Having a child? Here is the bill - Parenthood, Earnings and Careers in an Internal Labor

Document de Travail
Working Paper
2019-13

Claudio Lucifora
Dominique Meurs
Elena Vilar

Having a Child? Here is the Bill!

Parenthood, Earnings and Careers in an Internal Labor Market.

Claudio Lucifora*[1], Dominique Meurs†[2], and Elena Villar‡[3]

[1]UCSC and IZA

[2]University of Paris Ouest Nanterre and INED

[3]UCSC

July 2018

Abstract

Using a unique 12-years panel of personnel records from a large French company, we find that becoming mother (extensive fertility margins) largely affects labor market outcomes. Instead, fatherhood does not significantly impact on men's wages or careers. An event study approach with the use of non-parents as control group enables us to show that, prior to childbirth, future mothers' earnings are in line with that of non-mothers. However, one year after birth, they start to fall, reaching −9% in total pay and −30% in individual bonuses. This drop is persistent: 8 years after childbirth there is no evidence of a catching-up trend. Mothers also have lower chances to climb-up the hierarchy of the firm and be promoted to managerial positions. A decomposition of the motherhood penalty shows that these "missed promotions", likely due to an increase in absenteeism during the child's pre-school age, are the main determinants of mothers' lower outcomes within the firm.

Keywords: Children · Motherhood penalty · Gender inequalities · Event study
JEL Classification: J13 · J16 · J31

*We thank James Albrecht, Alex Bryson, Tommaso Colussi, Nabanita Datta Gupta, Francesco Fasani, Nicole Fortin, Andrea Ichino, Chinhui Juhn, Camille Landais, David Margolis, Pedro Martins, Martina Viarengo, and Ulf Zölitz for for helpful comments and discussions. We also thank seminar participants at the Graduate Institute of Geneva, QMUL, UCSC, Paris Ouest-Nanterre, University of Bergamo, University of Naples, the 2017 AASLE and AIEL conferences and 2018 SOLE, AFSE, SASE and SEHO conferences.

*claudio.lucifora@unicatt.it
†dominique.meurs@ined.fr
‡elena.villar@unicatt.it

1 Introduction

Parenthood leads to huge changes in all spheres of life. Individuals who become parents for the first time need to reorganize their entire working and leisure lives, with relevant consequences for their economic outcomes. It is nothing new that women face most of the challenges that the arrival of the first child implies. They are less likely to stay active in the labor market. If employed, they tend to work fewer hours and earn lower wages not only than men, but also than childless women (Sigle Rushton and Waldfogel, 2007). It has been estimated that during her career, a typical working mother with a medium level of education loses roughly half the earnings she would have had without having a child (Joshi and Davies, 2000).

A growing body of literature is now focusing on the wage differential between women with children and otherwise comparable women, the so called "*motherhood pay gap*". Pay penalties for mothers have been found both in the US (Waldfogel (1997), Budig and England (2001), Anderson et al. (2003), Bertrand (2011)), and Europe (Simonsen and Skipper (2012) for Denmark, Felfe (2012) for Germany, Wilner (2016) for France)[1]. These penalties range from 2% to 7% in hourly wages. Traditionally, they have been explained within a human capital framework: mothers tend to earn less because they make lower investments in education, have more career breaks and work more part-time. Moreover, they are believed to bring less effort to the labor market because of the burden of childcare activities. But it can also simply be that women with children are different from childless women in relevant ways that are associated with their earnings potential. For example, they may have higher preferences for family over career[2].

Most of the literature on the motherhood pay gap focuses on the effect of having an additional child among women who already have children (intensive fertility margins). But very few works

[1]The existence of penalties for mothers in all labor markets rises questions on the effectiveness of child-related policies. For example, there is no unique provision of maternity leave in the US, while in Germany mothers are allowed to take 3 years of leave after childbirth. But similar motherhood pay gaps are found in both countries. Norther European countries are usually praised for offering women good opportunities to pursue family and career. However, recent findings show that also within these institutional contexts the costs of motherhood are high and able to explain almost all the remaining gap in pay (Kleven et al. (2018), Lundborg et al. (2017))

[2]In order to address causality in interpretation of findings on the motherhood pay gap, these unobserved differences are usually assumed to be time-invariant (Budig and England, 2001). Other techniques used to disentangle the causal effect of childbirth from the association between children and earnings have been conditional-on-observables strategies such as OLS and propensity score matching (e.g. Simonsen and Skipper (2006, 2008)), firm and worker fixed effects (Budig and England (2001), Anderson et al. (2003), Wilner (2016)), and quasi-natural experiments based on twin births (Angrist and Evans (1998), Simonsen and Skipper (2012)) or IVF treatments (Lundborg et al., 2017)

have specifically looked at the labor market impact of turning into motherhood (extensive fertility margins)[3]. The aim of this paper is contribute to this specific stream of literature by giving a more comprehensive picture of the economic consequences of having the first child. In particular, we want to investigate how becoming parent is related to adjustments in individual behaviors at the workplace and what is the impact of these adjustments on economic outcomes.

We are able to provide new evidence on these mechanisms thanks to the availability of a 12-years panel (2005-2016) on the population of employees of a large French company. In 2013 this company accounted for $71,000$ employees. Adding external collaborators, it reached a whole workforce of $129,492$ individuals. Given its dimension and rigid, hierarchical internal structure, it can be considered as a large internal labor market, thus mitigating concerns of external validity of our findings. To our knowledge, no previous studies have been done on the impact of parenthood on earnings and careers of men and women within a firm. Indeed, the records at our disposal allow us to focus on precise measures of individual productivity (bonuses linked to performance, absenteeism) not available in survey data. Moreover, we are among the few able to provide empirical findings on the consequences of becoming father on earnings and careers[4].

To study the child effect at the extensive margins we develop an event study around the timing of first childbirth. Our preferred specification includes a control group of non-parents in the estimation sample. This strategy allows us to add individual fixed effects to our estimations, solving the underidentification problem typical of event studies designs.

Our results suggest a clear penalization in total earnings for becoming mother. Instead, we do not find any significant effect of fatherhood. The motherhood penalty can be explained by three main factors: lower hours worked, "missed promotions", and "missed bonuses". During the child's pre-school age, mothers work around 4% less with respect to non-mothers. This reduction in working hours is due to a shift from full-time to part-time contracts in the years immediately after delivery. Only when children enroll school, 6 years after childbirth, mothers tend to come back to full-time, starting to catch up non-mothers. The majority of mothers likely opt for part-time contracts because of lack of discretion in adjusting working schedules. We find

[3]Lundborg et al. (2017) develop a new IV strategy based on IVF induced fertility variation to estimate the causal effect of having children on women's career in Denmark

[4]Results on the impact of fatherhood on earnings are scarce and puzzling. There is some evidence of a "fatherhood bonus" ($4\% - 6\%$ in Denmark (Simonsen and Skipper, 2012)), but also evidence of no effect (Wilner, 2016) in France, or even of a negative effect (Cools and Strøm, 2016) in Norway

evidence that this lack of flexibility has a long and negative impact on their productivity, and, as a consequence, on their earnings. For example, among managers, who have the chance to adjust their working time more easily, the gap in earnings between mothers and non-mothers is lower and disappears by the time children start school. Lack of flexibility also means more requests for leaves, thus an increase in absenteeism. We find evidence of a rise in the number of hours of absence for mothers in the first years after delivery. This increase in absenteeism has two main consequences. First, a block in the progressions within the hierarchical ranks of the firm. These "missed promotions" are able to explain the largest part of the motherhood penalty, since they indicate a slowing down for mothers, as compared to childless women, in the career patterns within the firm. Second, they lead to lower bonuses. These bonuses are linked to individual productivity and are particularly relevant in the firm's division in which mothers represent the majority of the workforce: the commercial. In this division, productivity goals linked to specific incentive schemes play an important role, penalizing women who turn into motherhood, since they likely have lower chances to work long, and particular, hours (Goldin, 2014).

This paper is organized as follows. Section 2 describes the institutional background and data. Section 3 presents the empirical strategies and the estimation samples. Section 4 shows the main results. Section 5 explains the underlying mechanisms of the child penalty for mothers. In Section 6 we present some heterogeneous effects. In Section 7 we propose a decomposition of the motherhood penalty. In Section 8 we perform two placebo tests. Section 9 concludes.

2 Parental leave and childcare services in France and within the firm

Family policies have a long history in France, a country where fertility has traditionally been at the core of social and political agenda. This made France the European country with the highest fertility rate, 2 children per woman in 2015[5], and among the public systems that offer good opportunities to balance working and family life. Despite reductions in public support for families after the 2008 economic crisis, in 2014 expenditures on childcare and early education services were relatively high: 1.1% of GDP , compared to the OECD average of 0.7%[6].

[5] World Bank

[6] Family Policies, France (2014). Population Europe Resource Finder and Archive

A large network of local Family Allowances Funds (CAFs, *Caisse d'Allocations Familiales*) is responsible for the provision of job-protected child-related leaves and childcare services. Child-related leaves include maternity and paternity leave. These can be further extended to parental leave.

All working women are eligible to maternity leave for a total of 16 weeks for the first and second child. The minimal mandatory leave is 8 weeks: at least 2 before childbirth and 6 after. Generally, 6 weeks are taken before childbirth and 10 after. 26 weeks can be taken for a third, or more, birth. During maternity leave, the employment contract is suspended and the woman is entitled to daily allowances paid by social security. Allowances are calculated taking into account the gross 3 wages earned before the date of interruption of work, divided by 91.25 (for monthly paid employees). A ceiling of $3,218$ Euros per month has been set in 2016[7].

Since 2002, paternity leave can be taken by all working fathers for up to 11 days for single birth and 18 days for multiple births. The leave must begin within 4 months after the birth of the child. Payment rules are equal to those of maternity leave.

Maternity and paternity leave can be extended to parental leave. Parental leave is open to all employees with children who, at the timing of childbirth, have at least one year of tenure with the employer. The normal length of parental leave is one year, renewable two times. In case of multiple birth (at least three children), the leave can be renewed 5 times. Parental leave starts immediately after the end of maternity/paternity leave. During the leave, the employment contract is suspended. The employee perceives basic allowances for the provision of services for young children (PAJE, *Prestation d'Accueil du Jeune Enfant*) from the CAF. The amount of the allowance depends on family income and number of children.

Children have access to childcare services and preschool from a very young age, which is expected to help parents balancing work and family life. 48% of the country's children under age three are enrolled in some type of formal care[8]. These include publicly subsidized home-based care, accredited family daycare providers, and nursery (*crèches*). Allowances for crèches are guaranteed from CAFs according to family income and number of children, but a minimum of 15% of

[7] `https://www.service-public.fr/particuliers/vosdroits/F207`

[8] Population Europe Resource Finder and Archive

monthly payments is in charge of the family[9].

A universal model of preschool education, the *École maternelle*, is available to all children aged 3-6. The program is fully founded and organized by the State. In many municipalities, enrollments can be made from the age of 2.

Our company can be defined as family friendly. Employees with dependent children receive specific pecuniary and non-pecuniary advantages. Maternity and paternity leave are paid at full salary. Additional 4 weeks of maternity leave are provided until the birth of the second child, while 2 starting from the third. Future mothers are allowed to take one hour off for each working day. Re-founding of pregnancy-related health costs are provided and both male and female employees get a childbirth premium. The premium consists in a full month salary. Only mothers are allowed to take 6 days off per-year for child-related reasons. They can take 2 additional days for "sick child". Contributions to childcare expenses are guaranteed to all employees with children aged less than 3. For children aged 3-6, additional monthly payments are provided.

In 2012 the firm signed the "*Charte de la Parentalité*", the Corporate Parenthood Charter. This is an agreement proposed at national level by the Observatory for the Balance of Time and Parenthood within the Company[10] and aims promoting working environments in which employees with children can easily reconcile professional and family lives. More than 500 firms in France have already signed it. The effort of our company especially regarded the possibility for parents to work from home through teleworking.

3 Data

Our analysis is based on unique personnel records on the universe of employees of a large multi-utility French firm. In 2016 the company accounted for 61,000 employees. As shown by Figure A1, which reports the share of employees by French Département, we observe individuals over the whole territory. Given its dimension and internal structure, this company can be considered as a large internal labor market.

Data cover a 12-years period, from 2005 to 2016. The dataset combines different registers linked

[9] urlhttp://www.caf.fr/ma-caf/caf-du-bas-rhin/offre-de-service/petite-enfance/je-souhaite-placer-mon-enfant-en-creche

[10] Observatoire de l'Équilibre des Temps et de la Parentalité en Entreprise; www.observatoire-equilibre.com

at the individual level via personal identification numbers and contains rich information on demographic and job characteristics. Demographics include gender, age, marital status, number of dependent children, educational level, and place of residence. Job characteristics include tenure, occupational category, division of employment (administrative, commerce, production), annual number of hours worked, annual number of hours of absence from work and their cause, and place of work.

The main attribute of the firm is the rank level to which each employee is associated according to her occupational category, tenure, and level of responsibility. These rank levels describe the internal occupational hierarchy. Promotions are improvements within this hierarchical scale. Ranks range from 30, associated to the lowest blue-collar position, to 370, associated to the highest managerial position.

Total annual earnings are made up by a base-pay, that depends on hours worked and includes job indemnities for overtime or night work, and a performance-related pay. This pay component is linked to individual productivity, evaluated by employees' direct managers at the end of each year.

We selected employees aged 20-50. Selection on age is standard in the literature studying the effect of childbirth and aims at avoiding not biological births. The final dataset consists of an unbalanced panel of $363,125$ employee-year observations.

Table 1 provides sample means and standard deviations for selected variables used in the empirical analysis. Descriptives are shown by gender, parenthood status (employees with children vs employees without children) and occupational category (managers vs non-managers).

Independently from the occupational category, the group that accounts for the lowest labor supply is women with children. They also have the highest number of hours of absence from work. Interestingly, women without kids do not differ much from men in terms of hours supplied, although they tend to be more absent.

On average, mothers in a managerial position do better than non-mothers in terms of earnings. This is expected since, mainly because of seniority reasons, they tend to be at a higher rank level. However, despite being at a similar average rank, the differential in earnings with men with children is large.

On the other hand, mothers in a non-managerial positions perform slightly worse than non-

mothers in all pay components.

Table 1: **Descriptive Statistics of Selected Variables**

	Men				Women			
	Child		No Child		Child		No Child	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Managers								
Rank Level	225.92	40.50	208.82	32.50	227.77	37.88	210.31	34.01
Working hours	1592.83	49.61	1596.28	46.80	1560.78	99.89	1595.97	57.31
Absences	242.72	128.20	219.54	143.60	302.72	178.71	247.98	177.55
Paternity/Maternity	64.77	14.40 .	.	478.98	309.50	.	.	
Total annual earnings	65430.91	19246.23	55332.27	14631.78	58273.88	16051.33	54168.71	14075.78
Performance-pay	4227.12	2949.03	3200.79	2408.78	3858.34	2568.49	3237.92	2413.02
Base-pay	61203.83	17320.75	52131.57	13146.26	54415.72	14308.92	50930.80	12540.03
Obs	71370		24987		33235		12391	
Non Managers								
Rank Level	117.60	28.76	104.83	28.13	110.93	32.23	102.93	31.08
Working hours	1572.74	64.20	1577.48	62.69	1498.52		157.97 1568.30	88.05
Absences	314.11	174.12	298.12	212.23	358.17	255.02	326.39	273.37
Paternity/Maternity	66.22	14.74	.	.	441.52	296.85	.	.
Total annual earnings	39106.73	10993.46	36322.14	9587.88	29949.05	7749.70	30669.14	7135.48
Performance-pay	524.98	705.50	566.05	681.77	526.07	729.74	547.83	727.74
Base-pay	38581.84	10713.42	35756.20	9332.88	29423.32	7448.11	30121.45	6864.83
Obs	109375		39985		57134		14484	

Working hours, absences, maternity and paternity leaves are in total annual hours. Working hours include part-time

4 Empirical strategy

To study fertility effects at the extensive margin, we develop an event study. This methodology allows us to follow changes in employees' economic outcomes around the event "*birth of the first child*".

4.1 The event study

Consider a panel of $i = 1, .., N$ individuals for whom a specific outcome Y_{it} is observed for $t = 1, ..., T$ *calendar times* (e.g. years). In an ideal setting, each individual receives a treatment in some time periods r_i (e.g. some specific years within the panel), and stays treated forever. Let define $S_{it} = t - r_i$ the *relative event time*: it indicates, for each individual, the relative distance to the event. $D_{it} = 1 \cdot S_{it} \geq 0$ is the indicator for being treated.

Within this framework, we estimate the dynamic effect of the event[11] on the observed outcome

[11] We will also estimate the static specification: $Y_{it} = \eta i + \nu_t + \gamma \cdot D_{it} + \varepsilon_{it}$. Compared to the fully dynamic specification, it imposes no pre-trends and constant treatment effects for all relative event time periods

through the following equation:

$$Y_{it} = \sum_{s}^{S} \gamma_s \cdot \mathbf{1}\{S_{it} = s\} + X_{it}^{'}\alpha + \eta_i + \nu_t + \varepsilon_{it} \tag{1}$$

where γ_s are coefficients on indicators for time relative to the event, which occurs at $s = 0$. For $s < 0$ they show pre-event trends. For $s >= 0$, they capture the effective treatment effects, the dynamic impact of the event on the outcome of interest. X_{it} is a set of age cohort dummies allowing to control non-parametrically for life cycle trends. η_i and ν_t are individual and time fixed effects, ε_{it} is a random noise.

$\gamma_{s=-1}$, the relative time prior to the occurrence of the event, is the omitted category.

Given this set up, we face a well-known problem of underidentification (Dobkin et al. (2018) and Borusyak and Jaravel (2017)). For each individual i, the calendar time t is simply the sum of the time in which the event happens, r_i, and the relative event time, s_{it}. There is a perfect linear relationship between these effects. Since individual fixed effects subsume event time fixed effects, they cannot be included and estimated along the full set of calendar time and relative event time fixed effects.

To estimate Equation (1) we include a control group in the estimation sample. The presence of a control group solves the underidentification issue because the control group can be used to estimate the year effects independently of the causal effect of treatment (Borusyak and Jaravel, 2017). Our control group is made up by all employees who are not parents.

In a robustness check, we drop the unit fixed effects and balance the sample of employees who experience the birth of the first child around the event time. Without individual fixed effects there is no underidentification problem.

In our main strategy, we focus on individuals who experience the birth of the first child within a specific time window: 2007-2009. This selection is driven by the need to have enough childbirths to develop the analysis and a relatively large time span before and after the event. Since we want to capture the child effect along the extensive fertility margins, we additionally drop all employees who will have other children after the first one[12]. We have $7,126$ observations.

Our control group is made up by all the employees who, during the whole period, never receive

[12]In a second step of the analysis we will remove this restriction

the treatment, such as do not have any dependent children. We have 19,319 childless employees, for a total of 91,847 employee-year observations.

Our relative event time function, s, ranges from -3 years before the event up to 8 years after. We estimate Equation (1) separately for men and women. Our identifying assumption is that, conditional on life-cycle patterns, time trends and time invariant characteristics between treated and control units, the timing of childbirth is as good as random. The individual fixed effects allow us to control for constant individual-specific components of the error term correlated with the timing of childbirth. However, our assumption would be violated if there were time-varying shocks that are correlated both with the timing of childbirth and Y_{it}. For example, an unexpected promotion could impact on both the decision of having a child and earnings. In a robustness check, we will control for career progressions and show that results are not affected. We will additionally show that there is no correlation between the probability of having a child and present or past promotions.

Attrition, which in our setting is potentially due to exit from the firm because of the birth of the child, is another possible violation of our identification strategy. The share of employees who leave the firm is extremely low, both among parents and non-parents (Table A2). Most of those who leave the firm, both with and without having experienced the birth of the first child, move to another company. While no men who become fathers leave the company to take a period of parental leave, 23.20% of women who become mothers and leave (22 observations) do so. In Table A3 we additionally show that there is no correlation between the probability of leaving the firm at t conditional on having had a child at $t-1$, both for men and women.

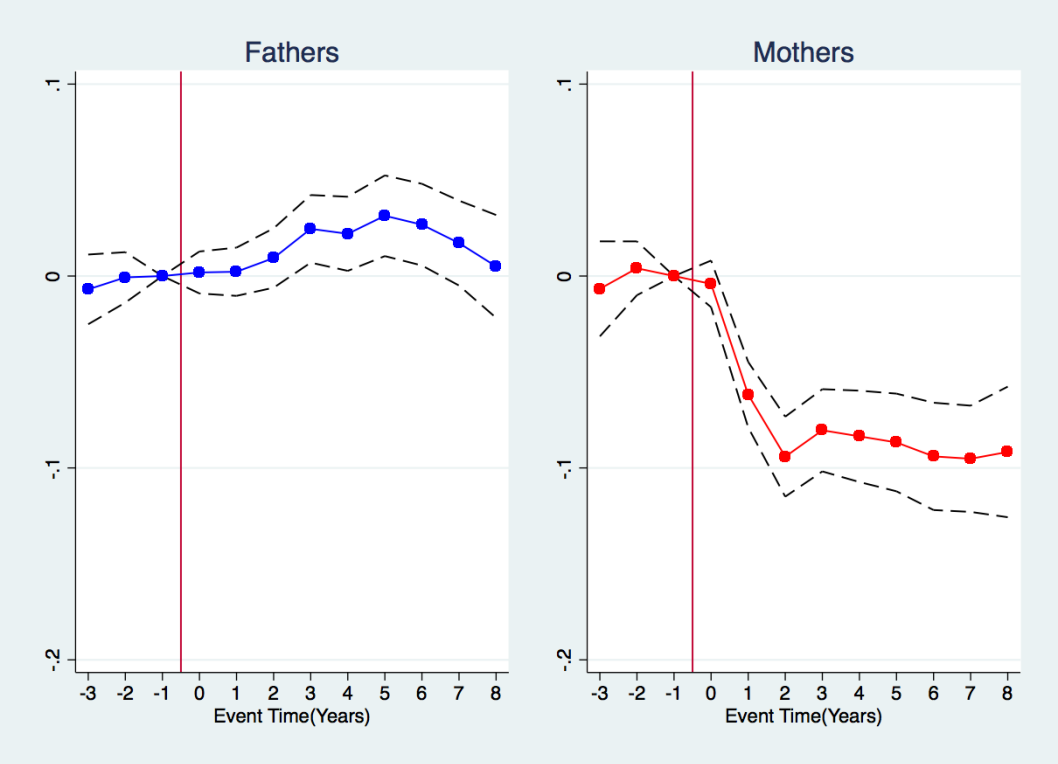
5 Results on total annual earnings

Table A4 reports results on the static specification of the impact of first childbirth on total annual earnings, where we impose no pre-trends and assume that the effect is constant for all s. Results are positive for fathers, $+2\%$, while negative for mothers, -6.4%. Figure 1, instead, shows the relative event time coefficients γ_s estimated from the dynamic specification (Equation (1)). 95% confidence intervals are included. The vertical red lines indicate the timing of childbirth.

Before the birth of the child, the event time indicators are not significantly different from zero, suggesting the absence of pre-trends. Employees' earnings, despite gender or parental status, evolve in parallel until the event "birth of the first child". After the event, however, we find a clear penalization for mothers and no or slightly positive effects for fathers.

The penalization for mothers is not immediate: at event time 0 results are still not significant. This may be due to the fact that our firm gives to new parents, both males and females, a childbirth premium corresponding to a full one month salary. It is just one year after birth that mothers' total pay starts to fall by around 6%. What is relevant is that it does not increase back. Results show that 8 years after childbirth mothers are earning 9% less than non-mothers.

Figure 1: **Total Annual Earnings by Event Time**



Note: The vertical lines indicate the timing of first childbirth. Each point represents the estimated coefficient from Equation (1) on the sample that includes employees without children as control units. The dependent variable is the log of total annual earnings. 95% CI included.

6 Underlying mechanisms

Findings on the event study show a penalty for mothers in terms of total annual earnings. In this section we investigate the channels through which this penalty arises: working hours, career paths, and absenteeism. We will also present results by earnings components (performance-related pay, base-pay).

6.1 Working hours

The arrival of the first child leads to important changes in individuals' labor supply. Since our results are all conditional on staying employed in the firm, we can study the evolution of hours supplied around the timing of first childbirth. We thus replicate our event study using as dependent variable the log of annual hours actually worked by the employees.

Results are reported in Figure A2. A significant reduction in hours worked, around 5%, is found for women one year after delivery. The subsequent year the pattern starts to improve and stabilizes during children's pre-school age, with a gap of 4% with non-mothers. When the child enrolls school, 6 years after birth, a clear catch-up trend is found. 8 years after, the differential in working hours between mothers and non-mothers is 2%. No effect is found on fathers.

Given these findings, we deeper the study on working hours by analyzing changes in contractual working time before and after first childbirth on the subsample of mothers (Table A5). Before the birth of the child none of these women is working part-time. A sharp increase in the share of part-time contracts is observed between event time 0 and 1: +5%. During pre-school years, most of mothers opt for a working contract that accounts for 80% of full time hours. When the child starts primary school we observe that mothers start to come back a full-time contract.

These findings suggest that individual choices on hours worked after childbirth are a relevant mechanism that negatively impacts earnings. However, the event study on working hours shows a catching-up process that is not found in earnings' trends.

6.2 Career paths

According to Davies and Frink (2014), the myth of the perfect worker began to emerge at the beginning of the 20^{th} century, when it was described as "a men completely devoted to his

employer, his faithfulness rewarded by promotions" (p. 26). This way of conceiving work has developed over time, with the advent of the "24/7" working culture and the widespread idea that employers implicitly require that work schedule should take precedence over family. We thus want to study how career patterns diverge between employees who have children and employees who do not by looking at the trajectories of their rank level.

Table A6 shows that, before childbirth, there are no, or only slightly, significant differences within the hierarchical rank of the firm between employees who are going to have a child and employees who are not. After childbirth, however, mothers, constantly slow down with respect to non-mothers. 8 years after childbirth, they end up at 6 levels behind with respect to childless women. In Table A7 we additionally show that mothers see reduced their probability to enter the highest managerial positions. 8 years after birth the chances to become a manager for a woman with a child is more than 10% lower with respect to a childless woman.

6.3 Absenteeism

Two major arguments have been developed to justify promotions within a firm. The first is based on tournament theory (Lazear and Rosen (1981), Rosen (1986)). A promotion is the prize allocated to the worker who ranks better than all other candidates. The winner will be moved to a position that involves higher responsibility and earnings. Her probability to win depends on her productivity and this probability is itself an incentive to exert higher effort. The second, based on job assignment models (Gibbons and Waldman, 1999a), views promotions as an instrument for the efficient allocation of the employees within the firm. The firm uses employment at lower hierarchical levels as a screening period during which it learns about employees' abilities and attitudes. According to Pfeifer (2010), both theories predict similar hypothesis on the determinants of promotions. Among these, absenteeism is particularly relevant. Indeed, absenteeism is an important proxy for productivity and work effort. According to the first theory on promotions, an absent employee cannot provide effort, and so her probability of winning the tournament declines. Instead, according to job assignment models, if an employee is absent the firm cannot learn about her productivity and can use absenteeism in the past as a proxy for productivity in the future.

We find confirmation of this fact in our firm. Absences are remunerated at full salary, so they do

not directly impact on wages, but they do affect the career patterns of employees. A rise in the number of hours of absences has two main consequences. A stop in annual improvements along the hierarchical ranks and a reduction in individual bonuses.

To better investigate this issue, we replicate our event study on the log of annual hours of absence to see if there are changes in the absenteeism behavior of parents around childbirth as compared to non-parents (Figure A3). We exclude the hours of paternity and maternity leave. During the pre-school years of the child, mothers make around 20% more hours of absences with respect to non-mothers. These include 6 days per-year that are guaranteed to mother of small children for family reasons and additionally 2 days of leave for "sick child". Only when children enroll primary school, we do not observe significant differences between mothers and non-mothers in terms of absenteeism. No significant effects are found for fathers.

6.4 Earnings components

Table A8 reports results of the estimation of Equation (1) on base-pay and performance-related pay linked to individual productivity.

Again, before the birth of the child, there are no significant differences between our treatment and control units. Focusing on base-pay, we find some positive effect for fathers. This is likely due to an increase in overtime in the years immediately after the arrival of the child, a standard result for men (Millimet, 2000). Mothers, instead, suffer a drop of 5.8% one year after delivery. A gap with non-mothers that gets worse over time, reaching -7.7% 8 years after. But the largest penalization for mothers is in the performance-relate pay: -30% two years after the event, with no evidence of a catching-up. The individual productivity of fathers does not seem to be affected by the birth of the first child.

7 Heterogeneous effects

7.1 By occupational category

According to Blau and Winkler (2017), women in manual occupations and service positions are those most penalized from childbirth. This type of jobs provides less flexibility in working time, as compared to professional jobs. Indeed, there is growing empirical evidence supporting the

intuition that women value flexibility at work more than men do (Bertrand, 2018). We know that, in our firm, employees in a managerial positions have the chance to arrange their working schedule more flexibly than other employees. We thus analyze the different impact of the birth of the first child on the subsamples of managers and non-managers (Table A9). Our results clearly point out that mothers in non-managerial positions are more penalized. For them, the gap with non-mothers is larger and more persistent (-8% 8 years after delivery). Mothers in managerial positions, instead, not only are less penalized, but also menage to catch-up non-mothers by the timing the child enrolls primary school. More flexible working time, allowing mothers to better reconcile working and family responsibilities, can help explaining these findings. Indeed, Table A9 shows that the reduction in working hours is much larger for women in non-managerial position, who likely face greater additional pressures on their time as they try to balance market and non-market work commitments. Moreover, the different incidence of the child penalty among managers and non-managers can be explained by the way employees in different occupational categories are evaluated and remunerated. It is more likely that managers are paid on the basis of their output, and so of their own productivity. Instead, non-managerial employees are likely paid according to their inputs, mainly how many hours they work and how many hours they are absent from work.

Among both categories, some positive or no effects are found for fathers.

7.2 By division

There is a relevant difference on how work is arranged and managed across the three main divisions of the firm: administrative, commerce, and production. In particular, in the commerce division, employees have to sell the product through direct contacts with clients. It is known that, in contrast to standard technology-based occupations, typical of the production division, business-type occupations tend to show larger elasticities of income with respect to hours worked. Goldin (2014) shows how these occupations involve work that is more structured, done under more time pressure, and that requires establishing, and maintaining, interpersonal relationships. We know that only 10% of men in our firm are employed in the commerce division, while 35% of women are so (Table A1).

As Table A11 shows, a penalty for mothers in total earnings is found in all divisions, but the

results are heterogeneous. In the administrative, we observe a penalty of 5% that disappears as soon as the child starts primary school. In the production, the penalty is persistent, but results have low power. The most penalized division is the commerce, where the motherhood penalty reaches 11.4% 5 years after childbirth and is still 5.6% 8 years after. In Table A12 we show that mothers working in the commerce division are also the most penalized in terms of performance-related pay. Indeed, the gap with non-mothers reaches more than 50% even 8 years after childbirth.

7.3 By workplace and place of residence

Having a high share of female colleagues at the workplace is not largely different, in terms of motherhood penalization, from having a low share of female colleagues, as shown in Table A13. Fathers working with a majority of male colleagues, instead, tend to be rewarded from the birth of the first child.

The place where the individual lives seems to matter more: the motherhood penalty is higher in urban areas (Table A14). We can explain this result by assuming that in these areas the availability of childcare services is more expensive. Indeed, other studies have found that women living in areas where the outsourcing of home production activities is more affordable tend to have better economic outcomes (Cortés and Tessada (2011), Cortés and Pan (forthcoming)).

8 Decomposition of the motherhood penalty

We have shown that the main mechanisms that help us explaining the negative impact of the birth first child for female employees as compared to childless women are a reduction in working hours, lower chances to climb-up the hierarchy of the firm, and lower performance-related pay. The last two mechanisms are linked to an increase in absenteeism observed during the child's pre-school age.

In this section we propose a decomposition of the motherhood penalty to understand the relative weight of these mechanisms. In particular, our main interest stands in explaining how much of the penalty observed between mothers and non-mothers can be decomposed into "less hours", "missed promotions" and "missed bonuses".

To do so, we rely on a standard decomposition of mean differences in log earnings based on a linear regression model (Oaxaca, 1973). In practice, we regress the log of total annual earnings on total annual hours worked, promotions and individual performance-related pay separately for parents and non-parents[13]. Then, we decompose the mean difference in log earnings into a component that accounts for differences in predictors between parents and non-parents (the explained part of the gap), and a component that accounts for differences in coefficients (the unexplained part of the gap).

We are aware that, in the right-side of the equation, we are including earnings determinants that directly respond to childbirth. But the aim of this exercise is to show how much each mechanism contributes to explain the gap, as if we were calculating an accounting identity.

Results of our exercise are presented in table A15. The average motherhood penalty is around 12%. Of this, almost 10% can be explained by our predictors. "Missed promotions", lower chances for mothers to improve their rank level within the firm, are able to explain the largest part of the gap. The reduction in working hours, due to the increase in part-time work, especially for mothers in non-managerial positions, during pre-school age of the child, is the second mechanism able to explain the penalty. The "missed bonuses" are able to explain a lower portion of the gap. However, we have seen that only mothers in the commerce division are largely penalized in terms of individual performance-related pay.

Results also show a positive gap for fathers, which cannot be explained by our predictors.

9 Results on the extended sample

Figure A4 shows results on the sample of employees who had their first child within the time window 2007-2009 and then, possibly, had other kids.

The patterns for fathers and mothers do not differ from our main results. For women we observe a first drop in total earnings 1 year after first childbirth, and a subsequent drop 4 years after. This second drop is likely associated with the birth of another child. 8 years after the birth of the first child, mothers are earning 10% less than childless women.

Fathers, instead, show a slightly positive trend with respect to non-fathers.

[13] Additional controls include age, education and year dummies

10 Robustness checks

In our first robustness check, we run an event study on a balanced sample of parents who who had their first child during the time window $2007 - 2009$. More specifically, for each parent, we set $s = 0$ for the years of the event (2007, 2008, or 2009) and relatively index all the other years. Then, we balance the sample around the event time $s = 0$. As a consequence, our specification includes all parents that we are able to observe from -2 years before childbirth to $+7$ years after. After having dropped the individual fixed effects, we run Equation (1) on the separate samples of fathers and mothers.

The main characteristic of this strategy is that each individual receives the treatment and is observed for the same number of years. Results are shown in Table A16 and confirm the patterns found in our main empirical strategy: negative, large and persistent effect for women, no effect for men.

In a second check we focus on the possibility that unexpected promotions influence both the decision of having a child and earnings. We start by additionally controlling for career progression. We thus include in Equation (1) dummies for rank levels. Results, reported in Table A17, are robust. Pre-trends are not statistically significant. One year after childbirth mothers face a drop in earnings of around 4%, which persists 8 years after. Positive effects are found for fathers. Then, we check for the correlation between past and current promotions and childbirth (Table A18). There is no association between being promoted and having a child, both for fathers and mothers. We find a slightly positive correlation between being promoted at $t - 1$ and having a child at t for women. However, this has low power and is very low in magnitude, 0.2%.

In a third robustness, we replicate our event study using different birth windows: $2008 - 2010$ and $2009 - 2011$. Results are shown in Figure A5 and are highly robust.

In our last robustness we try a different kind of experiment. We focus only on employees who do not have children during the observation period, the control group in our main event study, but experience a medium length period of sick leave, between one and three months, during the years 2007-2009. We then follow their earnings and careers around this event. In this case, the control group is made up by employees who, in the window 2007-2009, experienced less than one month of sick leave. We remember that we are controlling for time-invariant unobserved characteristics

between treatment and control units.

Results of this exercise are presented in Tables A19 and A20. Findings show a clear penalization for a medium-length sick leave period both for men and women, thus suggesting that the mechanism of absences has relevant economic consequences. What is interesting is that this effect is stronger for women, especially when analyzing their career patterns. 8 years after the sick leave period, women are falling 10 levels behind with respect to women who did not take it. The result for men is 7 levels.

Interpreting these results in light of the findings on the impact of the birth of the first child makes us thinking that while the sick-leave period is attached to the person and cannot be transferred, and because of this also men are penalized, all the burden of the consequences of childbirth stays with the mother and is transferred by the men to women. This translates in a clear penalization for mothers, but not for fathers.

11 Conclusions

Using a unique panel of personnel records from 2005 to 2016, we developed an event study with the use of a control group to capture the effect of becoming parent (extensive fertility margins) on the dynamic trajectories of earnings and careers among male and female employees of a large firm in France.

Despite the family-friendly institutional context, results show a clear penalty for women after first childbirth. While there are no significant differences between women who are becoming mothers and women who are not before the birth of the first child, 8 years after childbirth mothers are earning 9% less than childless female employees. Fathers' earnings, instead, are slightly positively or no significantly affected. The main channels underlying the motherhood penalty in total annual earnings pass through a reduction in working hours, a slowing down in the career tracks after childbirth and a large reduction in performance-related pay linked to individual productivity. The last two mechanisms are related to an increase in absenteeism during the child's pre-school age. A decomposition of the motherhood penalty shows that the "missed promotions" account for the largest part of the gap.

We can drive two main conclusions from our findings. First, even if family-friendly policies play a fundamental role in attracting and retaining women in the labor force, they will not reduce the penalty mothers face as long as they are negatively perceived and priced by employers. We show that the negative incidence of a reduction in working hours and an increase in absenteeism during the pre-school age of the child is strong and persists even when a clear catching-up trend in hours is found.

Second, it seems clear that a key driver of the motherhood penalty is still rooted in cultural norms that see the birth of a child as a female matter. The consequences of childbirth fully stay with the mother.

These results strengthen and give new evidence on what the current economic research is pointing out: the main explanation why many women's career is still largely penalized is childbearing and childcare.

References

Anderson, D. J., Binder, M., and Krause, K. The Motherhood Wage Penalty Revisited: Experience, Heterogeneity, Work Effort, and Work-Schedule Flexibility. *Industrial and Labor Relations Review*, 56(2):273–293, 2003.

Angrist, J. and Evans, W. Children and Their Parents' Labor Supply: Evidence from Exogenous Variation in Family Size. *The American Economic Review*, 88(3):450–477, 1998.

Bertrand, M. *New Perspectives on Gender*, chapter in Handbook of Labor Economics. Elsevier, Amsterdam, 2011.

Bertrand, M. The Glass Ceiling. *Becker Friedman Institute for Research in Economics Working Paper No.2018-38*, 2018.

Blau, F. D. and Winkler, A. Women, Work and Family. *NBER Working Paper N.w23644*, 1: 18–39, 2017.

Borusyak, K. and Jaravel, X. Revisiting Event Study Designs. *Working Paper 445541*, 2017.

Budig, M. and England, P. The Wage Penalty for Motherhood. *American Sociological Review*, 66(2):204–225, April 2001.

Cools, S. and Strøm, M. Parenthood Wage Penalties in a Double Income Society. *Review of Economics of the Household*, 14, 2016.

Cortés, P. and Pan, J. When Time Binds: Substitutes to Household Production, Returns to Working Long Hours and the Gender Wage Gap among the Highly Skilled. *Journal of Labor Economics*, forthcoming.

Cortés, P. and Tessada, J. Low-Skilled Immigration and the Labor Supply of Highly Skilled Women. *American Economi Journal: Applied Economics*, 3(3):88–123, 2011.

Davies, A. and Frink, B. D. The Origins of the Ideal Worker: the Separation of Work and Home in the United States From the Market Revolution to 1950. *Work and Occupations*, 1:18–39, 2014.

Dobkin, C., Finkelstein, A., Kluender, R., and Notowidigdo, M. The Economic Consequences of Hospital Admissions. *American Economic Review*, 108(2):308–352, 2018.

Felfe, C. The Motherhood Wage Gap: What about Job Amenities? *Labour Economics*, 19: 59–67, 2012.

Gibbons, R. and Waldman, M. Careers in Organizations: Theory and Evidence, Orley Ashenfelter and David E. Card (eds.). *Handbook of Labor Economics*, 3B:2373–2437, 1999a. Amsterdam: North-Holland.

Goldin, C. A Grand Gender Convergence: its Last Chapter. *American Economic Review*, 104 (4):1091–1119, 2014.

Joshi, H. and Davies, H. *The Price of Parenthood and the Value of Children*, chapter in Making Economic Policy in the 21st Century: Essays in Honour of Henry Neuberger. Bristol UK; Policy Press, 2000.

Kleven, H. J., Landais, C., and Søgaard, J. Children and Gender Inequality: Evidence fom Denmark. NBER Working Paper No. 24219, 2018.

Lazear, E. P. and Rosen, S. Rank-Order Tournaments as Optimal Labor Contracts. *Journal of Political Economy*, 89:841–864, 1981.

Lundborg, P., Plug, E., and Rasmussen, A. Can Women Have Children and a Career? IV Evidence from IVF Treatments. *American Economic Review*, 107(6):1611–1637, 2017.

Millimet, D. L. The Impact of Children on Wages, Job Tenure, and the Division of Household Labour. *The Economic Journal*, 110(462):C139–C157, 2000.

Oaxaca, R. Male-Female Wage Differentials in Urban Labor Markets. *International Economic Review*, 14(3):693–709, 1973.

Pfeifer, C. Determinants of Promotions in an Internal Labour Market. *Schmalenbach Business Review*, 62:342–358, 2010.

Rosen, S. Prices and Incentives in Elimination Tournaments. *American Economic Review*, 76: 701–715, 1986.

Sigle Rushton, W. and Waldfogel, J. Motherhood and Women' s Earnings in Anglo-American, Continental European, and Nordic Countries. *Feminist Economics*, 13(2):55–91, 2007.

Simonsen, M. and Skipper, L. The Family Gap in Wages: what Wombmates Reveal. *Labour Economics*, 19:102–112, 2012.

Waldfogel, J. The Effects of Children on Women's Wages. *American Sociological Review*, 62: 209–217, 1997.

Wilner, L. Worker-Firm Matching and the Family Pay Gap: Evidence from Linked Employer-Employee Data. *Journal of Population Economics*, 29(4):991–1023, 2016.

Appendix

Figure A1: **Number of Employees by Département**

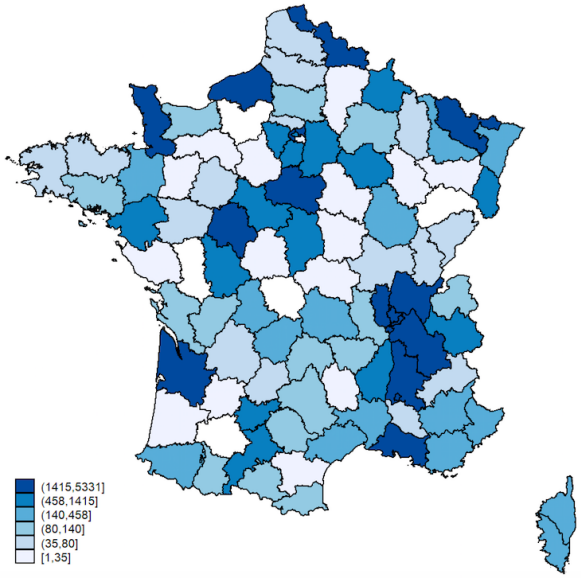


Table A1: **Descriptive Statistics**

	Men		Women	
	Mean	**SD**	**Mean**	**SD**
Demographics				
Age	35.52	6.85	35.84	6.44
Parent	0.59	0.49	0.65	0.48
Nb children	1.94	0.81	1.83	0.75
Couple	0.64	0.48	0.64	0.48
Single	0.23	0.42	0.22	0.41
Prev married	0.03	0.16	0.06	0.24
Less than secondary	0.09	0.29	0.09	0.28
Secondary	0.58	0.49	0.57	0.50
University	0.32	0.47	0.34	0.47
Job characteristics				
Manager	0.39	0.49	0.39	0.49
Tenure	10.89	8.06	10.37	6.41
Rank Level	156.25	62.18	153.55	65.26
Commerce	0.10	0.30	0.35	0.48
Production	0.75	0.43	0.29	0.45
Administrative	0.15	0.36	0.36	0.48
Working hours	1581.74	59.23	1535.10	132.88
Absences	286.90	171.31	380.30	298.48
Total earnings	47947.61	18686.86	40622.14	17462.27
Obs	245778		117347	

Table A2: **Share of Employees who Leave the Firm and Reason for Exit**

	Men				Women			
	Child		No Child		Child		No Child	
	%	Obs	%	Obs	%	Obs	%	Obs
Exit	2.39	98	1.74	1132	3.31	94	2.38	639
Change company	72.45	71	3.34	434	61.10	58	49.77	318
Parental leave	0	0	0	0	23.30	22	0	0
Pre-retirement/Invalidity	0	0	8.04	91	5.32	5	9.10	58
Retirement	11.22	11	20.23	229	0	0	14.08	90
Other	16.33	16	33.39	378	9.57	9	27.07	173

Table A3: **Probability of Exit at t Conditional on Childbirth at $t-1$**

	$Exit_t$	
	Fathers	**Mothers**
$Childbirth_{t-1}$	0.008	0.006
	(0.01)	(0.02)
Individual FE	✓	✓
Time FE	✓	✓
Obs	3655	2647

Clustered standard errors at the individual level in parentheses

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

Table A4: **Static Specification**

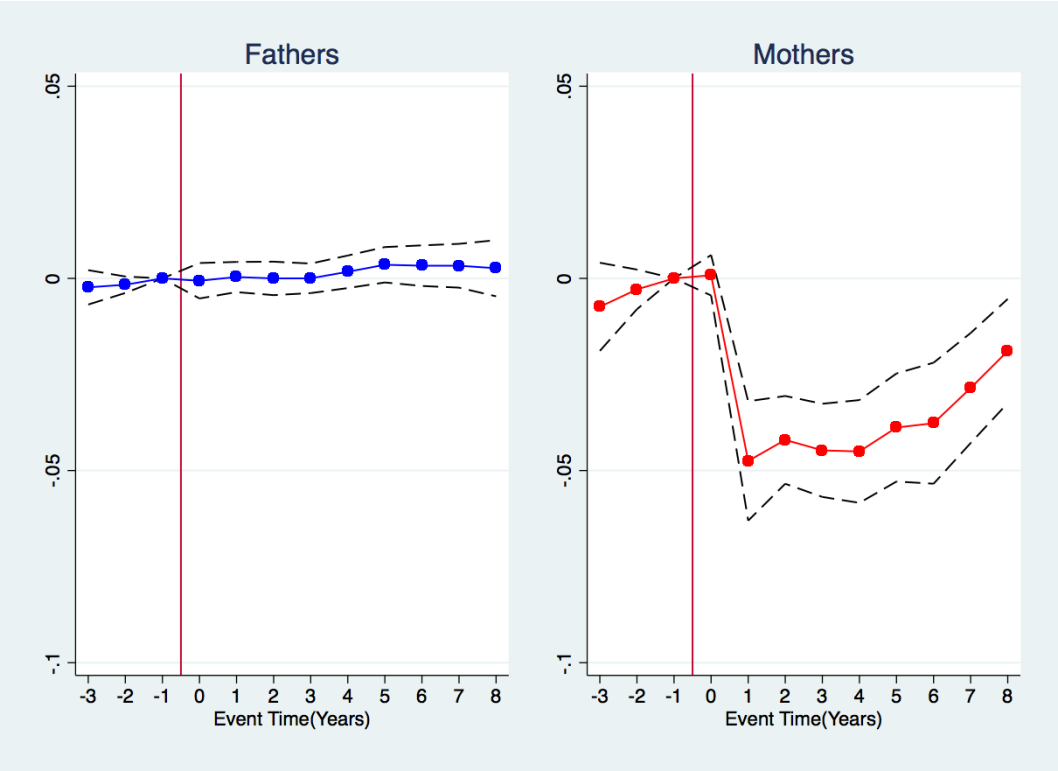
	Total earnings	
	Fathers	**Mothers**
D	0.020**	-0.064***
	(0.01)	(0.01)
Individual FE	✓	✓
Time FE	✓	✓
Obs	69066	29907

Clustered standard errors at the individual level in parentheses

D is the indicator variable for being treated $D_{it} = 1 \cdot \{S_{it} \geq 0\}$

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

Figure A2: **Annual Working Hours by Event Time**



Note: The vertical lines indicate the timing of first childbirth. Each point represents the estimated coefficient from Equation (1) on the sample that includes employees without children as control units. The dependent variable is the log of total annual earnings. 95% CI included.

Table A5: **Share of Mothers by Contractual Working Time**

	Full time	**80% full time**	**Part time**
-3 years	54.38	45.62	0
-2 years	48.78	51.22	0
-1 year	44.61	55.39	0
0	41.49	58.21	0.30
+1 year	39.73	54.88	5.39
+2 years	35.84	59.86	4.30
+3 years	36.17	59.57	4.26
+4 years	39.93	55.59	4.48
+5 years	43.80	52.32	3.88
+6 years	50.62	44.44	4.94
+7 years	55.93	39.41	4.66
+8 years	61.00	35.50	3.50

0: timing of first childbirth

Full time= 100% of working hours

80% full time= 80%-99% of working hours

Part time= 50% or less of working hours

Table A6: **Rank Level by Event Time**

	Rank level	
	Fathers	**Mothers**
-3 years	-0.746	0.338
	(0.82)	(0.99)
-2 years	-0.903*	1.091*
	(0.45)	(0.48)
0	0.0698	0.272
	(0.37)	(0.44)
+1 year	0.348	-2.043***
	(0.44)	(0.51)
+2 years	0.245	-3.641***
	(0.51)	(0.58)
+3 years	0.860	-3.154***
	(0.63)	(0.70)
+4 years	0.960	-3.256***
	(0.71)	(0.78)
+5 years	1.490*	-3.557***
	(0.72)	(0.87)
+6 years	1.364	-3.734***
	(0.78)	(0.95)
+7 years	1.360	-4.645***
	(0.88)	(1.11)
+8 years	2.014	-6.085***
	(1.14)	(1.34)
Age cohorts	✓	✓
Individual FE	✓	✓
Time FE	✓	✓
Obs	68807	29784

0: timing of first childbirth

Clustered standard errors at the individual level in parentheses

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

Table A7: **Probability to Become Manager by Event Time**

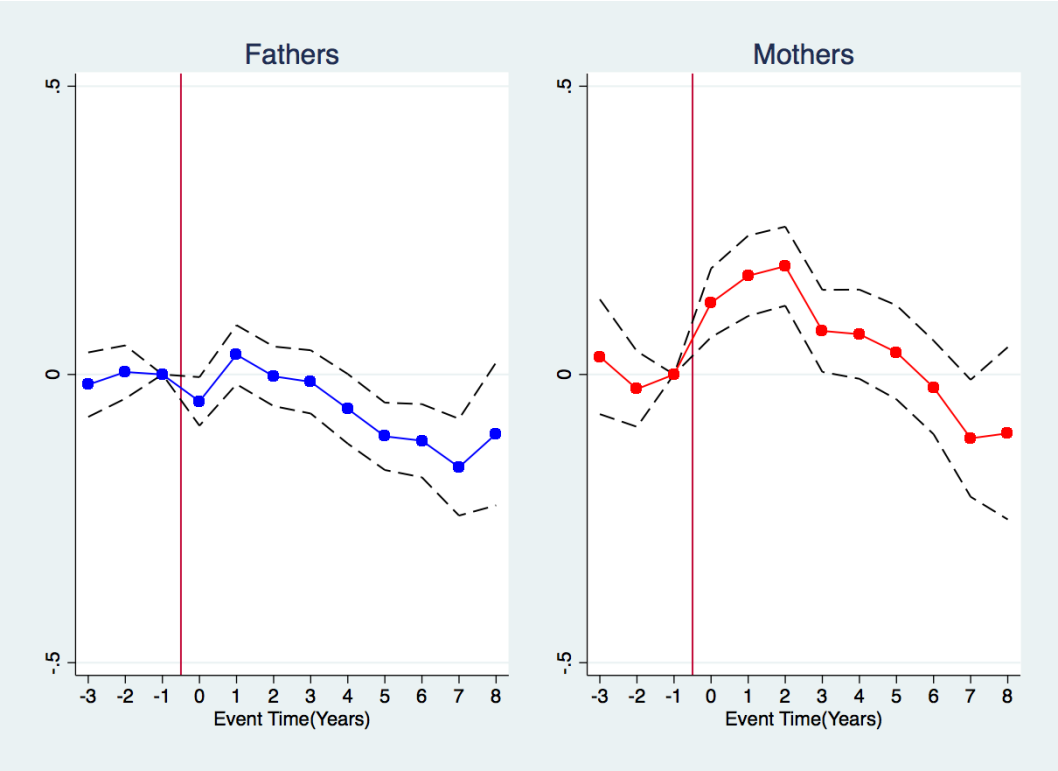
	Prob Manager	
	Fathers	**Mothers**
-3 years	0.016	-0.030
	(0.01)	(0.03)
-2 years	-0.004	0.005
	(0.01)	(0.01)
0	-0.001	-0.011
	(0.01)	(0.01)
+1 year	-0.001	-0.022*
	(0.01)	(0.01)
+2 years	0.006	-0.035**
	(0.01)	(0.01)
+3 years	0.009	-0.043**
	(0.02)	(0.01)
+4 years	0.017	-0.059***
	(0.02)	(0.02)
+5 years	0.011	-0.052*
	(0.02)	(0.02)
+6 years	-0.002	-0.068**
	(0.02)	(0.02)
+7 years	-0.012	-0.077**
	(0.02)	(0.02)
+8 years	-0.036	-0.119***
	(0.02)	(0.03)
Age cohorts	✓	✓
Individual FE	✓	✓
Time FE	✓	✓
Obs	68807	29784

0: timing of first childbirth

Clustered standard errors at the individual level in parentheses

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

Figure A3: **Annual Hours of Absences by Event Time**



Note: The vertical lines indicate the timing of first childbirth. Each point represents the estimated coefficient from Equation (1) on the sample that includes employees without children as control units. The dependent variable is the log of total annual earnings. 95% CI included. Hours of paternity and maternity leave are excluded.

Table A8: **Base-Pay and Performance-Related Pay by Event Time**

	Base		Performance	
	Fathers	**Mothers**	**Fathers**	**Mothers**
-3 years	-0.007	-0.003	0.045	-0.121
	(0.01)	(0.01)	(0.08)	(0.09)
-2 years	-0.0001	0.005	-0.008	0.005
	(0.01)	(0.01)	(0.06)	(0.07)
0	0.002	-0.002	0.025	-0.039
	(0.01)	(0.01)	(0.06)	(0.07)
+1 year	0.001	-0.058***	0.084	-0.106
	(0.01)	(0.01)	(0.06)	(0.07)
+2 years	0.010	-0.084***	0.024	-0.303***
	(0.01)	(0.01)	(0.06)	(0.08)
+3 years	0.024**	-0.070***	0.018	-0.289***
	(0.01)	(0.01)	(0.06)	(0.08)
+4 years	0.021*	-0.075***	0.010	-0.242**
	(0.01)	(0.01)	(0.06)	(0.08)
+5 years	0.032**	-0.077***	0.010	-0.308***
	(0.01)	(0.01)	(0.06)	(0.08)
+6 years	0.027*	-0.086***	0.002	-0.253**
	(0.01)	(0.01)	(0.06)	(0.08)
+7 years	0.019	-0.083***	-0.002	-0.393***
	(0.01)	(0.01)	(0.07)	(0.08)
+8 years	0.008	-0.077***	-0.039	-0.314***
	(0.01)	(0.02)	(0.08)	(0.09)
Age cohorts	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Obs	68807	29784	53810	21501

0: timing of first childbirth

Clustered standard errors at the individual level in parentheses

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

Table A9: **Total Annual Earnings by Event Time and Occupational Category**

	Non Managers		Managers	
	Fathers	**Mothers**	**Fathers**	**Mothers**
-3 years	-0.013	0.002	0.002	0.008
	(0.01)	(0.01)	(0.02)	(0.02)
-2 years	0.002	0.003	-0.008	0.013
	(0.01)	(0.01)	(0.01)	(0.01)
0	0.001	-0.006	0.010	-0.009
	(0.01)	(0.01)	(0.01)	(0.01)
+1 year	-0.008	-0.072***	0.034**	-0.025
	(0.01)	(0.01)	(0.01)	(0.01)
+2 years	0.002	-0.10***	0.032*	-0.077**
	(0.01)	(0.01)	(0.02)	(0.02)
+3 years	0.019	-0.086***	0.031	-0.054**
	(0.01)	(0.01)	(0.02)	(0.02)
+4 years	0.018	-0.090***	0.027	-0.050*
	(0.01)	(0.01)	(0.02)	(0.02)
+5 years	0.023	-0.087***	0.050**	-0.051*
	(0.01)	(0.02)	(0.02)	(0.02)
+6 years	0.028*	-0.097***	0.034	-0.041
	(0.01)	(0.02)	(0.02)	(0.02)
+7 years	0.011	-0.086***	0.034	-0.045*
	(0.01)	(0.02)	(0.02)	(0.02)
+8 years	0.005	-0.080***	0.009	-0.025
	(0.02)	(0.02)	(0.02)	(0.03)
Age cohorts	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Obs	42481	16612	26326	13172

0: timing of first childbirth

Clustered standard errors at the individual level in parentheses

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

Table A10: **Annual Working Hours by Event Time and Occupational Category**

	Non Managers		Managers	
	Fathers	**Mothers**	**Fathers**	**Mothers**
-3 years	-0.004	-0.004	0.001	0.001
	(0.00)	(0.01)	(0.00)	(0.01)
-2 years	-0.002	-0.003	0.001	0.001
	(0.00)	(0.00)	(0.00)	(0.00)
0	-0.001	-0.002	-0.001	-0.001
	(0.00)	(0.00)	(0.00)	(0.00)
+1 year	-0.001	-0.055***	0.002	-0.026*
	(0.00)	(0.01)	(0.00)	(0.01)
+2 years	-0.001	-0.050***	0.003	-0.021*
	(0.00)	(0.01)	(0.00)	(0.01)
+3 years	-0.002	-0.052***	0.004	-0.027*
	(0.00)	(0.01)	(0.00)	(0.01)
+4 years	0.001	-0.051***	0.004	-0.031*
	(0.00)	(0.01)	(0.00)	(0.01)
+5 years	0.004	-0.043***	0.003	-0.028*
	(0.00)	(0.01)	(0.00)	(0.01)
+6 years	0.004	-0.041***	0.004	-0.025*
	(0.00)	(0.01)	(0.00)	(0.01)
+7 years	0.004	-0.032**	0.005	-0.016
	(0.00)	(0.01)	(0.00)	(0.01)
+8 years	0.001	-0.019*	0.004	-0.009
	(0.01)	(0.01)	(0.00)	(0.01)
Age cohorts	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Obs	42481	16612	26326	13172

0: timing of first childbirth

Clustered standard errors at the individual level in parentheses

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

Table A11: **Total Annual Earnings by Event Time and Division**

	Commerce		**Production**		**Administrative**	
	Fathers	**Mothers**	**Fathers**	**Mothers**	**Fathers**	Mothers
-3 years	-0.012	0.001	-0.002	0.001	0.000	-0.012
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
-2 years	-0.002	0.001	-0.001	0.004	0.002	0.012
	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
0	0.002	-0.009	-0.001	-0.022	0.011	0.000
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
+1 year	0.012	-0.079***	0.002	-0.053**	-0.003	-0.028
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
+2 years	0.014	-0.109***	0.013	-0.076**	-0.001	-0.062***
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
+3 years	0.009	-0.097***	0.034**	-0.059**	0.023	-0.048*
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
+4 years	0.005	-0.107***	0.028*	-0.050*	0.053*	-0.049*
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
+5 years	0.007	-0.114***	0.040**	-0.053*	0.065*	-0.045*
	(0.02)	(0.02)	(0.01)	(0.03)	(0.03)	(0.02)
+6 years	0.025	-0.109***	0.027*	-0.066*	0.058*	-0.046*
	(0.02)	(0.02)	(0.01)	(0.03)	(0.03)	(0.02)
+7 years	0.008	-0.103***	0.020	-0.086*	0.041	-0.031
	(0.03)	(0.02)	(0.01)	(0.04)	(0.03)	(0.02)
+8 years	0.008	-0.056*	0.010	-0.082*	0.023	-0.019
	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)	(0.03)
Age cohorts	✓	✓	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓
Obs	5657	7946	42185	8417	8743	8525

0: timing of first childbirth

Clustered standard errors at the individual level in parentheses

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

Table A12: **Performance-Related Pay by Event Time and Division**

	Commerce		Production		Administrative	
	Fathers	**Mothers**	**Fathers**	**Mothers**	**Fathers**	**Mothers**
-3 years	0.010	-0.075	-0.196	-0.008	0.170	0.079
	(0.20)	(0.15)	(0.15)	(0.10)	(0.10)	(0.09)
-2 years	-0.009	-0.046	0.001	-0.014	-0.030	0.143*
	(0.13)	(0.10)	(0.14)	(0.08)	(0.10)	(0.07)
0	0.106	0.002	-0.007	-0.010	0.063	0.043
	(0.12)	(0.10)	(0.14)	(0.07)	(0.11)	(0.07)
+1 year	0.074	-0.096	0.006	0.058	0.088	0.0345
	(0.14)	(0.13)	(0.12)	(0.07)	(0.11)	(0.08)
+2 years	0.218	-0.283	-0.238	-0.044	0.057	-0.210
	(0.14)	(0.17)	(0.14)	(0.08)	(0.13)	(0.11)
+3 years	0.199	-0.323*	-0.206	-0.064	0.173	-0.197
	(0.15)	(0.14)	(0.15)	(0.07)	(0.12)	(0.11)
+4 years	0.190	-0.459**	-0.090	-0.068	0.220	-0.092
	(0.15)	(0.16)	(0.14)	(0.07)	(0.13)	(0.11)
+5 years	0.199	-0.519***	-0.127	-0.067	0.063	-0.263*
	(0.15)	(0.13)	(0.13)	(0.07)	(0.13)	(0.11)
+6 years	0.036	-0.555***	-0.192	-0.099	0.007	-0.079
	(0.18)	(0.14)	(0.16)	(0.08)	(0.12)	(0.10)
+7 years	0.233	-0.583***	-0.175	-0.086	0.121	-0.202
	(0.25)	(0.14)	(0.15)	(0.08)	(0.14)	(0.12)
+8 years	0.178	-0.564**	-0.105	-0.153	-0.094	-0.058
	(0.21)	(0.18)	(0.15)	(0.10)	(0.18)	(0.12)
Age cohorts	✓	✓	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓	✓	✓
Time FE	✓	✓	✓	✓	✓	✓
Obs	2662	3340	6936	32405	7004	6484

0: timing of first childbirth

Clustered standard errors at the individual level in parentheses

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

Table A13: **Total Annual Earnings by Event Time and Share of Male/Female Colleagues**

	<Median		>Median	
	Fathers	**Mothers**	**Fathers**	**Mothers**
-3 years	-0.018	-0.003	0.002	-0.010
	(0.01)	(0.02)	(0.01)	(0.02)
-2 years	-0.010	-0.003	0.007	0.012
	(0.01)	(0.01)	(0.01)	(0.01)
0	0.004	-0.001	0.005	-0.002
	(0.01)	(0.01)	(0.01)	(0.01)
+1 year	-0.001	-0.068***	0.010	-0.025
	(0.01)	(0.01)	(0.01)	(0.02)
+2 years	0.001	-0.080***	0.025*	-0.097***
	(0.01)	(0.01)	(0.01)	(0.02)
+3 years	0.021	-0.069***	0.036**	-0.072***
	(0.01)	(0.01)	(0.01)	(0.02)
+4 years	0.008	-0.076***	0.045**	-0.064**
	(0.01)	(0.01)	(0.01)	(0.02)
+5 years	0.020	-0.080***	0.056***	-0.059**
	(0.01)	(0.02)	(0.02)	(0.02)
+6 years	0.015	-0.078***	0.052**	-0.074***
	(0.01)	(0.02)	(0.02)	(0.02)
+7 years	0.003	-0.076***	0.046**	-0.072***
	(0.02)	(0.02)	(0.02)	(0.02)
+8 years	-0.014	-0.074***	0.031	-0.061*
	(0.02)	(0.02)	(0.02)	(0.03)
Age cohorts	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Obs	34464	15087	34343	14697

0: timing of first childbirth

<Median, >Median: the share of male/female colleagues is below/above the median number of male/female employees at the work place

Clustered standard errors at the individual level in parentheses

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

Table A14: **Total Annual Earnings by Event Time and Place of Residence**

	Urban		Rural	
	Fathers	**Mothers**	**Fathers**	**Mothers**
-3 years	-0.009	0.006	-0.005	-0.005
	(0.02)	(0.02)	(0.01)	(0.02)
-2 years	-0.006	0.009	0.002	0.004
	(0.01)	(0.01)	(0.01)	(0.01)
0	-0.000	-0.014	0.004	-0.001
	(0.01)	(0.01)	(0.01)	(0.01)
+1 year	0.011	-0.070***	0.003	-0.058***
	(0.01)	(0.01)	(0.01)	(0.01)
+2 years	0.025	-0.124***	0.010	-0.081***
	(0.01)	(0.02)	(0.01)	(0.01)
+3 years	0.049**	-0.091***	0.021*	-0.075***
	(0.02)	(0.02)	(0.01)	(0.01)
+4 years	0.043*	-0.092***	0.020	-0.081***
	(0.02)	(0.02)	(0.01)	(0.01)
+5 years	0.058**	-0.102***	0.028*	-0.081***
	(0.02)	(0.02)	(0.01)	(0.02)
+6 years	0.061**	-0.110***	0.022	-0.086***
	(0.02)	(0.03)	(0.01)	(0.02)
+7 years	0.048*	-0.137***	0.016	-0.075***
	(0.02)	(0.03)	(0.01)	(0.02)
+8 years	0.048*	-0.124***	0.001	-0.075***
	(0.02)	(0.03)	(0.02)	(0.02)
Age cohorts	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓
Time FE	✓	✓	✓	✓
Obs	42481	16612	26326	13172

0: timing of first childbirth

Urban: départements with the 10 most populated cities in France (Paris, Marseille, Lyon, Toulouse, Nice, Nantes, Strasbourg, Montpellier, Bordeaux, Lille)

Rural: the remaining départements.

Clustered standard errors at the individual level in parentheses

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

Table A15: **Decomposition of the Parenthood Pay Gap**

	Fathers	**Mothers**
Pay gap	0.032*	-0.121***
	(0.02)	(0.02)
Explained	0.001	-0.110***
	(0.01)	(0.02)
Promotions	0.029*	-0.061***
	(0.01)	(0.02)
Working Hours	-0.002*	-0.028***
	(0.00)	(0.00)
Performance Pay	0.003	-0.011***
	(0.00)	(0.00)
Unexplained	0.031***	-0.011*
	(0.01)	(0.01)
Obs	68807	29784

Clustered standard errors at the individual level in parentheses

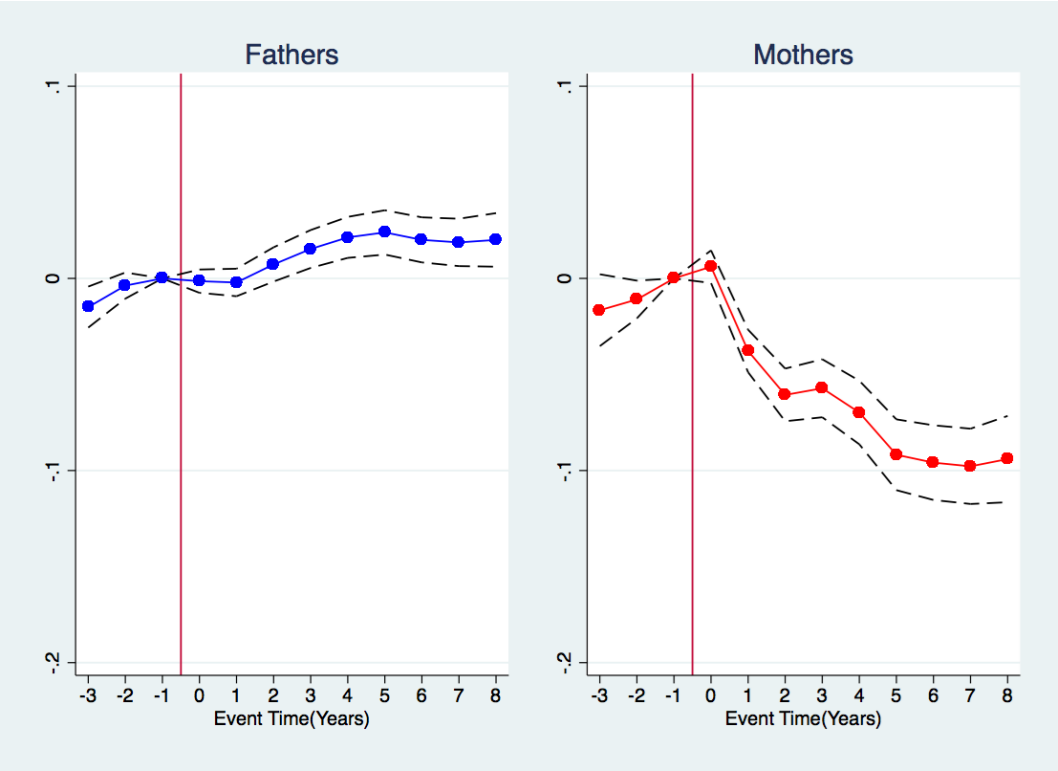
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Additional controls include age, year and education dummies

These are results of a twofold decomposition that uses non-mothers and non-fathers as norm.

Results are robust to a threefold decomposition

Figure A4: **Total Annual Earnings by Event Time, Extended Sample**



Note: The vertical lines indicate the timing of first childbirth. Each point represents the estimated coefficient from Equation (1) on the sample that includes employees without children as control units. The dependent variable is the log of total annual earnings. 95% CI included.

Table A16: **Total Annual Earnings by Event Time, Balanced Sample of Parents**

	Total earnings	
	Fathers	**Mothers**
-2 years	0.004	0.036
	(0.03)	(0.03)
0	-0.014	-0.022
	(0.03)	(0.03)
+1 year	-0.021	-0.062
	(0.03)	(0.03)
+2 years	-0.027	-0.136**
	(0.04)	(0.04)
+3 years	-0.025	-0.158**
	(0.04)	(0.05)
+4 years	-0.021	-0.170**
	(0.05)	(0.06)
+5 years	-0.016	-0.176**
	(0.05)	(0.06)
+6 years	-0.007	-0.180**
	(0.06)	(0.07)
+7 years	-0.028	-0.190*
	(0.06)	(0.08)
Age cohorts	✓	✓
Individual FE	✓	✓
Time FE	✓	✓
Obs	3539	2668

0: timing of random assignment of childbirth

Robust standard errors in parentheses

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

Table A17: **Total Annual Earnings by Event Time controlling for Career Progression**

	Total earnings	
	Fathers	**Mothers**
-3 years	0.007	0.002
	(0.01)	(0.01)
-2 years	0.015*	0.010
	(0.01)	(0.01)
0	0.012*	0.004
	(0.01)	(0.01)
+1 year	0.010	-0.039***
	(0.01)	(0.01)
+2 years	0.018**	-0.065***
	(0.01)	(0.01)
+3 years	0.031***	-0.046***
	(0.01)	(0.01)
+4 years	0.031***	-0.046***
	(0.01)	(0.01)
+5 years	0.039***	-0.046***
	(0.01)	(0.01)
+6 years	0.037***	-0.054***
	(0.01)	(0.01)
+7 years	0.028**	-0.051***
	(0.01)	(0.01)
+8 years	0.016	-0.039**
	(0.01)	(0.01)
Rank levels	✓	✓
Age cohorts	✓	✓
Individual FE	✓	✓
Time FE	✓	✓
Obs	73250	29555

0: timing of medium-length (1-3 months) sick leave period

Clustered standard errors at the individual level in parentheses

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

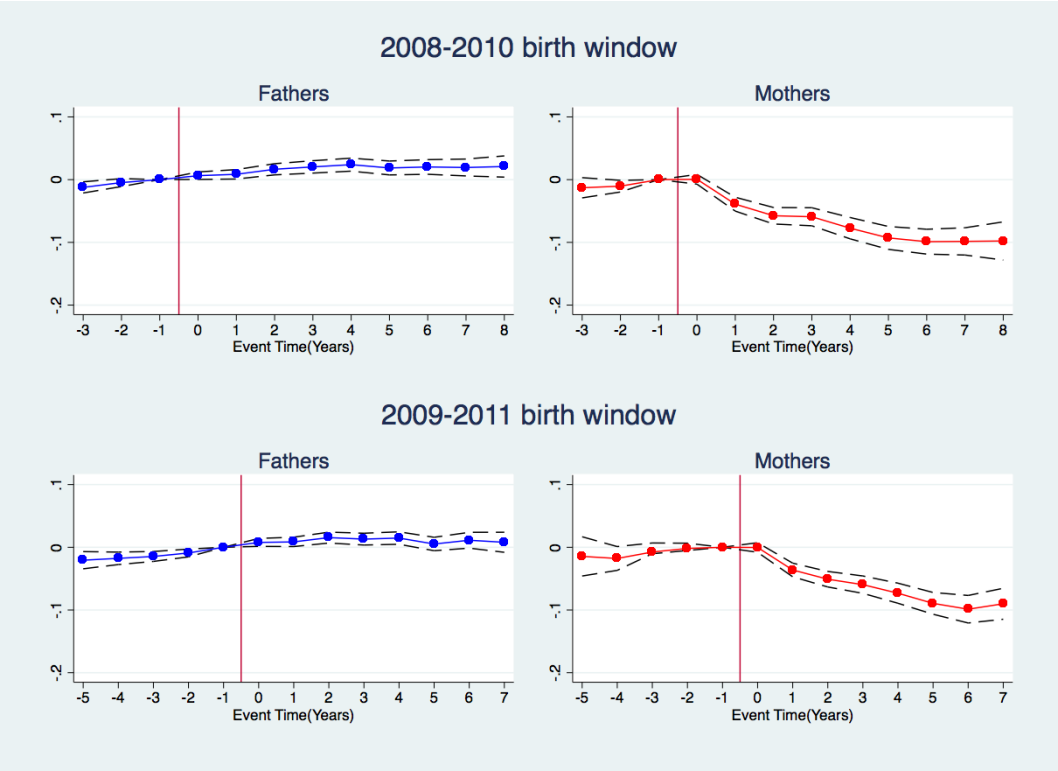
Table A18: **Past Promotions, Current Promotions and Childbirth**

	$Childbirth_t$	
	Fathers	**Mothers**
RL_t	0.001	-0.002
	(0.00)	(0.00)
RL_{t-1}	0.0004	0.002*
	(0.00)	(0.00)
RL_{t-2}	0.001	0.001
	(0.00)	(0.00)
Individual FE	✓	✓
Time FE	✓	✓
Obs	3221	2278

Clustered standard errors at the individual level in parentheses

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

Figure A5: **Different Time Windows**



Note: The vertical lines indicate the timing of first childbirth. Each point represents the estimated coefficient from Equation (1) on the sample that includes employees without children as control units. The dependent variable is the log of total annual earnings. 95% CI included.

Table A19: **Sick Leave and Total Annual Earnings by Event Time**

	Total earnings	
	Men	**Women**
-3 years	-0.007	-0.006
	(0.01)	(0.01)
-2 years	-0.001	-0.001
	(0.01)	(0.01)
0	-0.014**	0.001
	(0.01)	(0.01)
+1 year	-0.023***	-0.010
	(0.01)	(0.01)
+2 years	-0.031***	-0.018*
	(0.01)	(0.01)
+3 years	-0.031***	-0.024*
	(0.01)	(0.01)
+4 years	-0.056***	-0.037**
	(0.01)	(0.01)
+5 years	-0.064***	-0.056***
	(0.01)	(0.01)
+6 years	-0.066***	-0.063***
	(0.01)	(0.01)
+7 years	-0.081***	-0.095***
	(0.02)	(0.02)
+8 years	-0.086***	-0.103***
	(0.02)	(0.02)
Age cohorts	✓	✓
Individual FE	✓	✓
Time FE	✓	✓
Obs	73250	29555

0: timing of medium-length (1-3 months) sick leave period

Clustered standard errors at the individual level in parentheses

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

Table A20: **Sick Leave and Rank Level by Event Time**

	Rank level	
	Men	**Women**
-3 years	-0.069	-0.978
	(0.57)	(1.34)
-2 years	0.150	-0.334
	(0.33)	(0.53)
0	-0.442	-0.846*
	(0.31)	(0.38)
+1 year	-1.329**	-1.455**
	(0.42)	(0.47)
+2 years	-1.912***	-2.561***
	(0.51)	(0.57)
+3 years	-2.674***	-3.417***
	(0.61)	(0.71)
+4 years	-3.163***	-4.767***
	(0.69)	(0.77)
+5 years	-4.174***	-4.973***
	(0.77)	(0.90)
+6 years	-4.817***	-6.129***
	(0.85)	(0.95)
+7 years	-5.770***	-8.674***
	(1.04)	(1.12)
+8 years	-7.211***	-10.03***
	(1.37)	(1.72)
Age cohorts	✓	✓
Individual FE	✓	✓
Time FE	✓	✓
Obs	73250	29555

0: timing of medium-length (1-3 months) sick leave period

Clustered standard errors at the individual level in parentheses

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