Where does the time go?: Decomposing men and women's time use following a first-birth *

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June 29, 2026

Abstract

Is there a motherhood penalty in time use? Using a pseudo-event study design, we document that women's time spent on childcare and housework increases more post-birth than men's. Women are also more likely to spend more time on multi-tasking with women reporting a larger increase in time spent on childcare done simultaneously with leisure and housework. Using state-by-year variation in paid family leave legislation, we show that these policies change the motherhood penalty in time-use, increasing the gap in time use in the year of birth but reducing the gap in the years post-birth.

Keywords: childcare, female labor supply, time use.
JEL Codes: J13, J22, J38

*Thanks to Garrett Anstreicher for helpful comments. The authors have no conflicts of interest or funding sources to disclose. Corresponding Author: Joanna Venator, 140 Commonwealth Ave, Chestnut Hill, MA 02467; venator@bc.edu

1 Introduction

A growing literature documents that parenthood impacts mothers' labor market outcomes more than fathers', reducing attachment to the labor market, hours worked, and earnings (Kleven et al., 2019b, Cortes and Pan, 2020, Goldin and Mitchell, 2017, England et al., 2016, Gangl and Ziefle, 2009, Budig and England, 2001). Gender differences in the impacts of children – also known as the "child penalty" – are persistent and exist across countries (Kleven et al., 2019a). Past work has documented that this child penalty is increasingly important for explaining aggregate gender differences: the proportion of the gender earnings gap attributable to parenthood has grown over time since the 1980s, and as of 2013, 80% of the overall gap is attributable to the motherhood penalty (Kleven et al., 2019b).

These papers often implicitly attribute these earnings gaps to new mothers' increased care work, with a number of papers exploring whether the motherhood gap differs in the presence of policies that make childcare more accessible.[1] In this paper, we formally document how time spent in care work changes in response to new parenthood. Using American Time Use (ATUS) data in a pseudo-event study framework from Kleven [2022], we show that having a child is associated with a decline in paid work of 1.3 hours per day post-birth for mothers relative to fathers. This decrease in paid work is fully offset by an increase in hours spent on childcare (+1 hour) and housework (+0.4 hours).

When we look at mothers and fathers separately, we see that entry into parenthood shifts men and women's behavior by different magnitudes. Both men and women decrease time spent in leisure and time spent sleeping following a birth, but the decrease is similar for both genders, resulting in a null effect on leisure and sleep post-birth for mothers relative to fathers. Men and women re-allocate that lost leisure and sleep differently: while men increase hours per day in paid work by one hour and increase hours spent on childcare by 1.1 hours, women increase time spent in childcare by 2.3 hours per day, and increase time spent on housework by 0.2 hours.

The ATUS survey also allows us to observe how much time is spent in active childcare (i.e., childcare as the primary activity) versus passive/multi-tasking childcare (i.e., childcare as the secondary activity). When we combine passive and active childcare into a single measure, the gender gap in time spent on childcare post-birth more than doubles. Men's

[1] For example, Anstreicher and Venator [2024] show the child penalty is 22% lower in US counties with low childcare prices and 11% lower in counties with nearby family who might provide access to informal care. Andresen and Nix [2025] show that a Norwegian policy reform which increased access to high quality childcare reduced the child penalty by 23%.

composite childcare time increases by 5.8 hours in the first year post-birth whereas women's composite time increases by 9.8 hours, resulting in a motherhood gap of 4 hours. We see that mothers are much more likely to be engaging in childcare simultaneously with 'leisure' and simultaneously with other housework. This suggests an additional way in which care work disproportionately impacts mothers relative to fathers: mothers' leisure time is more likely to no longer be pure leisure, but rather be leisure time spent partially caring for a child. We can re-calculate a measure of 'uninterrupted leisure' which is defined as time spent in leisure as a primary activity without childcare being reported as a secondary activity simultaneously. When we re-calculate the motherhood penalty for uninterrupted leisure, we now see that mothers have about 0.6 fewer hours per day of uninterrupted leisure in the first year post-birth relative to fathers.

To validate our results, we replicate our pseudo-panel using the Panel Study of Income Dynamics (PSID), and compare our results to a true event study. While the PSID has less granular data available on time use, we attain results in our pseudo-event study which are consistent with both the true PSID event study and with our main results from the ATUS: women are spending less time on paid work and more on unpaid care work following the birth of their first child relative to men.

We then consider how policy can mitigate gendered differences in time use. Using state by year variation in paid family leave (PFL) legislation in a triple differences design, we test whether living in a state that mandates PFL coverage changes the gender gap in time use. We find that PFL decreases the gender gap in time spent on childcare by 0.9 hours on average over the three years post-childbirth. When we look at trends in time use separately by gender and policy setting, we see that PFL seems to allow parents to trade-off time spent on childcare in the first years of a child's birth. In the year of birth, PFL is associated with slightly higher time spent on childcare for mothers and lower time spent on childcare for fathers. In the year after birth, this trend flips with mothers in states with PFL decreasing their time spent on childcare relative to those without and fathers substantively increasing their time spent on childcare. This results in a statistically significant decline in the motherhood gap in childcare time in aggregate.

Taken together, these results document that the motherhood penalty in terms of hours of paid labor is almost entirely off-set by an increase in terms of hours spent on unpaid labor, but that the policy environment in which households make these home production decisions can mediate these effects. We see our work as contributing to the literature in three primary areas.

First, our paper builds on the growing literature documenting the gendered costs associated with fertility. While a large literature has shown how fertility pulls women out of the labor force, there is less literature documenting the causal effect of fertility on time use. Much of the work on gender differences in time spent in home production is descriptive in nature (see Budig and Folbre [2002] for an overview of this literature). While the gender gap in time spent in home production has drastically declined over the 20th century as women entered in the workforce, women continue to spend substantially more time in childcare and housework than men (Bianchi, 2011). Mothers' time use on childcare increases in response to increases in childcare prices and decreases in response to increases in wages (Kimmel and Connelly, 2007). We extend this literature by using a pseudo-event study design to estimate relative changes in time use by gender across demographic groups. The papers most similar to ours are analyses of time use post-child birth in Mexico (Aguilar-Gomez et al., 2026), the Netherlands (Koopmans et al., 2024, and Japan (Guo and Xie, 2024) which use a similar method to document changes in women's time in care work relative to men following the birth of their first child.

We see our paper as adding two new insights to this literature. First, we document impacts in the US context. One of the takeaways from the prior papers is that country context matters for the impacts of birth on time-use. For example, while Guo and Xie [2024] show that time spent in home production activities (i.e., childcare, housework) increases similarly for men and women but leisure declines more for women, Koopmans et al. [2024] finds large relative increases in home production activities and no relative difference in leisure post-birth for men and women. Given that the US is characterized by having relatively low access to affordable childcare and parental leave relative to other economically similar countries, we might expect that having children has greater impacts on time spent in childcare in the US. Second, unlike previous work on time use post-birth in other countries, our paper incorporates both primary and secondary time use. This allows us to document that the increase in home production partially manifests as increased multi-tasking for women, over and above the amount of time spent in primary care work.

Second, we contribute to the literature evaluating the impacts of PFL. A large literature has documented the impacts of PFL on labor market outcomes (see Rossin-Slater [2018] for an overview) with mixed findings of the impacts of US policies. While some evaluations of California's PFL found that it increased women's labor force attachment (Baum and Ruhm, 2016, Bana et al., 2020, Rossin-Slater et al., 2013) and increased fathers' leave-taking (Bartel et al., 2018), more recent work finds no positive impact on women's earnings and reduced

long-term earnings for first-time mothers (Bailey et al., 2025). A more limited set of papers has evaluated how time spent on childcare responds to paid family leave policies. Leveraging the California PFL in a difference-in-difference design, Trajkovski [2019] finds that access to paid family leave increased mothers time spent on childcare in the year following birth and had no significant impact on fathers time, but does not look at the long run differences in childcare separately by parent gender. Using the same policy variation, Gonalons-Pons [2023] finds that California's policy increased mothers time spent on childcare in the year of birth whereas fathers decreased time on childcare in year of birth. We contribute to this literature by expanding our analyses to incorporate multiple states' leave policies and looking at the longer-run impacts of the policy on the gender gap in time use. Our results are consistent with past findings, but also demonstrate that PFL continues to impact parental time-use beyond the year directly following birth.

Lastly, we find substantive gender differences in the amount of childcare conducted simultaneously with other activities, speaking to a smaller literature documenting that women are more likely to engage in multi-tasking and interrupted activities in both home and work contexts (Offer and Schneider, 2011; Craig and Brown, 2016; Adams et al., 2025). These papers find that women report that their own skills at multi-tasking is better than men, and both men and women predict that on average women are better at multi-tasking. However, experimental work on multi-tasking in a lab setting suggests that multi-tasking has significant productivity impacts and these differences do not differ between men and women (Buser and Peter, 2012). Moreover, Buser and Peter [2012] find that when given the opportunity to choose between focused time and multi-tasking, women preferred focused time significantly more than men. Our findings show that the amount of time women spend on multiple activities increases substantially more than that of men and that disparities in home production are exacerbated when this multi-tasking behavior is considered. This sheds light on one of the mechanisms through which the child penalty persists even if women re-enter the workforce: increases in mental and physical load caused by women taking on a greater amount of the 'passive childcare' that involves being on-call during other activities such as leisure and housework.

2 Data and Methods

The primary data source this paper uses is the American Time Use Survey (ATUS) from 2003-2023. The survey provides a repeated cross-section of time use data for a nationally

representative sample. Our primary outcomes of interest are average hours spent on paid work, childcare, leisure (which we define as social time, sports, personal care, phone time, and eating), and sleep. The dataset also includes demographic characteristics such as education level, marital status, race, and state, and data on the year and age at which the surveyed individual had their first child. We include hours on all days of the week, not just weekdays.

The ATUS has 245,000 observations over the years 2003-2023. We first restrict our sample to include only parents who were aged 18-50 at first birth, resulting in 39,000 parents. Because our dataset is a repeated cross-section, we do not have information on whether and when survey respondents without children will have children. This poses a challenge for identifying a control group that can be used to measure time use in the years leading up to the first birth. To account for this, this paper implements a pseudo-event study approach, as used in Kleven [2022], to gain insight into how time use behavior changes in women relative to men following the birth of their first child. Because we cannot observe whether/when those without children will eventually have children, the pseudo-event study imputes observations of pre-period outcomes in $t-n$ by matching parents of age a in year y to individuals without children in year $y-n$ who were age $a-n$ and have similar demographic characteristics.

In our setting, we construct a pseudo-panel by matching parents with non-parents on year and age at birth, as well as the following demographic characteristics: sex (male or female), education level (less than high school, high school, some college/associate's degree, bachelor's, graduate), marital status (ever married, never married), and race (White, Black, Hispanic, other), and region (Northeast, Midwest, South, and West). We then match parents to observations in the same demographic cell based on age and year of birth.[2] For example, if a parent was 30 in 2008 at time of first birth, a 28-year old non-parent in 2006 with the same demographics would be matched as a 't-2' observation for that parent.

At the end of this process, we end up with the time use data of a parent from the ATUS matched with up to five years of pre-event data leading up to the year before they gave birth. This results in a pseudo-panel of over 10,700 unique matches, who each are observed in one period as a "parent" and in at least one year as a "non-parent" (approx. 30,300 total observations). Appendix Table A-1 presents the demographic characteristics of the full ATUS sample (including only parents aged 18-50 at birth and all non-parents), compared with the characteristics of our final pseudo-panel dataset (parents and their non-parent matches), as

[2]To break ties, we order the parent and non-parent observations randomly and remove potential control matches once matched to a parent, so this process is done without replacement within a year, but with replacement across years.

well as four alternate matches described in Appendix Section A.2. While the full sample of non-parents is older, much less likely to be married, is more white, and has lower levels of education, these demographic differences are substantively reduced in the matched sample.

Using this pseudo-panel, we run the following model to identify the child penalty, which we estimate as the change in the difference in hours spent on an activity by women relative to men post-birth. We now interact our treatment and covariates with an indicator for female, to estimate how women are differentially adjusting their time use relative to men.

$$Y_{it} = \alpha + \beta D_{it} + \gamma X_i + \delta Z_i + \beta^f (F_i \times D_{it}) + \alpha^f F_i + \gamma^f (F_i \times X_i) + \delta^f (F_i \times Z_i) + u_{it} \quad (1)$$

D_{it} is a vector of dummies for each event-time (omitting the year before birth), X_i is a vector of demographic characteristics which parents and non-parents were matched on (education level, marital status, race, and region), and Z_i is a vector of additional fixed effects (age, year, and state). Standard errors are clustered at the individual match level. Observations are weighted using the ATUS weights and the inverse of the frequency with which a pre-birth observation appears in the panel. F_i is an indicator for female, and all other coefficients are the same as in equation 2. The coefficients β^f represent the relative difference in the hours spent on an activity of interest for women relative to men. In appendix section A.1, we also show that our results are robust to adding age at birth fixed effects, using the estimation strategies from Thakral and Tô [2025].

Because the child penalty is the difference in the impact of fertility by gender, a decline in hours worked could either be attributable to an increase in work hours for men, a decrease in work hours for women, or some combination of the two. To understand which spouses' behavior drives the gap, we also estimate the following specification separately for women and men:

$$Y_{it}^g = \alpha^g + \beta^g D_{it}^g + \gamma^g X_i^g + \delta^g Z_i^g + u_{it}^g \quad (2)$$

In this equation g denotes gender of the spouse. The subscript i is an index of matches and t is an index of event-times (from $t = -5$ through $t = 10$), so i represents a parent for time $t \geq 0$ and the corresponding matched non-parent for time $t < 0$.

2.1 Validation

While Kleven [2022] is able to validate that their matched non-parents are a good control group by showing a null effect on post-birth earnings for men, it is a priori not clear that we should expect null effects for men in terms of time spent in childcare. Therefore, we validate our pseudo-event study approach by comparing our pseudo-event study results to a more traditional event study using time use data from Panel Study of Income Dynamics (PSID). The PSID is a survey which follows a nationally representative sample of approximately 18,000 individuals and their descendants over-time. While the panel structure allows us to construct both a pseudo-panel and a true event study following parents both before and after birth, the PSID only has long-term data tracking time spent on paid work and housework, limiting our ability to analyze impacts of births on all types of time use.[3]

Further, unlike ATUS which relies on time diaries collecting the full set of activities completed in a day, the PSID asks survey respondents to report retrospectively their average time use in a typical day for four major categories: paid work, childcare, leisure, and housework. There are no restrictions in the PSID data against concurrent activities, or ensuring that hours accounted for cannot exceed the number of hours in a day (there are in fact instances of the contrary). This means that we can only measure overall time in a category and cannot measure multi-tasking in the PSID data. Because of these limitations, we prefer to use the ATUS data for our main analysis and use PSID data solely as a means of validating our pseudo-panel approach.

Appendix Table A-2 presents the summary statistics of the PSID sample. Columns 1-3 present the demographics of the true PSID panel of parents observed in at least one year before and after giving birth. Columns 4-6 present the demographics of the pseudo-panel we construct by matching parents with individuals with no children, using the same demographic categories as used in the ATUS (year/age at first birth, sex, race (4 categories), education (5 categories), marital status (2 categories), and region (4 categories).

[3]The PSID also began tracking time spent on childcare and leisure beginning in 2017, meaning that while we can construct an event study for these variables as well, there are much fewer observations of parents five years post-birth (or pre-birth) whom we also observe both before (or after) their child is born. As a result, the coefficient on time period t+5 for instance is identified off of only 64 observations rather than the 441 we have available in year t+1). For completeness, we also replicate our pseudo-event study over 2017-2023 for the four time-use variables, in which we match individuals on all demographics except year of first birth. We attain similar results in this specification as well, as reported in Appendix Figure A-3.

3 Results

3.1 Impacts on Primary Time Use

Our first analysis looks at the child penalty in time spent per day on childcare, paid work, leisure, and sleep as a primary activity. Figure 1 and Appendix Table A-3 report the coefficients estimated in equation 1 for these outcomes. Coefficients represent the relative difference in change in hours spent on an activity post-birth for a mother relative to a father. Horizontal lines denote the aggregate post-period effect, estimated using a post-birth indicator rather than disaggregated event-time indicators.

We first show that women decrease their hours worked by 1.3 hours (33.8%) relative to hours worked by men. In the periods leading up to the first birth, we find no significant difference in hours worked by gender, and the gap that appears is persistent and significant for the first nine of the ten years we model post-child birth. This is consistent with the existing literature on the child penalty which finds that women reduce their weekly employment by 24% and their annual earnings by 31% (Kleven, 2022). However, unlike much of the survey data used to calculate child penalties in past papers, ATUS data allows us to explore how women are spending the time that they previously spent in paid labor.

We find that the decline in paid labor for mothers relative to fathers is primarily being shifted towards childcare. After birth, women increase their hours of childcare by 1 hour relative to men.[4] This effect is highest directly following birth (1.6 hours) and then persists at a lower magnitude across the subsequent years post-birth. There is also a significant increase in the time spent on housework. After birth, women are on average spending an additional 0.4 hours (+23.4%) on housework relative to men with the effect persisting and increasing as the child ages. These two effects together demonstrate that increased time spent on unpaid care work fully offsets the decline in time spent on paid work.

In contrast, we find no significant gender difference in time spent on leisure or sleep for women relative to men. This does not, however, imply that new mothers are not changing their hours spent on these activities. In Figure 2 and Appendix Tables A-4 and A-5, we decompose the gender gaps we observe, using equation 2 to estimate the effects of a first birth separately by gender. We find that the null results on leisure in Figure 1 correspond to both men and women decreasing leisure by similar amounts, with respective decreases of 1.3 and 1.2 hours (relative to a baseline of 6.8 for both). Similarly, we find decreases of 0.5

[4]Because childcare time is essentially zero for the pseudo-parents in the pre-period, we do not report percent change for childcare.

hours of sleep for men (-5.6%) and 0.4 hours (-4.2%) for women. The decrease in time spent on leisure and sleep persists for both men and women in the following post-birth years.

This decomposition also demonstrates that post-childbirth we see greater household specialization. The decrease in leisure time for women is primarily reallocated towards childcare and housework, whereas men's former leisure time is reallocated towards childcare to a lesser extent and paid work. Childcare increases substantially for both men and women post-birth, with men and women spending minimal time on childcare pre-birth, and increasing their childcare time by 1.7 and 3.3 hours respectively in the first year. While women's housework increases substantively, men's time spent in housework is unchanged. The longer term trends for time spent on childcare and housework suggest that the downward trend in time spent on childcare and upward trend in housework which we observe in Figure 1 correspond primarily to changes in the mother's behavior, rather than a redistribution of these activities between parents.

Even as the time required for childcare decreases with older children, women are not immediately reallocating their time back into paid work. Housework is the only category where we observe an upward trend in time use for mothers over the post-birth period. This asymmetry in the relationship between paid work and childcare could be explained by additional time costs of children on the overall amount of time needed for housework (cleaning up after children, preparing food, additional laundry).

Another potential contributing factor to the persistence of the child penalty could be barriers to returning to work after a gap in work experience. There is evidence that a gap in human capital accumulation through missed work experience can exacerbate the post-birth wage gap, thus increasing the opportunity cost of returning to work even as the time needed for childcare decreases [Blundell et al., 2016, Laun and Wallenius, 2021]. Overall, these findings indicate that women are decreasing their hours of paid work long term and are substituting this time towards household activities.

3.2 Impacts of childbirth on multi-tasking

In addition to reporting time use in primary activities, the ATUS also allows us to measure how childbirth impacts the probability that men and women are engaged in multi-tasking behavior. The ATUS includes data on the time spent on childcare as a secondary activity, which is defined as any time where the respondent is taking care of a child while also doing some other primary activity (such as working or eating). This allows us to answer two

additional questions about time-use post-birth. First, how does composite time on childcare change for men and women? Childcare as a secondary activity is sometimes described as 'passive' childcare, such as when a parent is watching television but also keeping an eye on their child playing in the same room. If the gender gap in time use declines when we incorporate childcare as a secondary activity, this may suggest men engage more in this type of passive childcare than women. Conversely, if the gap increases, then women both spend more time engaged in both active and passive childcare. Second, how does uninterrupted time spent on other tasks change? If women are multi-tasking by taking care of children while working, this may contribute to earnings declines post-birth. Similarly, if there are differences in uninterrupted leisure time post-birth, we might expect that the spouse who is engaging in passive care during leisure gets less relaxation value from leisure, contributing to worse mental health and productivity.

To answer the first question, we re-run our event studies using composite childcare time, defined as the sum of hours in which childcare is listed as either a primary or a secondary activity. The top panel of Figure 3 reports the results both for the relative difference in composite time (top left panel) and for secondary time only (top right).[5] We find that women are increasing their total hours of childcare relative to men by 4 hours in the first year (compared to 1.6 hours in primary childcare time) and the gap is persistently higher post-birth. This suggests that not only do women spend more time focused on childcare as their primary task, but they also engage in more child-related multi-tasking than their spouses. When we account for secondary time use, our estimate for the gender gap in childcare more than doubles. Time use surveys which do not report secondary time use thus substantially underestimate the magnitude of the gender gap in hours of childcare.

We then further break down secondary childcare in the remaining panels of Figure 3 and Appendix Table A-7, which report the corresponding primary activity done concurrently with childcare. We do not see that women are spending more time on childcare and paid work simultaneously than men. They are, however, spending a greater amount of leisure time and housework time engaging in multi-tasking. The gap in time spent multi-tasking on childcare post-birth is around two hours of which about one-third is multi-tasking during leisure and half is multi-tasking during housework. Overall, these findings suggest that there is an additional childcare time cost faced by women, particularly during home-based activities, which analyses focusing solely on primary time use categories might overlook.

[5]Column 1-3 of Appendix Table A-6 reports the values of these coefficients both for the relative amount and separately by gender.

In light of this finding, we revisit our original estimate for time spent on leisure. When considering primary time use in leisure, we found no difference in the gender gap. In Figure 4 and Column 4-6 of Appendix Table A-6, we compare our original estimate with an adjusted estimate of "uninterrupted leisure", which excludes concurrent leisure/childcare time. We now find that women significantly decrease their time spent on leisure by an additional 0.6 hours relative to men in the first year post-birth. When we look at the effects on men and women separately, we find that men decrease leisure by 3.5 hours (-51.6%), while women spend 4.1 fewer hours on leisure (-62%).[6] This leisure gap decreases after the first several years post-birth.

3.3 Impacts of Paid Family Leave on the Child Penalty in Time Use

To better understand what factors exacerbate the child penalty, we next explore how the time use penalty differs across policy settings. We explore how the expansion of paid family leave (PFL) policies over time have impacted the gender differences in time-use post-birth. PFL may decrease the gender gap in time spent on childcare if it either increases the amount of time spent in childcare by fathers who take leave or if it allows women to stay more attached to the workforce. Conversely, it may increase the gender gap if only women take up PFL and thus spend more time in care activities. To test this, we leverage the staggered rollout of PFL policies across states. Between 2003 and 2023, 10 states (California, New Jersey, Rhode Island, New York, DC, Washington, Massachusetts, Connecticut, Oregon, and Colorado) enacted laws mandating paid family leave (PFL). Because the policy rollout is staggered, we run a specification in which we run a stacked difference-in-difference specification using the method from [Wing et al., 2024, Deshpande and Li, 2019, Cengiz et al., 2019]. We keep only treated states for which we can observe 3 years pre- and 3 years post- policy implementation and create clean comparison 'stacks' in which each treatment year is compared only to never-treated states. We assign treatment based on policy setting at time of birth. The regression then includes all 'stacks' in one sample and includes interactions of the state and year fixed effects with indicators for stack with standard errors clustered at the stack-state level.[7]

Figure 5 shows how PFL changes in the gap in post-birth childcare time and the impacts

[6] Appendix Tables A-8 and A-9 report coefficients for pseudo event studies run separately by gender.

[7] To create the balanced time window, we therefore have to drop five treatment states: California (2004), Massachusetts (2021), Connecticut (2022), Oregon (2022), and Colorado (2023).

of birth on time spent in childcare for men and women with and without PFL. We see that child penalty is 0.7 hours higher in the year of birth, though this difference is only marginally significant (p=0.088). When we look at the graphs disaggregated by gender and policy, we see that this increase comes from men reducing their time spent in childcare in t=0. However, in year t+1, the gender gap is 3.2 hours smaller with PFL than without, coming from women substantially reducing their hours spent in childcare in t=1 with PFL and men increasing their hours. In years t=2 and t=3, the gap is similar across policy settings. Aggregated over all post-periods, PFL is associated with a statistically significant 0.95 hour decline ($p < 0.001$) in the gender gap in childcare time. We also look at whether the gender gap in paid work changes in the year post-birth. We find that there is a -0.7 hour decrease in the gender gap in time spent in paid work with PFL, but this is not statistically significant (p=0.28). In event studies, women's long-run decline in paid work time is less pronounced in the presence of PFL, but we cannot reject the null that the coefficients are the same across policy settings. These results are consistent with paid family leave increasing care time for mothers in the short run, but decreasing it in the long run by re-allocating care work across genders and increasing attachment to the labor force.

4 Robustness Checks

4.1 Evaluating alternate match groups

Our identification strategy relies on the assumption that our matched non-parents' time use prior to the placebo birth year is a good proxy for what the actual parents' time use would have been. To test how sensitive our results are to what demographic groups we use to construct the matched control, Appendix Section A.2 reports four alternative matches and evaluates how our estimates change under different specifications; we find that our estimates of the child penalty in care time is not sensitive to choice of match.

4.2 Validating Pseudo-Event Study Approach

To validate our pseudo-event study approach, we use the panel data of time use from the 2003-2023 PSID survey to compare the results of an event study to our pseudo-event study approach. Appendix Figure A-1 and Appendix Table A-10 report our results for the effect of first birth on the time spent by women relative to men on paid work and housework.

We find that our pseudo-panel and panel results are largely consistent with one another and that we cannot reject the null that post-birth impacts on time-use penalties are equal across methods. We further find that our PSID results are largely consistent with those of the pseudo-panel using the ATUS data. We find that women are spending 1.1 fewer hours on paid work post-birth relative to men in the PSID event study (1.5 hours in the pseudo-event study), and 0.8 additional hours on childcare (1 hour in the pseudo-event study), which are both consistent in sign and approximate magnitude with our ATUS results.

We also use the PSID to evaluate our match quality, discussed in more detail in Appendix Section A.3. Kleven [2022] argues that observing a jump in employment post-birth for men (which isn't observed in a true panel event study) indicates that the parents are selected on unobservables relative to non-parents. In our pseudo-event study using ATUS, we see that time in paid work increases, which seems at first to violate the pseudo-match selection assumptions set out in Kleven [2022]. In the PSID, the pseudo-event study depicts increases in paid work by men whereas the event study does not. However, the pseudo-event study also predicts a smaller decline in paid work for women than the real event study, meaning that while levels within gender differ across specifications, the estimated gender gap is similar across specifications. While this does not rule out selection on unobservables, it is suggestive evidence that this selection does not bias our estimates of the gender gap in the pseudo-event match framework.

5 Conclusion

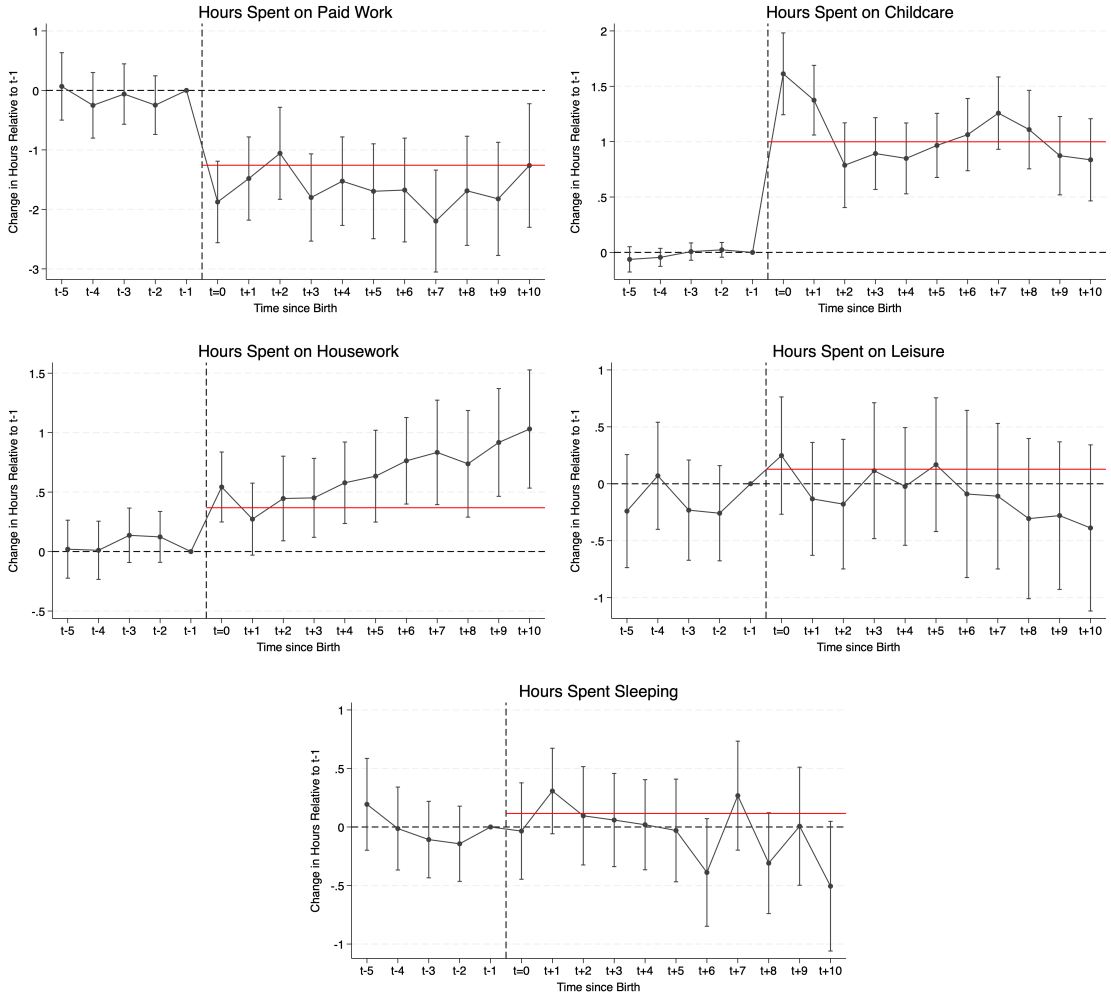
This paper documents how gender differences in labor market outcomes post-birth are mirrored by corresponding gender differences in changes in home production behavior following the birth of a first child. Using the pseudo-event study design from Kleven [2022] and time-use data from ATUS 2003-2023, we first show that there is a sizeable gender difference in time-use post-birth with women experiencing larger declines in time spent in paid work and larger increases in time spent in childcare and housework. We show that the gendered decline in the labor force participation documented in other work is fully offset by an increase in time spent in unpaid care work. Moreover, when we account for both active time spent in childcare as the primary activity and passive time spent in childcare as a secondary activity, we see that the gender gap widens further. Specifically, while overall time spent in leisure declines similarly for fathers and mothers, uninterrupted time spent in leisure declines significantly more for mothers around the time of birth. Mothers are also more likely to be

spending time engaging in multi-tasking on housework and childcare. When we look at how PFL policies change this behavior, we see that they allow parents to trade-off care time and close the gender gap in time spent on care, with mothers increasing childcare time in the year of birth and fathers increasing childcare time in the year following birth.

Overall, these results provide evidence that changes in household care needs are one reason that there are persistent gender differences in earnings following the birth of a first child. Having children substantially increases the amount of care work needed in a household, and the increased time burden is primarily borne by mothers. Additionally, mothers are more often balancing care of children with other tasks, increasing the amount of time needed to complete tasks and potentially reducing productivity across all tasks. Though these results persist, our study suggest that policies that encourage men to take time off work for care is one pathway towards closing gender gaps in time-use.

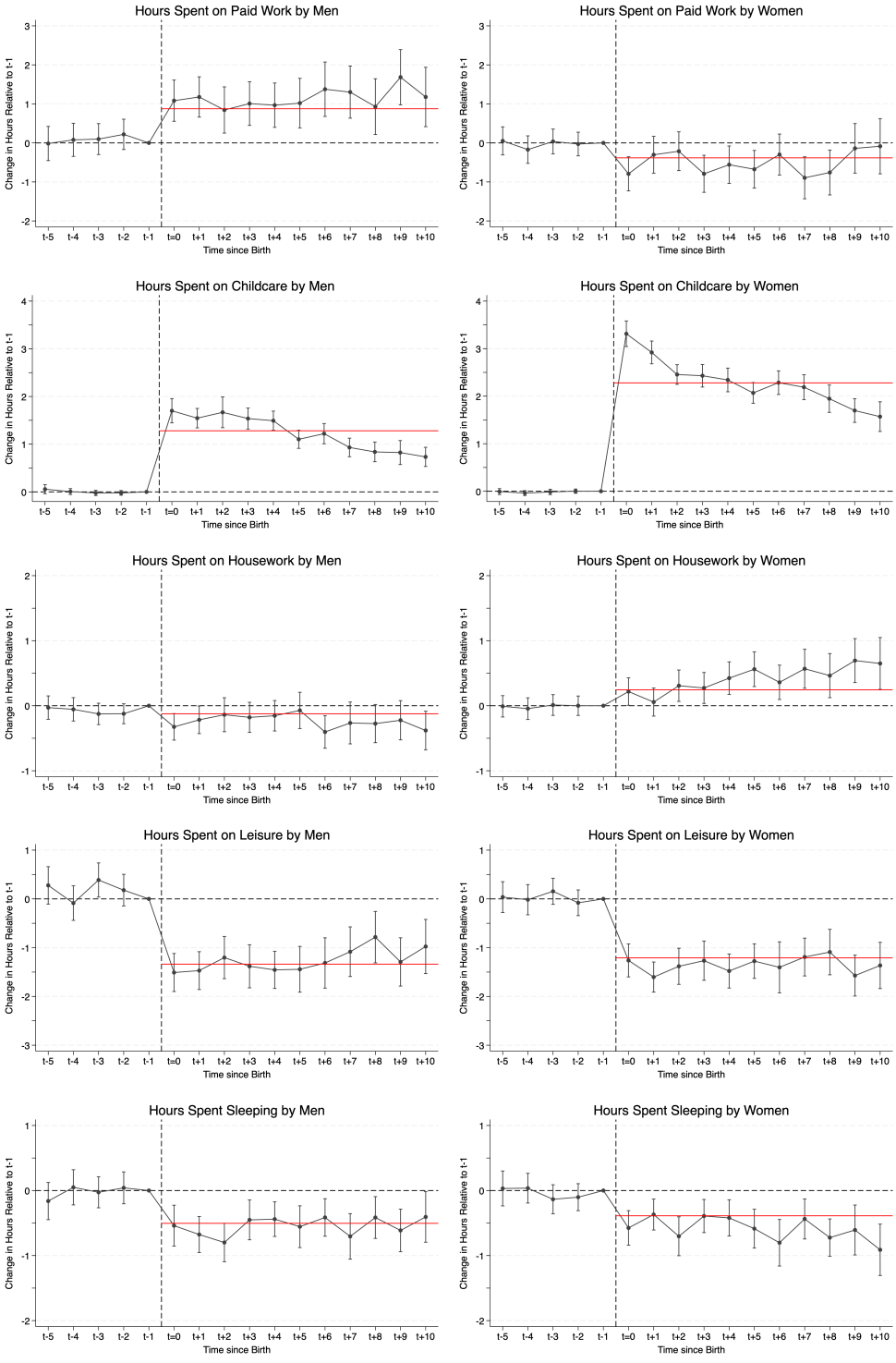
6 Tables and Figures

Figure 1: Women Increase Time on Home Production Post-Birth Relative to Men



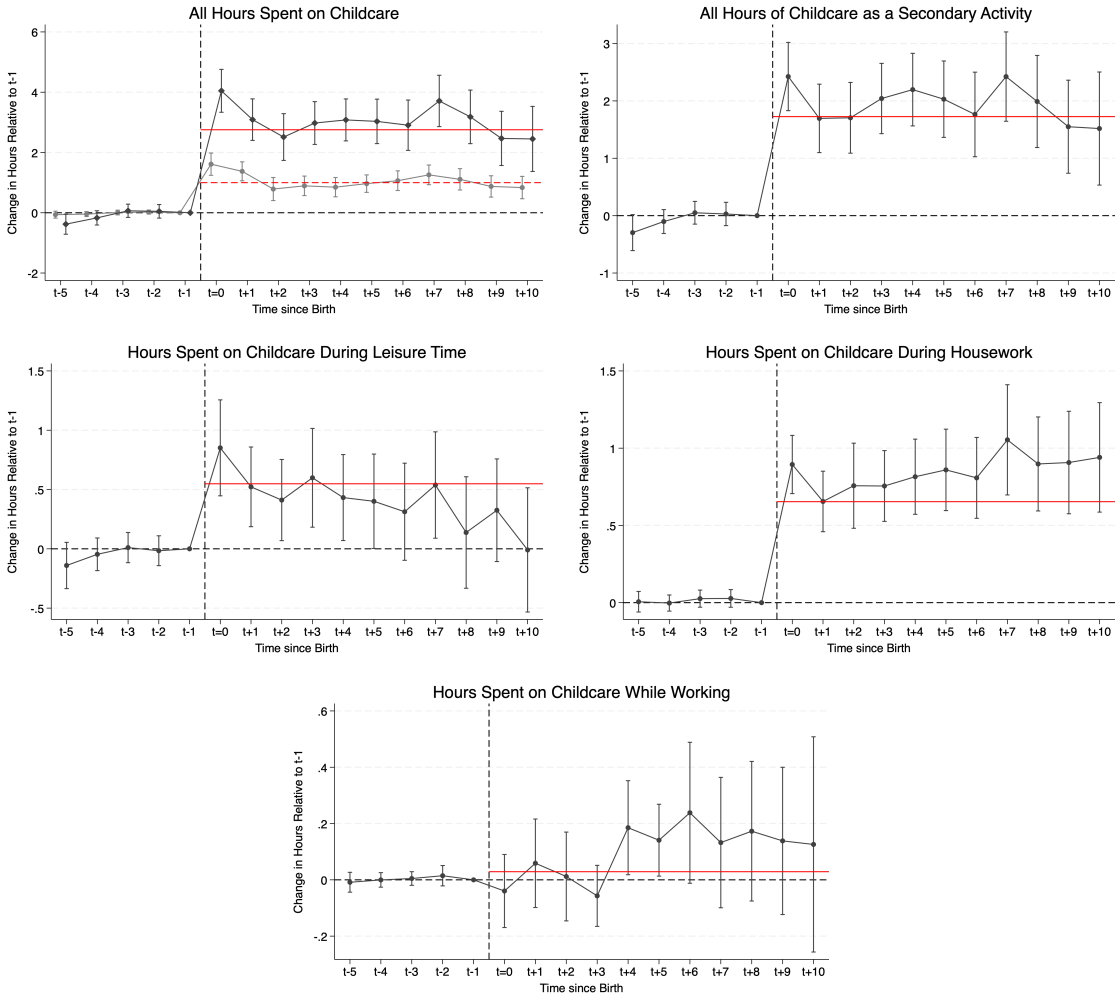
Notes: These figures report results from pseudo event-study regressions of hours of time use on dummies for event-time around birth interacted with gender, along with controls for year at birth, age at birth, sex, education level, marital status, race (white, black, hispanic, other), region (Northeast, Midwest, West, South). Data is sourced from ATUS. The red line denotes the aggregate post-period coefficient, estimated using a post-birth indicator for periods t+1 through t+10. 95% confidence interval shown; Standard errors are clustered at the individual match level.

Figure 2: Gender Differences in Time-Use Post-Birth



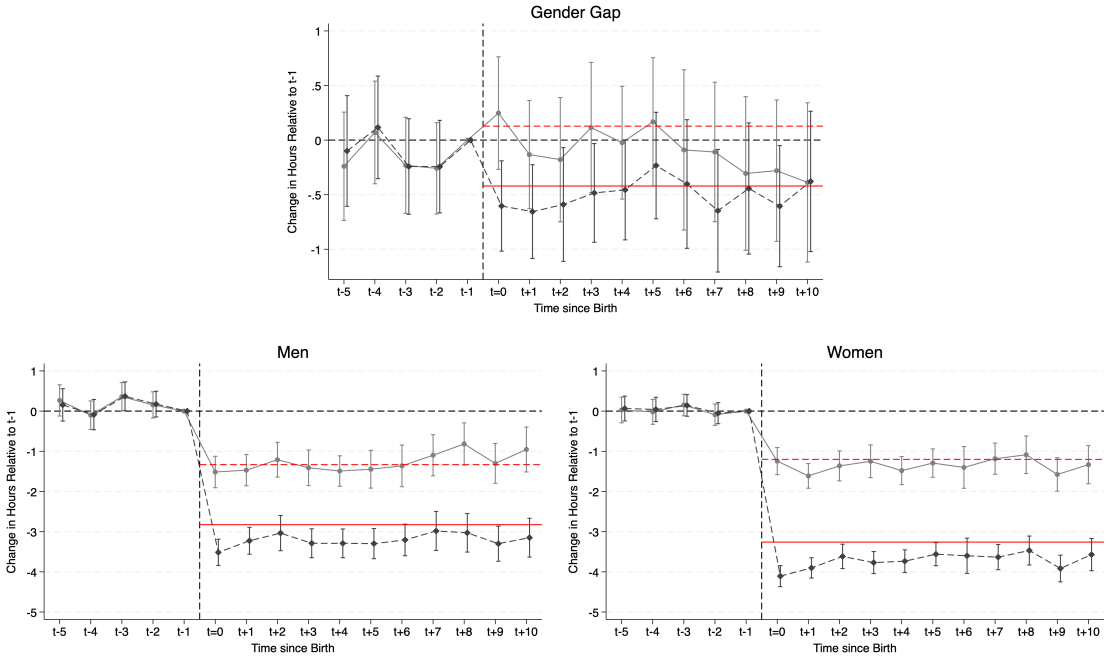
Notes: These figures report results from pseudo event-study regressions of hours of time use on dummies for event-time around birth separately by gender, along with controls for year at birth, age at birth, sex, education level, marital status, race (white, black, hispanic, other), region (Northeast, Midwest, West, South). Data is sourced from ATUS.The red line denotes the aggregate post-period coefficient, estimated using a post-birth indicator for periods t+1 through t+10. 95% confidence interval shown; Standard errors are clustered at the individual match level.

Figure 3: Women's Relative Increase in Time on Other Tasks More Often Co-incides with Childcare



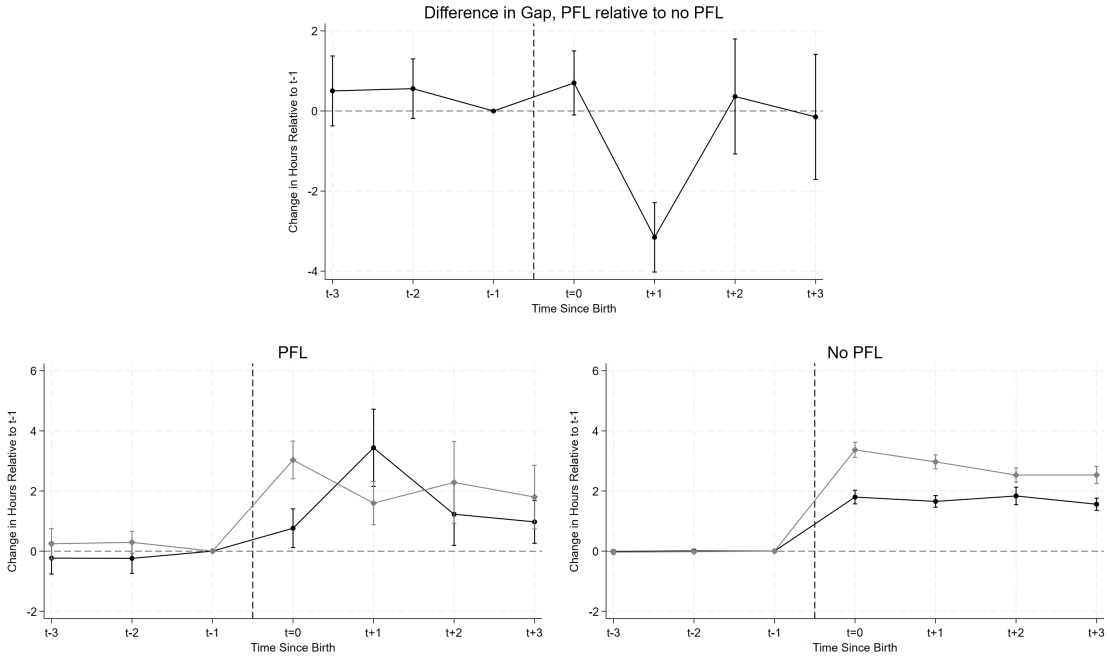
Notes: These figures report results from regressions of all composite measures of childcare (including time where childcare is the secondary activity) on dummies for event-time around birth separately by gender, along with controls for year, age, sex, state, education level, marital status, race (white, black, hispanic, other), region (Northeast, Midwest, West, South). The top left panel indicates the relative change in total childcare (primary + secondary time) for women relative to men, the top right panel indicates the relative change in secondary time on childcare, the middle left panel indicates relative time spent jointly on childcare and leisure, the middle right panel indicates relative time spent jointly on childcare and housework, and the bottom panel indicates relative time spent jointly on childcare and paid work. Data is sourced from ATUS. The solid red line denotes the aggregate post-period coefficient on all time spend on childcare estimated using a post-birth indicator for periods t+1 through t+10, and the dashed red line denotes the post-period coefficient on childcare as a primary activity. 95% confidence interval shown; Standard errors are clustered at the individual match level.

Figure 4: Women Have Less Uninterrupted Leisure Time Post-Birth Relative to Men



Notes: These figures report results from pseudo event study regressions of time spent in leisure on dummies for event-time around birth separately by gender, along with controls for year, age, sex, state, education level, marital status, race, region. The solid line represents the average daily hours that an individual reports spending on leisure, while the dashed line subtracts leisure time while the respondent is simultaneously also taking care of a child. Data is sourced from ATUS. The solid red line denotes the aggregate post-period coefficient on uninterrupted leisure estimated using a post-birth indicator for periods t+1 through t+10, and the dashed red line denotes the post-period coefficient on leisure as a primary activity. 95% confidence interval shown; Standard errors are clustered at the individual match level.

Figure 5: Paid Family Leave Changes Time Spent on Childcare Directly After Birth



Notes: These figures report results from stacked pseudo event study regressions of time spent in childcare on dummies for event-time around birth separately by gender and PFL policy, along with controls for year, age, sex, state, education level, marital status, race, region. The top panel reports the difference in the gender gap by PFL; the bottom left panel reports effects for men and women with PFL; and the bottom right panel reports effects for men and women without PFL. Data is sourced from ATUS. 95% confidence interval shown; Standard errors are clustered at the stack-state level.

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7 Online Only Appendix

A.1 Robustness to Including Birth Cohort FE

The estimation of the child penalty is subject to the classic age-period-cohort identification problem in which age, birth cohort, and time period are co-linear, meaning that while we can include event-time and age FE in our model or event-time and birth-cohort FE in our model, we cannot include all three. Thakral and Tô [2025] document that the omission of age-at-birth FEs can result in a biased estimate of the child penalty because it implicitly assumes that the child penalty is equal for all age. They propose a range of such constrained estimator restrictions, such as calibrating the slope of the age effects or imposing a flat pre-trend between certain time periods, that allow for the addition of birth-cohort FEs. We re-estimate our primary specification, impact of child birth on childcare time, including birth-cohort FEs with three of the restrictions proposed in Thakral and Tô [2025].

Appendix Figure A-7 shows the gender difference in childcare time for our baseline specification, a specification which includes age-at-birth FE but normalizes the age-at-birth FE for age 30 and 35 to be equal, a specification which includes age-at-birth FE but normalizes the event-time FE for t-5 to be equal to the event-time FE for t-1, and a specification which includes age-at-birth FE but normalizes the age FE to be equal to ages 50-55. The inclusion of the event-time normalization and the age normalization do not substantively change our estimates. The inclusion of the age-at-birth normalization does not substantively change our estimates prior to t+5, but results in a larger time-use child penalty post t+5, suggesting that our baseline results, if biased, are a conservative estimate of the child penalty in time-use.

A.2 Evaluating Match Quality

To evaluate the choice of matching variables, we tested five possible sets of characteristics, trying to balance match on demographics with observing enough observations within a demographic cell. All versions match on individuals by age and year of first birth and sex. Our primary specification described in text matches on two categories of marital status (ever married, never married), four categories of race (White, Black, Hispanic, Other), five education categories (less than HS, HS, Some College, College, More than College), and four geographic categories (Northeast, Midwest, South, and West). In the first alternates specification, we match on 2 categories of marital status (ever married, never married), 2

categories of race (white, non-white), and four categories of education (HS or less, Some College, College, More than College). In the second, we expand the race categories and the education categories to be the same as the primary specification and increases the marital status categories to 3 (currently married, previously married, never married), but still does not match on region. In the third, we used the expanded marital definition and add the geographic categories. In the fourth, we use the race, education, and marital status categories of the primary specification, but replace region with state.

Appendix Table A-1 compares the demographic characteristics under different matches. Comparing specification 1 to our primary specification, we can see that combining HS and less than HS into a single category results in substantial over-representation of less than HS non-parents. Alternate specification 1 also over-predicts the proportion previously or never married. Adding additional education, race, and marital status groups in alternative specification 2 improves the match. However, our primary specification demonstrates that we do not directly need to match on all three marriage categories, but rather that matching on more granular education and race categories can improve match: comparing alternative specification 3 which is the same as our primary specification but matches on three marriage categories rather than two, we see similar match on marital status, but fewer observations. Thus, adding a third category for marital status does not capture a large enough subsample of the population to justify its inclusion in our main analysis. Lastly, specification four which adds matching on state shows that ATUS is too small to allow for such a granular geographic cell type: we both lose a large portion of the sample and have worse match on education and age when we match on state.

A.3 Validating the Pseudo-Event Study

For our results to hold, it must be the case that creating a matched non-parent sample on observable characteristics also balances the observable characteristics. Kleven [2022] evaluates his match in part by looking at the gender specific event studies and argues that observing a jump in employment post-birth for men (which isn't observed in a true event study) indicates that the parents are selected on unobservables relative to non-parents. In our pseudo-event study of the time spent on paid work around childbirth, we do see an uptick in time spent on paid work.

Because we match on less granular categories than Kleven [2022], it is possible that changing our match definition will remove the shift in behavior for men. In Figure A-4, we

present the results of our pseudo-event study of the time spent on paid work around childbirth under the four alternative match groups described in Appendix Table A-1. Overall, we find consistency in our results across versions with all specifications, with all showing an increase in time spent in paid work for men including specification 4 which includes state and most closely mirrors the demographic categories used in Kleven [2022]. This suggests that it is not our choice of observables to match on that generate this jump.

Second, it is possible that unlike earnings or annual hours of work, men do experience small changes in daily time spent in paid work. To test this, we can compare the gender specific trends in the PSID pseudo-event study to the gender specific trends in the real PSID event study. In our PSID validation exercise on hours of paid work by sex (presented in Appendix Figure A-5), we see that there is a significant increase in time spent for paid work for men in the pseudo panel, but not in real panel. There are also differences for women, with the real event study predicting a larger decline in hours spent on paid work than the pseudo-event study. Therefore, as we observe in Appendix Figure A-1, the effect on the gap in hours is consistent between our pseudo-event study and true event study. Moreover, the magnitude of the gender gap in paid work in the real event study is similar to that seen in the ATUS. This suggests that while the pseudo-event study may result in biased estimates of the within gender time use, the gap in time use is estimated accurately in the pseudo-event study.

A.4 Appendix Figures and Tables

Table A-1: ATUS Summary Statistics

	Non-Matched		Matched		Alt. Version 1		Alt. Version 2		Alt. Version 3		Alt. Version 4	
	Parent	Non-Parent	Parent	Non-Parent	Parent	Non-Parent	Parent	Non-Parent	Parent	Non-Parent	Parent	Non-Parent
Sex												
Female	54.23	49.25	52.98	53.18	53.38	52.47	53.67	53.10	53.68	54.25	57.62	57.99
Marital Status												
Married	77.58	40.67	64.68	56.75	65.76	48.40	64.68	56.07	64.12	54.69	57.23	48.27
Never Married	17.62	42.56	31.43	39.73	30.49	40.64	32.38	41.68	33.87	43.78	42.02	51.11
Was Married	4.80	16.78	3.89	3.51	3.74	10.96	2.94	2.25	2.01	1.53	0.75	0.62
Race												
White	61.35	70.46	68.31	71.09	56.58	55.75	60.79	64.62	68.08	70.15	66.74	63.70
Black	9.96	11.58	8.62	8.42	12.32	13.76	10.71	9.78	8.58	8.59	6.72	5.85
Hispanic	20.60	12.35	18.11	17.00	21.99	22.56	21.76	20.75	18.23	17.58	22.47	26.95
Other	8.10	5.61	4.96	3.49	9.11	7.93	6.74	4.86	5.12	3.67	4.07	3.49
Region												
Northeast	16.74	17.68	14.83	13.19	17.15	16.19	17.35	16.93	15.11	13.45	16.07	14.94
Midwest	23.60	23.93	22.50	23.38	22.53	21.94	23.29	22.55	22.83	23.76	21.85	21.22
South	36.72	36.63	39.74	41.39	37.21	37.62	36.42	36.19	39.43	40.97	34.58	33.63
West	22.94	21.77	22.94	22.04	23.11	24.25	22.94	24.32	22.63	21.82	27.50	30.21
Education												
Less than HS	10.85	20.01	11.78	13.27	13.13	21.03	12.96	13.54	11.85	14.02	14.47	20.50
High School	25.34	27.58	21.73	20.76	26.02	22.01	23.46	23.33	21.57	20.79	18.24	17.58
Associate/Some College	23.94	24.66	25.85	27.24	24.28	23.76	25.03	26.12	25.73	26.82	26.31	26.04
Bachelors	24.14	17.84	26.75	27.72	23.46	22.35	25.30	25.41	27.11	27.51	29.27	26.21
Graduate	15.73	9.91	13.89	11.02	13.12	10.84	13.25	11.60	13.74	10.86	11.70	9.68
Age	33.58	46.10	33.95	26.67	33.96	27.02	33.91	26.83	33.53	26.01	32.62	24.79
Age First Birth	28.35	.	29.74	29.40	29.75	29.79	29.73	29.57	29.38	28.74	28.47	27.54
Observations	39109	136768	10668	19618	13449	35876	11951	27391	9830	17499	3889	5000

Notes: This table reports demographic characteristics of the ATUS 2003-2023 sample of parents and non-parents first without matching (Col. 1 and 2.), then with our preferred match (Col. 3 and 4) based on age and year of birth of their first child, sex, education level (5 cat.), marital status (2 cat.), race (4 cat.), and region (4 cat.). Col 5 and 6 report demographics for match based on age and year of birth of their first child, sex, education level (4 cat.), marital status (2 cat.), and race (2 cat.). Col 7 and 8 report demographics for match based on age and year of birth of their first child, sex, education level (5 cat.), marital status (3 cat.), and race (4 cat.). Col 9 and 10 report demographics for match based on age and year of birth of their first child, sex, education level (5 cat.), marital status (3 cat.), race (4 cat.), and region (4 cat.). Col 11 and 12 report demographics for match based on age and year of birth of their first child, sex, education level (5 cat.), marital status (3 cat.), race (4 cat.), and state (50 cat.).

Table A-2: PSID Summary Statistics

	Panel			Pseudo-Panel		
	Post-Birth	Pre-Birth	Total	Post-Birth	Pre-Birth	Total
Sex						
Female	50.24	50.22	50.23	51.13	51.38	51.25
Marital Status						
Never Married	20.87	19.64	20.22	24.65	25.16	24.91
Ever Married	79.13	80.36	79.78	75.35	74.84	75.09
Race						
White	77.18	79.99	78.70	76.16	85.24	80.64
Black	7.59	5.83	6.64	5.99	5.44	5.72
Hispanic	7.50	7.28	7.38	9.29	5.32	7.33
Other	7.73	6.90	7.28	8.56	4.01	6.31
Region						
Northeast	17.22	17.81	17.53	18.40	17.37	17.91
Midwest	22.25	19.90	21.00	21.15	21.44	21.29
South	35.32	36.88	36.15	35.22	36.71	35.92
West	25.21	25.41	25.31	25.23	24.49	24.88
Education						
Less than HS	3.19	2.74	2.95	1.94	1.33	1.63
HS	41.48	37.73	39.45	42.36	40.67	41.49
Some College	8.19	7.79	7.97	5.46	4.75	5.09
Bachelors	33.96	35.67	34.89	38.68	38.72	38.70
Graduate	13.18	16.06	14.74	11.55	14.52	13.09
Age	32.35	28.19	30.14	31.36	26.66	28.99
Age at First Birth	29.48	31.03	30.30	29.01	29.41	29.21
Observations	7246	7465	14711	19733	19132	38865

Notes: This table reports demographic characteristics of the PSID sample of parents and non-parents first in the true panel (Col. 1 and 2.), then in a pseudo-panel created with the same methodology as the ATUS preferred match (Col. 3 and 4) in which observed parents are matched to non-parents in earlier years based on age and potential year of birth of their first child, sex, education level (5 cat.), marital status (2 cat.), race (4 cat.), and region (4 cat.).

Table A-3: Pseudo-Event Study on Time Use of Women Relative to Men

	(1) Paid Work	(2) Child Care	(3) House Work	(4) Leisure	(5) Sleep
t-5	0.067	-0.063	0.020	-0.240	0.194
	(0.289)	(0.058)	(0.124)	(0.253)	(0.200)
t-4	-0.251	-0.045	0.011	0.070	-0.013
	(0.281)	(0.041)	(0.125)	(0.240)	(0.181)
t-3	-0.061	0.007	0.137	-0.232	-0.108
	(0.259)	(0.040)	(0.117)	(0.225)	(0.167)
t-2	-0.247	0.023	0.123	-0.259	-0.143
	(0.251)	(0.034)	(0.109)	(0.213)	(0.164)
t-1	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
t=0	-1.875***	1.613***	0.543***	0.248	-0.035
	(0.350)	(0.188)	(0.150)	(0.263)	(0.210)
t+1	-1.481***	1.374***	0.273*	-0.133	0.307*
	(0.357)	(0.160)	(0.154)	(0.253)	(0.186)
t+2	-1.057***	0.787***	0.446**	-0.179	0.096
	(0.394)	(0.195)	(0.182)	(0.290)	(0.214)
t+3	-1.800***	0.893***	0.452***	0.115	0.059
	(0.374)	(0.165)	(0.169)	(0.304)	(0.203)
t+4	-1.525***	0.849***	0.578***	-0.024	0.019
	(0.379)	(0.163)	(0.175)	(0.264)	(0.196)
t+5	-1.695***	0.966***	0.634***	0.168	-0.030
	(0.407)	(0.148)	(0.197)	(0.300)	(0.224)
Mean	3.72	0.06	1.58	6.80	8.99
N	30283	30283	30283	30283	30283

Notes: Pseudo-event study on the time use of women relative to men using a pseudo panel from the ATUS 2003-2023 of parents and non-parents merged on age and year of birth of their first child, sex, education level (5 cat.), marital status (2 cat.), race (4 cat.), and region (4 cat.). Fixed effects included for year, age, and state. Standard errors clustered at the individual match level (sex, year at birth, age at birth, observation number). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-4: Pseudo-Event Study of Time Use by Women

	(1) Paid Work	(2) Child Care	(3) House Work	(4) Leisure	(5) Sleep
t-5	0.052	-0.007	-0.009	0.037	0.032
	(0.184)	(0.032)	(0.084)	(0.161)	(0.137)
t-4	-0.172	-0.038	-0.045	-0.016	0.036
	(0.180)	(0.027)	(0.085)	(0.158)	(0.117)
t-3	0.037	-0.015	0.011	0.155	-0.135
	(0.162)	(0.028)	(0.081)	(0.137)	(0.114)
t-2	-0.028	0.001	0.000	-0.080	-0.102
	(0.155)	(0.023)	(0.076)	(0.134)	(0.106)
t-1	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
t=0	-0.793***	3.313***	0.218**	-1.262***	-0.575***
	(0.223)	(0.137)	(0.108)	(0.172)	(0.136)
t+1	-0.304	2.920***	0.056	-1.603***	-0.369***
	(0.241)	(0.122)	(0.110)	(0.157)	(0.121)
t+2	-0.213	2.456***	0.308**	-1.382***	-0.704***
	(0.254)	(0.105)	(0.123)	(0.189)	(0.152)
t+3	-0.792***	2.430***	0.273**	-1.267***	-0.392***
	(0.242)	(0.121)	(0.122)	(0.205)	(0.130)
t+4	-0.558**	2.341***	0.424***	-1.478***	-0.421***
	(0.245)	(0.127)	(0.127)	(0.178)	(0.142)
t+5	-0.676***	2.068***	0.562***	-1.276***	-0.586***
	(0.246)	(0.112)	(0.136)	(0.181)	(0.152)
Mean	3.24	0.07	1.69	6.75	9.21
N	17009	17009	17009	17009	17009

Notes: Pseudo-event study on the time use of women using a pseudo panel from the ATUS 2003-2023 of parents and non-parents merged on age and year of birth of their first child, sex, education level (5 cat.), marital status (2 cat.), race (4 cat.), and region (4 cat.). Fixed effects included for year, age, and state. Standard errors clustered at the individual match level (sex, year at birth, age at birth, observation number). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-5: Pseudo-Event Study of Time Use by Men

	(1) Paid Work	(2) Child Care	(3) House Work	(4) Leisure	(5) Sleep
t-5	-0.016	0.056	-0.029	0.277	-0.162
	(0.223)	(0.049)	(0.092)	(0.196)	(0.146)
t-4	0.079	0.006	-0.055	-0.086	0.049
	(0.216)	(0.032)	(0.092)	(0.181)	(0.138)
t-3	0.098	-0.022	-0.126	0.387**	-0.027
	(0.202)	(0.028)	(0.084)	(0.179)	(0.122)
t-2	0.219	-0.021	-0.123	0.179	0.041
	(0.198)	(0.025)	(0.078)	(0.166)	(0.125)
t-1	0.000	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)	(.)
t=0	1.082***	1.700***	-0.325***	-1.509***	-0.540***
	(0.269)	(0.129)	(0.104)	(0.199)	(0.161)
t+1	1.177***	1.546***	-0.216**	-1.470***	-0.677***
	(0.263)	(0.104)	(0.108)	(0.198)	(0.141)
t+2	0.844***	1.668***	-0.138	-1.203***	-0.799***
	(0.302)	(0.164)	(0.133)	(0.221)	(0.151)
t+3	1.008***	1.538***	-0.179	-1.382***	-0.451***
	(0.285)	(0.113)	(0.118)	(0.225)	(0.156)
t+4	0.967***	1.493***	-0.154	-1.455***	-0.440***
	(0.290)	(0.103)	(0.120)	(0.195)	(0.136)
t+5	1.020***	1.102***	-0.072	-1.443***	-0.556***
	(0.324)	(0.097)	(0.142)	(0.239)	(0.164)
Mean	4.34	0.04	1.45	6.87	8.72
N	13274	13274	13274	13274	13274

Notes: Pseudo-event study on the time use men using a pseudo panel from the ATUS 2003-2023 of parents and non-parents merged on age and year of birth of their first child, sex, education level (5 cat.), marital status (2 cat.), race (4 cat.), and region (4 cat.). Fixed effects included for year, age, and state. Standard errors clustered at the individual match level (sex, year at birth, age at birth, observation number). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-6: Pseudo Event Study of Time Use Adjusted for Secondary Time in Childcare

	Adjusted Childcare			Adjusted Leisure		
	(1)	(2)	(3)	(4)	(5)	(6)
	Gap	Men	Women	Gap	Men	Women
t-5	-0.379*	0.259	-0.0997	-0.0996	0.155	0.0643
	(0.170)	(0.148)	(0.0874)	(0.259)	(0.205)	(0.157)
t-4	-0.170	0.00369	-0.143	0.116	-0.0872	0.0418
	(0.121)	(0.0891)	(0.0768)	(0.240)	(0.192)	(0.155)
t-3	0.0654	-0.0660	-0.00850	-0.242	0.369*	0.141
	(0.112)	(0.0755)	(0.0817)	(0.223)	(0.183)	(0.137)
t-2	0.0474	-0.0521	0.000174	-0.243	0.174	-0.0521
	(0.115)	(0.0858)	(0.0771)	(0.216)	(0.163)	(0.134)
t-1	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
t=0	4.046***	5.781***	9.819***	-0.604**	-3.515***	-4.107***
	(0.363)	(0.263)	(0.246)	(0.211)	(0.167)	(0.134)
t+1	3.090***	5.641***	8.711***	-0.655**	-3.227***	-3.902***
	(0.351)	(0.261)	(0.233)	(0.219)	(0.170)	(0.129)
t+2	2.513***	5.896***	8.389***	-0.590*	-3.036***	-3.616***
	(0.396)	(0.301)	(0.245)	(0.266)	(0.224)	(0.155)
t+3	2.977***	5.821***	8.756***	-0.484*	-3.289***	-3.770***
	(0.362)	(0.263)	(0.245)	(0.231)	(0.183)	(0.140)
t+4	3.081***	5.647***	8.693***	-0.456	-3.291***	-3.735***
	(0.355)	(0.255)	(0.245)	(0.234)	(0.182)	(0.143)
t+5	3.032***	5.423***	8.419***	-0.233	-3.297***	-3.560***
	(0.376)	(0.281)	(0.247)	(0.249)	(0.191)	(0.146)
Mean	0.250	0.150	0.320	6.710	6.820	6.630
Observations	30283	13274	17009	30283	13274	17009

Notes: Pseudo-event study on time use adjusted to account for time spent on childcare as a secondary activity. Using a pseudo panel from the ATUS 2003-2023 of parents and non-parents merged on age and year of birth of their first child, sex, education level (5 cat.), marital status (2 cat.), race (4 cat.), and region (4 cat.). Fixed effects included for year, age, and state. Standard errors clustered at the individual match level (sex, year at birth, age at birth, observation number)). * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A-7: Pseudo Event Study of Secondary Time on Childcare by Women Relative to Men

	(1) Paid Work	(2) House Work	(3) Leisure	(4) All Secondary
t-5	-0.009	0.006	-0.141	-0.296*
	(0.018)	(0.034)	(0.100)	(0.160)
t-4	-0.000	-0.003	-0.046	-0.102
	(0.013)	(0.027)	(0.070)	(0.106)
t-3	0.005	0.026	0.010	0.050
	(0.012)	(0.028)	(0.065)	(0.101)
t-2	0.015	0.027	-0.016	0.029
	(0.018)	(0.029)	(0.064)	(0.104)
t-1	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
t=0	-0.040	0.894***	0.851***	2.425***
	(0.066)	(0.096)	(0.206)	(0.304)
t+1	0.059	0.655***	0.522***	1.695***
	(0.080)	(0.100)	(0.171)	(0.304)
t+2	0.012	0.757***	0.411**	1.706***
	(0.080)	(0.140)	(0.175)	(0.315)
t+3	-0.057	0.755***	0.599***	2.042***
	(0.055)	(0.117)	(0.212)	(0.312)
t+4	0.185**	0.815***	0.432**	2.197***
	(0.085)	(0.124)	(0.185)	(0.323)
t+5	0.141**	0.859***	0.401**	2.030***
	(0.065)	(0.134)	(0.203)	(0.340)
Mean	0.00	0.03	0.09	0.18
N	30283	30283	30283	30283

Notes: Pseudo-event study on the time spent on childcare as a secondary activity for women relative to men using a pseudo panel from the ATUS 2003-2023 of parents and non-parents merged on age and year of birth of their first child, sex, education level (5 cat.), marital status (2 cat.), race (4 cat.), and region (4 cat.). Fixed effects included for year, age, and state. Standard errors clustered at the individual match level (sex, year at birth, age at birth, observation number). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-8: Pseudo Event Study of Secondary Time on Childcare by Women

	(1)	(2)	(3)	(4)
	Paid Work	House Work	Leisure	All Secondary
t-5	0.0117	0.0111	-0.0327	-0.0929
	(0.0101)	(0.0230)	(0.0456)	(0.0789)
t-4	0.00942	-0.00454	-0.0582	-0.105
	(0.00889)	(0.0189)	(0.0386)	(0.0711)
t-3	0.00589	0.0105	0.00775	0.00641
	(0.00799)	(0.0222)	(0.0425)	(0.0746)
t-2	0.0179	0.0193	-0.0343	-0.00126
	(0.0164)	(0.0227)	(0.0339)	(0.0697)
t-1	0	0	0	0
	(.)	(.)	(.)	(.)
t=0	0.147***	1.391***	2.853***	6.506***
	(0.0400)	(0.0772)	(0.149)	(0.208)
t+1	0.211***	1.291***	2.290***	5.791***
	(0.0550)	(0.0761)	(0.112)	(0.201)
t+2	0.164***	1.491***	2.244***	5.934***
	(0.0461)	(0.0873)	(0.115)	(0.214)
t+3	0.0481	1.510***	2.501***	6.326***
	(0.0312)	(0.0882)	(0.153)	(0.213)
t+4	0.317***	1.583***	2.250***	6.352***
	(0.0729)	(0.0951)	(0.131)	(0.229)
t+5	0.187***	1.692***	2.259***	6.350***
	(0.0556)	(0.100)	(0.131)	(0.224)
Mean	0	0.0400	0.120	0.240
N	17009	17009	17009	17009

Notes: Pseudo-event study on the time spent on childcare as a secondary activity by women using a pseudo panel from the ATUS 2003-2023 of parents and non-parents merged on age and year of birth of their first child, sex (male/female), education level (5 cat.), marital status (2 cat.), race (4 cat.), and region (4 cat.). Fixed effects included for year, age, and state. Standard errors clustered at the individual match level (sex, year at birth, age at birth, observation number). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-9: Pseudo Event Study of Secondary Time on Childcare by Men

	(1) Paid Work	(2) House Work	(3) Leisure	(4) All Secondary
t-5	0.0203	0.00524	0.108	0.203
	(0.0149)	(0.0249)	(0.0885)	(0.139)
t-4	0.00973	-0.00192	-0.0119	-0.00269
	(0.00969)	(0.0188)	(0.0588)	(0.0789)
t-3	0.00118	-0.0154	-0.00247	-0.0438
	(0.00941)	(0.0175)	(0.0490)	(0.0681)
t-2	0.00329	-0.00807	-0.0182	-0.0306
	(0.00840)	(0.0183)	(0.0545)	(0.0767)
t-1	0	0	0	0
	(.)	(.)	(.)	(.)
t=0	0.187***	0.497***	2.002***	4.081***
	(0.0527)	(0.0572)	(0.142)	(0.221)
t+1	0.152***	0.636***	1.767***	4.096***
	(0.0583)	(0.0647)	(0.130)	(0.229)
t+2	0.152**	0.734***	1.833***	4.228***
	(0.0660)	(0.110)	(0.131)	(0.231)
t+3	0.105**	0.755***	1.902***	4.284***
	(0.0457)	(0.0766)	(0.148)	(0.228)
t+4	0.132***	0.768***	1.818***	4.155***
	(0.0441)	(0.0798)	(0.131)	(0.227)
t+5	0.0460	0.833***	1.859***	4.320***
	(0.0339)	(0.0896)	(0.156)	(0.256)
Mean	0	0.0200	0.0600	0.110
N	13274	13274	13274	13274

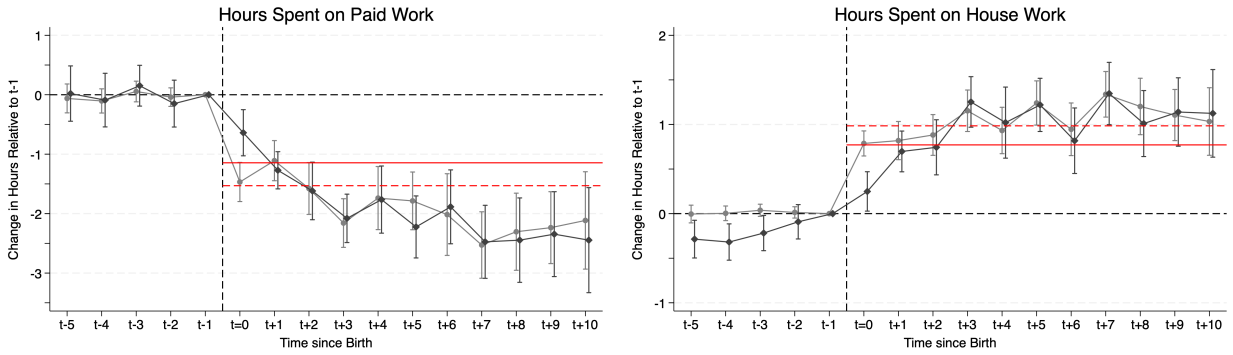
Notes: Pseudo-event study on the time spent on childcare as a secondary activity by men using a pseudo panel from the ATUS 2003-2023 of parents and non-parents merged on age and year of birth of their first child, sex (male/female), education level (5 cat.), marital status (2 cat.), race (4 cat.), and region (4 cat.). Fixed effects included for year, age, and state. Standard errors clustered at the individual match level (sex, year at birth, age at birth, observation number). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A-10: PSID Validation– Time Use of Women Relative to Men

	(1) Pseudo-Panel	(2) Panel	(3) Pseudo-Panel	(4) Panel
t-5	-0.062	0.019	-0.004	-0.286***
	(0.124)	(0.237)	(0.051)	(0.108)
t-4	-0.104	-0.090	0.004	-0.319***
	(0.104)	(0.230)	(0.042)	(0.104)
t-3	0.054	0.152	0.038	-0.218**
	(0.089)	(0.175)	(0.035)	(0.101)
t-2	-0.040	-0.149	0.014	-0.092
	(0.079)	(0.201)	(0.032)	(0.098)
t-1	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
t=0	-1.468***	-0.639***	0.787***	0.249**
	(0.168)	(0.198)	(0.072)	(0.113)
t+1	-1.109***	-1.271***	0.819***	0.697***
	(0.172)	(0.160)	(0.109)	(0.116)
t+2	-1.577***	-1.619***	0.882***	0.744***
	(0.222)	(0.247)	(0.117)	(0.158)
t+3	-2.158***	-2.080***	1.154***	1.253***
	(0.209)	(0.207)	(0.119)	(0.144)
t+4	-1.739***	-1.764***	0.932***	1.021***
	(0.270)	(0.288)	(0.133)	(0.203)
t+5	-1.786***	-2.224***	1.241***	1.219***
	(0.248)	(0.266)	(0.126)	(0.152)
Mean	5.48	5.60	1.20	1.23
N	28179	14108	28091	14063

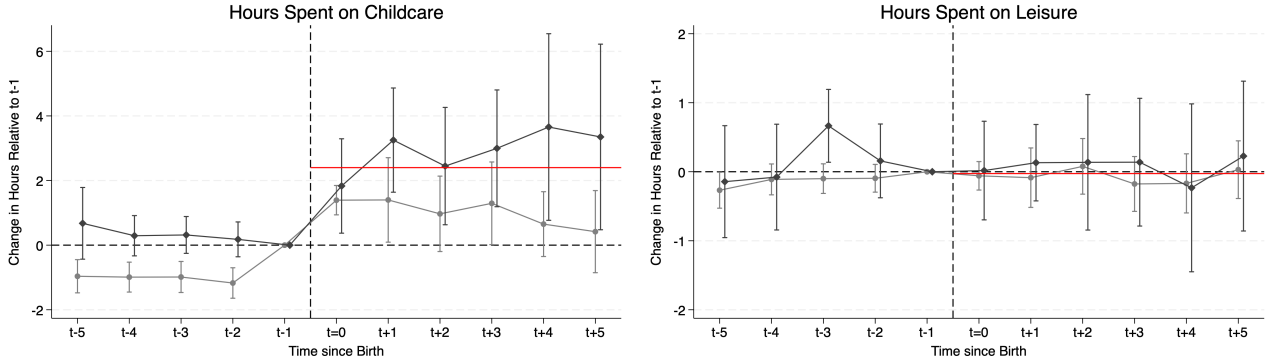
Notes: This table reports results from an event study and a pseudo-event study from PSID 2003-2023 of hours of time use on dummies for event-time around birth interacted with gender, along with controls for year at birth, age at birth, sex, education level, marital status, race, region. Standard errors are clustered at the individual match level. Column 1 and 2 report results for hours of paid work and column 3 and 4 reports results for hours of child care. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure A-1: Pseudo-Event Study Validation: Time Use of Women Relative to Men (PSID)



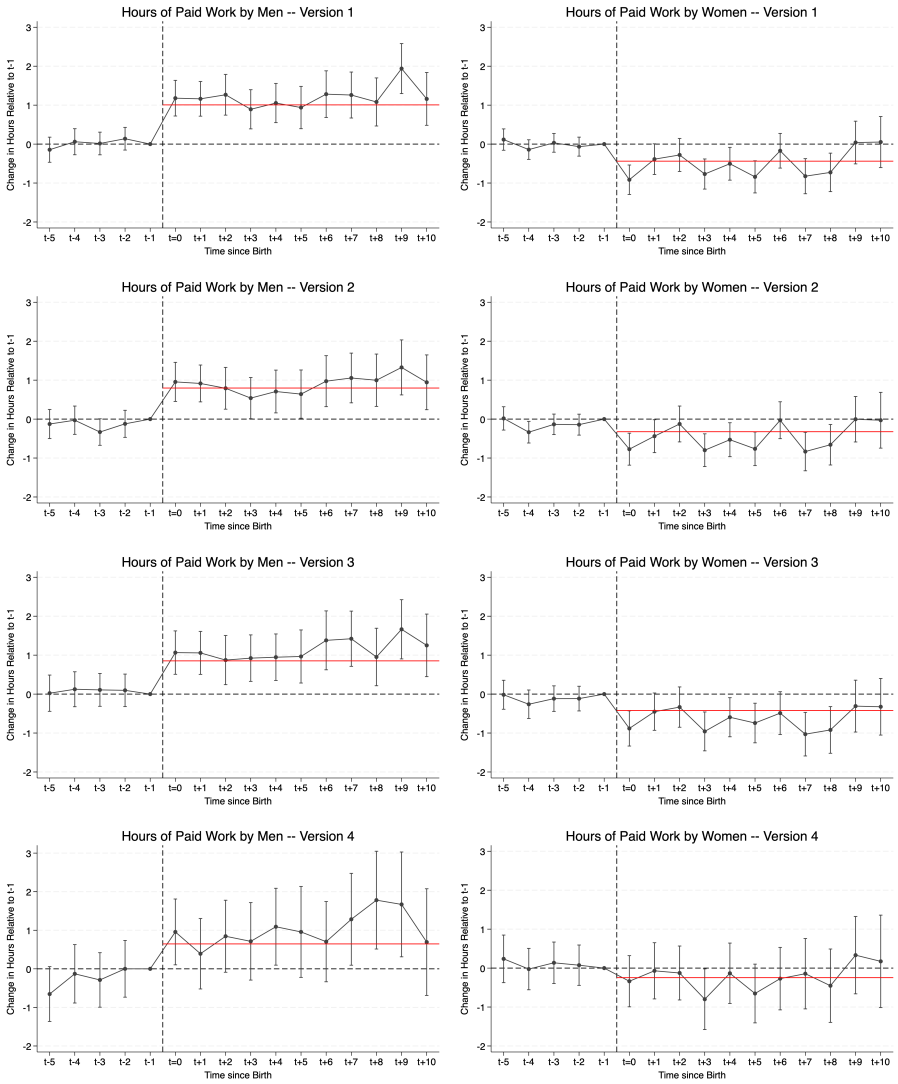
Notes: These figures report results from an event study (black line) and a pseudo-event study (gray line) of hours of time use on dummies for event-time around birth interacted with gender, along with controls for year at birth, age at birth, sex, education level, marital status, race (white, black, hispanic, other), region (Northeast, Midwest, West, South). The solid red line denotes the aggregate post-period coefficient over the event study estimated using a post-birth indicator for periods t+1 through t+10, while the dashed line denotes the post-period coefficient over the pseudo-event study. 95% confidence interval shown; Standard errors are clustered at the individual match level.

Figure A-3: Pseudo-Event Study Validation: Time Use of Women Relative to Men (PSID 2017-2023)



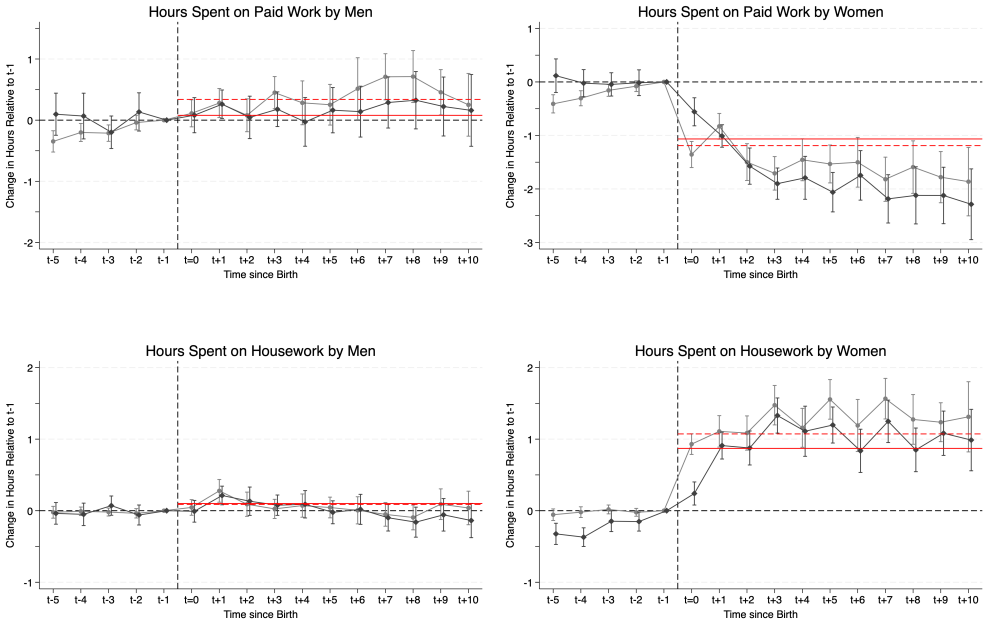
Notes: PSID 2017-2023. These figures report results from an event study (black line) and a pseudo-event study (gray line) of hours of time use on dummies for event-time around birth interacted with gender, along with controls for year at birth, age at birth, sex, education level, marital status, race (white, black, hispanic, other), region (Northeast, Midwest, West, South). The solid red line denotes the aggregate post-period coefficient over the event study estimated using a post-birth indicator for periods t+1 through t+10, while the dashed line denotes the post-period coefficient over the pseudo-event study. 95% confidence interval shown; Standard errors are clustered at the individual match level.

Figure A-4: ATUS Matchgroup Variability - Hours of Paid Work by Men



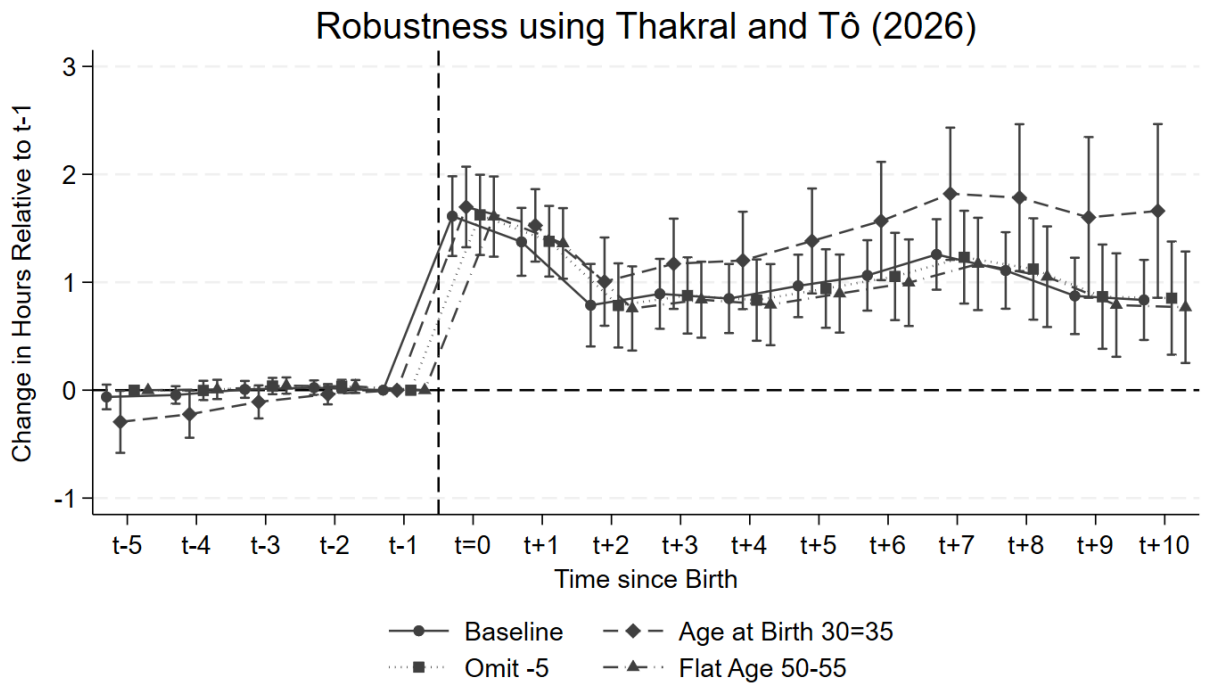
Notes: These figures report the results from the pseudo-event study of the time spent on paid work on dummies for event-time around birth. In Version 1, the pseudo-panel is created by matching on marital status (2 cat.), education (4 cat.), and race (2 cat.). Version 2 matches on marital status (3 cat.), education (5 cat.), and race (4 cat.). Version 3 adds region (4 cat.), and Version 4 replaces region with state (50 cat.). All versions also match on individuals by age and year of first birth and sex.

Figure A-5: Pseudo-Event Study Validation: Time Use by Sex (PSID)



Notes: These figures report results from an event study (black line) and a pseudo-event study (gray line) of hours of time use on dummies for event-time around birth interacted with gender, along with controls for year at birth, age at birth, sex, education level, marital status, race (white, black, hispanic, other), region (Northeast, Midwest, West, South). The solid red line denotes the aggregate post-period coefficient over the event study estimated using a post-birth indicator for periods t+1 through t+10, while the dashed line denotes the post-period coefficient over the pseudo-event study. 95% confidence interval shown; Standard errors are clustered at the individual match level.

Figure A-7: Robustness to Birth Cohort Fixed Effects: Child Care Time Use



Notes: These figures report results from our primary pseudo-event study (solid line, circle) compared to results which add birth cohort fixed effects with three different normalizations proposed by Thakral and Tô [2025]. The dashed line with a diamond marker normalizes the age FE at age 30 to be equal to age 35. The dotted line with a square marker normalizes the event-time FE at t-5 to be equal to the FE at t-1. The dash-dot line with a triangle marker normalizes the age FE from age 50 to 55 to be equal. 95% confidence interval shown; Standard errors are clustered at the individual match level.