,819	
Dependent Variable Mean		0.064			0.031	

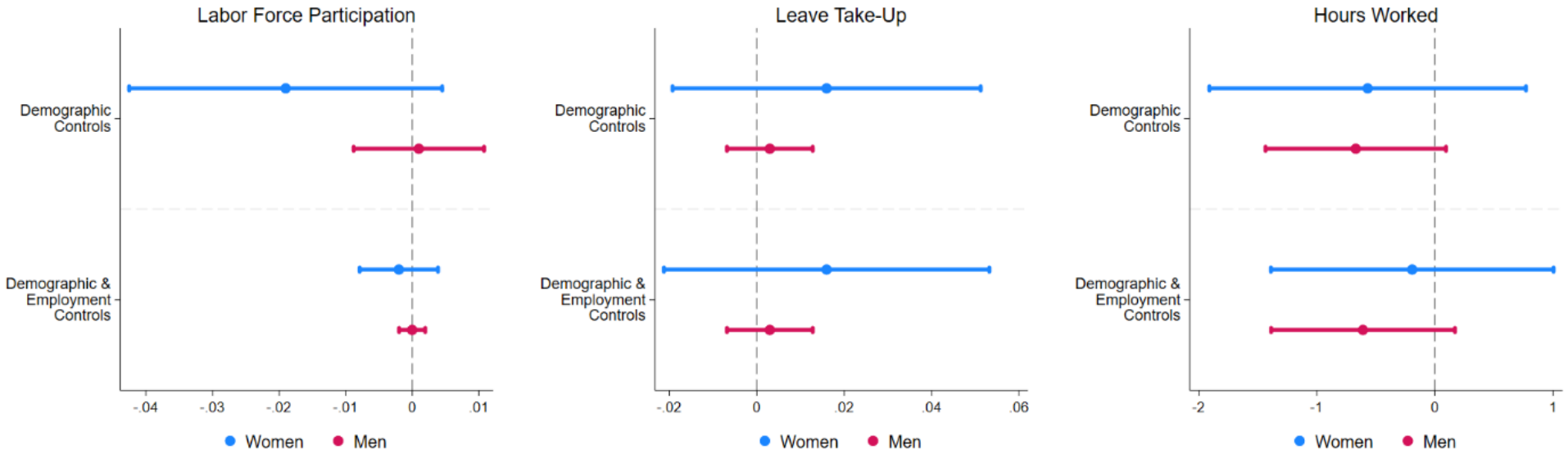
Note: Sample are ages 25-45 and are employed. Time period is between May 2020-September 2022 when the CPS question about whether the respondents telework because of COVID-19 was asked. Demographic controls include education, races, age, citizenship status, marital status, # of children, # of children under age 5. Employment controls include 25 occupation groups and 8 industry groups. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 7: Impact of Telework on Hours Worked Last Week

	Mothers			Fathers		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
Telework	2.3021***	1.6821***	0.8004***	-0.1914	-0.5544***	-0.3843***
	(0.1469)	(0.1476)	(0.1497)	(0.1404)	(0.1454)	(0.1457)
Infant	-1.9158***	-1.1574***	-1.1204***	-0.3379**	-0.2993*	-0.3046*
	(0.1864)	(0.2156)	(0.2098)	(0.1350)	(0.1612)	(0.1585)
Telework × Infant	1.0926***	1.0263***	0.9795***	-0.2478	-0.1969	-0.1219
	(0.2968)	(0.2961)	(0.2903)	(0.2640)	(0.2621)	(0.2588)
Year/Month/State	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	No	Yes	Yes	No	Yes	Yes
Employment Controls	No	No	Yes	No	No	Yes
R-squared	0.0191	0.0334	0.0677	0.0079	0.0202	0.0448
Observations		120,915			143,225	
Dependent Variables Mean		36.582			42.875	

Note: Regressions are conditional on working, i.e, having positive work hours last week (Sample excludes those who are out of the labor force, unemployed, and not at work). Age is restricted to 25-45. Time period is between May 2020-September 2022 when question about whether the respondents telework because of COVID-19 is asked. Demographic controls include education, races, age, citizenship status, marital status, # of children, # of children under age 5. Employment controls include 25 occupation groups and 8 industry groups. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Figure 1: Impact of New Birth with 2015-2016 Cohort



Note: We obtain coefficients using the full models consistent with Table 2-Table 4.

Appendix Tables

Table A1: Impact of a New Birth During the Pandemic on Hours Worked for Actively Working

	Women		Men	
VARIABLES	(1)	(2)	(3)	(4)
New Birth	-2.8573***	-2.8882***	-0.4147*	-0.4160*
	(0.3460)	(0.3408)	(0.2439)	(0.2421)
New Birth × Pandemic Cohort	-0.4099	-0.3944	-0.3284	-0.3248
	(0.4862)	(0.4865)	(0.3233)	(0.3232)
Demographic Controls	Yes	Yes	Yes	Yes
Employment Controls	No	Yes	No	Yes
R-squared	0.6350	0.6358	0.5783	0.5787
Number of Individuals	53,769		56,666	
Number of Observations	337,592		373,895	
Dependent Variable Mean	37.61		42.49	

Note: Sample includes only actively working individuals. Each model includes year-month fixed effects. Demographic controls include education, citizenship, marital status, and school status. Employment controls include 27 occupations and 10 industries. Cohort coefficient is omitted due to year and month controls. Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1