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ORIGINAL PAPER

The effects of paid family leave—does it help fathers' health, too?

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Abstract

I investigate the effects of California's paid family leave (CA-PFL) program, the first state-mandated paid leave available to both mothers and fathers in the US. I examine the effects on the overall health of mothers and fathers during two distinct periods: health *immediately around* childbirth and health *following* childbirth. To do so, I leverage the variation in the timing of the Survey of Income and Program Participation (SIPP) health care topical module relative to the *exact* year and month of childbirth. I find that CA-PFL has improved mothers' health during pregnancy and immediately after childbirth. This improvement in health is accompanied by a reduced likelihood of mothers not working or taking unpaid work absence. Some improvements manifest in fathers' health too during the same period. However, I observe that fathers report more instances of feeling sick, starting around 5 months after childbirth. Further analysis reveals that the share of fathers not working or taking unpaid work absence rises temporarily when the leave period ends. Understanding the effects on fathers' health and leave utilization is pivotal to evaluating the program's overall benefits and potential unintended consequences given the growing focus on enhancing equal access to paid leave for both mothers and fathers.

Keywords Paid family leave · California · Fathers · Health · SIPP

JEL Classification J13 · I18 · I38

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1 Introduction

The United States is the only OECD country that does not mandate paid maternity leave (OECD Family Database 2018). The only existing national mandate in the US is the Family and Medical Leave Act (FMLA) of 1993, which provides women with *unpaid*, job-protected leave for up to 12 weeks after birth. However, FMLA-eligible workers constitute only 60% of the workforce (Klerman et al. 2012; Rossin-Slater and Uniat 2019; Irish et al. 2021).

In response to the limited nature of the FMLA, California enacted the first state-level paid family leave in 2004, and six other states[1] and Washington D.C. have followed suit since then. California's Paid Family Leave (CA-PFL) commenced on July 1, 2004, by offering six weeks of paid leave to all new parents with a 55% wage replacement rate up to a maximum benefit of $728 per week. For some mothers not eligible for leave from FMLA, PFL offered a new benefit. For most mothers, PFL was an *extension* of maternity leave of additional 6 weeks—by claiming State Disability Insurance (SDI) and CA-PFL consecutively, women in California can take partially paid leave for 4 weeks before giving birth and for 12 to 14 weeks after giving birth. For the first time, fathers with a newborn were able to take partially paid leave for 6 weeks after childbirth.

Given that CA-PFL was the first source of government-provided paid leave available to both mothers and fathers, the goal of this study is to identify the effects of CA-PFL on both mothers' and fathers' health and healthcare utilization. I make two major contributions to the broad body of literature that documents the effects of CA-PFL on health.

First and foremost, I provide the first evidence of the effects of CA-PFL on mothers' and fathers' health in two different periods, separately: (i) health *immediately around* childbirth (during pregnancy and up to 5 months following childbirth: a period during which parents are eligible to take up the leave) and (ii) health *following* childbirth (five to 20 months after childbirth: a period when the leave expires). Most prior research has only documented *post-birth* health outcomes of mothers such as breastfeeding duration, self-reported health, postnatal outpatient visits, or mental health (Appelbaum & Milkman 2011; Chatterji & Markowitz 2005; Chatterji & Markowitz 2012; Huang and Yang 2015; Bullinger 2019; Irish et al 2021). Since mothers can enjoy an extended length of paid leave starting during pregnancy, by claiming SDI and CA-PFL consecutively, positive effects on maternal health could manifest even before childbirth. Fathers could also experience health benefits before childbirth due to spousal correlation in health (Wilson 2002; Hoppmann et al. 2011; Kim et al. 2014). Hence, studying the two periods separately can shed light on the policy's potential spillover effects beyond post-birth periods. This approach also contributes to a better understanding of CA-PFL's impact on parental health in the

[1] Six states with effective years are New Jersey (2009), Rhode Island (2014), New York (2018), Washington (2019), Massachusetts (2019), and Connecticut (2022). The PFL in Washington DC went into effect in 2020.

months when parents are actively taking the leave, distinct from the months after the leave has ended.

Second, there has been little attention to the CA-PFL's potential effects on fathers' health, despite the fact that CA-PFL covers both male and female workers. To my knowledge, there are three papers that study the effects of CA-PFL on parents' mental health: Bullinger (2019) uses data from National Survey of Children's Health and finds no statistically significant effect on fathers' mental health, with the argument that the increase in fathers' leave-taking in response to the introduction of CA-PFL was much smaller relative to that of mothers. Lee et al. (2020) use data from the Panel Study of Income Dynamics and find that after CA-PFL, psychological distress was reduced for mothers, but increased for fathers, though not statistically significantly. Most recently, Irish et al. (2021) use data from the National Health Interview Survey 1997–2016 to study the PFL policies of California and New Jersey. They find that exposure to PFL is associated with decreased psychological distress among parents. All three studies shed some light on the effect of CA-PFL on fathers' *mental* health aspects. However, it is crucial to confirm that the effects found in these previous papers are not limited to the mental health aspects but are also evidenced in overall health and healthcare utilization. Given the extensive evidence that fathers' utilization of CA-PFL is on the rise, albeit still considerably lower than that of mothers (Klerman et al. 2012; Baum & Ruhm 2016; Bartel et al. 2018), the impact of CA-PFL fathers' health is not straightforward. On one hand, upon becoming eligible for paid leave, fathers' own program take-up is expected to yield direct benefits in paternal health outcomes. On the other hand, if the take-up of paid family leave is unequally shared and primarily utilized by mothers, despite it being equally available to both parents, the effects of paid family leave on fathers' health remain uncertain. Even if a father does not take the leave himself, the fact that his partner can be paid while taking the leave even from during pregnancy could still have a positive indirect influence on fathers. However, as indicated by the findings of this study, when all available weeks of leave expire a few months after birth and mothers have to return to work, fathers would need to be abruptly engaged in newborn care and utilize all available resources. This might include taking paid and/or unpaid leave, seeking nonparental care, or being absent from work without pay, which could potentially add stress and negatively affect fathers' health.

Investigating the effects of PFL on mothers' and fathers' health, encompassing both physical and mental aspects, and healthcare utilization is of paramount importance for the following reasons. Foremost, society bears substantial costs when its labor force is sick and fragile. If providing PFL leads to improved overall health of new mothers and fathers who are part of the prime working age group, the policy may have a big implication on strengthening the nation's labor force with increased productivity. Moreover, if PFL is associated with lower healthcare utilization, driven by better parental health, this would have further implications on reducing healthcare costs in the US. Lastly, it is well documented that the well-being of a newborn depends on the health of the mother (Population Reference Bureau 2002). Recent literature has also emphasized that the father's health during the perinatal period is critical for infant health and development (Kotelchuck 2022). Hence, the poor health of new mothers and fathers could adversely affect a newborn's developing body and brain, potentially leading to long-lasting consequences for their future mental, physical, cognitive, and social outcomes (Clinton et al. 2016; Cook et al. 2019).

By utilizing various health outcomes such as self-reported health status, number of nights spent in the hospital, any days sick, and daily prescription drug usage, which capture both physical and mental health status as well as the level of healthcare utilization, this paper attempts to supplement the literature by filling the existing gap. The data comes from the Survey of Income and Program Participation (SIPP) Medical Expenses/Utilization of Health Care topical module. It allows me to observe various health outcomes for both mothers and fathers during months around childbirth. I compare health outcomes of mothers and fathers before and after CA-PFL in California versus other states. Additional analysis compares mothers or fathers of infants in California to those of children aged 1–17, relative to corresponding mothers or fathers of the same age children in other states, before and after the CA-PFL program, to identify the effects of CA-PFL on maternal and paternal health.

The findings consistently show that mothers' health during pregnancy and immediately following childbirth (i.e., the period during which most mothers are expected to utilize the leave) has improved after the introduction of CA-PFL. Mothers with access to CA-PFL show a higher rate of self-reported health being excellent, fewer days of illness, lower daily prescription drug usage, and fewer nights spent in the hospital. For fathers too, I find that CA-PFL led to an increase in excellent health reporting and a decrease in any days feeling sick during months around childbirth. My post-birth analysis reveals that some of the positive health effects on mothers continue to persist even after the leave expires, that is, 5 to 20 months after childbirth. However, health benefits on fathers are no longer detected during this time frame, and only a slight increase in the likelihood of reporting any days feeling sick is observed.

To explore why there is a positive effect on parental health even before giving birth and absence of positive health effects on fathers later on, I perform multiple mechanism analysis by investigating three potential pathways: (i) career pauses due to childbirth; (ii) parental leave usage, separately for pre- and post-birth periods; and (iii) work and personal earnings trajectories around childbirth. The first mechanism analysis reveals that CA-PFL raised the share of fathers who are either not working or are absent from work without pay by 1.8 percentage points, starting exactly 4 months after birth—the time when mothers would have used up all the available leave benefits. It provides suggestive evidence that as mothers exhaust their combination of paid and unpaid leave weeks, the responsibility of childcare begins to weigh on their spouses, potentially affecting their postnatal health. From the second mechanism analysis, I find that *prenatal* maternal leave take-up is 35% higher for mothers with access to CA-PFL compared to their counterparts, which explains why the positive effects of CA-PFL materialize even before childbirth. The final mechanism analysis highlights a stark difference between California mothers and fathers' work and earnings trajectory during the months surrounding childbirth before and after CA-PFL. Specifically, I find strong evidence that a larger share of mothers is in the labor force and actively working during the months around childbirth after CA-PFL became effective; yet, I detect no difference in these same outcomes for fathers before and after the introduction of CA-PFL. This mechanism analysis helps us to understand the heterogeneous effects of CA-PFL on parental health around the time of childbirth.

My study provides timely evidence to inform ongoing policy discourse at both federal and state levels. It also presents new insights into the effects on fathers' health and healthcare utilization around childbirth. Although CA-PFL was designed to be gender-neutral, its short duration, low wage replacement rate, and lack of job protection may have led to unequal utilization among parents. Thus, these aspects should continue to be actively discussed as a potential source of unintended consequences that could affect fathers' health in a more nuanced manner.

2 Background

California is one of several states that have had long-standing State Disability Insurance (SDI) programs. States with SDI have offered maternity leave to pregnant employees with partial wage replacement, since the Pregnancy Discrimination Act (PDA) of 1978 requires employers to treat a normal pregnancy and childbirth (in addition to pregnancy with complications) like any other temporary disability. As a result, women in California can claim SDI benefits for up to 4 weeks before the delivery and 6 weeks after birth (8 weeks for Cesarean sections).

On July 1, 2004, California's paid family leave (CA-PFL) went into effect and offered 6 weeks of paid leave to all new parents (including fathers), with a 55% wage replacement rate up to a maximum benefit of $728 per week in 2004 (which has increased to $1620 per week in 2023 with a wage replacement rate of up to 60 to 70%). The 6 weeks of CA-PFL *extend* the existing SDI of 10 weeks. Consequently, pregnant women in California can take some form of partially paid leave for 4 weeks before giving birth and for 12 to 14 weeks after giving birth by claiming SDI and CA-PFL consecutively. The leave does not need to be taken all at once or immediately after birth, as long as they are used in a 12-month period after birth. CA-PFL does not provide job protection nor continuation of fringe benefits, unless leave under FMLA is taken simultaneously.

Unlike strict eligibility requirements under FMLA, an employee is eligible for CA-PFL if they have paid SDI taxes on at least $300 earned approximately 5 to 18 months before the leave begins. Coverage is near-universal among private sector employees, while self-employed and state and local employees need to opt in to be covered. CA-PFL is funded by the employee payroll taxes, similar to the SDI program.[2]

Finally, CA-PFL is a gender-neutral program where eligible parents are entitled to take the same amount of leave, either simultaneously or separately. In the US, fathers' access to paid leave on the private market has been very low, and the take-up rate has been even lower. According to a 2012 report, only 14% of employers offer paid paternity leave to most of their male employees (Klerman, Daley, & Pozniak

[2] More details regarding CA-PFL can be found: https://www.edd.ca.gov/disability/paid-family-leave/

2012), and less than 2% of fathers of children under age one reported being on leave according to the 2013 American Communities Survey (Bartel et al. 2018). In this regard, CA-PFL is salient in light of its entitlement to both mothers and fathers. However, in the first year of the program's passage, only 17% of new child claims were made by a male worker, which had increased to 30% by 2013. Bartel et al. (2018) find that fathers of infants in California are 46% more likely to be on leave after CA-PFL had become available, relative to a baseline take-up rate of 1.99%. Given that CA-PFL has allowed an increasing number of fathers to be on leave, it is pivotal to measure the direct impact of CA-PFL on fathers' health and healthcare utilization. If we do not detect any health benefits for fathers, it is important to question why.

3 Data

To measure the impact of CA-PFL on various health outcomes of mothers and fathers around childbirth, it is essential to know a child's birth month and year, state of residence at birth, parental employment status as well as parental health outcomes for children born during both pre- and post-PFL years. The Survey of Income and Program Participation (SIPP) contains all of these critical measures.

In SIPP core surveys, all individuals in a household are surveyed every 4 months and followed throughout each panel. A wave indicates this 4-month period. Table 1 shows that there are 12 waves in the 1996 panel (covering a total of 48 months, from April 1996 to March 2000), 9 waves in the 2001 panel (covering a total of 36 months, from Feb 2001 to Jan 2004), 12 waves in the 2004 panel (covering a total of 48 months, from Feb 2004 to Jan 2008), and 16 waves in the 2008 panel (covering a total of 64 months, from September 2008 to December 2013). Given that CA-PFL went into law in July 2004, my study's reference period, from 1996 to 2013, covers a sufficient timeframe to measure the effects of the policy by comparing those who were exposed to the policy (parents with childbirth in July 2004–2013) to those who were not exposed to the policy (parents with childbirth in 1996–June 2004).

This paper's main outcomes are collected through the SIPP Medical Expenses/Utilization of Health Care topical modules. The SIPP topical modules are not repeated in every wave of SIPP core data but collected only in select waves. Table 1 indicates the waves in each panel when individuals were surveyed about their medical expenses and utilization of healthcare. As a concrete example, a mother who gave birth in July 2003 would have had her health topical modules implemented twice: once about 6 to 9 months before giving birth (October 2002 to January 2003, from the 2001 Panel Wave 6) and once more 3 to 6 months after giving birth (October 2003 to January 2004, from the 2001 Panel Wave 9). Taking advantage of the variation in the timing of the SIPP topical modules relative to the month of childbirth across all mothers and fathers, I examine the impact of CA-PFL on health during months surrounding childbirth.

The Medical Expenses/Utilization of Health Care topical modules have detailed health-related questions. I focus on the three different aspects of health: (i) one that reflects any marginal improvement/deterioration in health (report of current health

Table 1 Summary of the 1996 to 2008 SIPP panels and availability of healthcare topical modules

Wave	1996 panel		2001 panel		2004 panel		2008 panel	
	Interview months	Health topical module	Interview months	Health topical module	Interview months	Health topical module	Interview months	Health topical module
1	Apr 96–Jul 96		Feb 01–May 01		Feb 04–May 04		Sep 08–Dec 08	
2	Aug 96–Nov 96		Jun 01–Sep 01		Jun 04–Sep 04		Jan 09–Apr 09	
3	Dec 96–Mar 97	V	Oct 01–Jan 02	V	Oct 04–Jan 05	V	May 09–Aug 09	
4	Apr 97–Jul 97		Feb 02–May 02		Feb 05–May 05		Sep 09–Dec 09	V
5	Aug 97–Nov 97		Jun 02–Sep 02		Jun 05–Sep 05		Jan 10–Apr 10	
6	Dec 97–Mar 98	V	Oct 02–Jan 03	V	Oct 05–Jan 06	V	May 10–Aug 10	
7	Apr 98–Jul 98		Feb 03–May 03		Feb 06–May 06		Sep 10–Dec 10	V
8	Aug 98–Nov 98		Jun 03–Sep 03		Jun 06–Sep 06		Jan 11–Apr 11	
9	Dec 98–Mar 99	V	Oct 03–Jan 04	V	Oct 06–Jan 07		May 11–Aug 11	
10	Apr 99–Jul 99				Feb 07–May 07		Sep 11–Dec 11	V
11	Aug 99–Nov 99				Jun 07–Sep 07		Jan 12–Apr 12	
12	Dec 99–Mar 00	V			Oct 07–Jan 08		May 12–Aug 12	
13							Sep 12–Dec 12	
14							Jan 13–Apr 13	
15							May 13–Aug 13	
16							Sep 13–Dec 13	

Table 2 SIPP health care topical module survey questions

Outcomes	Survey questions
Report of current health status	Would you say your health in general is excellent, very good, good, fair or poor?
Number of nights spent in hospital	How many nights in all did … spend in a hospital of any type during the past 12 months?
Daily prescription medication	Do … take prescription medicines on a daily basis?
Number of sick days	Number of sick days in past 12 months including days while a patient at a hospital during the past 12 months, about how many days did illness or injury keep … in bed more than half of the day?

status being excellent, any days feeling sick, number of days feeling sick); (ii) one that reflects a more extreme change in health (number of nights spent in the hospital[3]); and (iii) one that reflects a chronic aspect of health (daily prescription medication usage). Table 2 shows the survey questions for each outcome.[4] It is worth noting that these outcomes capture *both the physical and mental* aspects of one's health, for health data items in the SIPP are defined to measure "physical, mental, and social well-being" (U.S. Department of Health and Human Services 1991; Adler 1992).

Another benefit of using the SIPP data is that it reports the birth month and birth year of all individuals in a household. Accordingly, in every wave of the SIPP panel, I first identify newborns whose birth month and birth year are the same as the calendar month and calendar year of the reference month. This means that I use the *exact birth month and year* of each child, as well as their state of residence at birth, to precisely define the treatment group and control group. This makes a notable difference from the existing literature, where a common strategy is to rely on the age of the youngest child at the time of survey to locate potentially eligible parents, which can lead to substantial measurement bias and even a wrong classification of treated and control groups (Rossin-Slater et al. 2013; Bartel et al. 2018; Bullinger 2019; Irish et al. 2021).

In order to identify the mothers and fathers of newborns, I use a variable that links each child with their parents.[5] Then, by linking the parents' unique identifiers

[3] Outliers above 99.5 percentiles in the number of days sick and number of nights in the hospital are dropped.

[4] I focus on health outcomes that can be clearly identified to be either health improving or deteriorating. There are other health outcomes available in the SIPP topical modules, e.g., number of visits to a doctor, any hospital stays, and any prescription drug usages. I do not use these outcomes because I am not able to identify whether any changes in these outcomes indicate a positive or a negative change. For example, I am unable to tell if the visit to a doctor is a well-visit or a sick visit. Studying the incidence of hospital stay is not meaningful because almost all women in my sample are hospitalized for giving birth. Prescription drug usage can be health-improving and necessary in some circumstances, while it can be risky in other circumstances. Nevertheless, I show these health outcomes in Appendix Table A8 and A9.

[5] The analysis sample can include a mismatched sample of parents and thus may not include both parents. For instance, if, at the time of birth, a newborn has a mother in the same household, but no father, then I include only the baby's mother in the analysis.

across all waves within the same panel, I obtain their monthly data about changes in household composition and economic circumstances over time. This permits me to depict a monthly trajectory of labor force participation, work, and personal earnings of each parent, which I use to explore as potential mechanism analysis later on. While the panel nature of the SIPP is useful, the intermittency of health topical modules limits my ability to explore the month-to-month evolution of health outcomes around childbirth. Hence, it is more accurate to think of the study's main analysis on health as using repeated cross sections (Rodgers 2020).

For the main analysis of health outcomes, I include mothers and fathers in the analysis only if their health topical modules were collected anytime between nine months prior to childbirth (i.e., during pregnancy) and 20 months following childbirth. While two of the health outcomes (self-reported health and daily prescription drug usage) are asked *without* the reference period, the other two health outcomes (number of nights spent in the hospital and number of days sick) are asked with a reference period of the past 12 months (see Table 2). That said, I use the topical modules that were collected anytime during pregnancy (i.e., 9 months prior to childbirth) up to 5 months following childbirth to measure "health around childbirth," and those that were collected anytime from 5 to 20 months after childbirth to measure "health after childbirth."[6]

I restrict the sample to mothers whose age at childbirth range between 18 and 45 years old and include all fathers without any age restriction, mainly due to biological reasons. Paid family leave is only relevant if an individual is in the workforce. Accordingly, in the main analysis, I restrict to mothers or fathers who reported working at any point during the 9 months prior to birth and had non-zero average earnings. This allows parents who chose to take leave before childbirth to be still included in the sample. I drop self-employed individuals. In order to isolate the effects of CA-PFL, there should be no other states that implemented PFL during my sample years of 1996 to 2013. After California's program, New Jersey was the second state that introduced its own PFL in July 2009, followed by Rhode Island in 2014, New York in 2018, Washington in 2019, Massachusetts in 2019, Washington DC in 2020, and finally Connecticut in 2022. Since my sample period spans up to 2013, and New Jersey was the only state that implemented PFL during the sample years, I omit births that occurred in New Jersey in or after July 2009 to avoid its confounding effects in the study. Appendix Figure A1 shows the data tree illustrating all of the sample inclusion/exclusion criteria.

[6] This approach leads to a better reporting of healthcare utilization, given a well-documented recall bias prevalent in the survey data. Specifically, 1-year recall period can lead to substantial amount of negative errors (under-reporting), where people may recall an event but report that it happened earlier than it actually did (backward telescoping), while forgetting to report an event that occurred recently is unlikely (Bhandari and Wagner 2006; Kjellsson et al. 2014). In other words, if a respondent is asked about the number of days sick in the past 12 months during month 5 after giving birth, she may under-report incidents that took place during her pregnancy. Her response could be more accurate if the same question were actually asked during pregnancy. That said, I still show the results using the most restrictive choice of topical modules months in Appendix Table A6 and A7 column 5.

Table 3 Summary statistics of mothers and fathers with newborn

	Mothers				Fathers			
	CA		Rest of US		CA		Rest of US	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Health excellent	0.309	0.375	0.397	0.389	0.422	0.373	0.475	0.378
	(0.018)	(0.031)	(0.006)	(0.010)	(0.017)	(0.027)	(0.006)	(0.009)
Health excellent or very good	0.761	0.792	0.762	0.798	0.777	0.725	0.814	0.773
	(0.016)	(0.026)	(0.006)	(0.008)	(0.014)	(0.025)	(0.005)	(0.008)
Any sick days	0.644	0.455	0.669	0.582	0.372	0.213	0.348	0.301
	(0.018)	(0.032)	(0.006)	(0.010)	(0.016)	(0.022)	(0.006)	(0.008)
Number of days sick	6.481	1.256	5.806	4.441	1.051	0.472	1.200	1.104
	(0.664)	(0.110)	(0.183)	(0.208)	(0.077)	(0.062)	(0.051)	(0.084)
Number of days sick if any	10.068	2.762	8.684	7.643	2.836	2.322	3.470	3.671
	(0.990)	(0.149)	(0.262)	(0.330)	(0.168)	(0.163)	(0.133)	(0.251)
Non-birth hospital stay	0.376	0.019	0.410	0.035	0.016	0.015	0.031	0.024
	(0.019)	(0.009)	(0.007)	(0.004)	(0.004)	(0.007)	(0.002)	(0.003)
Number of nights in the hospital	1.376	1.085	1.725	1.891	0.051	0.008	0.081	0.047
	(0.069)	(0.092)	(0.031)	(0.070)	(0.015)	(0.009)	(0.007)	(0.007)
Daily prescription medication usage	0.290	0.061	0.327	0.331	0.101	0.102	0.104	0.157
	(0.017)	(0.015)	(0.006)	(0.009)	(0.010)	(0.017)	(0.004)	(0.007)
Number of visits to doctors	12.773	10.019	12.226	12.186	3.165	1.181	2.454	2.183
	(0.791)	(0.617)	(0.153)	(0.298)	(0.315)	(0.159)	(0.100)	(0.100)
Labor force participation	0.769	0.873	0.802	0.866	0.985	0.987	0.978	0.988
	(0.016)	(0.021)	(0.005)	(0.007)	(0.004)	(0.006)	(0.002)	(0.002)
Working	0.601	0.753	0.673	0.735	0.928	0.933	0.932	0.919
	(0.019)	(0.028)	(0.006)	(0.009)	(0.009)	(0.014)	(0.003)	(0.005)

Table 3 (continued)

	Mothers				Fathers			
	CA		Rest of US		CA		Rest of US	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Age	29.757	30.787	28.717	29.517	31.933	32.251	31.201	31.855
	(0.239)	(0.381)	(0.071)	(0.108)	(0.208)	(0.355)	(0.076)	(0.115)
Number of own children	1.309	1.517	1.444	1.306	1.485	1.732	1.445	1.455
	(0.049)	(0.090)	(0.015)	(0.023)	(0.042)	(0.071)	(0.015)	(0.022)
White	0.836	0.749	0.830	0.819	0.839	0.896	0.884	0.867
	(0.014)	(0.028)	(0.005)	(0.008)	(0.012)	(0.017)	(0.004)	(0.006)
Black	0.031	0.091	0.127	0.101	0.027	0.029	0.076	0.065
	(0.007)	(0.018)	(0.004)	(0.006)	(0.005)	(0.009)	(0.003)	(0.004)
Married	0.783	0.844	0.766	0.786	0.918	0.892	0.901	0.850
	(0.016)	(0.023)	(0.006)	(0.008)	(0.009)	(0.017)	(0.004)	(0.006)
Less than high school	0.145	0.101	0.073	0.050	0.237	0.232	0.084	0.088
	(0.014)	(0.019)	(0.003)	(0.004)	(0.014)	(0.023)	(0.004)	(0.005)
Highschool grad	0.199	0.230	0.269	0.163	0.177	0.263	0.292	0.249
	(0.015)	(0.027)	(0.006)	(0.007)	(0.013)	(0.024)	(0.006)	(0.008)
Some college	0.322	0.278	0.321	0.312	0.292	0.250	0.290	0.292
	(0.018)	(0.029)	(0.006)	(0.009)	(0.015)	(0.024)	(0.006)	(0.008)
BA degree or more	0.334	0.392	0.336	0.476	0.293	0.254	0.334	0.371
	(0.018)	(0.031)	(0.006)	(0.010)	(0.015)	(0.024)	(0.006)	(0.009)
Average monthly earnings during pregnancy ($2004)	2023.225	2253.210	1915.731	2354.306	4049.349	3436.863	3560.246	3557.345
	(74.389)	(135.591)	(21.684)	(43.268)	(144.795)	(166.714)	(40.078)	(60.793)
Average weekly hours worked during pregnancy	33.526	32.522	33.965	32.848	44.053	40.746	46.709	40.455
	(0.504)	(0.868)	(0.188)	(0.255)	(0.382)	(0.642)	(0.179)	(0.239)

Table 3 (continued)

	Mothers				Fathers			
	CA		Rest of US		CA		Rest of US	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Household total income ($2004)	6383.028	5789.141	5210.799	5726.478	5937.186	5269.284	5282.833	5580.134
	(243.236)	(268.959)	(60.460)	(88.214)	(181.652)	(228.753)	(53.683)	(87.683)
Observations	675	246	5725	2472	884	333	6226	3040

Data: 1996–2008 SIPP core surveys and health care topical modules.

Sample is restricted to mothers or fathers who were interviewed for SIPP health topical module anytime from 9 months before to 5 months after childbirth and worked during pregnancy with positive earnings. Standard deviations are in parentheses.

Births from 1996 to July 2004 are included in pre column; births after July 2004 to 2013 are in the post column. SIPP person weights are used

Summary statistics for the health around birth analysis sample are presented in Table 3. It is clearly observed that there was a significant reduction in the likelihood of reporting any days sick, the number of days sick, and the prevalence of daily prescription drug usage for CA mothers and fathers, compared to their counterparts residing in the rest of the US. It is also noteworthy that the probability of reporting excellent health increased significantly for CA mothers and fathers, but not for their counterparts in other states.

Lastly, for one of the mechanism analyses, I use the latest SIPP waves from 2019 and 2020, where all parental leave information, separately for the pre- and post-birth periods, is collected regarding the respondent's first child (Scherer 2022). Specifically, both men and women are asked a series of questions, such as whether they worked during the pregnancy leading up to the birth of their first child, the types of leave (if any) used after the child was born, as well as prior to the birth. This data allows me to explore the pattern and timing of leave usage and the types of leave used for *both* mothers and fathers, painting a more complete picture of parental leave-taking behaviors around childbirth.

4 Empirical strategy

A. Methodology

I estimate the following Eq. (1) to examine the impact of CA-PFL on mothers' and fathers' health. I run Eq. (1) *separately* for "months around childbirth" analysis and "months after childbirth" analysis:

$$Y_{isyt} = \alpha + \beta_1 CA \bullet Post_{isyt} + X_{isyt}{}'\gamma + State_s + Year_y + months\ to\ birth_{it} + \lambda_{sy} + \varepsilon_{isyt} \quad (1)$$

The outcome of interest Y_{isyt} is the health measured during month t for a mother-birth (or a father-birth)[7] i who gave birth in year y in state s. $Post_{isyt}$ is one if births were from July 2004 to 2013, and zero if from 1996 to June 2004. CA_{isyt} is one if births were in California, and zero otherwise. Hence, the treatment variable, $CA \bullet Post_{isyt}$, is an indicator equal to one if the birth occurred in California in or after July 2004. For control groups, I use states similar to California on a range of dimensions such as size, demographic makeup, geography, cultural atmosphere, and environment. Specifically, I use three control groups: (i) other large/similar states (Florida, New York, Pennsylvania, and Texas); (ii) (i) plus neighboring states (Arizona, Nevada, Oregon, and Washington); and (iii) all other states plus Washington D.C. I include birth state ($State_s$) and birth year ($Year_y$) fixed effects to address time-invariant state-level differences in health outcomes and nationwide changes in health over time, respectively. X is a vector of individual controls such as age at birth, number of children, race, marital status, education, average earnings before

[7] Some individuals have multiple births during the same panel, so I treat two births to the same parents as two different observations. There are not enough observations to make use of mother (or father) fixed effects.

birth, household-level income, and whether the birth occurred in July 2004 or later. It is important to control for the month in which the health topical module questions were asked ($monthstobirth_{it}$ dummies), since health status could be substantially different depending on when it was measured relative to childbirth. Lastly, I control for state-year level characteristics (λ_{sy}) such as unemployment rate, TANF benefit levels, poverty rate, minimum wage, whether the state governor is a democrat or not, log of state population, and per capita income. The coefficient of interest, β_1, represents the effects of CA-PFL on various health outcomes, which is identified by comparing mothers or fathers who gave birth before or after July 2004, in California versus other states. SIPP person weights are used in all regressions. Standard errors are clustered at the state level; however, when the number of treated clusters is small, exploiting policy variation across states using standard errors clustered at the state level may be challenging (Bertrand, Duflo, & Mullainathan 2004; Donald & Lang 2007). Accordingly, I also derive p values outlined in Ferman and Pinto (2019), to address the single treated state and heterogeneous cluster size issue in this study setting.[8]

In the next analysis, I expand my study sample by including mothers or fathers whose youngest child is 1–17 years old, who were not affected by CA-PFL[9], to address the possibility that factors specific to California affected the health outcomes around the time of CA-PFL's introduction.[10] This specification allows me to identify the effects of CA-PFL by comparing mothers or fathers with newborns to mothers or fathers of older children, before and after July 2004, in California versus other states:

$$\begin{aligned} lY_{isyt} =& \alpha + \beta_2 \bullet CA \bullet POST \bullet Newborn_{isyt} + \partial \bullet CA \bullet Newborn_{isyt} \\ &+ \theta \bullet POST \bullet Newborn_{isyt} + \delta \bullet CA \bullet Post_{isyt} + \sigma \bullet Newborn_{isyt} \\ &+ X_{ist}{}'\gamma + State_s + Year_y + months\ to\ birth_{it} + \lambda_{sy} + \varepsilon_{ist} \end{aligned} \tag{2}$$

The coefficient of interest, β_2, now represents the effects of CA-PFL after isolating its effects from other California-specific changes over time that influenced the health of all mothers and fathers.[11] As in Eq. (1), standard errors are clustered at

[8] Bartel et al. (2018), Rodgers (2020), and Golightly and Meyerhofer (2022) employ the Ferman-Pinto method for calculating p values in the same CA-PFL setting. I am grateful to Luke P. Rodgers for his generous assistance in applying this method to the SIPP data.

[9] When I expand the age range of the control group to be 1 to 17 years old, I make sure that the children in the control group were born *before* CA-PFL, thus never exposed to CA-PFL. Specifically, I drop parents with youngest children aged 1 from the 2004 panel, children aged 1–5 from the 2008 panel wave 4, children aged 1–6 from the 2008 panel wave 7, and children aged 1–7 from the 2008 panel wave 10 because their parents could have been eligible for PFL when the policy was first implemented in 2004.

[10] For example, Rossin-Slater et al. (2013) compare mothers of youngest children aged below 1 with those with youngest children aged 5 to 17. Bullinger (2019) compares households with infants aged 0–1 with those who had a youngest child aged 1–17 at the time of survey. The key assumption is that mothers with older children would have similar trends in outcomes, in the absence of the treatment, to women with infants. Rossin-Slater (2013) find that the results are robust to changes in the minimum and maximum child threshold ages for inclusion into comparison groups of children aged 5 to 17.

[11] I do not use the terminologies, "difference-in-difference (DD)" or "triple-difference (DDD)" for the specifications as it is inappropriate given the intermittent timing of the SIPP topical module data.

the state level, but I again verify the statistical significance by using Ferman-Pinto p values (Ferman & Pinto 2019). I apply the same sample criteria on mothers and fathers in the comparison group who report any hours worked with non-zero earnings. For mothers or fathers with a newborn, I include their health outcomes based on the timing of topical modules relative to the month of childbirth—specifically, I include parents only if their health information was collected during the 9 months leading up to and 5 months following childbirth, to analyze health around childbirth. However, mothers and fathers in the comparison group do not have a birth reference point. Accordingly, for every observation, I assign months-to-birth dummies by generating random numbers with a uniform distribution between − 9 and 5. Appendix Table A1 shows the summary statistics of mothers and fathers whose youngest child is 1–17 years old.

Finally, to study potential mechanisms through which CA-PFL affects parental health status, I utilize the longitudinal nature of SIPP core surveys to observe the month-to-month changes in work and personal earnings before and after childbirth. Specifically, I estimate the effects of CA-PFL in the event study (Jacobson et al. 1993) by following the same mothers and fathers in California and comparing the work and earnings trajectory between ones who gave birth before CA-PFL to those who gave birth after CA-PFL.

$$Y_{iyt} = \sum_{m=-12}^{12} \delta_m \bullet I_{iyt}\left(t - t_i^* = m\right) + \sum_{m=-12}^{12} \beta_m \bullet I_{iyt}(t - t_i^* = m) \bullet Post_{iyt} + \gamma_i + \varepsilon_{iyt} \tag{3}$$

Y_{iyt} is the outcome for a mother-birth (or a father-birth) i during month t in year y who gave birth in month t_i^*.[12] I include a set of mother-birth (or father-birth) fixed effects (γ_i) to account for both observed and unobserved time-invariant individual characteristics.

t_i^* is the month of childbirth for a mother i or a father i. Thus, $I_{iyt}\left(t - t_i^* = m\right)$ is a set of dummy variables that indicate each observation's timing relative to a birth, with m ranging from 12 months before to 12 months after birth. I omit as a reference group the 9th to 12th month prior to birth ($m = -9$ to -12) so that the coefficients of interest (β_m) map the time path of outcomes relative to her own pre-pregnancy level. $Post_{iyt}$ equals to one when a mother (or a father) i gave birth *after* the paid family leave was in effect in California. I cluster the standard errors at the mother-birth or father-birth level. The coefficients of interest, β_m, capture two differences: (i) a difference relative to the same mother (or father)'s own pre-birth outcomes and (ii) a difference between a mother (or a father) subject to PFL and their counterpart who was not exposed to PFL. Yet, as noted earlier, not all individuals have information for the full 12 lead and 12 lag months; this is because women gave birth at different times within the SIPP panel. Therefore, it is important to highlight that there exists substantial variation across individuals in the number of months with valid outcomes. In other words, the trajectory of work and personal earnings does not represent a balanced panel that follows individuals every month throughout the entire pre- and post-birth period.

[12] In this specification, I do not use the subscript s because I restrict to women and men in California.

B. Identifying assumption

The major identifying assumption of this model is that there are no other time-varying factors of mothers' and fathers' health that were correlated with the implementation of the policy. If the CA-PFL law induced selection into the sample by altering the sample composition, the estimates would not be able to detect the pure effects of CA-PFL on health. To evaluate this possibility, I run Eq. (1) with the outcome replaced with each of a mother's or father's demographic characteristics to estimate the effects of CA-PFL on the compositional changes in demographic characteristics of those who gave birth after the policy compared to their pre-policy counterparts. Appendix Table A2 and A3 show that CA-PFL is uncorrelated with time-varying factors such as fertility (measured by the number of children) or total household income. Furthermore, I find there are no differential compositional changes in California versus other states for the majority of observed demographic characteristics for mothers. However, I find that fathers who are white, black, or whose highest education degree is the BA degree or more are more likely to represent the treatment group after CA-PFL. That said, in order to address the concern that differential demographic trends among mothers and fathers of newborns in California may drive the results, I control for individual demographic characteristics in the models.

Another critical identifying assumption is that there exist parallel trends in health outcomes between California and other states before CA-PFL became effective. While the parallel trend assumption is inherently untestable, I attempt to estimate the model only for the pre-treatment years and use any one of the pre-treatment years as the year of "artificial policy change." I discuss this in detail in the Results section.

5 Results

A. The effects of CA-PFL on mother's health around childbirth

The main results for mothers' health are presented in Table 4. The first three columns show the regression coefficients β_1 from Eq. (1), for three different control groups. As mentioned earlier, β_1 are derived by comparing mothers in California who gave birth before and after CA-PFL to mothers in control states who gave birth before and after CA-PFL. Hence, the estimates may capture contemporaneous factors which affected all mothers' health in California. Accordingly, I include mothers with an older child aged 1–17 in order to net out any potential factors that affected all California mothers' health over time. These estimates are reported in the last column, and they correspond to the regression coefficients β_2 from Eq. (2).

Table 4 suggests that CA-PFL leads to an overall improvement in mothers' health from the pregnancy period to the first 5 months following childbirth, the period during which most mothers use the leave. Panel A shows that CA-PFL led to an improvement in mothers' self-reported health during this critical period surrounding childbirth. Specifically, the share of mothers who report their health to be in the top category, i.e., excellent, is higher by 10 percentage points, compared to mothers from non-CA states. The likelihood of reporting any days feeling sick (panel B) is

Table 4 Effects of CA-PFL on mothers' health around birth

	Families with newborn			Families with newborn vs older child 1–17 years
	Similar states	Similar states and neighboring states	All states except CA	All states except CA
	(1)	(2)	(3)	(4)
A. Excellent health				
Birth after CA-PFL	0.243***	0.148***	0.100***	0.095†
standard error	(0.027)	(0.086)	(0.049)	(0.028)
FP corrected *p* value	[0.000]	[0.000]	[0.000]	[0.151]
Observations	2798	3359	9095	34604
R-squared	0.088	0.095	0.074	0.052
Pre-PFL mean for CA mothers with newborn	0.309			
B. Any days sick				
Birth after CA-PFL	− 0.076*	− 0.052	− 0.034	− 0.064†
Standard error	(0.139)	(0.063)	(0.045)	(0.023)
FP corrected *p* value	[0.051]	[0.185]	[0.392]	[0.412]
Observations	2798	3359	9095	25037
R-squared	0.098	0.105	0.094	0.073
Pre-PFL mean for CA mothers with newborn	0.644			
C. Number of days sick				
Birth after CA-PFL	− 6.514***	− 6.047***	− 2.420*	− 3.692*
standard error	(1.256)	(1.679)	(1.431)	(0.579)
FP corrected *p* value	[0.000]	[0.000]	[0.070]	[0.089]
Observations	2791	3351	9087	34596
R-squared	0.054	0.064	0.059	0.023

Table 4 (continued)

	Families with newborn			Families with newborn vs older child 1–17 years
	Similar states	Similar states and neighboring states	All states except CA	All states except CA
	(1)	(2)	(3)	(4)
Pre-PFL mean for CA mothers with newborn	6.481			
D. Number of nights in the hospital				
Birth after CA-PFL	− 0.577***	− 0.461***	− 0.637**	− 0.622*
standard error	(0.509)	(0.467)	(0.310)	(0.178)
FP corrected p value	[0.000]	[0.000]	[0.038]	[0.068]
Observations	2798	3359	9093	34602
R-squared	0.185	0.176	0.171	0.102
Pre-PFL mean for CA mothers with newborn	1.376			
E. Daily prescription medication				
Birth after CA-PFL	− 0.389***	− 0.334***	− 0.257***	− 0.203***
Standard error	(0.056)	(0.056)	(0.038)	(0.018)
FP corrected p value	[0.000]	[0.000]	[0.000]	[0.000]
Observations	2798	3359	9095	34604
R-squared	0.105	0.097	0.068	0.039
Pre-PFL mean for CA mothers with newborn	0.29			

Data: 1996–2008 SIPP health care topical modules.

This table reports regression coefficients β_1 from Eq. (1) in the first 3 columns and β_2 from Eq. (2) in the last column for each outcome. Similar states include Florida, New York, Pennsylvania, and Texas. Neighboring states include Arizona, Nevada, Oregon, and Washington. Robust standard errors clustered at the state level are shown in parentheses and Ferman-Pinto (2019) adjusted p values are shown in brackets. Stars are based on FP p values: *FP $p < 0.10$; **FP $p < 0.05$; ***FP $p < 0.01$

†The estimates are statistically significant with $p < 0.10$ with standard errors clustered at the state level, but not with FP p values

lower by 6 to 7 percentage points (10 to 12% when evaluated at the pre-PFL mean), and the number of reported days sick (panel C) is lower by 2 to 6 days for mothers with access to CA-PFL. It appears that having the ability to take *paid*-time off from work for *longer* (through a combination of SDI and PFL) may have a substantially positive effect on the overall health of mothers, which can then lead to a lower level of healthcare utilization. In fact, this result is supported by previous studies which found that the receipt of paid leave and its longer duration are associated with improved mental health (Chatterji and Markowitz 2012; Mandal 2018; Bullinger 2019; Lee et al. 2020; Irish et al. 2021) and a lower level of healthcare utilization (Chatterji and Markowitz 2005; Beuchert et al. 2016).

While almost every mother is hospitalized around childbirth, the number of nights spent during hospitalization (panel D) is significantly lower by 0.6 nights for California mothers after the introduction of PFL, compared to mothers without PFL. Finally, the result also shows that mothers have a lower likelihood of taking daily prescription medication by 20 to 25 percentage points (panel E). This finding is worth highlighting given that taking prescription drugs during pregnancy is known to be risky, which could cause premature birth, pregnancy loss, or birth defects such as development disabilities (CDC 2020).

While the parallel trend assumption is not testable, I attempt to estimate the model only for the pre-treatment years and use any one of the pre-treatment years as the year of "artificial policy change," to see whether the coefficient on the interaction term in the regression of health outcomes is indistinguishable from zero. Appendix Table A4 provides evidence that there are no confounding trends in any of maternal health outcomes in California prior to the introduction of CA-PFL, showing opposite signs if any.[13]

In Appendix Table A6, I check model specifications to address several concerns: First, I drop average earnings during pregnancy and household income from the model as they are potentially endogenous. The estimates (column 2) stay almost identical to those from the main model (column 1). Second, any evidence of self-selection into the treatment group closer to the effective date of CA-PFL may be concerning if this has caused some shifting of the timing of births and composition of the treatment group, as found in Lichtman-Sadot (2014). Hence, I leave out the year of 2004 from the model to address this concern. Appendix Table A6 column 3 presents the result, assuring that the estimates are robust. Third, my post-PFL sample expands to 2013, including births during the Great Recession. Given that the Great Recession reduced fertility substantially, particularly among women with low socioeconomic status and in California (Schneider 2015; Schneider and Hastings 2015), births during the Great Recession may have been positively selected. I estimate the model by dropping the 2008 panel (covering births from September 2008 to December 2013) in Appendix Table A6 column 4 and confirm that the results are not driven by births during the Great Recession. Lastly, since some health care questions are asked with a reference period of past 12 months, I use the health measures

[13] Caution should be exercised when interpreting the excellent health outcome, as some of the estimates show significance for several placebo years.

only if they were collected between 0 and 5 months following childbirth.[14] Appendix Table A6 column 5 shows the results. The sizes of estimates are slightly larger due to the fact that these outcomes are collected during the concentrated time frame around childbirth.

B. The effects of CA-PFL on father's health around childbirth

Next, I turn to fathers' health. Previous studies have found that there is a high correlation between the health of spouses (Wilson 2002; Hoppmann et al. 2011; Kim et al. 2014). Hence, we could expect that there exists an indirect effect on fathers' health due to strong spousal correlation. This indirect effect could be particularly prevalent during pregnancy, since it is the period when only mothers are able to take leave through claiming CA-PFL with SDI. After childbirth, by directly utilizing PFL, fathers could see similar health benefits to those seen in mothers. Table 5 suggests that CA-PFL led to an increase in the share of fathers reporting excellent health, by 8 to 15 percentage points (18 to 35% increase from the pre-treatment mean, panel A). There is also evidence that CA-PFL led to a decrease in the likelihood of reporting any days sick by 7 to 12 percentage points, or 20 to 34% from pre-PFL mean (panel B). It is certainly promising that CA-PFL has affected fathers' health toward a positive direction, like their spouses, during this critical period. Yet, I do not see any effects on the extreme and chronic aspects of health of fathers. Again, in Appendix Table A5, I check whether there exist any pre-trends in fathers' health outcomes prior to the introduction of CA-PFL by estimating the model only for the pre-treatment years and using any one of the pre-treatment years as the "hypothetical policy year." Appendix Table A5 provides strong evidence that there are no confounding trends in any of paternal health outcomes in California before CA-PFL became effective. I do observe statistically significant and sizable estimates for self-reported excellent health status for fathers in California. That said, the estimates are negative, the opposite of what I obtain when using 2004 as the true policy year.

Finally, in Appendix Table A7, I check robustness to different model specifications and find that estimates are not sensitive to dropping some demographic variables or years of analysis or to the change of period when the outcomes are collected.

C. The effects of CA-PFL on parental post-birth health

Next, I analyze the impact of CA-PFL on parental health during postnatal months, specifically the 5 to 20 months following childbirth, during which access to paid family leave ends, to see whether the positive health effects around childbirth persist afterward. Table 6 presents the results. I find that the positive effects

[14] If a topical module is implemented in month 0, then the question will cover the past 12 months including the month of childbirth and the entire pregnancy period. If a topical module was performed in 5 months after childbirth, this will cover the first 5 months after childbirth and last 7 months during pregnancy. Accordingly, using SIPP topical modules collected during 0 to 5 months after childbirth would, all together, encompass both the entire pregnancy period and the first 5 months after birth.

Table 5 Effects of CA-PFL on fathers' health around birth

	Families with newborn			Families with newborn vs older child 1–17 years
	Similar states	Similar states and neighboring states	All states except CA	All states except CA
	(1)	(2)	(3)	(4)
A. Excellent health				
Birth after CA-PFL	0.149***	0.078**	0.044	0.081*
Standard error	(0.060)	(0.054)	(0.038)	(0.022)
FP corrected *p* value	[0.000]	[0.018]	[0.316]	[0.100]
Observations	3445	4161	10460	34911
R-squared	0.076	0.077	0.073	0.055
Pre-PFL mean for CA fathers with newborn	0.422			
B. Any days sick				
Birth after CA-PFL	− 0.128***	− 0.086*	− 0.107*	− 0.076†
standard error	(0.029)	(0.050)	(0.045)	(0.026)
FP corrected *p* value	[0.000]	[0.066]	[0.073]	[0.273]
Observations	3445	4161	10460	34911
R-squared	0.099	0.082	0.058	0.024
Pre-PFL mean for CA fathers with newborn	0.372			
C. Number of days sick				
Birth after CA-PFL	0.455*	0.404	− 0.256	− 0.268
Standard error	(0.185)	(0.264)	(0.362)	(0.180)
FP corrected *p* value	[0.064]	[0.170]	[0.328]	[0.547]
Observations	3431	4147	10438	34853
R-squared	0.048	0.046	0.063	0.012

Table 5 (continued)

	Families with newborn			Families with newborn vs older child 1–17 years
	Similar states	Similar states and neighboring states	All states except CA	All states except CA
	(1)	(2)	(3)	(4)
Pre-PFL mean for CA fathers with newborn	1.051			
D. Number of nights in the hospital				
Birth after CA-PFL	0.008	0.028	− 0.008	0.009
Standard error	(0.052)	(0.052)	(0.041)	(0.018)
FP corrected *p* value	[0.699]	[0.392]	[0.644]	[0.850]
Observations	3437	4153	10438	34777
R-squared	0.072	0.046	0.026	0.008
Pre-PFL mean for CA fathers with newborn	0.051			
E. Daily prescription medication				
Birth after CA-PFL	0.043*	0.040	− 0.033	− 0.020
Standard error	(0.055)	(0.054)	(0.040)	(0.022)
FP corrected *p* value	[0.066]	[0.521]	[0.478]	[0.575]
Observations	3445	4161	10460	34911
R-squared	0.069	0.065	0.063	0.072
Pre-PFL mean for CA fathers with newborn	0.101			

Data: 1996–2008 SIPP health care topical modules.

This table reports regression coefficients β_1 from Eq. (1) in the first 3 columns and β_2 from Eq. (2) in the last column for each outcome. Similar states include Florida, New York, Pennsylvania, and Texas. Neighboring states include Arizona, Nevada, Oregon, and Washington. Robust standard errors clustered at the state level are shown in parentheses, and Ferman-Pinto (2019) adjusted p values are shown in brackets. Stars are based on FP p values: *FP $p < 0.10$; **FP $p < 0.05$; ***FP $p < 0.01$

†The estimates are statistically significant with $p < 0.10$ with standard errors clustered at the state level, but not with FP p values

Table 6 Effects of CA-PFL on parental health: post-birth

	Mothers			Fathers		
	Similar states	Similar states and neighboring states	All states except CA	Similar states	Similar states and neighboring states	All states except CA
	(1)	(2)	(3)	(4)	(5)	(6)
A. Excellent health						
Birth after CA-PFL	0.134***	0.091**	0.002	− 0.026	− 0.094***	− 0.030
Standard error	(0.092)	(0.069)	(0.061)	(0.088)	(0.058)	(0.038)
FP corrected p value	[0.000]	[0.018]	[0.996]	[0.209]	[0.000]	[0.413]
Observations	2547	3043	8163	3479	4149	10113
R-squared	0.097	0.093	0.071	0.072	0.075	0.063
Pre-PFL mean	0.344			0.377		
B. Any days sick						
Birth after CA-PFL	0.107***	0.036	− 0.018	0.034	0.157***	0.131**
Standard error	(0.204)	(0.190)	(0.072)	(0.057)	(0.085)	(0.049)
FP corrected p value	[0.000]	[0.514]	[0.673]	[0.482]	[0.000]	[0.031]
Observations	2547	3043	8163	3479	4149	10113
R-squared	0.097	0.104	0.088	0.089	0.091	0.067
Pre-PFL mean	0.529			0.353		
C. Number of days sick						
Birth after CA-PFL	0.377	− 1.217***	− 0.411	− 0.422	0.208	− 0.235
Standard error	(0.964)	(1.274)	(1.083)	(0.724)	(0.660)	(0.588)
FP corrected p value	[0.403]	[0.000]	[0.424]	[0.440]	[0.532]	[0.410]
Observations	2547	3039	8151	3472	4142	10103
R-squared	0.071	0.058	0.054	0.037	0.032	0.039
Pre-PFL mean	3.464			0.942		

Table 6 (continued)

	Mothers			Fathers		
	Similar states	Similar states and neighboring states	All states except CA	Similar states	Similar states and neighboring states	All states except CA
	(1)	(2)	(3)	(4)	(5)	(6)
D. Number of nights in the hospital						
Birth after CA-PFL	− 0.818***	− 0.611***	− 0.405**	− 0.019	0.067	− 0.035
Standard error	(0.360)	(0.315)	(0.181)	(0.099)	(0.083)	(0.109)
FP corrected *p* value	[0.000]	[0.000]	[0.049]	[0.67]	[0.148]	[0.208]
Observations	2547	3043	8163	3479	4149	10094
R-squared	0.181	0.18	0.174	0.048	0.043	0.047
Pre-PFL mean	0.889			0.048		
E. Daily prescription medication						
Birth after CA-PFL	0.069***	0.110	− 0.096*	− 0.059	− 0.039	− 0.105**
Standard error	(0.063)	(0.089)	(0.058)	(0.065)	(0.060)	(0.034)
FP corrected *p* value	[0.000]	[0.112]	[0.061]	[0.199]	[0.372]	[0.046]
Observations	2547	3043	8163	3479	4149	10113
R-squared	0.12	0.1	0.074	0.092	0.078	0.07
Pre-PFL mean	0.227			0.132		

Data: 1996–2008 SIPP health care topical modules.

This table reports regression coefficients β_1 from Eq. (1) for each outcome. Models include birth state FE, birth year FE, months-to-birth indicators, individual-level covariates, and state-level covariates. Similar states include Florida, New York, Pennsylvania, and Texas. Neighboring states include Arizona, Nevada, Oregon, and Washington.

Robust standard errors clustered at the state level are shown in parentheses, and Ferman-Pinto (2019) adjusted p values are shown in brackets. Stars are based on FP p values: *FP $p < 0.10$; **FP $p < 0.05$; ***FP $p < 0.01$

on some maternal health measures (e.g., excellent health reporting, number of nights in the hospital) still exist even after access to paid leave ends. However, estimates for other outcomes are relatively inconclusive across different control groups. Positive effects of CA-PFL on fathers' health are no longer detected during this period, with an unexpected increase in the likelihood of reporting any days sick (panel B).

In Appendix Tables A8 and A9 I attempt to explore other measures of health, available in the SIPP health care topical module. I do not use these as the main outcomes of my study because they fail to show parallel pre-trends prior to CA-PFL or because of the existence of some unreliable reporting. Nonetheless, these additional outcomes exhibit a similar story about mothers and fathers' health around childbirth—the share of mothers reporting their health being very good or excellent (panel A) is higher with a substantial reduction in the number of days feeling sick (conditional on reporting any, panel B) and non-birth hospitalization (panel C). This persists even after childbirth. A decrease in non-birth hospitalization is especially consistent with Beuchert et al. (2016), which documents that the increase in the length of paid maternity leave in Denmark reduced the probability of an inpatient hospital stay within 1 year of giving birth by nearly 70%. Although it is not possible to tell whether a doctor's visit is for a well checkup or a sick visit, mothers with access to CA-PFL appear to visit doctors less during the critical period of time around childbirth (panel D), accompanied with fewer days sick (panel B). Indeed, Chatterji and Markowitz (2005), using different state maternity leave laws prior to passage of the FMLA, also find that longer maternity leave is associated with a lower likelihood of having frequent outpatient visits after childbirth. The results for fathers (Appendix Table A9) are largely inconclusive across different control states for these outcomes, with a consistent increase in hospitalization (panel C) and a decline in the number of doctor visits (panel D) during this time frame. Further investigation of heterogeneity of the effects across parents after birth is warranted.

6 Mechanism analysis

A. Career pauses

To explore potential mechanisms through which CA-PFL influences parent's health and healthcare utilization, I examine a proxy for career pauses as an outcome. The SIPP core survey asks whether the respondent has ever been absent from work without pay or did not work at all *due to* pregnancy, childbirth, or childcare, and if so, the number of such weeks. If respondents report these events in the months following childbirth, it would represent a significant pause to one's career, specifically caused by the birth of a child. Not being able to work or being absent from work without getting paid could potentially impose mental distress and anxiety on new parents, especially if they used to work before having a child. This could then further worsen both physical and mental health and well-being.

Table 7 Effects of CA-PFL on mothers' career pause

	Absent from work without pay or no work due to childbirth/childcare			Number of weeks absent from work without pay or no work due to child-birth/childcare		
	Month 0–3	Month 4–6	Month 7–9	Month 0–3	Month 4–6	Month 7–9
	(1)	(2)	(3)	(4)	(5)	(6)
Birth after CA-PFL	− 0.159***	− 0.089**	0.013	− 1.048**	0.088	− 0.168
	(0.055)	(0.038)	(0.047)	(0.514)	(0.214)	(0.199)
Observations	26419	23789	21609	26419	23789	21609
R-squared	0.134	0.121	0.123	0.071	0.047	0.062
Mean of outcome	0.489	0.335	0.282	3.405	0.602	0.557

Data: 1996–2008 SIPP core surveys. This table reports regression coefficients β_1 from Eq. (1). Models include birth state FE, birth year FE, months-to-birth indicators, individual-level covariates, and state-level covariates. Robust standard errors clustered at the state level are shown in parentheses.

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$

Consequently, I substitute these variables in as an outcome in Eq. (1) to estimate the effects of CA-PFL on the incidence of unpaid work absence or not working because of the birth of a child for mothers and for fathers. In Table 7 columns 1 to 3, I find that the likelihood of being absent from work without pay or not working at all due to childbirth/childcare is significantly lower for California mothers after CA-PFL came into effect—it is lower by 16 percentage points in the first 4 months after birth, by 9 percentage points in the next 3 months, but the effects disappear after month 7. This finding is consistent with Baum and Ruhm (2016) that document that CA-PFL is associated with higher leave use by mothers, which continues for approximately 6 months after childbirth. During the first 4 months after childbirth, mothers in California report one less week of unpaid work absence or no work than mothers residing in other states, as shown in column 4 of Table 7. This difference goes away after month 4. This number closely aligns with the estimate from Bartel et al. (2018), where they estimate CA-PFL increases the leave-taking of new mothers by six more days.[15] Most importantly, this analysis also confirms the hypothesis that most women in California use paid family leaves *immediately following childbirth*, rather than saving them for later usage within a 12-month timeframe.

In contrast, Table 8 indicates that after the passing of CA-PFL, California fathers are *more* likely to report weeks of unpaid work absence or no work due to childcare from the fourth month following childbirth—Table 8 column 5 suggests that California fathers have an additional tenth of a week (equivalent to additional 16 hours) of no job or being absent from work without pay from 4 to 6 months

[15] Existing research suggests that CA-PFL increased the use of leave-taking among mothers by 3 to 5 weeks, particularly among socioeconomically disadvantaged groups (Baum and Ruhm 2016; Rossin-Slater et al. 2013), while it increased leave-taking by nearly 1 week for fathers (Baum and Ruhm 2016).

Table 8 Effects of CA-PFL on fathers' career pause

	Absent from work without pay or no work due to childbirth/childcare			Number of weeks absent from work without pay or no work due to childbirth/childcare		
	Month 0–3	Month 4–6	Month 7–9	Month 0–3	Month 4–6	Month 7–9
	(1)	(2)	(3)	(4)	(5)	(6)
Birth after CA-PFL	0.018	0.018***	0.028**	– 0.053	0.096**	0.105
	(0.011)	(0.003)	(0.011)	(0.046)	(0.022)	(0.068)
Observations	30756	27989	25585	30756	27989	25585
R-squared	0.032	0.030	0.038	0.052	0.042	0.034
Mean of outcome	0.010	0.004	0.001	0.047	0.054	0.000

Data: 1996-2008 SIPP core surveys. This table reports regression coefficients β_1 from Eq. (1). Models include birth state FE, birth year FE, months-to-birth indicators, individual-level covariates, and state-level covariates. Robust standard errors clustered at the state level are shown in parentheses

*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

after childbirth, that is, approximately a 1.8 percentage point increase in the likelihood of such case (Table 8 column 2). It provides suggestive evidence that mothers are most likely to take up a mix of paid and unpaid family leave immediately after childbirth, which expires around month 4, and consequently puts joint childcare burdens on fathers.

This analysis implies that the short duration of the paid leave offered by CA-PFL and its absence of job protection could have imposed a relatively higher opportunity cost on fathers. While it may capture only a small fraction of the whole mechanism through which CA-PFL plays a role on parental health, a stark difference between mothers' and fathers' incidence of unpaid work absences, particularly due to childbirth, implies that the leave is not utilized equally across parents. This helps to understand the heterogeneous impact of CA-PFL on *postnatal* parental health, particularly the finding that fathers report a higher incidence of experiencing days of feeling sick from months 5 to 20.

B. Leave usage

In the latest SIPP waves from 2019 and 2020, all parental leave information, separately for the pre- and post-birth periods, is collected regarding the respondent's first child (Scherer 2022). I use the same model from Eq. (1) to compare parents who gave birth after CA-PFL became effective (July 2004 to 2011) to those who gave birth prior to CA-PFL (1996 to June 2004). I study the following outcomes: likelihood of quitting work, usage of paid/unpaid/any leave for the pre-birth and post-birth periods, separately. Table 9 shows that, before childbirth, CA-PFL led mothers to take more of all types of leave and to be less likely to quit working compared to their counterparts from other states. This pattern was

Table 9 Effects of CA-PFL on pre- and post-birth leave usage of mothers

	Quit work (1)	Paid leave (2)	Unpaid leave (3)	Any leave (4)
A. Pre-birth				
Birth after CA-PFL	– 0.074***	0.018	0.017	0.071***
	(0.016)	(0.015)	(0.012)	(0.024)
Observations	1570	1570	1570	1570
R-squared	0.108	0.078	0.052	0.059
Mean of outcome	0.049	0 .159	0.021	0.199
B. Post-birth				
Birth after CA-PFL	– 0.083***	0.067***	– 0.060	0.080***
	(0.015)	(0.021)	(0.044)	(0.027)
Observations	1760	1760	1754	1760
R-squared	0.094	0.124	0.088	0.084
Mean of outcome	0.091	0.390	0.131	0.568

Data: 2019 and 2020 SIPP core survey. Sample is restricted to mothers who had a first birth between 1996 and 2011 and worked during pregnancy. Birth year fixed effects, birth month fixed effects, birth state fixed effects, and individual demographic characteristics are controlled for in all regressions. Robust standard errors clustered by state are in parentheses

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$

Table 10 Effects of CA-PFL on pre- and post-birth leave usage of fathers

	Paid leave (1)	Unpaid leave (2)	Any leave (3)
A. Pre-birth			
Birth after CA-PFL	– 0.011***	– 0.027***	– 0.038***
	(0.003)	(0.008)	(0.008)
Observations	1379	1379	1379
R-squared	0.063	0.147	0.118
Mean of outcome	0.007	0.010	0.016
B. Post-birth			
Birth after CA-PFL	0.052	– 0.075***	– 0.027
	(0.036)	(0.023)	(0.034)
Observations	1379	1379	1379
R-squared	0.188	0.103	0.146
Mean of outcome	0.247	0.077	0.366

Data: 2019 and 2020 SIPP core survey.

Sample is restricted to fathers who had a first birth between 1996 and 2011 and worked during pregnancy. Birth year fixed effects,

birth month fixed effects, birth state fixed effects, and individual demographic characteristics are controlled for in all regressions.

Robust standard errors clustered by state are in parentheses

$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$

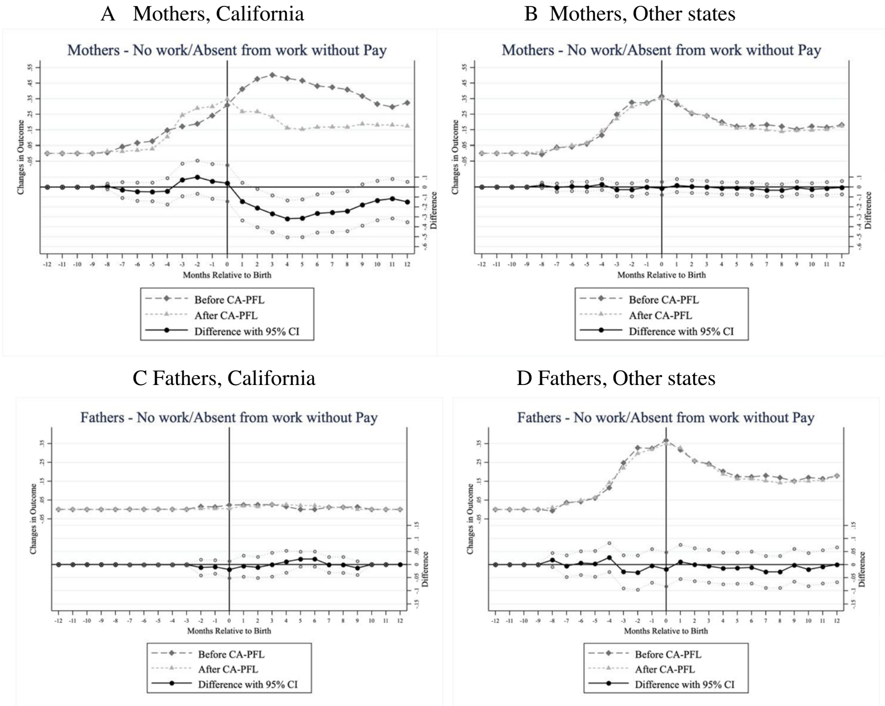

Fig. 1 Effects of CA-PFL on no work or work absence without pay. *Data*: 1996–2008 SIPP core surveys. These figures report regression coefficients β_m from Eq. (3). Pre- vs post-PFL differences are presented in a solid line with 95% confidence interval. Sample is restricted to mothers and fathers who had a birth during SIPP panels and worked with non-zero earnings during pregnancy. A reference group is 9th to 12th month prior to birth

also observed in Baum and Ruhm (2016), who document that leave-taking begins to rise several months before the birth. Table 9 then shows that, after a child is born, mothers with CA-PFL are less likely to quit their work and use paid leave more by 6.7 percentage points, equivalent to a 17% increase. Overall usage of any type of leave after birth rises by 8 percentage points, or about 14%. As a further data check, I use the 2008 SIPP Panel Fertility History Topical module to produce an event-study plot that compares California mothers who use any paid leave before and after childbirth to corresponding mothers in other states. Appendix Figure A2 shows that there is a clear upward trend in paid leave usage of California mothers after the year 2004 (corresponding to time = 0), compared to pre-PFL years. Overall average treatment effect on treated is estimated to be 0.269, or 27%.

In contrast, Table 10 presents the leave usage of fathers, showing an overall *reduction* in all types of leave-taking before childbirth. Knowing that mothers will

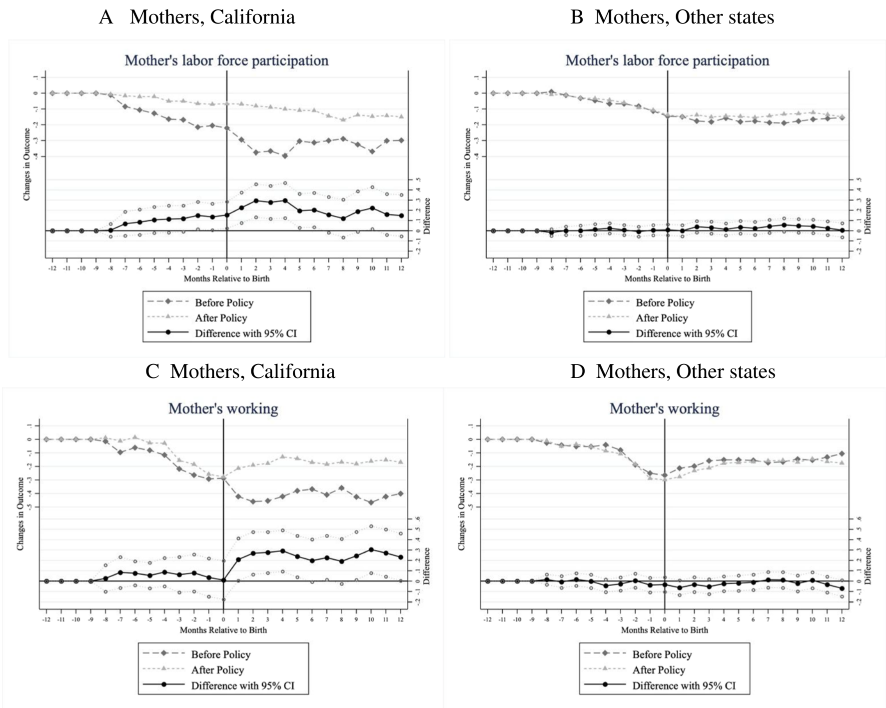

Fig. 2 Effects of CA-PFL on mothers' work and earnings. *Data*: 1996–2008 SIPP core surveys. These figures report regression coefficients β_m from Eq. (3). Pre- vs post-PFL differences are presented in a solid line with 95% confidence interval. Sample is restricted to mothers who had a birth during SIPP panels and worked with non-zero earnings during pregnancy. A reference group is 9th to 12th month prior to birth

be getting paid leave for the upcoming childbirth, with some mothers starting to take up leave even before delivery, fathers are all together less likely to utilize any types of leave during pre-birth periods. After their child is born, fathers' take-up of unpaid leave is lower than their counterparts, with a marginally significant increase in paid leave take-up.[16]

All in all, the 2019 and 2020 SIPP leave data, while the information is only limited for the first child, allows me to paint a more complete picture of parental leave-taking behaviors around childbirth by examining the effects separately for pre- and post-birth periods. In particular, the finding that CA-PFL allows mothers to utilize any type of leave even *before* giving birth, consistent with findings from previous studies, suggests that the positive effects of CA-PFL could expand beyond the post-natal periods.

[16] Unfortunately, I am unable to produce the estimates for fathers' report of quitting work due to the fact that no fathers in the sample reported quitting during the survey period.

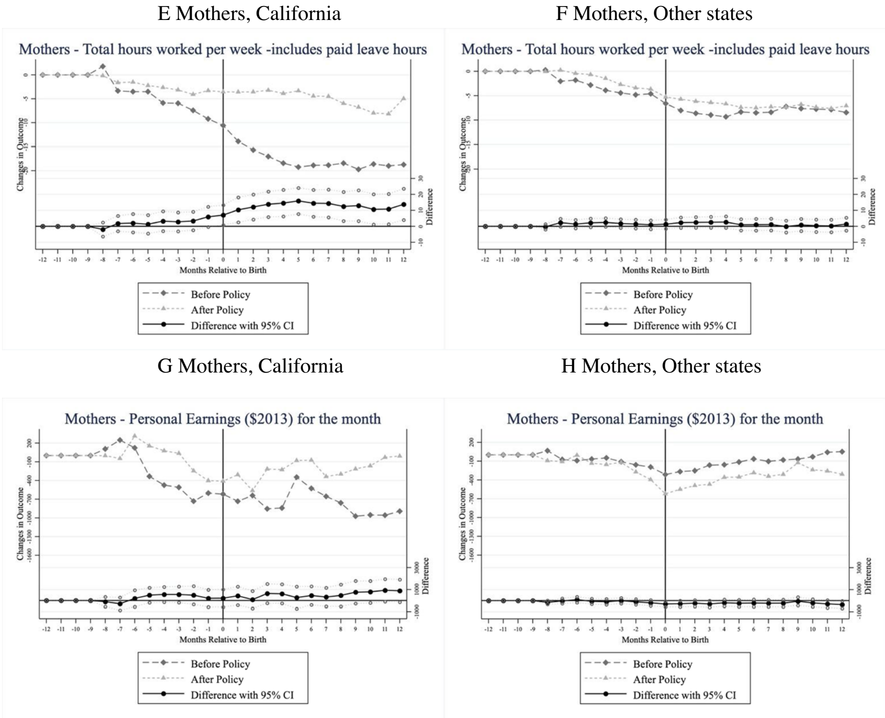

Fig. 2 (continued)

C. The event study analysis of parental work and earnings

Lastly, I leverage the panel structure of the SIPP core survey and draw a month-by-month work and earnings trajectory of mothers and fathers around childbirth. In other words, I plot the coefficient β_m from Eq. (3) for 12 months before and 12 months after childbirth.

Figure 1 panels A to D confirm the findings from Tables 7 and 8 by illustrating that the share of mothers who are not working or are absent from work without pay due to childbirth/childcare is much smaller after CA-PFL became effective, while there is no pre- vs post-difference for mothers in other states. Fathers experience such incidences *more* during month 5 to 6 in California, with marginally significant estimates shown in panel C, which is not detected in other states (panel D).

Figure 2 shows the work and earnings trajectory of mothers. Consistent with the findings in many other studies (Rossin-Slater et al. 2013; Baum and Ruhm 2016; Byker 2016), the share of mothers in the labor force (panel A) and who are working[17] (panel C) is significantly higher after the introduction of CA-PFL.

[17] In the SIPP, a person is coded as "working" even if s/he is on any paid/unpaid leave.

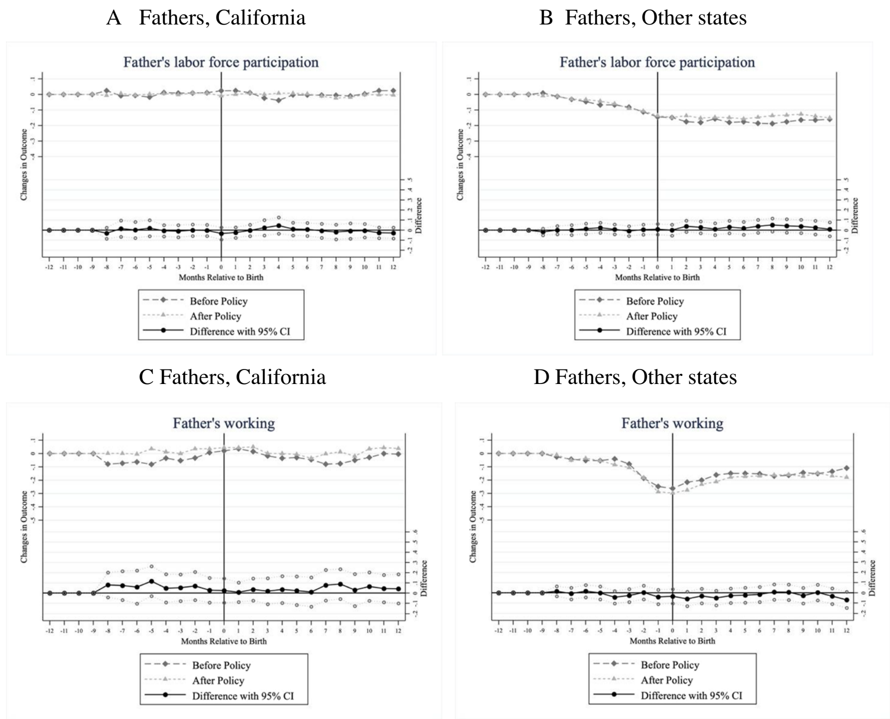

Fig. 3 Effects of CA-PFL on fathers' work and earnings. *Data*: 1996–2008 SIPP core surveys. These figures report regression coefficients β_m from Eq. (3). Pre- vs post-PFL differences are presented in a solid line with 95% confidence interval. Sample is restricted to fathers who had a birth during SIPP panels and worked with non-zero earnings during pregnancy. A reference group is 9th to 12th month prior to birth

In particular, this increase in the share of mothers participating in the labor force emerges even before giving birth. This is also evident in the total hours worked (panel E), which includes paid leave hours. As shown in Figure 2 panels B, D, and F, we do not observe such trends for mothers residing in other states, with the pre- and post-difference being indistinguishable from zero. Interestingly, mothers in California show a slightly higher level of personal earnings with marginal statistical significance after the policy is in effect (panel G), and again the difference starts even before giving birth.

Figure 3 displays the same outcomes for California fathers. Unlike mothers, I do not detect any difference between fathers from California and those from other states in any of the outcomes. As mentioned in Section 4, however, these event study plots should be read with caution because the timing of birth relative to the SIPP survey results in an unbalanced panel before and after birth.

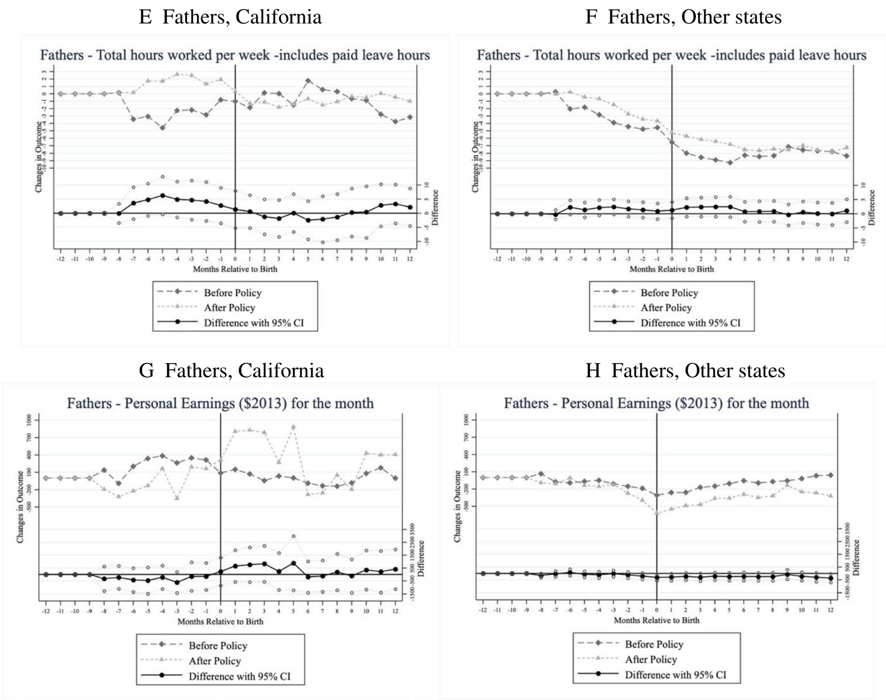

Fig. 3 (continued)

7 Conclusion

With a growing focus to promoting equal access to paid leave for both parents, it is essential to examine the impact of the PFL mandated in California, the first source of government-provided paid parental leave available to both mothers and fathers, on parental outcomes. Despite the fact that both parents are eligible for CA-PFL and an increasing number of fathers are taking the leave, little attention has been given to the effects CA-PFL has had on fathers' health. Three existing papers that study parental health limit their analysis to mental health. Given that mental and physical health are highly correlated and intertwined (Ohrnberger et al. 2017), it is crucial to confirm that the effects found in these previous papers are not limited to mental health, but also evidenced in overall health and healthcare utilization. Studying the policy's impact on the health and healthcare utilization of new mothers and fathers has broader implications for labor force productivity, healthcare costs in the US, as well as the health, growth and development of newborns.

By leveraging the variation in the timing of the Survey of Income and Program Participation (SIPP) health care topical module relative to the *exact* year and month of childbirth, I estimate the effects on parental health over two separate time windows: (i) health *immediately around* childbirth (during pregnancy and up to 5 months following childbirth: a period during which parents are eligible to take up the leave) and (ii) health *following* childbirth (5 to 20 months after childbirth: a period when the leave expires). It is worth noting that most of the research on PFL's impact on maternal health has focused on post-birth health outcomes measured in the years after giving birth. Given that mothers can take an extended paid leave starting from pregnancy, through claiming SDI and CA-PFL consecutively, positive effects on maternal health could manifest even before childbirth. Fathers' health could also benefit prior to childbirth given strong spousal correlation in health. Hence, studying these two periods separately can shed light on the policy's potential spillover effects beyond post-birth periods. This approach also enhances our understanding of the impact of CA-PFL on parental health during the months when they are actively taking the leave, as opposed to the months after the leave has ended.

I find that mothers' health has improved after CA-PFL in every measure that I use—they experience fewer sick days, spend fewer nights in the hospital, and show a decrease in daily prescription drug usage with a substantial improvement in self-reported health in the months when they are eligible to take up PFL. This is accompanied by a significantly lower likelihood of being absent from work without pay or not working due to pregnancy/childbirth during the first 4 months after childbirth compared to their counterparts in the rest of the US. Further mechanism analysis reveals that mothers begin taking up leave even before giving birth. Also, I confirm that the positive health effects on mothers are accompanied by a higher share of mothers who are attached to the labor force and working, with slightly increased personal earnings.

Fathers also exhibit improved health during the critical period around childbirth, supporting the hypothesis that fathers experience similar health benefits to mothers when using their own paid leave, as well as the hypothesis that there exists a positive indirect effect from their spouses. Yet I observe that fathers report a higher incidence of feeling sick starting from 5 months after their baby is born, coinciding with the time when the leave is expected to expire. At the same time, fathers report a slight increase in the prevalence of being absent from work without pay or not working due to childbirth from months 4 to 6 following childbirth. Consistent with what has been documented in many existing studies, my event-study analysis confirms that there is no statistically significant difference in fathers' labor force participation, hours worked, or personal earnings before and after the policy change.

This paper contributes to the relatively limited body of literature that examines the effects of CA-PFL on fathers' health. While the findings on mothers' health are promising, understanding its effects on fathers' health and leave usage is pivotal to evaluating the program's overall benefits and any potential unintended consequences. CA-PFL was introduced in 2004 with a low wage replacement rate of 55% and provided no job protection, imposing a high opportunity cost, which resulted in lower take-up rate among fathers. Indeed, my study suggests that mothers predominantly make use of the paid leave immediately after childbirth, with the childcare responsibilities shifting to fathers around months 4 and 6, corresponding to the period when mothers need to return to work. Since California is the very first state that introduced paid family leave for nearly all employees, there might have been a learning curve for parents to become acquainted with the new policy and develop strategies to optimize its utilization, such as maximizing the total time spent with their infants at home or effectively balancing infant care responsibilities between parents, etc.

The study has several limitations. First, due to the sample size, I am unable to test for heterogeneity of the effects by parent characteristics like income, education, and race/ethnicity or by birth order of a child. Moreover, the infrequency of the topical modules constrains my ability to leverage the SIPP's panel structure, which, in turn, restricts my capacity to track the same individuals and demonstrate changes in health outcomes over time. These limitations highlight the potential for future research on this topic to meaningfully inform policy design.

In conclusion, this study suggests that policymakers should continue to view paid leave as an opportunity to improve health outcomes during the months surrounding childbirth for both mothers and fathers. Nevertheless, the fact that I find more nuanced effects on fathers' postnatal health and a subsequent, while temporary, increase in fathers' unpaid work absence implies that there might be unintended consequences of the program. These potential consequences should be accounted for when expanding such programs in the future, especially with a focus on providing equal utilization opportunities to both parents.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s00148-024-00994-0.

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Data availability The datasets used in the manuscript are publicly available at https://www.census.gov/programs-surveys/sipp/data/datasets.html. The author confirms that all data generated or analyzed during this study can be provided upon request.

Declarations

Conflict of interest The author declare no competing interests.

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