

# Minding Your Business or Your Child? Childbirth and the Organization of Entrepreneurial Firms

Valentina Rutigliano \*

First version: October 23, 2023

This version: March 10, 2026

Using Canadian administrative data, I show that childbirth has substantial and persistent negative effects on female entrepreneurs' firm performance, while father-owned businesses remain largely unaffected. Childbirth also reshapes the firm's workforce. Although incumbent employees experience earnings losses, mother-owned firms become more likely to hire and retain mothers, and employee fertility increases. These patterns are consistent with a shift toward family-friendly firm culture. Finally, I show that child-care availability and progressive gender norms mitigate the adverse effect of childbirth on the entrepreneurship gap.

**Keywords:** Entrepreneurship, childbirth, employee spillovers, gender norms, childcare

**JEL Classification:** G30, J13, J16, L26, M13

---

\*Southern Methodist University. [vrutigliano@smu.edu](mailto:vrutigliano@smu.edu)

I am indebted to Jan Bena, Marco Pagano, and Raffaele Saggio for their generous mentorship. I thank for helpful comments Fabrizio Core, Spencer Dean, Valentina Duque, Nicole Fortin, Antonio Gargano, Lorenzo Garlappi, David Green, Juanita Gonzalez-Urbe, Isaac Hacamo, Tural Karimli, Olivia Kim, Thomas Lemieux, Clemens Mueller, Hernán Ortiz Molina, Paige Ouimet, Pascuel Plotkin, Heather Sarsons, Gaëlle Simard-Duplain, Pablo Valenzuela-Casasempere, Danielle van Jaarsveld, William Xiong, and Reem Zaiour. I also thank conference and seminar participants at SFS Cavalcade, CIRANO & Université Laval Les femmes en économie, Organizations & Markets Workshop at Queen's University, CSEF-RCFS Conference on Finance, Labor and Inequality, Linked Employer-Employee Data Workshop, UBC Empirical brownbags, UBC Summer Finance Conference, EFA, IDB Accelerating Growth for Women-led SMEs, FMA, HEC Paris Entrepreneurship Workshop, AEA, Finance Down Under, SOLE, SITE, Lone Star Finance Conference, AFA, HEC Montreal, US Census Bureau, Monash University, Wilfrid Laurier University, Simon Fraser University, Université du Québec à Montréal, University of Illinois Urbana-Champaign, Copenhagen Business School, Stockholm School of Economics, Universidad Carlos III, Frankfurt School of Finance and Management, London Business School, Hong Kong University, McGill University, and Southern Methodist University. I gratefully acknowledge financial support from the Social Sciences and Humanities Research Council. The views expressed herein are those of the author and do not necessarily reflect the views of Statistics Canada.

# I Introduction

Young firms account for a disproportionate share of net job creation and drive aggregate productivity dynamics (Haltiwanger, Jarmin, and Miranda, 2013; Andrews et al., 2022). Despite some convergence over the past decades, women remain substantially underrepresented among founders, particularly in high-growth ventures. The causes of these disparities are not entirely understood, but they matter for aggregate efficiency and the nature of job creation. To the extent that women face constraints that limit entry or scaling, the result may be a misallocation of talent with consequences for aggregate growth (Hsieh et al., 2019). These gaps may also shape the composition of job creation by affecting which firms expand and the employment practices they adopt. This paper shows that childbirth is a gender-specific shock to founder productivity and examines its effects on firm performance, workplace policies, and employee outcomes.

Understanding the impact of childbirth on women’s entrepreneurship is important for two reasons. First, it can help explain gender disparities in both firm entry and performance. If children are a significant factor behind these gender gaps in entrepreneurship, then policies designed to support mothers could yield higher-than-anticipated returns as they can foster new business creation or prevent the closure of women-owned firms. Second, examining firm performance before and after childbirth helps determine whether its effects extend beyond women’s careers and alter the firm as a workplace. If childbirth affects not only firm performance but also workers’ outcomes and workforce composition, this implies that founder life events shape job quality and worker sorting across firms.

This paper studies the effect of children on women’s entrepreneurship using rich administrative data from Canada. Using an event study design around the birth of the first child, I find that childbirth among women founders generates large and persistent declines in firm outcomes: sales, assets, and profits fall by 15–25% following childbirth, explaining half of the gender gap in firm outcomes. These firm-level effects spill over to employees, whose earnings decline by about 4% on average. These average losses mask an important reorganization of the firm as a workplace: after childbirth,

mother-owned firms hire and retain more workers who are mothers and pay them higher salaries than at comparable firms. Consistent with broader changes in the workplace environment, I also find within-firm fertility spillovers. Finally, I show that childcare availability (supplied by either retired grandparents or daycare centers) and more progressive gender norms significantly attenuate the negative effects of childbirth. These results suggest that frictions, such as limited childcare support, are an important explanation for the existence of gender gaps in entrepreneurship. Addressing these frictions can thus lead to significant efficiency gains by fostering the creation of more women-led firms and improving the performance of existing ones.

Studying the impact of childbirth on entrepreneurial firms and workers requires longitudinal data that tracks individuals through childbirth events, along with firm-level information, including ownership, balance sheets, and personnel data. I use the Canadian Employer-Employee Dynamics Database (CEEDD), covering the years 2001-2017. The CEEDD is a set of administrative files compiled by Statistics Canada, containing both demographic information on workers and detailed financial data on firms. An advantage of the CEEDD is that it contains ownership records for the entire universe of Canadian private firms. This linkage allows for precise identification of entrepreneurs and accurate measurement of the earnings extracted by each founder. Another key strength of the CEEDD is that it allows childbirth events to be identified using the Canada Child Benefit and birth records. Finally, by using historical tax filing data, I link entrepreneurs to their families of origin, allowing me to study the effect of informal childcare provided by grandparents.

The first part of the analysis examines how a childbirth event experienced by the founder affects firm performance. Using a matched event-study design that compares firms owned by women who become mothers to similar firms owned by women with zero observed fertility,<sup>1</sup> I find that childbirth leads to a substantial deterioration in firm outcomes. In the 5 years following

---

<sup>1</sup>I use the matching approach as my main identification strategy for two reasons that are specific to the entrepreneurship context. First, it can be straightforwardly extended to the case of co-founder spouses, in which spouses with children are matched to spouses without children. Second, employees in mother-owned firms are suitably compared to those in firms led by women who remain childless. As a complementary check, I also estimate a parent-only design that directly contrasts mothers' firms with fathers' firms to gauge the effect on the gender gap. As a robustness test, I supplement the evidence with an instrumental variable approach, using the sex of the first two children as an instrument for the birth of a third child (Angrist and Evans, 1998). Details on the empirical strategies are discussed in Section III.

childbirth, sales decline on average by 22%, assets by 17%, and profit by 21% relative to the control group. These effects extend beyond mere downsizing. Firms become less efficient, with profit margins decreasing by 6 percentage points. Survival rates also decline, though the effect is modest. To assess the economic significance of the main findings, I test whether the effects are concentrated among small firms or firms in low-value-added sectors. I show that this is not the case: the negative effects persist even for firms in the top quintile of the size distribution. In addition, the largest effects are concentrated in sectors such as scientific research, manufacturing, and computer system designs, and they are not solely driven by low-value-added service industries.

Crucially, firm performance is virtually unaffected when a male founder (solo or with a non-spouse co-founder) has a child. An Oaxaca decomposition shows that children are a substantial contributor to gender inequality in entrepreneurial outcomes, accounting for 47% of the gender gap in sales and 54% of the gap in profits. However, fathers experience performance penalties in one case: when they own the firm together with mothers. Couple-owned firms experience 8% and 10% drop in sales and profits, respectively, in the first childbirth year. Since firms owned by couples account for a large share of businesses, this channel exposes a substantial number of fathers to the childbirth shock.

The second set of main results concerns workers. I show that the founder's transition to parenthood reshapes the firm's workforce, with large and persistent effects on workers' careers, workforce composition, and employees' family decisions. After the entrepreneur has a child, the firm's incumbent workers experience career disruptions. Workers in mother-owned firms see their earnings drop by 2% in the first year after childbirth, relatively to workers employed in firms owned by women without children. The decline in earnings persists for at least 5 years, with earnings remaining 4% lower than the control group. Workers affected by entrepreneur's childbirth event are also 1 percentage point more likely to experience unemployment. These effects are concentrated among younger and short-tenure employees.

At the same time, mother-owned firms undergo a marked compositional shift: the share of

workers who are parents rises significantly, entirely driven by the entry and retention of mother-employees. This compositional change is accompanied by a 4.5% increase in the earnings of mother-employees in treated firms, relative to control firms. The effects of the founder's childbirth extend beyond careers to workers' family decisions. Employee birth rates start to rise in the year after the entrepreneur becomes a mother and peak in the second year. For workers exposed before age 30, this translates into roughly 45 additional births per 1,000 employees over the subsequent five years. These results show that firms adjust their employment policies after the entrepreneur's childbirth. The evidence is consistent with the firm offering non-pecuniary amenities or workplace conditions that become more attractive to workers with family responsibilities. More broadly, the findings indicate that the entrepreneur's personal circumstances can induce a broader reorganization of the firm, affecting not only performance but also the composition of the workforce and the nature of the workplace.

Finally, the third part of the analysis examines how childbirth affects entrepreneurial careers. Prior to childbirth, women entrepreneurs out-earn their male counterparts. However, income trajectories sharply diverge in the year of first childbirth. Mothers' total income declines by around 11% relative to women without children, while fathers' remains stable. This drop is modest relative to the child penalties typically found for wage employees, a gap that could reflect two facts: entrepreneurship offers greater discretion over hours and effort than salaried work, and the pool of female founders is positively selected on ability and earnings potential. If entrepreneurship truly is a congenial option for new mothers because it offers greater discretion over time allocation, we should perhaps expect to observe an inflow of women into entrepreneurship after childbirth. Tracing dynamic effects around the first birth for women who were not yet founders, I find a 35-40% drop in firm-creation rates in the childbirth year. Although entry gradually rebounds, it never returns to the pre-birth level. The result is consistent with the "greedy-job" view of entrepreneurship (Goldin, 2014): despite its nominal flexibility, running a young firm typically demands long and unpredictable hours (Levine and Rubinstein, 2017), making it difficult to combine with the commitments of early motherhood.

I test several potential mechanisms to explain why childbirth systematically impacts entrepreneurial outcomes for mothers, but not for fathers. The first is that mothers become more risk averse and switch to safer, lower-return investment strategies. The second potential explanation is that, after childbirth, couples need to specialize and choose to allocate tasks based on their comparative advantage. Since women entrepreneurs are more likely to be the secondary earner compared to male entrepreneurs, they take on a larger share of childcare responsibilities, while their partners continue working outside the home. Third, couples might adhere to traditional gender norms, regardless of their comparative advantage in the labor market. Fourth, I examine the role of childcare availability, both informal (through family) and formal (through daycare centers).

The evidence provides little support for the risk-aversion channel. Female breadwinners, for whom comparative advantage favors market work, do somewhat better than other mothers, yet still incur sizeable losses, suggesting that specialization based on labor market advantage alone cannot fully explain the division of labor after childbirth. The evidence points to gender norms and caregiving constraints. Using a sample of second-generation immigrants to Canada, I find that women from cultures with more traditional gender norms suffer markedly larger post-birth declines in firm performance, consistent with cultural expectations related to childcare responsibilities. Childcare expansions, captured by increases in local childcare-worker density, attenuate the performance decline for mothers whose children are under 3 relative to mothers with older children. Family support plays a similar role: linking mothers to their own parents via tax identifiers, I find that mothers who live near grandparents experience smaller losses. An event study around grandmother retirement shows a significant improvement in business performance for mothers living near newly retired grandmothers, with no similar effect from grandfather retirement, suggesting that the mechanism is tied specifically to caregiving. Finally, the effects of grandmother's retirement are stronger in municipalities with limited childcare availability, suggesting that family-provided childcare can substitute for formal services.

This paper contributes to several strands of literature. A first strand is the child-penalty literature, which shows that children create large and persistent earnings losses for mothers and

drive most of the remaining gender wage gap (Angelov, Johansson, and Lindahl, 2016; Kleven, Landais, and Sjøgaard, 2019). Recent work documents similar penalties for highly skilled women, including lawyers, scientists, and inventors (Azmat and Ferrer, 2017; Kim and Moser, 2025; Mueller, Obernberger, and Seidlitz, 2025). While much of this literature focuses on how children affect individual career outcomes, this paper studies how the effects of childbirth propagate within organizations by studying spillovers from founders to firms and employees. Evidence on such spillovers is limited. Existing work has focused on workers' parental leave, typically finding modest effects on firms and co-workers (Brenøe et al., 2024; Huebener et al., 2025; Ginja, Karimi, and Xiao, 2023). Entrepreneurial firms differ because founders are central inputs and difficult to substitute, so founder childbirth can have larger and more persistent consequences. Moreover, founders directly set work arrangements and employment policies for themselves and their employees, so childbirth can trigger organizational changes that reshape employment practices and job composition within the firm.

Second, this paper contributes to the growing literature on gender gaps in entrepreneurship. Previous studies have shown that women entrepreneurs face greater challenges in raising capital, partly due to investor biases (Alesina, Lotti, and Mistrulli, 2013; Hebert, 2025; Ewens and Townsend, 2020). Entry is higher when women grow up in communities rich in business owners, have better access to peers, or get exposed to entrepreneurship early in life (Markussen and Røed, 2017; Field et al., 2016; Mertz, Ronchi, and Salvestrini, 2024), suggesting that information and networks matter alongside finance. The entrepreneurship gender gap has consequences for aggregate productivity, and removing financial frictions and gender-specific barriers to business formation increases welfare (Bento, 2025; Morazzoni and Sy, 2022).

Closely related to this paper, recent work links fertility events to entrepreneurial decisions. Yang, Kacperczyk, and Naldi (2024) find that Swedish mothers are more likely to enter entrepreneurship when child penalties in the labor market are high, suggesting that entrepreneurship can serve as a means of avoiding career disruptions. Bonney, Pistaferri, and Voena (2025); Ferrando et al. (2025); Core and Karpati (2025) find evidence of child penalties for female-owned businesses

and self-employed women in Norway and the Netherlands, respectively. Access to reproductive healthcare and to family policies, such as parental leave and maternity benefits, increases female participation rates and improves women’s entrepreneurial outcomes (Core, 2024; Zandberg, 2021; Fontenay, 2024; Gottlieb, Townsend, and Xu, 2022). My contribution is three-fold. First, using high-quality administrative data covering the entire Canadian population, I estimate the effects of founder childbirth on firm performance and show that motherhood accounts for roughly half of the gender gap in entrepreneurial outcomes. Second, I document that these founder shocks propagate to workers—affecting employees’ earnings and family formation—and I provide evidence that firms reorganize as workplaces by shifting hiring, retention, and pay in ways that make them more accommodating to mothers. Third, I document systematic heterogeneity in the childbirth penalty: the effects are smaller where childcare is more available (through grandparents or daycare) and where gender norms are more progressive.

## **II Data**

### *A. Data Sources and Sample Selection*

I use the Canadian Employer-Employee Dynamics Database (CEEDD), a comprehensive administrative dataset compiled by Statistics Canada. The CEEDD integrates data from multiple government agencies, including the Canada Revenue Agency (CRA), Employment and Social Development Canada, and Immigration, Refugees, and Citizenship Canada (IRCC).

Each agency contributes specific data. The Canada Revenue Agency provides personal and corporate tax records. The T1 personal tax file contains individual demographic and financial characteristics, such as birth year, gender, marital status, and municipality of residence. The T2 corporate tax file includes firm financial statements, location, and industry classification for all corporations in Canada. The T4 Statement of Remuneration file contains job-level information, including annual employment income received by each worker from each employer.

Employment and Social Development Canada provides data on federal government programs

and services, including Employment Insurance. Finally, Immigration, Refugees, and Citizenship Canada provides detailed immigration records. By linking these administrative sources through unique identifiers (anonymized Social Insurance Numbers for individuals and Business Numbers for firms), the CEEDD creates a rich longitudinal dataset, allowing detailed analysis of individuals, families, and firms over time.

*Identifying entrepreneurs.*— Defining who is considered an entrepreneur is a debated issue among entrepreneurship scholars. There is no consensus on whether the definition should include all or a subset of the self-employed. I focus on individuals who start incorporated firms, as incorporation may serve as a better proxy for entrepreneurship than overall self-employment (Rubinstein and Levine, 2018). Most unincorporated self-employed individuals have little ambition to grow their businesses, whereas incorporation is more common for ventures with high-growth potential due to limited liability and separate legal identity. Levine and Rubinstein (2017) show that individuals choose the legal form of their firm based on the nature of their planned business activities rather than switching legal forms ex post based on business success.

The CEEDD's T2 corporate tax file can be linked through firm-level identifiers to Schedule 50 (T2S50), a tax form that contains information on the firm's ownership structure. Private Canadian-controlled corporations are required to file a Schedule 50 to disclose the identity of all owners who hold at least 10% of common or preferred shares. Combining the T2 Schedule 50 and T4 files allows me to accurately identify entrepreneurs and measure returns to entrepreneurship. This represents a significant improvement over existing studies that typically rely on top earners within a firm to identify entrepreneurs. Since business owners can decide to pay themselves via salary, dividends, or a mix of both, ignoring dividend income could introduce substantial measurement error. The availability of detailed ownership data allows for precise identification of entrepreneurs and an accurate measurement of the payoff extracted from the firm by each founder.

The sample covers the period 2001–2017. I restrict the sample to firms created during this period that had positive sales within the first five years of founding. Entrepreneurs are defined

as firm owners who hold at least 20% of shares in the first year ownership is reported,<sup>2</sup> provided that ownership information is available within three years of the firm's founding.<sup>3</sup> I include in the sample firms founded at least two years before childbirth to ensure they were established prior to pregnancy. In addition, in my main analysis I exclude firms created by spouses (married or cohabiting couples) to separately identify the effects of childbirth on firms owned by fathers versus mothers. Firms created by couples are analyzed separately.

*Family-level data.*— Family-level data is drawn from the T1 Family File (T1FF), which aggregates information on family units by linking tax filers to their spouses and dependent children. Statistics Canada constructs family relationships by cross-referencing tax return filings and benefit claims.

To identify birth events, I use a family-level identifier to link individual tax files to a supplemental file containing children's year of birth and sex. Data on children is collected by Statistics Canada from the Canada Child Tax Benefit, a federal program supporting families, as well as from a supplemental birth record file, ensuring comprehensive coverage of children born in Canada. I restrict the parent sample to individuals who had their first child between 2001 and 2017.

Additionally, I use family identifiers to construct intergenerational links over time. By observing individuals who previously filed taxes together as part of a family unit, I can track familial relationships over time, even if co-filing ceases. This allows me to link entrepreneurs to their parents and study the effect of informal childcare provided by grandparents.

*Immigration records.*— To identify immigrants, I link individuals to immigration records from the Longitudinal Immigration Database compiled by Immigration, Refugees and Citizenship Canada (IRCC). This file contains information on all individuals granted permanent residency in Canada since 1980, including their country of origin and year of arrival. Through individual-level identifiers, immigration records can be linked to tax records. To construct my sample of second-generation immigrant entrepreneurs, I first build family linkages by linking entrepreneurs to their own parents,

---

<sup>2</sup>Results are robust to using alternative ownership thresholds.

<sup>3</sup>I allow for a three-year window because co-founders may delay equity allocation to evaluate contributions and avoid costly renegotiation ex post (Wasserman, 2008).

as described above. If an entrepreneur was born in Canada but has at least one parent recorded in the immigration database, I classify her as a second-generation immigrant.

### *A. Summary Statistics*

Table 1 presents descriptive statistics for the entrepreneurs and their firms in Panel A and workers in Panel B. In panel A, I report summary statistics as observed two years before the entrepreneur's first childbirth, separately for (i) mothers and their matched control group composed of women without children and (ii) fathers and their matched control group of men without children. Mean firm age is 2.8 years for mothers' firms and 3.1 years for fathers' firms, with virtually identical values in the corresponding control groups. These figures place the analysis in the domain of start-ups still in their initial stages, rather than mature small businesses that typically contribute less to employment growth. Mothers' ventures generate, on average, \$285,800 in annual sales, hold \$183,300 in total assets (in 2012 dollars), and employ 5.9 people. Fathers' firms are larger in terms of sales, at \$349,300 dollars, but comparable in terms of assets and employment. The most notable gender difference lies in the sectoral composition: 95% of women-led firms operate in services versus 72% of men-led firms. In addition, 18% of mothers participate in mixed-gender teams compared with only 7.5% of fathers.

Turning to entrepreneurs, two years prior to childbirth, women are on average 31.7 years old and report \$69,300 in individual income and \$127,900 in household income (in 2012 dollars). This implies an average age at first birth above 33. By contrast, the average Canadian woman giving birth for the first time during this period was 28 years old, and the average annual earnings among employed women aged 25–54 was approximately \$39,000.<sup>4</sup> Fathers are virtually identical in age to mothers, with a mean age of 31.9 years. More strikingly, the earnings profile is reversed relative to typical population patterns. Mothers report slightly higher pre-birth individual income than fathers (\$69,300 versus \$65,900). Female entrepreneurs are a highly selected group: they delay childbirth relative to other women, and their pre-birth earnings place them well above the average of the

---

<sup>4</sup>Author's calculations using Statistics Canada's [Table 11-10-0239-01](#).

female earnings distribution, at levels comparable to those of male entrepreneurs. The estimates in this paper capture the effects of childbirth on a select group with comparatively high levels of human and financial capital.

Panel B characterizes the employee sample used in the worker-level analysis. I include all individuals aged 18–65 who remain continuously employed at either a treated (mother-owned) firm or its matched control firm in both  $t^* - 1$  and  $t^*$  (where  $t^*$  is the entrepreneur’s childbirth year). Baseline earnings average \$24,000 for workers in mothers’ firms and \$23,600 for workers in the matched firms. The two groups are virtually identical on every other observable: mean age is 32.4 versus 32.5 years, average tenure is 2.3 years in both samples, and roughly 71% of employees are women in either group. A large share of workers are themselves exposed to family responsibilities: 41% are parents, defined as having at least one child under age 18, and about 30% are mothers.

### III Identifying the Effect of Childbirth on Entrepreneurial Outcomes

Childbirth events are not random occurrences, complicating causal inference. The ideal experiment would randomly assign fertility shocks to individuals, enabling a clean comparison between parents and non-parents.<sup>5</sup> In the absence of such an experiment, I use a quasi-experimental design combining event studies and an instrumental variable approach. A key strength of this setting is that it allows me to track outcomes not only for entrepreneurs and their firms, but also for the workers they employ. Because employees are not involved in fertility decisions, worker-level outcomes are particularly well-identified and offer compelling evidence of the spillover effects of childbirth.

To study the effect of childbirth on entrepreneurial firms, the first approach I use is to match firms owned by mothers to firms owned by women with zero observed lifetime fertility. I rely on matching as my baseline identification strategy for two reasons. First, it can easily be applied to

---

<sup>5</sup>Perhaps the closest approximation to this ideal is [Gallen et al. \(2023\)](#), who exploit failures of long-term contraception as exogenous shocks to pregnancy. They find large earnings penalties from unplanned pregnancies, consistent with estimates from event studies on all births. In contrast, using IVF success as an instrument for planned pregnancies yields smaller effects—though interpretation is complicated by negative earnings effects even in the control group (unsuccessful IVF), suggesting that infertility may itself reduce earnings.

co-founder spouses by matching those who have children with similar spouses who do not. Second, employees in firms owned by women without children are the most suitable control group for employees in mother-owned firms. Section III.A describes the matching algorithm. The identifying assumption behind this approach is that the decision to have a child is not correlated with unobserved shocks to firm performance. One concern is that fertility can be timed strategically. For example, entrepreneurs might decide to have children after their firms have reached certain milestones, implying that their firms would exhibit accelerated growth before pregnancy; alternatively, they might have a child when the business has been performing poorly. I show that firms owned by mothers do not grow faster (or more slowly) than control firms in the years before pregnancy. Instead, they follow virtually identical trends to control firms up until childbirth and sharply diverge afterward.

While I find no evidence of differential trends before childbirth, one might argue that entrepreneurs possess private information about *future* performance. Mothers could time childbirth based on anticipated (but unobservable) shifts in firm outcomes. However, any such foresight would have to concern purely idiosyncratic shocks, as industry-by-year fixed effects absorb common shocks. Moreover, while childbirth can be planned to some extent, both its exact timing and future entrepreneurial outcomes are inherently uncertain. This is particularly relevant in the entrepreneurial context, where business performance is highly volatile and difficult to predict at the time of fertility decisions. To further mitigate this concern, I restrict the sample to women nearing the end of their childbearing years, for whom pregnancy is costlier to postpone and pregnancy timing is harder to predict. Results remain similar, supporting the interpretation that the sudden drop in women's entrepreneurial activity observed upon childbirth is caused by the childbirth event itself, rather than by mothers planning the timing of childbirth with perfect foresight of future entrepreneurial outcomes.

The second approach I use is to compare outcomes for mothers and fathers, as detailed in Section III.B. This strategy estimates the effect of childbirth for women relative to men and provides insight into how parenthood contributes to gender inequality in entrepreneurship. Because both

groups are parents, the comparison also mitigates concerns about selection into parenthood. The identifying assumption is that the timing of childbirth is not correlated with firm outcomes in systematically different ways for mothers and fathers.

Finally, to further reduce concerns related to selection bias, I use the sex of the first two children as an instrumental variable for the birth of a third child, as described in Section III.C.

### A. Mothers vs. women without children

In this section, I restrict the analysis to women and I start by analyzing the effect of childbirth on firm outcomes. The sample comprises a panel of founders who had their first child during the sample period in year  $t^*$ , with the condition that the childbirth occurred during an entrepreneurship spell lasting at least 2 years between  $t^* - 2$  and  $t^*$ . In the main analysis, I exclude firms jointly owned by spouses. Mothers are matched to women with no observed lifetime fertility using exact matching on industry at the 4-digit level, year, founder status, and marital status, and caliper-matching on firm age, entrepreneur's age, individual income percentile, and household income percentile, using calipers of 1 year, 5 years, 25%, and 25%, respectively. The matching is performed two years before childbirth (the last year in which individuals do not know that they will have a child in year  $t^*$ ). I implement an analogous design for fathers, matching them to men with no observed lifetime fertility.

I estimate the following event-study specification:

$$y_{jt} = \alpha_j + \lambda_{s(j),p(j),t} + \sum_{k=a}^b \beta_k R_{jt}^k + \sum_{k=a}^b \theta_k (R_{jt}^k \times Mother_j) + X'_{jt} \gamma + \epsilon_{jt}, \quad (1)$$

where  $y_{jt}$  is an outcome (e.g., sales) for firm  $j$  in year  $t$ .  $Mother_j$  is an indicator for whether firm  $j$  is owned by a mother;  $R_{jt}^k = \mathbf{1}\{t = t_i^* + k\}$  are event-study indicators with  $t_i^*$  denoting the calendar year of the first childbirth. The coefficients of interest,  $\theta_k$ , measure the effect of children relative to  $\theta_{-2}$ . The set of control variables  $X_{jt}$  includes firm age indicators, number of owners (a proxy for how dependent the firm is on the founder who has a child), a polynomial for the entrepreneur's

age, and marital status. The firm fixed effects,  $\alpha_j$ , control for time-invariant firm characteristics, and  $\lambda_{s(j),p(j),t}$  denote industry-province-year fixed effects.

Beyond the effects of childbirth on firm performance, I study the spillover effects on workers employed by mothers, relatively to workers employed in the matched control firms. Since employees are not involved in the entrepreneur's fertility choices, their career outcomes are less subject to endogeneity concerns related to the entrepreneur's timing of childbirth. I focus on employees who had worked at the firm for at least one year before the entrepreneur's childbirth and follow their employment and earnings trajectories over time. Workers may stay with the firm or move to another employer in the post-childbirth period. The following equation estimates the impact of childbirth on workers:

$$y_{ht} = \alpha_h + \lambda_t + \sum_{k=a}^b \beta_k R_{j(h)t}^k + \sum_{k=a}^b \theta_k (R_{j(h)t}^k \times Mother_{j(h)}) + X'_{ht} \gamma + \epsilon_{ht}, \quad (2)$$

where  $y_{ht}$  represents an outcome (e.g., earnings) for worker  $h$  in year  $t$ .  $\alpha_h$  and  $\lambda_t$  denote worker and year fixed effects, respectively.  $Mother_{j(h)}$  is an indicator for whether the entrepreneur who employs worker  $h$  is a mother and  $R_{j(h)t}^k = \mathbf{1}\{t = t_{j(h)}^* + k\}$  are event-study indicators with  $t_{j(h)}^*$  denoting the year of the entrepreneur's first childbirth. The set of control variables  $X_{ht}$  includes indicators for worker's age.

To complement the analysis of incumbent entrepreneurs, I also study how childbirth affects the decision to start a business. I expand the sample to all women who had their first child within the sample period, rather than just those who were already entrepreneurs. Each mother is matched to a non-mother based on year, marital status, and location (Census Metropolitan Area), together with caliper matching on age, individual income percentile, and family income percentile (with calipers of 1 year, 3%, and 3%, respectively). I estimate:

$$y_{it} = \alpha_i + \lambda_t + \sum_{k=a}^b \beta_k R_{it}^k + \sum_{k=a}^b \theta_k (R_{it}^k \times Mother_i) + X'_{it} \gamma + \epsilon_{it}, \quad (3)$$

where  $y_{it}$  is equal to 1 if individual  $i$  starts a firm in year  $t$ .  $\alpha_i$  and  $\lambda_t$  represent individual and year

fixed effects, respectively. The set of covariates  $X_{it}$  includes age dummies to control for life-cycle trends and marital status.

### B. Mothers vs. fathers

In this section, I complement the baseline analysis by following [Kleven, Landais, and Søgaaard \(2019\)](#) and re-estimating the event study in a sample restricted to parents. I restrict the sample to individuals who become parents during the sample period and estimate variants of Equations 1 and 3 separately for mothers and fathers. Identification comes from not-yet-treated parents, so that at each event time treated mothers are compared to women who have not yet had a child, and treated fathers are compared to men who have not yet had a child. This allows me to compute the penalty  $P_k$  that women experience relative to men as the difference in outcomes between mothers and fathers at time  $k$ , following the birth of their first child.<sup>6</sup>

*Gap due to childbirth.*— To quantify the extent to which childbirth contributes to the gender gap in entrepreneurial outcomes, I use a modified Oaxaca-Blinder decomposition. The standard Oaxaca-Blinder decomposition divides the gap in outcomes between two groups into an explained component, which reflects differences in observable characteristics, and an unexplained component, which captures differences in returns to these characteristics and other unobserved factors ([Oaxaca, 1973](#); [Blinder, 1973](#); [Altonji and Blank, 1999](#); [Fortin, Lemieux, and Firpo, 2011](#)).

The mean gender gap  $\Delta$  is given by  $\Delta = (E[y_{jt}^m] - E[y_{jt}^w]) / E[y_{jt}^m]$ , where  $y_{jt}^g$  is a firm outcome (e.g., profits) for firm  $j$  owned by an individual of gender  $g$  in year  $t$ .  $\Delta$  can be decomposed into inequality due to children and residual inequality:

$$\hat{\Delta} = \frac{E[P_k \cdot \tilde{y}_{jt}^w]}{E[\hat{y}_{jt}^m]} + \sum_q (\beta_q^m - \beta_q^w) \frac{E[X_{qjt}^m]}{E[\hat{y}_{jt}^m]} + \sum_q \beta_q^w \frac{E[X_{qjt}^m] - E[X_{qjt}^w]}{E[\hat{y}_{jt}^m]}. \quad (4)$$

$P_k$  is the child penalty at event time  $k$ ,  $\tilde{y}_{jt}^w$  is the predicted counterfactual outcome for women (what

<sup>6</sup>For each gender  $g \in m, w$ , I express the estimated effect at event time  $k$  relative to the counterfactual outcome in the absence of children:  $P_k^g = \hat{\theta}k^g / \mathbb{E}[\tilde{y}_{jt}^g | t = t_j^* + k]$ . The difference  $P_k = P_k^m - P_k^w$  represents the relative penalty that mothers experience due to childbirth.

women’s outcomes would be absent childbirth), and  $\hat{y}_{jt}^m$  is the predicted actual outcome for men. The first term measures the direct effect of childbirth on gender inequality in firm outcomes. It captures the share of the gender gap attributable to the differential impact of children on women relative to men, scaled by counterfactual firm outcomes for women. The second term represents differences in the returns to observable characteristics between men and women (the unexplained component of the gender gap). Finally, the third term measures differences in the distribution of observable characteristics, such as industry sorting, prior experience, or firm characteristics, representing the explained component of the gap.

### *C. Instrument: sibling sex mix*

To mitigate potential selection issues stemming from the endogeneity of childbirth, I use the sex of the first two children as an instrument for the birth of a third child (Angrist and Evans, 1998). This approach exploits parents’ preference for variety in the sex mix of their children: a couple with two boys or two girls is more likely to have a third child than a couple with one child of each sex. This provides quasi-random variation in family size among parents with two children.

To assess the robustness of my main empirical strategy, I estimate event-study specifications around the birth of the third child, using both OLS and IV approaches. Comparing these estimates offers a check on the credibility of the event study design as a strategy for causal inference. Appendix B provides details on the instrument and estimation.

## **IV The Effect of Childbirth on Firms, Workers, and Entrepreneurs**

### *A. Firms*

Figure 1 plots event-study estimates for mothers and fathers separately, each relative to a matched control group of same-sex entrepreneurs without children. Panel (a) shows the trajectory of firm sales for mothers relative to the matched sample of women without children. The two groups follow nearly identical paths until the year before childbirth, after which a sharp divergence emerges. In

the year of childbirth, sales for firms owned by mothers drop by over 20%. This effect persists, with sales still 16% lower after five years. Panel (b) documents a similar pattern for firm assets, which, on average, decline by about 17% in the five years following childbirth. Profits, shown in panel (c), experience the sharpest initial drop –falling by 27% in the year of childbirth– and show only a partial recovery, remaining 17% lower five years later. To assess whether these findings simply reflect downsizing, rather than a decline in performance, in panel (d) I examine the effect on profit margins. I find a 6 percentage point decline, pointing to an efficiency loss rather than just scale reduction.<sup>7</sup>

By contrast, the estimates for fathers are close to zero across all firm outcomes. Relative to matched men without children, father-owned firms show no meaningful decline in sales, assets, or profits following childbirth. If anything, sales rise modestly in later years, and profit margins display a small positive effect.

I next assess the role of childbirth in the gender gap in firm performance using a parent-only comparison in the spirit of [Kleven, Landais, and Søgaaard \(2019\)](#). Specifically, I re-estimate the event study among parents only, using not-yet-treated parents as the comparison group. [Figure A.2](#) shows that the results are quantitatively very similar to those from the matched design, indicating that the estimated effects are not driven by the choice of control group. I then use a modified Oaxaca–Blinder decomposition to quantify how much childbirth contributes to gender differences in firm outcomes. The estimates imply that childbirth accounts for 47% of the sales gap and 54% of the profit gap between male- and female-owned firms, pointing to its central role in explaining gender disparities in firm performance.

An important question is whether the effects of childbirth, though large on average, are primarily driven by small, low-productivity firms. If the most productive firms are unaffected,

---

<sup>7</sup>These estimates are conditional on firms remaining active. I turn to the effect of childbirth on firm survival in [Figure A.1](#). Unlike the substantial declines observed in other firm outcomes, the effect on survival is modest, reducing the probability of remaining in business by only 3-4%. One possible explanation is that child penalties in the wage sector lower the opportunity cost of keeping a low-performing firm afloat. Alternatively, the non-pecuniary value of entrepreneurship, such as flexibility or autonomy, may make self-employment more attractive to mothers despite the large impact on the firm.

the broader economic implications may be less severe. Table 2 shows that the effects persist even among firms in the top quintile of the size and productivity distribution, as measured by assets or value-added two years prior to childbirth. Among firms in the top quintile by assets, sales fall by 12% after childbirth; among those in the top quintile by value-added, the decline reaches 18%. While smaller than the average effect, these declines remain substantial. Similarly, Figure A.3 shows that the largest impacts occur in sectors such as scientific research, manufacturing, and computer systems design, rather than in low-productivity sectors such as personal services or hospitality. Taken together, these findings indicate that the consequences of childbirth are not limited to the lower end of the firm distribution but extend to firms that play a disproportionate role in generating value-added.

How severe the childbirth shock is for firms should depend on how critical the mother's own involvement is to the venture. Figure A.4 compares firms that experience childbirth within the first five years of operation to older firms. Although performance declines in both groups, the effects are much larger for young firms. For sales, the immediate drop is 25 log points for young firms, more than twice the decline for older firms. This pattern suggests that early-stage ventures are especially exposed to shocks that reduce the founder's time and attention. Consistent with firms reorganizing in response to this loss of founder input, Figure A.5 shows that the probability that a non-owner employee becomes the firm's top-paid worker rises by 13 percentage points in the childbirth year. I interpret this as a shift toward more formal delegation or professional management. This transition almost always reflects an internal promotion rather than an external hire, and is associated with an average wage increase of 61 log points. Table A.2 further shows that co-founders attenuate the childbirth shock, but do not eliminate it. The post-childbirth declines in sales, profits, and profit margins are all smaller in firms with a co-founder than in solo-founder firms, yet the net effects remain negative across outcomes. These patterns suggest that founder human capital is only imperfectly replaceable, even in a multi-founder setting.

A distinctive set of co-founders consists of ventures jointly founded by spouses. I analyze these "family firms" separately, matching each to a couple-owned control firm in which no children

are ever born. Figure A.6 shows that in the year of the couple's first childbirth, sales suddenly fall by 8% and profits by 10% relative to their matched controls, a decline about 40% the size observed in mother-owned firms. The smaller and more transitory decline suggests partial intra-household substitution. Family firms are less exposed than ventures dependent on a single mother-founder, but they still experience a meaningful productivity shock following childbirth. This margin is important because spousal co-founding is a common organizational form among female entrepreneurs; indeed, a woman entrepreneur's most frequent co-founder is her spouse. The fact that couple-owned firms also experience a sizable, though temporary, decline suggests that childbirth shocks are not confined to solo female founders, but affect a broader set of entrepreneurial ventures.

I conduct several robustness tests to mitigate the concerns that results might be driven by endogenous birth timing and selection into parenthood. First, I re-estimate the event study on a sample of women who became mothers after age 35 and were single when they founded the firm. In these cases, conception is difficult to postpone and costlier to delay.<sup>8</sup> Figure A.7 shows that the patterns remain very similar, with even larger short-term declines than for younger women. Second, to assess whether women strategically time childbirth to minimize firm disruptions, I examine the interaction between the business cycle at birth and firm performance in Figure A.8. I find that giving birth during a boom is especially costly, consistent with foregone opportunities when growth potential is highest. At the same time, I find that births are roughly evenly distributed across the business cycle, with a slightly higher likelihood of women giving birth during a boom. This pattern is inconsistent with women systematically timing childbirth to align with periods of lower opportunity costs.

Finally, to help address concerns about selection into parenthood, I turn to examining the effect of having a third child, using the same-sex instrument and comparing results to a standard event study. Figure A.9 shows that the estimated effects of a third child are smaller in magnitude than those of a first child, consistent with the interpretation that the marginal disruption from additional

---

<sup>8</sup>Women aged 35–39 have a 50% lower likelihood of spontaneous conception compared to women aged 19–26. Miscarriage rates also rise sharply, reaching 27% at age 40 (Taylor, 2003; Delbaere, Verbiest, and Tydén, 2020).

children is less pronounced once women are already mothers. For instance, in the year of birth, sales decline by 15% and profits by 11%, with both outcomes returning to pre-birth levels within three years. The similarity between OLS and IV estimates lends further credibility to the event study design as a strategy for estimating the causal effects of childbirth on firm outcomes.

In summary, the evidence establishes childbirth as a sizable productivity shock: it depresses output and margins in mother-led firms, leaves solo father-led firms largely untouched, and generates intermediate but still meaningful losses in spousal co-founded ventures. Whether these losses remain limited to the firm's balance sheet or cascade to its workforce is the question taken up in the following section.

## *B. Workers*

The existing literature on childbirth focuses on mothers' own careers, but it generally overlooks potential changes in how the firm organizes its workforce and spillovers to other employees within firms. I show that the founder's transition to motherhood disrupts the careers of incumbent workers, but also shifts the firm's labor composition in ways consistent with more family-friendly workplace conditions.

I begin by examining the effects on incumbent employees, defined as workers employed in treated firms or in matched control firms for at least one year before the childbirth event. Figure 2 shows that childbirth to the entrepreneur leads to persistent earnings losses for these workers. In panel (a) I use earnings in levels to include in the sample workers who leave the labor force. The reported effects are expressed as percentages of the counterfactual outcome in the absence of childbirth. On average, workers in treated firms experience an earnings decline of approximately 2% in the first year following childbirth, compared to the control group. This decline persists for at least five years, with earnings remaining 4% lower than the pre-childbirth trajectory. These numbers reflect both employed and non-employed workers. Panel (b) examines the impact of childbirth on log earnings, which restricts the sample to workers with positive earnings. Workers in treated firms experience an average earnings decline of approximately 3.5% in the first 5 years

following the entrepreneur's childbirth. Panel (c) examines the probability of experiencing a period of involuntary exit from the labor force, defined as receiving positive income from unemployment insurance. I find that the average increase in unemployment risk across the first five years after childbirth is approximately 1 percentage point. In panel (d), I consider an alternative measure of reduced career opportunities by defining underemployment as earning less than the equivalent of 12 weeks of full-time minimum wage employment. I find an average increase in underemployment risk of approximately 1.5 percentage points.

The average effect masks significant heterogeneity across workers. Panel (a) of Figure 3 shows that the effects are concentrated among young workers (those below the median age at the time of childbirth), consistent with younger workers being especially exposed to economic shocks (Kahn, 2010; Oreopoulos, Wachter, and Heisz, 2012). A similar pattern emerges for tenure in panel (b): employees with shorter spells at the firm absorb the shock, whereas those above the median tenure are largely insulated, at least in the short run. A plausible interpretation is that long-tenured employees command firm-specific knowledge and can step into supervisory roles, making them quasi-substitutes for the absent entrepreneur, while recently hired workers become the margin of adjustment. Panel (c) shows that the both workers whose pre-birth earnings fell above and below the firm-specific median experience similar earnings effects. Finally, panel (d) shows that both male and female workers experience a decline in earnings, with larger point estimates for men.

The disruption experienced by incumbent workers raises a broader question: does the entrepreneur's childbirth also change employment composition? To examine this, I turn from incumbent outcomes to the composition of the workforce. Table 3 addresses this by comparing firm-level employment outcomes in treated mother-owned firms to those in the matched sample of control firms. The evidence points to a systematic reorganization of the firm's human capital after childbirth. I begin with the share of parents in the firm, which provides a broad measure of whether treated firms become relatively more likely to employ workers with family responsibilities. Column (1) documents that the share of parents in treated firms rises by 1.5 percentage points, an increase of about 5%. Columns (2) and (3) show that this increase is entirely driven by mothers. The

share of mother-employees rises by 1.8 percentage (8%), while the share of fathers does not change significantly. As documented in Columns (4) and (5), the reallocation operates through both hiring and retention. The hiring rate of mothers increase by 0.7 percentage points (9.1%), while the rate of voluntary separations for mothers decreases by 1.6 percentage points (18.2%). The changes in workforce composition are also reflected in relative pay. Column (6) shows that mothers in treated firms also experience relative earnings gains: their earnings are about 4.9% higher than those of mothers in comparable firms. The intra-firm motherhood penalty narrows by 3.5% (Column (7)).

This reorganization of the workforce is consistent with the firm becoming a more family-friendly workplace after the entrepreneur's childbirth. If workers perceive that parenthood is less costly in this environment, they may be more willing to adjust their own family-formation decisions. I next test this implication by examining whether employee fertility rises following the founder's childbirth. The sample is restricted to workers of fertile age (18–45) at the time of the founder's first childbirth. In Panel (a) of Figure 4, the dependent variable is an indicator equal to one if the employee has a childbirth in year  $t$ . Birth rates among treated employees begin to rise in the year following the founder's childbirth and reach their peak two years after the event. Over the five-year post-event window, workers in treated firms are on average 0.5 percentage points more likely to have a child than workers in the control group, equivalent to a 9.5% increase over the counterfactual mean. Panel (b) shows that the fertility response is entirely driven by younger employees: among those aged 18–29 at the time of exposure, the increase reaches 0.9 percentage points, or 15.5% of the counterfactual outcome. There is no detectable effect for workers aged 30–40. Panel (c) replaces the binary outcome with the cumulative number of children an employee has recorded by year  $t$ , estimated using Poisson pseudo-maximum likelihood. The results mirror the patterns in Panel (a): the child count significantly rises two years after the entrepreneur becomes a mother. At 5 years after the entrepreneur's childbirth event, the expected number of children is 3.6% higher among employees in treated firms relative to those in the control group. Results are driven by young workers, for whom the relative increase reaches 7.1%. One interpretation is a role-model effect: younger workers may be especially responsive to the highly visible example set by the entrepreneur.

At the same time, the result is also consistent with younger workers benefiting disproportionately from a workplace that becomes more family-friendly after childbirth, particularly if they face tighter financial constraints.

In summary, these results suggest that childbirth changes the firm along margins that go beyond performance. The decline in incumbents' earnings is accompanied by changes in hiring, retention, and pay that are consistent with a more family-friendly workplace. In particular, the firm becomes relatively more attractive to mother-employees and appears to reduce the earnings penalty associated with motherhood within the firm, which may in turn supports higher employee fertility. More broadly, these findings suggest that the entrepreneur's personal life can shape the firm's workplace.

### *C. Entrepreneurs' outcomes*

In this section, I examine to which extent childbirth contributes to gender differences in entrepreneurial career trajectories. A substantial body of literature has documented the long-term effects of motherhood on women's earnings, but the existing research focuses on salaried employees. The effect of career disruptions due to childbirth may differ for entrepreneurs compared to the broader labor force.

In Figure 5, I compare mothers' outcomes to those of women without children. In panels (a) and (b), the sample is composed of individuals who had been entrepreneurs for at least two years before becoming parents. Panel (a) compares the income trajectories of mothers relative to their matches, irrespective of whether they are still entrepreneurs at any point. Mothers experience an average 11% decline in total income over the five years following childbirth, compared to women without children. Among continuing entrepreneurs, compensation (measured as the sum of wages and dividends paid to the entrepreneur) that mothers take from their firms after childbirth declines by nearly 20% (panel (b)).

Up until this point, I have examined outcomes for individuals who were already entrepreneurs before having their first child. Next, I expand the analysis to study how motherhood impacts the

likelihood of all women, regardless of prior entrepreneurial experience, to start a new firm. Panel (c) presents an event study that tracks firm entry surrounding childbirth. While the adverse effects on firm outcomes primarily appear after childbirth, the decline in mothers' firm creation rates begins in the pregnancy year. This effect peaks in the birth year, reaching a 40% decline, and subsequently tapers off, albeit without reverting to pre-birth levels. These results suggest that motherhood deters women from entrepreneurship.

In Figure A.10, I extend the analysis to fathers. The top panel compares fathers to their matched sample of men without children. In the bottom panel, I restrict the sample to parents only. Two main findings emerge. First, men experience no income decline: their total income trends slightly upward, increasing by 2.5%. It is worth remembering that, two years before childbirth, women entrepreneurs slightly out-earn men. Even among this highly positively selected sample of women, childbirth produces a substantial and persistent earnings gap that men do not experience. Second, childbirth dampens new firm creation for both sexes. While the effect is considerably larger for women, men's entry rates decline by about 10% 5 years after childbirth.

## V Mechanisms

In the previous section, I presented evidence that childbirth affects entrepreneurial outcomes. I now examine the underlying mechanisms to determine whether these effects stem from maternal preferences, such as increased risk aversion, or from constraints, such as limited access to childcare. Gender norms fall somewhere in between, shaping behavior through social expectations and blurring the line between choice and constraint. I first examine whether childbirth leads to a shift in risk preferences. Second, I turn to the role of household specialization and cultural norms to understand how couples choose to allocate tasks. Finally, I study childcare availability to understand if relaxing constraints has an effect on how mothers allocate time. If improving access to childcare mitigates the negative effects of childbirth, this would suggest that external constraints, rather than solely women's preferences, play a role in determining women's time allocation.

### A. *The risk-return trade-off*

Parenthood has been linked to increased risk aversion (Görlitz and Tamm, 2020). The first potential explanation for the decline in firm outcomes post-childbirth could be related to changes in the risk-return profile of mother-owned firms. If female entrepreneurs become more risk-averse after having children, they may adopt safer, lower-risk investment strategies that yield lower but more stable returns.<sup>9</sup>

To assess whether reduced risk-taking explains the decline in firm performance post-childbirth, I use three proxies for firm risk-taking behavior. The first is the volatility of returns on assets,  $\sigma(\text{ROA})$ , measured as the standard deviation of ROA before and after childbirth. A decrease in  $\sigma(\text{ROA})$  would indicate lower fluctuations in returns, suggesting a shift toward more conservative investment decisions. Similarly, I measure profit volatility as the standard deviation of profits over the same period. Finally, I use leverage as a proxy for the riskiness of corporate financing choices, defined as the ratio of total long-term liabilities to total assets. A higher leverage ratio indicates greater reliance on debt financing, increasing the firm's exposure to financial shocks.

Table A.3 shows no significant change in the volatility of ROA or profits after childbirth. The leverage ratio, however, increases. While the risk-return trade-off suggests that a shift toward lower-risk investment should reduce both risk and returns, the data show no evidence of reduced risk. These findings suggest that the observed decline in firm performance post-childbirth cannot be explained by a move toward safer investment strategies.

---

<sup>9</sup>A large literature has studied gender differences in risk preferences, mostly finding that women are more risk averse than men (see Bertrand (2011) for a review). Faccio, Marchica, and Mura (2016) find that firms led by female CEOs have lower leverage and less volatile earnings, suggesting lower levels of risk-taking compared to firms led by men. The relationship between gender and risk-taking may depend on context; for example, in their experimental setting, Kirchler, Lindner, and Weitzel (2018) find no gender differences in risk-taking among finance professionals. The effect of parenthood on risk preferences may be particularly pronounced for mothers due to evolutionary pressures: women's substantial investment in childbearing and caregiving may heighten their tendency to adopt safer strategies to protect both themselves and their children.

### *B. Individual or household decisions?*

Up to this point, I have treated outcomes after childbirth as a result of women's individual choices. However, most entrepreneurs with children are married, so it is reasonable to assume that career and childcare decisions are made at the household level rather than by individuals alone. One possibility is that couples allocate work and childcare responsibilities based on their respective comparative advantage to maximize household income: the partner with higher earnings prioritizes their career, while the other assumes a greater share of childcare duties (Andresen and Nix, 2022). Since women entrepreneurs are more likely than men entrepreneurs to be the secondary earner, this could explain why they take on a greater share of childcare responsibilities compared to male entrepreneurs.

If couples specialize based on labor market advantage, firms owned by female breadwinners should be less affected by childbirth than those owned by female secondary earner. This is because households with a female breadwinner would prioritize the mother's entrepreneurial career, while the father would take on a greater share of childcare. In addition, household income should be affected similarly regardless of whether the husband or wife was the primary earner, as they would adjust labor supply efficiently irrespective of gender. Moreover, female breadwinners should experience a less negative (or even positive) impact on their own income, as they might increase their labor supply to meet the additional financial demands of parenthood.

To test these predictions, I classify women based on whether they were the primary earner in the household during the three years before their first childbirth. Panel A of Table 4 provides some evidence in support of the household specialization hypothesis. However, since primary earners tend to own larger firms, which generally experience smaller post-childbirth declines, I use inverse probability weighting to reweight the sample so that firms owned by primary and secondary earners have similar characteristics. The results are mixed: primary earners experience a smaller decline in sales (40% smaller than for secondary earners) but the effects on profits and profit margins are similar between the two groups. Even among breadwinners, the performance penalty remains substantial, suggesting that while household specialization may mitigate the effects of childbirth, it

does not fully offset them.

Panel B of Table 4 shows that couples with a female breadwinner before childbirth experience a 6.7% larger decline in total family income than couples in which the husband was the primary earner. This reflects two forces: female breadwinners suffer income losses that are 13% larger than those of secondary earners and their spouses do not fully compensate for these losses.

These findings could be explained by mothers having an inherent comparative advantage in childcare tasks, independent of their labor market advantage. The existing literature has largely ruled out childbirth itself as the primary driver of large career penalties for mothers (Kleven, Landais, and Sogaard, 2021; Andresen and Nix, 2022), but other forms of comparative advantage, such as nurturing abilities beyond childbirth and nursing, could still matter. In addition, gender norms and preferences may shape household decision-making, leading women to prioritize childcare even when they have a stronger position in the labor market. I explore this hypothesis in the next section.

### *C. Culture*

Immigrants provide a useful setting for studying cultural influences because norms and beliefs are embedded within individuals, whereas institutions and policies are location-specific. As people migrate, they bring their cultural heritage with them, while leaving behind the institutional environment of their home country (Alesina, Giuliano, and Nunn, 2013).<sup>10</sup>

In this section, I examine whether the effect of childbirth on women's entrepreneurial outcomes can be attributed to cultural preferences related to gender norms. I focus on second-generation immigrants, i.e., individuals born in Canada to foreign-born parents<sup>11</sup> (who, as Canadian citizens

---

<sup>10</sup>A large literature in economics and finance has studied culture, defined as a set of shared values, beliefs, and preferences that influence individual behavior within a particular society or group and persist across generations (Guiso, Sapienza, and Zingales, 2006; Alesina and Giuliano, 2015; Boelmann, Raute, and Schönberg, 2024; Grinblatt and Keloharju, 2001). Gender norms are a subset of cultural norms that specifically pertain to expectations associated with individuals based on their gender. These norms shape the division of labor within households, influence career choices by prescribing which professions are deemed suitable for men and women, and affect investment in human capital. In cultures where men are perceived as primary earners, families may prioritize investing in sons' education over daughters' (Johnston, Schurer, and Shields, 2014; Humlum, Nandrup, and Smith, 2019).

<sup>11</sup>Canada, with its large immigrant population and long-standing support for cultural diversity, represents an ideal setting. During my sample years, about 20% of the Canadian population was made up of immigrants.

since birth, are more precisely referred to as second-generation Canadians). This approach offers several advantages over studying first-generation immigrants. Second-generation individuals typically have a stronger command of the host country's language, greater exposure to its education system and labor market, and no direct choice in the immigration decision, which was made by their parents (Fernández, 2007).

To measure gender norms by country of ancestry, I rely on data from the World Values Survey, a large-scale international research project that examines people's values and beliefs across countries. The survey was conducted in multiple waves since the early 1980s and covers a wide range of topics, including attitudes toward democracy, social capital, religion, family, and gender roles. I use responses to specific survey questions to construct a gender progressivity index, capturing country-level attitudes toward gender norms (see Appendix B for details on its construction). Figure A.11 shows the distribution of gender norms across countries.

Table 5 compares firm outcomes after childbirth for entrepreneurs whose parents immigrated from countries with more egalitarian versus more conservative gender norms, separately by gender. Columns (1)-(3) show that women whose parents originated from traditional cultures experience larger declines in sales, profits, and profit margins than their egalitarian counterparts. These results are not explained by systematic differences in pre-birth firm characteristics. Because the sample of second-generation female founders is relatively small, in columns (4)-(6) I extend the analysis to all business owners and find similar results.

In columns (7)-(9), I repeat the exercise for fathers. If anything, the pattern is reversed: male entrepreneurs from traditional cultural backgrounds exhibit equal or better business outcomes following the birth of a child. This divergence is consistent with women from traditional backgrounds prioritizing family responsibilities over their entrepreneurial pursuits post-childbirth, while traditional gender norms reinforce men's role as primary providers. These findings suggest that while couples do specialize after having children, the process appears to be driven more by gender norms than by labor market advantage.

#### D. Informal childcare

The role of grandparents in providing childcare to their grandchildren is an important aspect of family support networks.<sup>12</sup> In this section, I study the role of proximity to grandparents in mitigating the impact of childbirth on women’s entrepreneurial outcomes.

To examine the role of grandparents, I first establish a connection between entrepreneurs and their own parents. This linkage is possible because individuals residing at the same address file taxes together (non-filers, such as dependent children, are input by Statistics Canada). Thus, individuals who lived with their own parents at any point from 2001 onward are included in the sample. I then define a mother as living near her parents if they reside in the same Census Metropolitan Area or Census Agglomeration<sup>13</sup>. This measure of proximity serves as an indicator of potential childcare availability within family networks.

Table 6 shows that mothers who live in the same city as their parents experience less severe declines in business performance after childbirth. Geographical proximity to grandparents mitigates the negative effects of motherhood on sales, profits, and profitability. Panel B provides the corresponding analysis for fathers and shows no meaningful differences by proximity to grandparents in entrepreneurial outcomes after childbirth (with the exception of profits, which are *lower* among fathers living closer to grandparents). Figure A.12 shows that the mitigating effect for mothers is strongest when the child is very young. This pattern is likely driven by the intensive caregiving demands of infants and toddlers, which may lead mothers to rely more heavily on grandparental support during the early years. As children grow older, formal childcare options such as preschool and daycare may become more available, reducing the reliance on grandparents.

To provide further evidence on the role of grandmothers, I study the impact of grandmother

---

<sup>12</sup>In the United States, 20% of working mothers with children under five rely on grandparents as their primary childcare providers (Posadas and Vidal-Fernandez, 2013); in Mexico, grandmothers take care of 40% of children aged under six (Marcos, 2023). Several studies have found that access to grandparental childcare increases mothers’ labor supply but a negative effect on grandmothers’ employment (Kaufmann, Özdemir, and Ye, 2022; Zamarro, 2020).

<sup>13</sup>A Census Metropolitan Area is akin to a commuting zone. Statistics Canada defines CMAs as regions with at least 100,000 people, including a core urban area of at least 50,000 and surrounding municipalities with high economic and social integration. In rural areas, a Census Agglomeration must have a core population of at least 10,000.

retirement on their daughters' firms in Figure A.13. I restrict the analysis to mothers who did not experience childbirth during their entrepreneurial spell, ensuring that the decision to become a mother is not influenced by the grandmother's retirement. In addition, I restrict the sample to grandmothers who were employed at some point to capture a shift in their time availability for childcare. The empirical strategy compares mothers whose own mothers retire while living in the same municipality (allowing for potential childcare support) to mothers whose mothers also retire but live farther away. I find that mothers living in close proximity to grandmothers see significant improvements in firm performance following the retirement event. Examining pre-trends, there is no evidence that the retirement event is driven by an increase or a decline in business performance prior to retirement, supporting the interpretation that the improvements in firm outcomes result from the grandmother's retirement.<sup>14</sup>

Table A.4 shows that the effect of grandmother retirement on business performance is concentrated among women living in municipalities where center-based childcare provision is lacking. This suggests some degree of substitution between informal (e.g. family-provided) and formal childcare support, consistent with evidence that expanding formal childcare services partially reduces reliance on family-provided care (Baker, Gruber, and Milligan, 2008). Details on how I measure childcare provision at the municipality level are discussed below.

### *E. Formal childcare*

The availability of childcare affects labor market outcomes even for highly skilled professional women.<sup>15</sup> In this section, I analyze the impact of formal childcare on mothers' entrepreneurial outcomes, using childcare expansion events at the municipality level as an exogenous shock to childcare availability. To measure the availability of formal childcare, I construct a municipality-

---

<sup>14</sup>A potential concern is that these results may reflect general family assistance (for example, involvement with the business) rather than caregiving support. To address this, I conduct a falsification test by examining the effect of grandfather retirement and find no such improvement in entrepreneurial outcomes (Panel B of Figure A.13). This suggests that the results are not driven by broader family involvement but are specific to the caregiving support traditionally provided by grandmothers.

<sup>15</sup>In the finance industry, the availability of childcare benefits is linked to lower gender pay gaps (Lagaras et al., 2022). (Barber et al., 2021) find that, during the COVID-19 pandemic, time spent on childcare reduced productivity for female finance academics.

level index based on the ratio of workers employed in childcare centers to the number of children under the age of two. Since the data does not report hours worked, childcare workers are classified as full-time if their annual earnings exceed the equivalent of full-time minimum wage. If a childcare worker's annual earnings are below this threshold, I consider them as a fraction of a full-time worker, proportional to their earnings relative to the full-time minimum wage.

I define a childcare shock as a one-standard-deviation increase in the density of childcare workers within a municipality over a given year. If a municipality undergoes multiple instances of childcare expansion based on the above definition, I consider the municipality treated starting from the first expansion event. Since childcare expansions may be correlated with broader labor market trends, such as rising female employment, I include municipality-by-year fixed effects in all specifications. This ensures that identification relies on within-municipality-year variation, comparing mothers in the same location and year who were differentially exposed to increased childcare availability based on their child's age at the time of expansion.

Specifically, I compare mothers with children under 6 who experienced a childcare expansion when their child was at most 2 years old with mothers whose children were older (3 to 6 years old) at the time of the expansion. This triple-differences design allows me to assess how the timing of childcare expansions affects mothers who are more likely to benefit due to their child's younger age. This approach is similar to [Simintzi, Xu, and Xu \(2024\)](#), who study the impact of the 1997 universal childcare reform in Quebec on women's labor market outcomes and firms by exploiting variation in treatment intensity based on the child's age at the time of expansion. While I cannot exploit the 1997 reform because it pre-dates the start of my sample, I validate my measure by confirming that childcare density in Quebec municipalities is consistently higher than in the rest of Canada, reflecting the province's long-standing investment in childcare services.

The results in [Table 7](#) show that the expansion of formal childcare significantly improves firm performance for mothers with young children. Specifically, the triple interaction term shows an 11% increase in sales and a 7% rise in profit margin relative to mothers whose children were older

at the time of the expansion. For robustness, I include fathers in the analysis, as shown in Panel B, to ensure that the observed effects are specific to mothers.

## VI Conclusion

Entrepreneurship is a key driver of economic growth and innovation, yet women remain significantly underrepresented among entrepreneurs, particularly in high-growth ventures. Female entrepreneurs are less likely to succeed in scaling their businesses or achieving high-value outcomes, such as acquisitions or IPOs. Despite a growing literature on female entrepreneurs, our understanding of the underlying factors driving the entrepreneurship gender gap remains incomplete.

This paper contributes to filling this gap by examining the effects of childbirth on women's entrepreneurial activity. Drawing on comprehensive administrative data from Canada, I first show that childbirth leads to a persistent decline in the performance of women-owned firms, explaining a large fraction of the entrepreneurship gender gap. While these effects attenuate over time, they do not fully recover to pre-birth levels. Second, I show that the negative spillovers extend beyond the entrepreneur herself, reducing earnings and increasing job displacement risk for employees of affected firms. At the same time, the post-childbirth firm increasingly hire and retains mothers, who earn more than mothers in comparable firms, and birth rates rise among employees. These patterns suggest that the founder's childbirth reorganizes the workplace in ways that make it more attractive to workers with family responsibilities.

These findings contribute to the broader discussion on demographic change and economic dynamism. Children impose significant career costs on women; this paper provides new evidence that these costs extend beyond individuals, creating spillovers for entrepreneurial firms and their employees. At the same time, many advanced economies face declining fertility rates, raising concerns about the long-term implications for labor supply and innovation. A growing literature documents a decline in business dynamism, with falling rates of firm entry and young firm activity across industries and regions ([Decker et al., 2016](#)). Demographic shifts may be one contributing

factor, as new firm creation is closely linked to the supply of young workers, who are disproportionately employed in high-growth, innovative firms (Ouimet and Zarutskie, 2014; Karahan, Pugsley, and Şahin, 2024). Understanding the trade-offs between the immediate economic costs of children and the long-term effects of demographic change on entrepreneurship and productivity remains an important avenue for future research.

## References

- Alesina, Alberto, and Paola Giuliano, 2015, Culture and institutions, *Journal of Economic Literature* 53, 898–944.
- Alesina, Alberto, Paola Giuliano, and Nathan Nunn, 2013, On the origins of gender roles: Women and the plough, *The Quarterly Journal of Economics* 128, 469–530.
- Alesina, Alberto F, Francesca Lotti, and Paolo Emilio Mistrulli, 2013, Do women pay more for credit? evidence from italy, *Journal of the European Economic Association* 11, 45–66.
- Altonji, Joseph G, and Rebecca M Blank, 1999, Race and gender in the labor market, *Handbook of Labor Economics* 3, 3143–3259.
- Andresen, Martin Eckhoff, and Emily Nix, 2022, What causes the child penalty? evidence from adopting and same-sex couples, *Journal of Labor Economics* 40, 971–1004.
- Andrews, Michael J, Aaron Chatterji, Josh Lerner, and Scott Stern, 2022, *The role of innovation and entrepreneurship in economic growth* (University of Chicago Press).
- Angelov, Nikolay, Per Johansson, and Erica Lindahl, 2016, Parenthood and the gender gap in pay, *Journal of labor economics* 34, 545–579.
- Angrist, Joshua D., and William N. Evans, 1998, Children and their parents' labor supply: Evidence from exogenous variation in family size, *The American Economic Review* 88, 450–477.
- Azmat, Ghazala, and Rosa Ferrer, 2017, Gender gaps in performance: Evidence from young lawyers, *Journal of Political Economy* 125, 1306–1355.
- Baker, Michael, Jonathan Gruber, and Kevin Milligan, 2008, Universal child care, maternal labor supply, and family well-being, *Journal of Political Economy* 116, 709–745.
- Barber, Brad M, Wei Jiang, Adair Morse, Manju Puri, Heather Tookes, and Ingrid M Werner, 2021, What explains differences in finance research productivity during the pandemic?, *The Journal of Finance* 76, 1655–1697.
- Bento, Pedro, 2025, Female entrepreneurship in the us 1982–2012: Implications for welfare and aggregate output, *Journal of Monetary Economics* 149, 103676.
- Bertrand, Marianne, 2011, New perspectives on gender, in *Handbook of Labor Economics*, volume 4, 1543–1590 (Elsevier).
- Blinder, Alan S, 1973, Wage discrimination: reduced form and structural estimates, *Journal of Human Resources* 436–455.
- Boelmann, Barbara, Anna Raute, and Uta Schönberg, 2024, Wind of change? cultural determinants of maternal labor supply, *American Economic Journal: Applied Economics* 13, 1–35.
- Bonney, John, Luigi Pistaferri, and Alessandra Voena, 2025, Childbirth and firm performance: Evidence from norwegian entrepreneurs, Technical report, National Bureau of Economic Research.
- Brenøe, Anne Ardila, Serena Canaan, Nikolaj A Harmon, and Heather N Royer, 2024, Is parental leave costly for firms and coworkers?, *Journal of Labor Economics* 42, 1135–1174.
- Core, Fabrizio, 2024, Female innovative entrepreneurship and maternity risk, *Review of Finance* 28, 1383–1418.
- Core, Fabrizio, and Daniel Karpati, 2025, Self-employed mothers: Child penalties, maternity

benefits, and family health .

- Decker, Ryan A, John Haltiwanger, Ron S Jarmin, and Javier Miranda, 2016, Declining business dynamism: What we know and the way forward, *American Economic Review* 106, 203–207.
- Delbaere, Ilse, Sarah Verbiest, and Tanja Tydén, 2020, Knowledge about the impact of age on fertility: a brief review, *Upsala Journal of Medical Sciences* 125, 167–174.
- Ewens, Michael, and Richard R Townsend, 2020, Are early stage investors biased against women?, *Journal of Financial Economics* 135, 653–677.
- Faccio, Mara, Maria-Teresa Marchica, and Roberto Mura, 2016, Ceo gender, corporate risk-taking, and the efficiency of capital allocation, *Journal of Corporate Finance* 39, 193–209.
- Fernández, Raquel, 2007, Women, work, and culture, *Journal of the European Economic Association* 5, 305–332.
- Ferrando, Mery, Francesca Truffa, Teodora Tsankova, and Ashley Wong, 2025, Motherhood and the gender gap in self-employment .
- Field, Erica, Seema Jayachandran, Rohini Pande, and Natalia Rigol, 2016, Friendship at work: Can peer effects catalyze female entrepreneurship?, *American Economic Journal: Economic Policy* 8, 125–153.
- Fontenay, Sébastien, 2024, How can paid maternity leave boost female entrepreneurship?, *Journal of Human Resources* .
- Fortin, Nicole, Thomas Lemieux, and Sergio Firpo, 2011, Decomposition methods in economics, in *Handbook of Labor Economics*, volume 4, 1–102 (Elsevier).
- Gallen, Yana, Juanna S Joensen, Eva R Johansen, and Gregory F Veramendi, 2023, The labor market returns to delaying pregnancy, *Available at SSRN 4554407* .
- Ginja, Rita, Arizo Karimi, and Pengpeng Xiao, 2023, Employer responses to family leave programs, *American Economic Journal: Applied Economics* 15, 107–135.
- Goldin, Claudia, 2014, A grand gender convergence: Its last chapter, *American Economic Review* 104, 1091–1119.
- Görlitz, Katja, and Marcus Tamm, 2020, Parenthood, risk attitudes and risky behavior, *Journal of Economic Psychology* 79, 102189.
- Gottlieb, Joshua D, Richard R Townsend, and Ting Xu, 2022, Does career risk deter potential entrepreneurs?, *The Review of Financial Studies* 35, 3973–4015.
- Grinblatt, Mark, and Matti Keloharju, 2001, How distance, language, and culture influence stockholdings and trades, *The Journal of Finance* 56, 1053–1073.
- Guiso, Luigi, Paola Sapienza, and Luigi Zingales, 2006, Does culture affect economic outcomes?, *Journal of Economic Perspectives* 20, 23–48.
- Haltiwanger, John, Ron S Jarmin, and Javier Miranda, 2013, Who creates jobs? small versus large versus young, *Review of Economics and Statistics* 95, 347–361.
- Hebert, Camille, 2025, Gender stereotypes and entrepreneur financing, *The Review of Financial Studies* .
- Hsieh, Chang-Tai, Erik Hurst, Charles I Jones, and Peter J Klenow, 2019, The allocation of talent and us economic growth, *Econometrica* 87, 1439–1474.
- Huebener, Mathias, Jonas Jessen, Daniel Kuehnle, and Michael Oberfichtner, 2025, Parental leave,

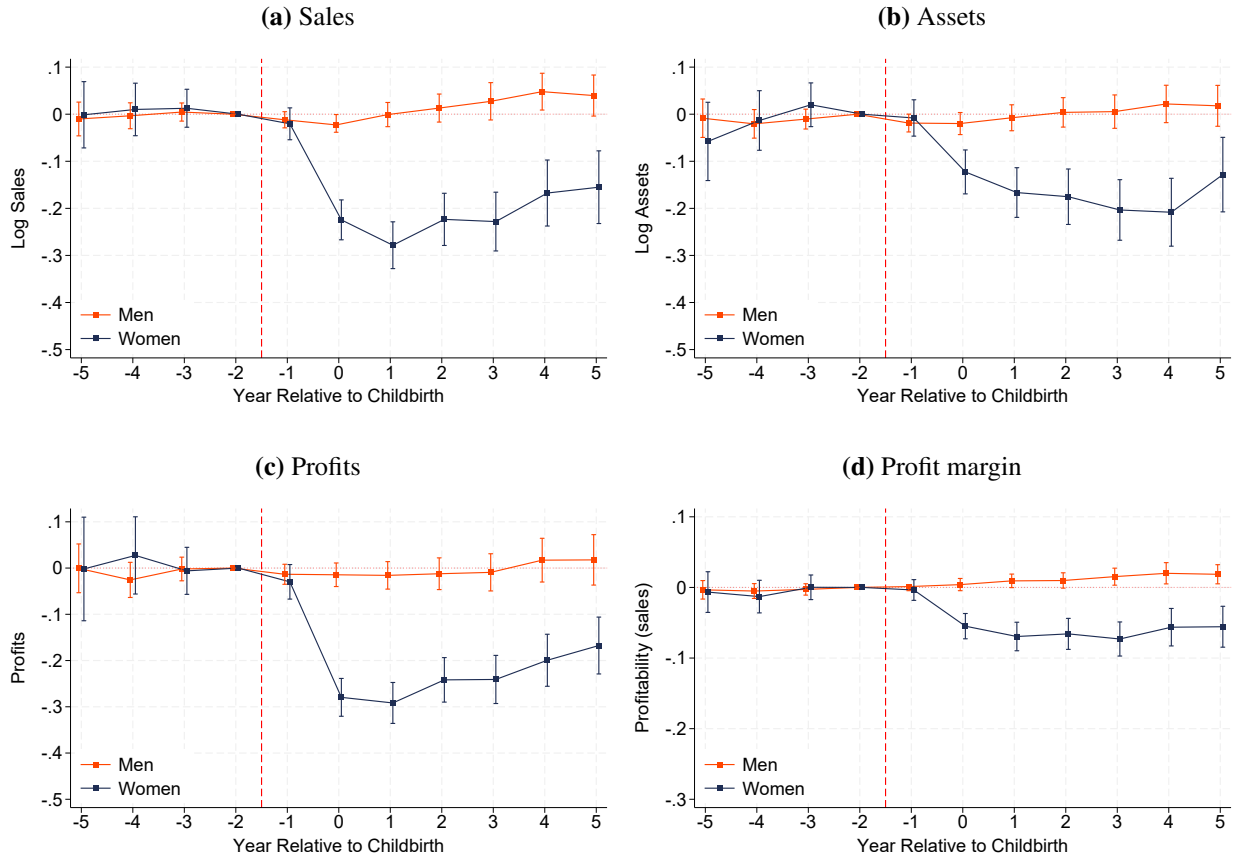
- worker substitutability and firms' employment, *The Economic Journal* 135, 1467–1495.
- Humlum, Maria Knoth, Anne Brink Nandrup, and Nina Smith, 2019, Closing or reproducing the gender gap? parental transmission, social norms and education choice, *Journal of Population Economics* 32, 455–500.
- Johnston, David W, Stefanie Schurer, and Michael A Shields, 2014, Maternal gender role attitudes, human capital investment, and labour supply of sons and daughters, *Oxford Economic Papers* 66, 631–659.
- Kahn, Lisa B, 2010, The long-term labor market consequences of graduating from college in a bad economy, *Labour Economics* 17, 303–316.
- Karahan, Fatih, Benjamin Pugsley, and Ayşegül Şahin, 2024, Demographic origins of the start-up deficit, *American Economic Review* 114, 1986–2023.
- Kaufmann, Katja, Yasemin Özdemir, and Han Ye, 2022, Spillover effects of old-age pension across generations: Family labor supply and child outcomes .
- Kim, Scott, and Petra Moser, 2025, Women in science. lessons from the baby boom, *Econometrica* 93, 1521–1560.
- Kirchler, Michael, Florian Lindner, and Utz Weitzel, 2018, Rankings and risk-taking in the finance industry, *The Journal of Finance* 73, 2271–2302.
- Kleven, Henrik, Camille Landais, and Jakob Egholt Søgaaard, 2019, Children and gender inequality: Evidence from denmark, *American Economic Journal: Applied Economics* 11, 181–209.
- Kleven, Henrik, Camille Landais, and Jakob Egholt Søgaaard, 2021, Does biology drive child penalties? evidence from biological and adoptive families, *American Economic Review: Insights* 3, 183–198.
- Lagaras, Spyridon, Maria-Teresa Marchica, Elena Simintzi, and Margarita Tsoutsoura, 2022, Women in the financial sector, *Available at SSRN 4098229* .
- Levine, Ross, and Yona Rubinstein, 2017, Smart and illicit: who becomes an entrepreneur and do they earn more?, *The Quarterly Journal of Economics* 132, 963–1018.
- Marcos, Miguel Angel T, 2023, Grandmothers and the gender gap in the mexican labor market, *Journal of Development Economics* 162, 103013.
- Markussen, Simen, and Knut Røed, 2017, The gender gap in entrepreneurship – the role of peer effects, *Journal of Economic Behavior & Organization* 134, 356–373.
- Mertz, Mikkel, Maddalena Ronchi, and Viola Salvestrini, 2024, Female representation and talent allocation in entrepreneurship: The role of early exposure to entrepreneurs, *Available at SSRN 4920176* .
- Morazzoni, Marta, and Andrea Sy, 2022, Female entrepreneurship, financial frictions and capital misallocation in the us, *Journal of Monetary Economics* 129, 93–118.
- Mueller, Clemens, Stefan Obernberger, and Arnim Seidlitz, 2025, Innovation and motherhood, *Available at SSRN 5527321* .
- Oaxaca, Ronald, 1973, Male-female wage differentials in urban labor markets, *International Economic Review (Philadelphia)* 14, 693–709.
- Oreopoulos, Philip, Till v. Wachter, and Andrew Heisz, 2012, The short- and long-term career effects of graduating in a recession, *American Economic Journal: Applied Economics* 4,

1–19.

- Ouimet, Paige, and Rebecca Zarutskie, 2014, Who works for startups? the relation between firm age, employee age, and growth, *Journal of Financial Economics* 112, 386–407.
- Posadas, Josefina, and Marian Vidal-Fernandez, 2013, Grandparents' childcare and female labor force participation, *IZA Journal of Labor Policy* 2, 1–20.
- Rubinstein, Yona, and Ross Levine, 2018, Selection into entrepreneurship and self-employment, Technical report, National Bureau of Economic Research.
- Simintzi, Elena, Sheng-Jun Xu, and Ting Xu, 2024, The effect of childcare access on women's careers and firm performance .
- Taylor, Alison, 2003, Extent of the problem, *Bmj* 327, 434–436.
- Wasserman, Noam, 2008, The founder's dilemma, *Harvard Business Review* 86, 102–109.
- Yang, Tiantian, Aleksandra Kacperczyk, and Lucia Naldi, 2024, The motherhood wage penalty and female entrepreneurship, *Organization Science* 35, 27–51.
- Zamarro, Gema, 2020, Family labor participation and child care decisions: The role of grannies, *SERIEs : Journal of the Spanish Economic Association* 11, 287–312.
- Zandberg, Jonathan, 2021, Family comes first: Reproductive health and the gender gap in entrepreneurship, *Journal of Financial Economics* 140, 838–864.

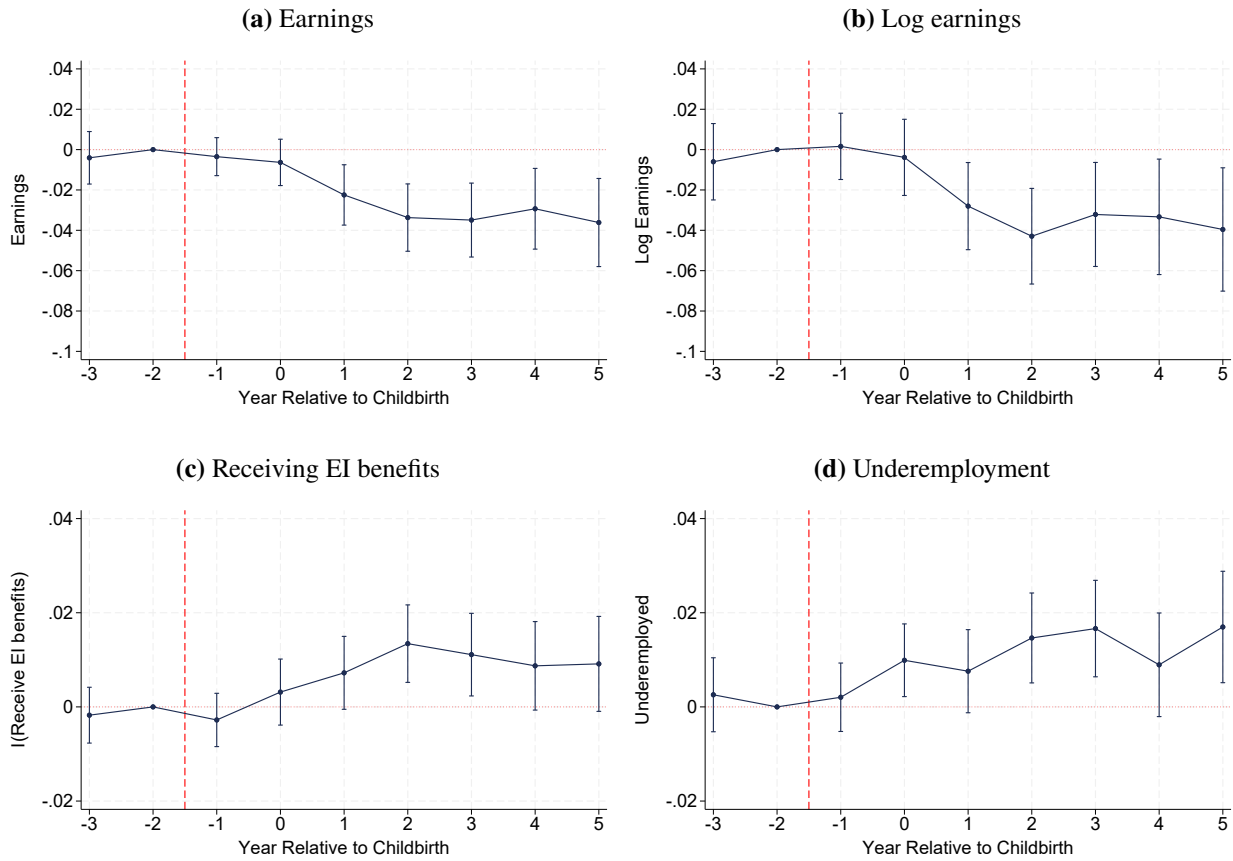
# Figures

**Figure 1: Gender gap in the effect of childbirth on firm outcomes**



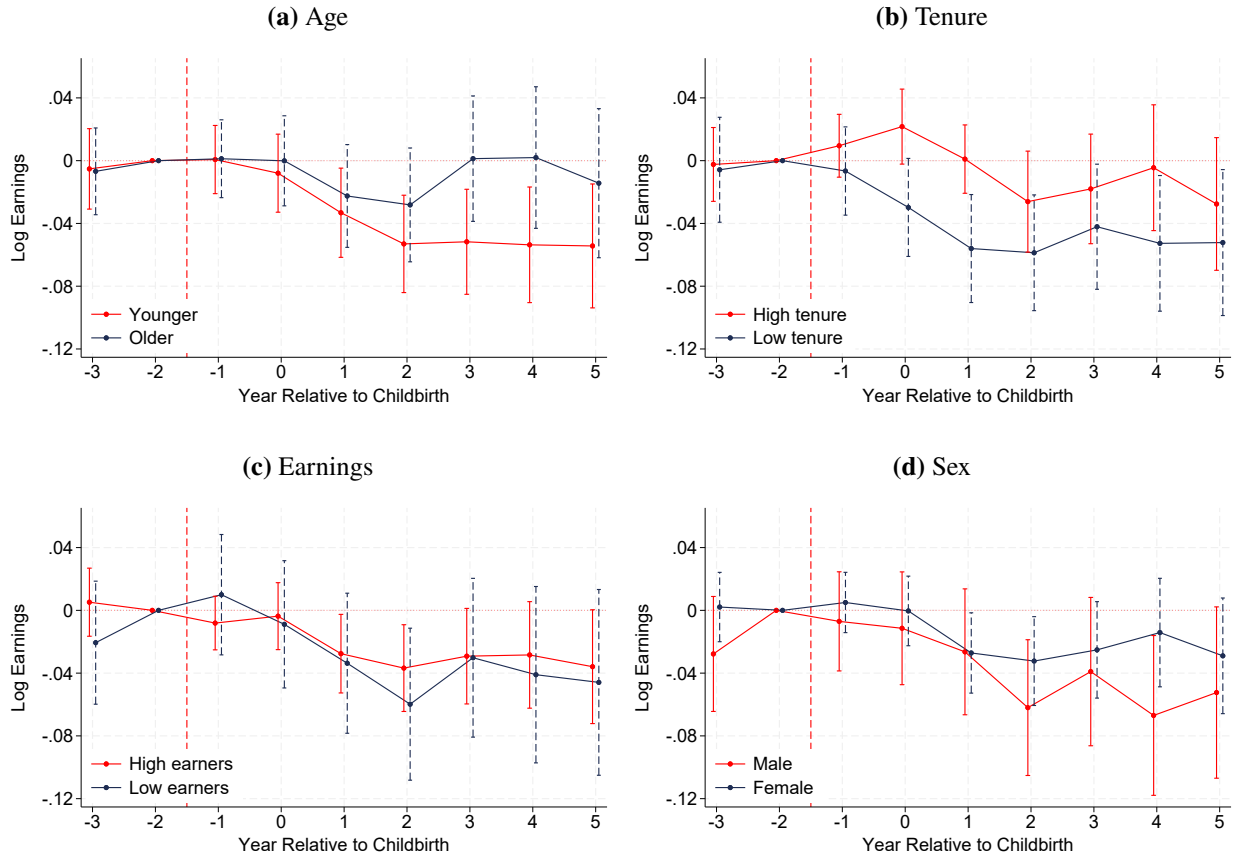
*Notes:* The graphs show event-study estimates obtained by fitting equation 1 on log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)), separately for men and women. Year 0 is when the first childbirth event takes place. Coefficients for profits are reported as a percentage of the counterfactual outcome absent children. Profit margin is the ratio of profits to sales. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

**Figure 2: Effect of childbirth on workers' careers**



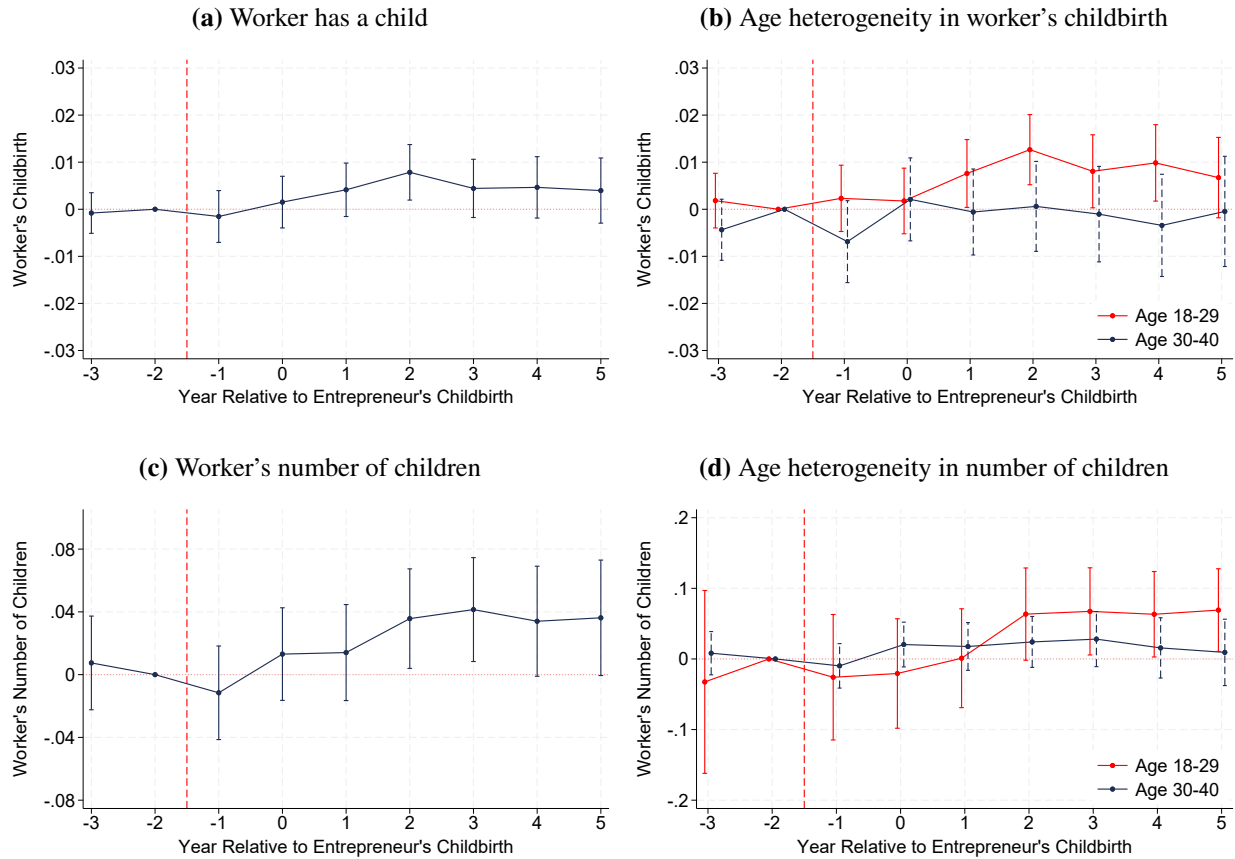
*Notes:* The graphs show event-study estimates obtained by fitting equation 2 on total earnings (panel (a)), log earnings (panel (b)), the probability of receiving EI benefits (panel (c)), and underemployment (panel (d)). Year 0 is when the entrepreneur's first childbirth event takes place. The treated group include workers employed in firms in which the entrepreneur had a child, compared to a control group of workers employed in a matched sample of firms owned by women with zero observed fertility. In panel (a), earnings refer to total employment income in year  $t$  and coefficients are expressed as a percentage deviation from the counterfactual earnings trajectory in the absence of childbirth. In panel (c), receiving EI benefits is an indicator equal to 1 if the individual reports positive income from unemployment insurance. In panel (d), underemployment is an indicator equal to 1 if the individual earns in one year less than an amount equivalent to 12 weeks of full-time employment at minimum wage. Control variables include indicators for worker age. Worker and year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the worker level.

**Figure 3: Heterogeneous effects of childbirth on workers' earnings**



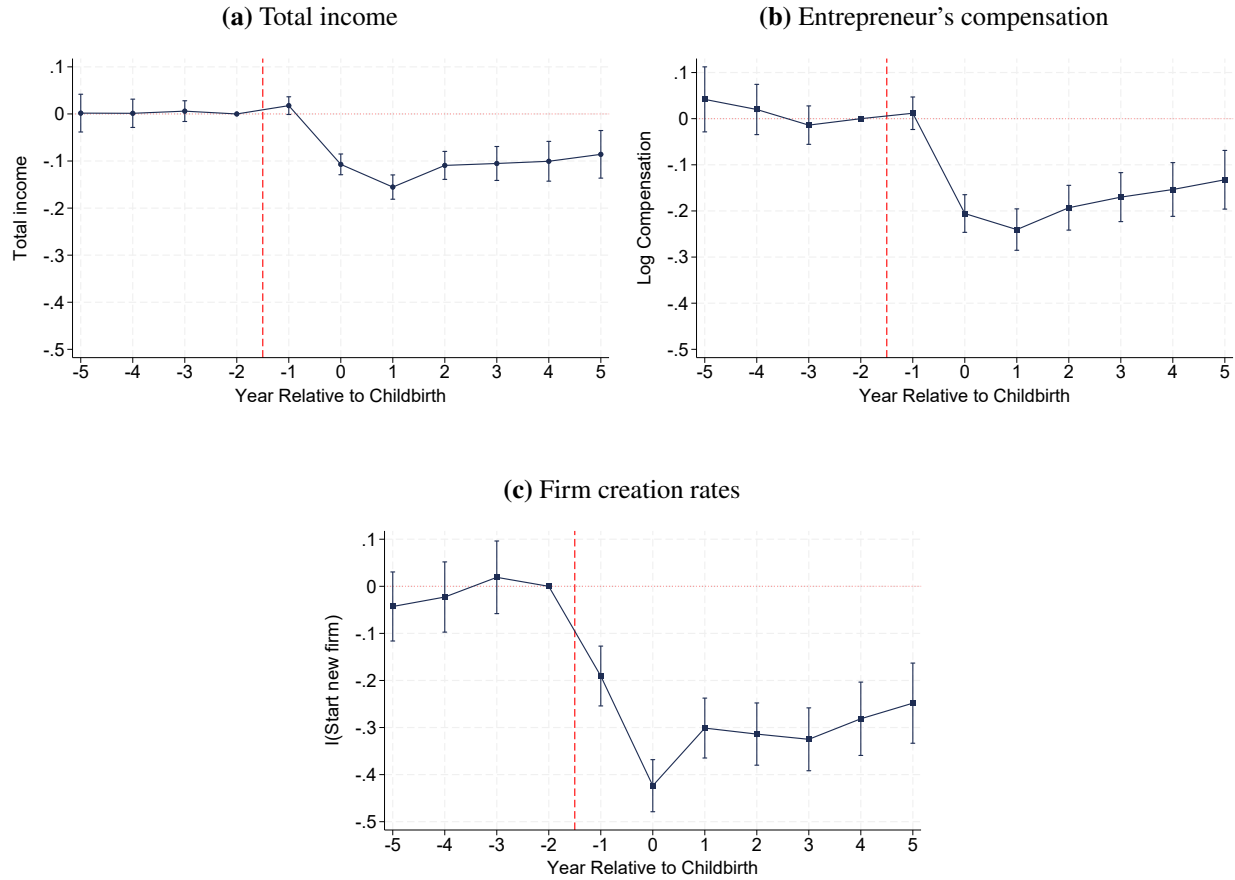
*Notes:* The graphs show event-study estimates obtained by fitting equation 2 on log earnings. Year 0 is when the entrepreneur's first childbirth event takes place. The treated group include workers employed in firms in which the entrepreneur had a child, compared to a control group of workers employed in a matched sample of firms owned by women with zero observed fertility. Panel (a), (b), and (c) show results for workers who were above or below the median age, tenure, and earnings, respectively, the year before the entrepreneur had a child. Panel (d) shows the earnings effects for male and female workers. Control variables include indicators for worker age. Worker and year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the worker level.

**Figure 4: Effect of entrepreneur’s childbirth on workers’ fertility**



*Notes:* Panel (a) shows event-study estimates obtained by fitting equation 2 on an indicator for whether a worker experiences childbirth in year  $t$ . Year 0 is when the entrepreneur’s first childbirth event takes place. The treated group include workers employed in firms in which the entrepreneur had a child, compared to a control group of workers employed in a matched sample of firms owned by women with zero observed fertility. The sample includes workers of fertile age (18-45). Panel (b) repeats the analysis separately for workers who were aged 18–29 and 30–40 at the time of the entrepreneur’s childbirth. In panel (c), the number of children a worker has by time  $t$  is modeled using Poisson pseudo-maximum likelihood estimation suitable for count outcomes. Panel (d) again splits the sample by age at exposure. I report 95% confidence intervals based on standard errors clustered at the worker level.

**Figure 5: Effect of childbirth on entrepreneurial career outcomes**



*Notes:* The graphs show the effect of childbirth on entrepreneurial career outcomes. Year 0 is when the first childbirth event takes place. Panel (a) and (b) report coefficients obtained by fitting variations of equation 1, for the sample of individuals who were entrepreneurs for at least two years before the first childbirth event. In panel (a), total income is income from all sources, irrespective of whether the individual is still an entrepreneur at any point. Coefficients are reported as a percentage of the counterfactual outcome absent children. Control variables include a polynomial for individual age and marital status. Individual and year fixed effects are included. In panel (b), entrepreneurs' compensation is the sum of wages and dividends entrepreneurs take from their firms (conditional on the firm being active). Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. Panel (c) reports event-study estimates obtained fitting equation 3, irrespective of any entrepreneurial experience prior to childbirth. Coefficients are reported as a percentage of the counterfactual outcome absent children. Control variables include indicators for individual age and marital status. Individual and year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the individual level (panel (a) and (c)) and at the firm level (panel (b)).

## Tables

**Table 1: Descriptive statistics**

<i>Panel A: Entrepreneurs</i>						
	(1)	(2)	(3)	(4)	(5)	(6)
	<b>Mothers</b>	<b>Matched controls</b>	<b>Standardized difference</b>	<b>Fathers</b>	<b>Matched controls</b>	<b>Standardized difference</b>
Firm age	2.8 (2.0)	2.8 (2.0)	-0.01	3.1 (2.3)	3.2 (2.3)	-0.04
Sales (000)	285.8 (645.5)	263.1 (571.7)	0.03	349.3 (793.5)	306.7 (712.9)	0.06
Sales per owner (000)	217.8 (529.6)	212.7 (511.9)	0.01	244.9 (570.9)	242.1 (576.5)	0.00
Assets (000)	183.3 (382.1)	172.6 (353.6)	0.03	182.9 (329.7)	180.6 (422.4)	0.01
Assets per owner (000)	138.8 (297.9)	137.1 (293.3)	0.01	134.2 (243.0)	142.5 (340.9)	-0.03
Number of employees	5.9 (15.8)	5.1 (12.7)	0.06	5.9 (19.8)	5.0 (22.7)	0.04
Equity share	79.7 (28.4)	83.0 (26.8)	-0.11	79.4 (28.3)	84.9 (25.7)	-0.17
Mixed team (%)	18.2	17.8	0.01	7.5	7.7	-0.01
Service sectors (%)	94.8	94.8	0.00	72.4	72.4	0.00
Entrepreneur age	31.7 (4.3)	32.3 (5.0)	-0.13	31.9 (4.4)	32.6 (5.0)	-0.15
Entrepreneur income (000)	69.3 (70.9)	69.5 (71.1)	-0.00	65.9 (71.5)	64.7 (68.4)	0.02
Family income (000)	127.9 (121.1)	126.0 (121.8)	0.02	103.1 (91.5)	101.4 (91.0)	0.02
Number of observations	10,535	10,535		45,800	45,800	

**Table 1: Descriptive statistics – continued**

<i>Panel B: Workers</i>			
	(1)	(2)	(3)
	<b>Workers in mothers' firms</b>	<b>Workers in matched firms</b>	<b>Standardized difference</b>
Earnings (000)	24.0 (20.9)	23.6 (20.3)	0.02
Age	32.4 (12.1)	32.5 (11.9)	-0.01
Tenure	2.3 (1.8)	2.3 (1.8)	0.01
Female (%)	71.7	70.6	0.02
Parent (%)	41.4	40.1	0.03
Mother (%)	30.9	29.2	0.04
Number of observations	26,315	23,750	

*Notes:* This table presents summary statistics for entrepreneurs (Panel A) and workers (Panel B). In panel A, summary statistics are reported at  $t^* - 2$ , i.e., two years before the entrepreneur's first childbirth. Column (1) reports summary statistics for mothers (T), column (2) for their matched controls (C), and column (3) reports the standardized mean difference between the two groups, calculated as  $(\bar{x}_T - \bar{x}_C)/\sqrt{s^2}$ , where  $s^2$  is the pooled variance. Columns (4)-(6) show summary statistics for fathers, their matched controls, and the standardized mean difference between the two groups. Panel B reports summary statistics for the sample of workers, which includes individuals aged 18-65 employed at mothers' firms or the matched control firms in both  $t^* - 1$  and  $t^*$  continuously. Summary statistics are reported at  $t^* - 1$ . Standard deviations are reported in parenthesis. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

**Table 2: Top-performing firms**

	Top 20% by assets		Top 20% by value added			
	(1)	(2)	(3)	(4)	(5)	(6)
	Log Sales	Profits	Profit margin	Log Sales	Profits	Profit margin
Post × Mother	-0.121*** (0.041)	-29,147*** (4,337)	-0.059*** (0.015)	-0.180*** (0.028)	-42,764*** (3,666)	-0.055*** (0.009)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry × province × year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	24,435	24,435	24,435	32,425	32,425	32,425

*Notes:* This table examines outcomes for the top quintile of the firm distribution. The top quintile is calculated two years before childbirth, using the full sample of male- and female-owned firms within each cohort. The difference in sample size between columns (1)-(3) and columns (4)-(6) is due to the fact that more women-owned firms rank in the top quintile by value added than in the top quintile by assets. The treated group is a sample of firms owned by a female entrepreneur for at least two years before she had her first child. The control group is a matched sample of firms owned by female entrepreneurs with zero observed fertility. “Post” is an indicator equal to 1 in the year of birth of the first child or after. Profits are expressed in constant 2012 dollars. Controls include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Standard errors are reported in parenthesis and are clustered at the firm level. \* indicates statistical significance at the 10% level, \*\* at the 5% level, and \*\*\* at the 1% level. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

**Table 3: The impact of founder's childbirth on internal labor market reorganization**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Share Parents	Share Mothers	Share Fathers	Hiring Rate Mothers	Quit Rate Mothers	Log Earnings Mothers	Pay Gap Mothers
Post × Mother	0.015** (0.006)	0.018*** (0.006)	-0.004 (0.003)	0.007* (0.004)	-0.016*** (0.007)	0.049** (0.024)	-0.035** (0.016)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × province × year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.668	0.685	0.742	0.444	0.412	0.695	0.460
Observations	59,190	59,190	59,190	59,190	37,055	45,860	45,860

*Notes:* This table examines the reorganization of the firm's internal labor market following the founder's first childbirth. Columns (1)-(3) analyze the stock of employees. Column (4) analyzes the inflow (hiring rate) of mothers. Column (5) analyzes the outflow (voluntary quits) of mothers. Columns (6)-(7) examine earnings outcomes. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Standard errors are reported in parenthesis and clustered at the firm level. \* indicates statistical significance at the 10% level, \*\* at the 5% level, and \*\*\* at the 1% level. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada. 10% level, \*\* at the 5% level, and \*\*\* at the 1% level.

**Table 4: Specialization within the household**

<i>Panel A: firm outcomes</i>						
	Raw			Inverse Probability Weighting		
	(1)	(2)	(3)	(4)	(5)	(6)
	<b>Log Sales</b>	<b>Profits</b>	<b>Profit Margin</b>	<b>Log Sales</b>	<b>Profits</b>	<b>Profit Margin</b>
Post × Mother	-0.345*** (0.034)	-16,486*** (1,523)	-0.078*** (0.012)	-0.348*** (0.035)	-22,310*** (2,016)	-0.077*** (0.011)
Post × Mother × Main earner	0.153*** (0.045)	-5,987** (2,516)	0.021 (0.016)	0.143*** (0.048)	1,111 (2,704)	0.014 (0.017)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry × province × year effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm effects	Yes	Yes	Yes	Yes	Yes	Yes
$R^2$	0.800	0.770	0.658	0.800	0.768	0.657
Number of observations	86,110	93,745	86,110	80,125	83,945	80,125
<i>Panel B: income</i>						
	(1)	(2)	(3)			
	<b>Household Income</b>	<b>Individual Income</b>	<b>Spousal Income</b>			
Post × Mother	0.073*** (0.016)	-0.069* (0.039)	0.122*** (0.017)			
Post × Mother × Main earner	-0.067*** (0.024)	-0.130*** (0.047)	0.022 (0.028)			
Controls	Yes	Yes	Yes			
Individual effects	Yes	Yes	Yes			
Province × year effects	Yes	Yes	Yes			
$R^2$	0.522	0.454	0.626			
Number of observations	227,195	225,440	133,570			

*Notes:* This table examines variation in firm and individual-level outcomes depending on main earner status. The sample is restricted to entrepreneurs who were married or cohabiting the year before giving birth to their first child. “Main earner” is an indicator equal to 1 if the mother earned more than 50% of the household income in the 3 years before childbirth. Panel A examines firm outcomes for main vs. secondary earners. In columns (4)-(6), observations are reweighted to achieve a balanced distribution of firm characteristics between main and secondary earners. Panel B examines the effect on log income, irrespective of whether the individual is still an entrepreneur at any point. The control group includes the entrepreneurs who own the matched firms and their spouses (spouses stay in the sample if they are still married to the entrepreneur). Controls in Panel B include a polynomial for individual age, marital status, and interaction between main earner status and marital status. Standard errors are reported in parenthesis and are clustered at the firm level (Panel A) and at the individual level (Panel B). \* indicates statistical significance at the 10% level, \*\* at the 5% level, and \*\*\* at the 1% level.

**Table 5: Cultural norms and firm outcomes**

	Mothers (founders)			Mothers (all firm owners)			Fathers (founders)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Log Sales	Profits	Profit Margin	Log Sales	Profits	Profit Margin	Log Sales	Profits	Profit Margin
Post × Traditional	-0.256** (0.123)	-34,205*** (4,705)	-0.141** (0.061)	-0.253*** (0.088)	-18,000*** (3,582)	-0.081*** (0.028)	0.176** (0.070)	-1,953 (5,718)	0.027 (0.033)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province × year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.800	0.762	0.680	0.822	0.812	0.652	0.793	0.703	0.600
Number of observations	8,525	9,475	8,525	15,670	18,020	15,670	31,430	34,845	31,430

*Notes:* This table presents regression estimates examining variation in mothers' and fathers' firm outcomes depending on cultural norms. The sample includes parents who are second-generation immigrant entrepreneurs, i.e., individuals born in Canada from foreign-born parents. "Post" is an indicator equal to 1 in the year of birth of the first child or after. "Traditional" is an indicator equal to 1 if the entrepreneur's parents immigrated from a country with traditional gender norms. The construction of the gender norms index is detailed in Appendix C. Columns (1)-(3) show results for mothers who are founders; columns (4)-(6) for all mothers who are business owners. Columns (7)-(9) shows results for fathers who are founders. Profits are expressed in constant 2012 dollars. Controls include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Standard errors are reported in parentheses and are clustered at the firm and landing year *times* country of origin level. \* indicates statistical significance at the 10% level, \*\* at the 5% level, and \*\*\* at the 1% level. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

**Table 6: Proximity to grandparents and firm outcomes**

<i>Panel A: mothers</i>			
	(1)	(2)	(3)
	<b>Log Sales</b>	<b>Profits</b>	<b>Profit Margin</b>
Post × Close to grandparents	0.133*** (0.035)	5,728** (2,287)	0.071*** (0.024)
Controls	Yes	Yes	Yes
Industry × province × year effects	Yes	Yes	Yes
Firm effects	Yes	Yes	Yes
$R^2$	0.803	0.756	0.598
Number of observations	49,770	54,820	49,770
<i>Panel B: fathers</i>			
	(1)	(2)	(3)
	<b>Log Sales</b>	<b>Profits</b>	<b>Profit Margin</b>
Post × Close to grandparents	0.019 (0.019)	-3,748*** (1,338)	0.007 (0.012)
Controls	Yes	Yes	Yes
Industry × province × year effects	Yes	Yes	Yes
Firm effects	Yes	Yes	Yes
$R^2$	0.766	0.670	0.496
Number of observations	236,635	259,890	236,635

*Notes:* This table presents regression estimates examining variation in mothers' and fathers' firm outcomes depending on proximity to grandparents. "Post" is an indicator equal to 1 in the year of birth of the first child or after. "Close to grandparents" is an indicator equal to 1 if the grandparents live in the same municipality as the parent, as a proxy for the availability of informal childcare through family networks. Panel A shows results for firms owned by mothers; Panel B for firms owned by fathers. The sample includes mother and father entrepreneurs who can be matched to their own family of origin through tax files. Profits are expressed in constant 2012 dollars. Controls include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Standard errors are reported in parenthesis and clustered at the firm level. \* indicates statistical significance at the 10% level, \*\* at the 5% level, and \*\*\* at the 1% level. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

**Table 7: Formal childcare expansion and firm outcomes**

<i>Panel A: mothers</i>			
	(1)	(2)	(3)
	<b>Log Sales</b>	<b>Profits</b>	<b>Profit Margin</b>
Post expansion × Mother	-0.048 (0.041)	711 (2,992)	-0.054* (0.029)
Post expansion × Mother × Child under two	0.113** (0.050)	4,625 (3,913)	0.072*** (0.027)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Industry × year FE	Yes	Yes	Yes
Municipality × year FE	Yes	Yes	Yes
Number of observations	58,335	58,335	58,335
<i>Panel B: mothers and fathers</i>			
	(1)	(2)	(3)
	<b>Log Sales</b>	<b>Profits</b>	<b>Profit Margin</b>
Post expansion × Father × Child under two	-0.028 (0.031)	-1,813 (2,239)	0.004 (0.008)
Post expansion × Mother × Child under two	0.172*** (0.050)	11,494** (4,819)	0.095*** (0.031)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Industry × year FE	Yes	Yes	Yes
Municipality × year FE	Yes	Yes	Yes
Number of observations	344,540	344,540	344,540

*Notes:* This table examines the effect of formal childcare expansion on firm outcomes. The treated sample include parents of children who are at most six years old. “Post expansion” is equal to 1 in or after the year the municipality experiences an increase in childcare provision of at least one standard deviation. “Child under two” is equal to 1 if the parent has a child who is two years old or younger at the time of expansion. In Panel A, mothers and their matches are part of the sample. In Panel B, fathers and their matches are also included. Profits are expressed in constant 2012 dollars. Controls include indicators for firm age, the number of firm owners, a polynomial for individual age, marital status, and indicators for the number of children under 3 years old in the household. Standard errors are double clustered at the firm and municipality level. \* indicates statistical significance at the 10% level, \*\* at the 5% level, and \*\*\* at the 1% level. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

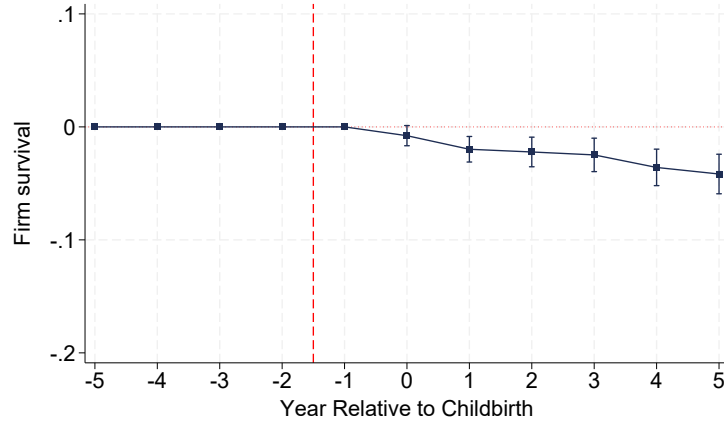
**Internet Appendix to**

**“Minding Your Business or Your Child?  
Entrepreneurs, Fertility, and Firm and Worker  
Outcomes ”**

Valentina Rutigliano  
Southern Methodist University

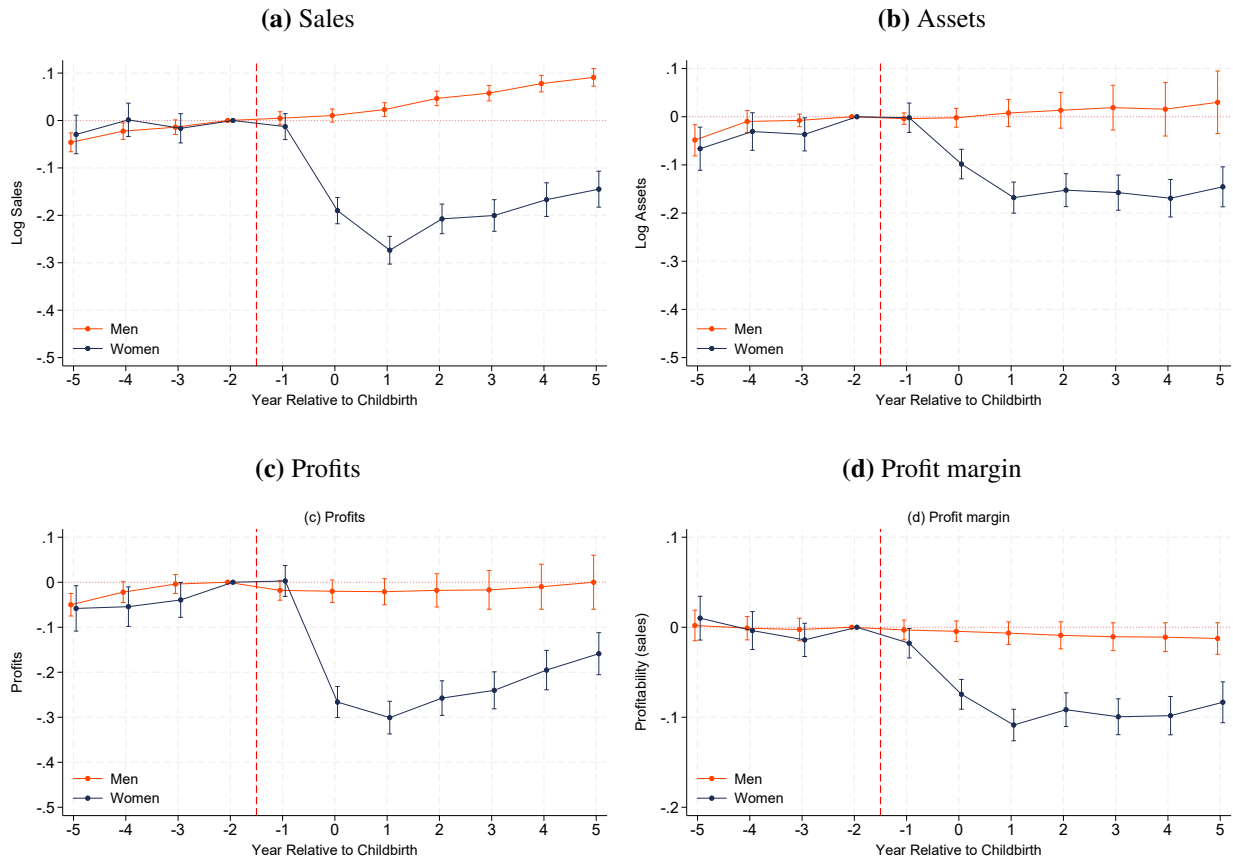
## A Additional Figures and Tables

Figure A.1: Firm survival



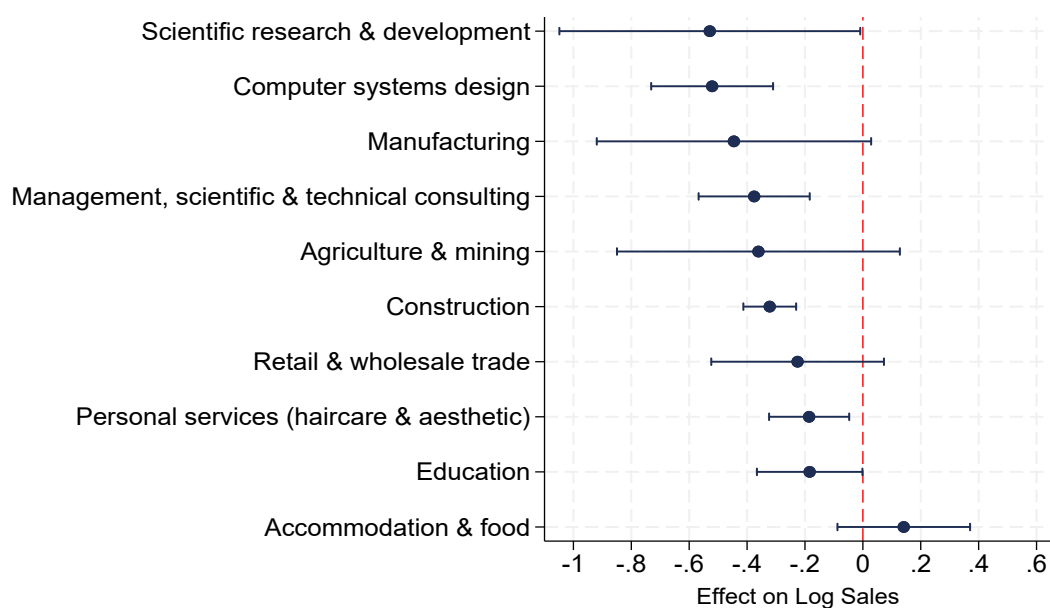
*Notes:* The graphs show event-study estimates obtained by fitting equation 1 on an indicator variable for firm survival. Year 0 is when the first childbirth event takes place. The treated group is a sample of firms owned by a female entrepreneur for at least two years before she had her first child. The control group is a matched sample of firms owned by female entrepreneurs with zero observed fertility. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

**Figure A.2: Effect of childbirth on firm outcomes: mothers vs. fathers**



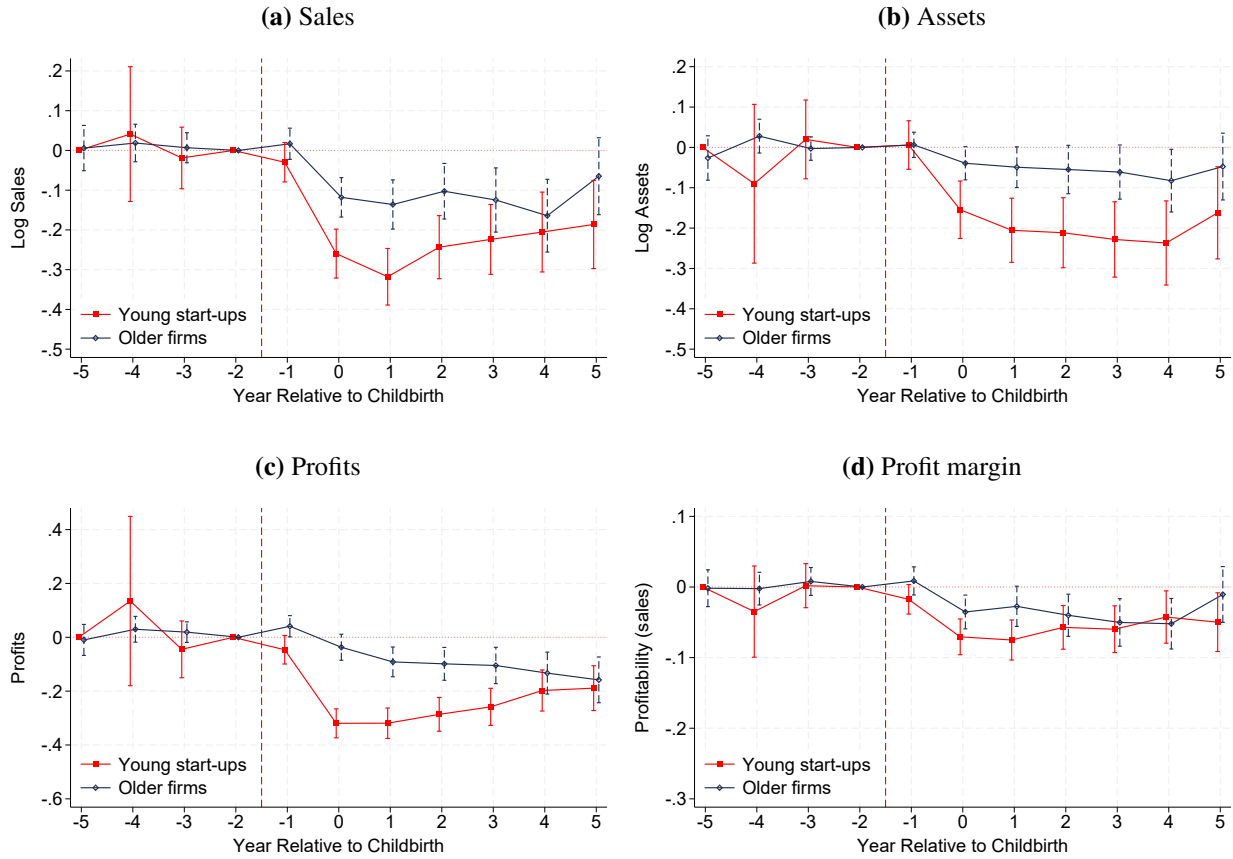
*Notes:* The graphs show event-study estimates obtained by estimating equation 1 on the sample restricted to parents, separately for mothers and fathers, following [Kleven, Landais, and Sjøgaard \(2019\)](#). Identification comes from not-yet-treated parents. Outcomes include log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)). Year 0 is when the first childbirth event takes place. Coefficients for profits are reported as a percentage of the counterfactual outcome absent children. Profit margin is the ratio of profits to sales. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

**Figure A.3: Effect of childbirth on log sales by industry**



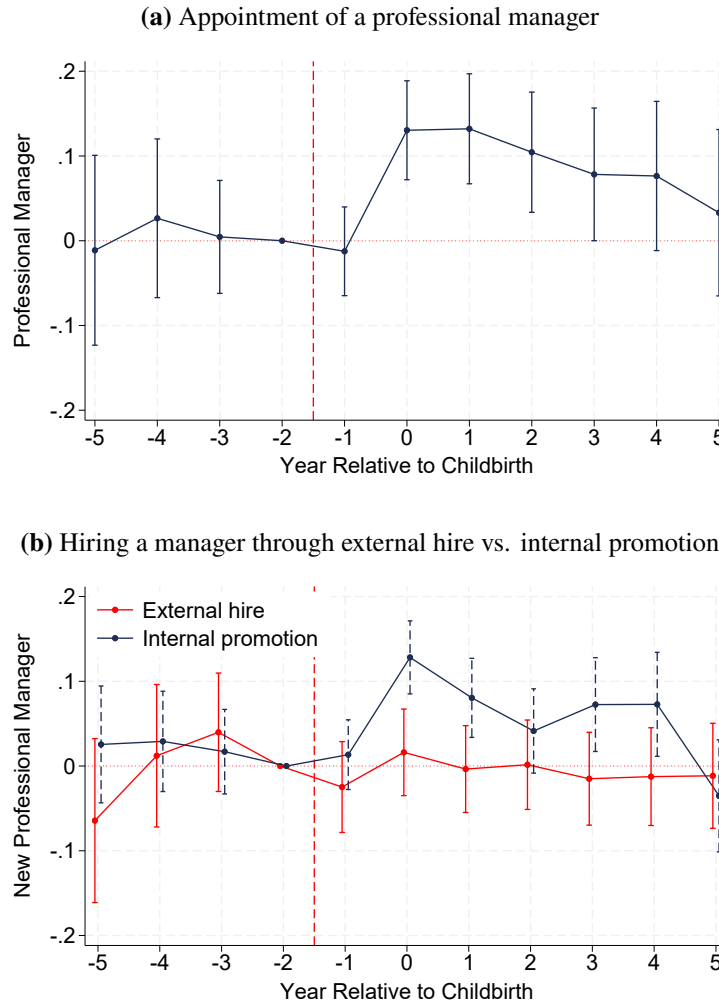
*Notes:* The graphs show event-study estimates obtained by fitting a two-period version of equation 1 on log sales, separately by industry. I report coefficients on the interaction  $Post \times Mother_j$ .  $Post$  is an indicator equal to 1 in the year of birth of the first child or after. The treated group is a sample of firms owned by a female entrepreneur for at least two years before she had her first child. The control group is a matched sample of firms owned by female entrepreneurs with zero observed fertility. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included, where industry codes are at the 4-digit level. I report 95% confidence intervals based on standard errors clustered at the firm level.

**Figure A.4: Effect of childbirth on firm outcomes by firm age**



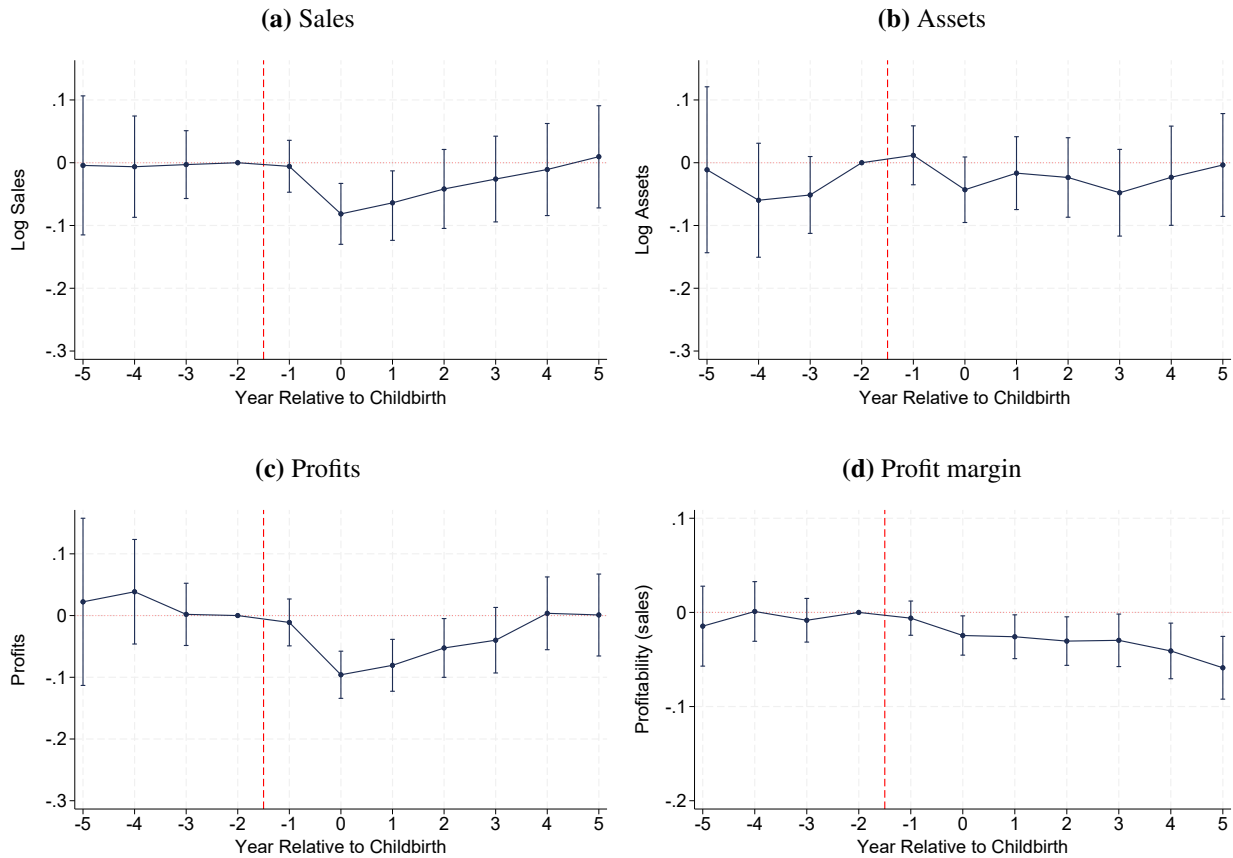
*Notes:* The graphs show event-study estimates obtained by fitting equation 1 on log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)), separately by firm age. Young start-ups are firms that experienced the entrepreneur’s first childbirth when they were at most 5 years old. Older firms are defined as firms that were older than 5 when the entrepreneur had her first child. Year 0 is when the first childbirth event takes place. The treated group is a sample of firms owned by a female entrepreneur for at least two years before she had her first child. The control group is a matched sample of firms owned by female entrepreneurs with zero observed fertility. Coefficients for profits are reported as a percentage of the counterfactual outcome absent children. Profit margin is the ratio of profits to sales. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

**Figure A.5: Effect of childbirth on manager appointment**



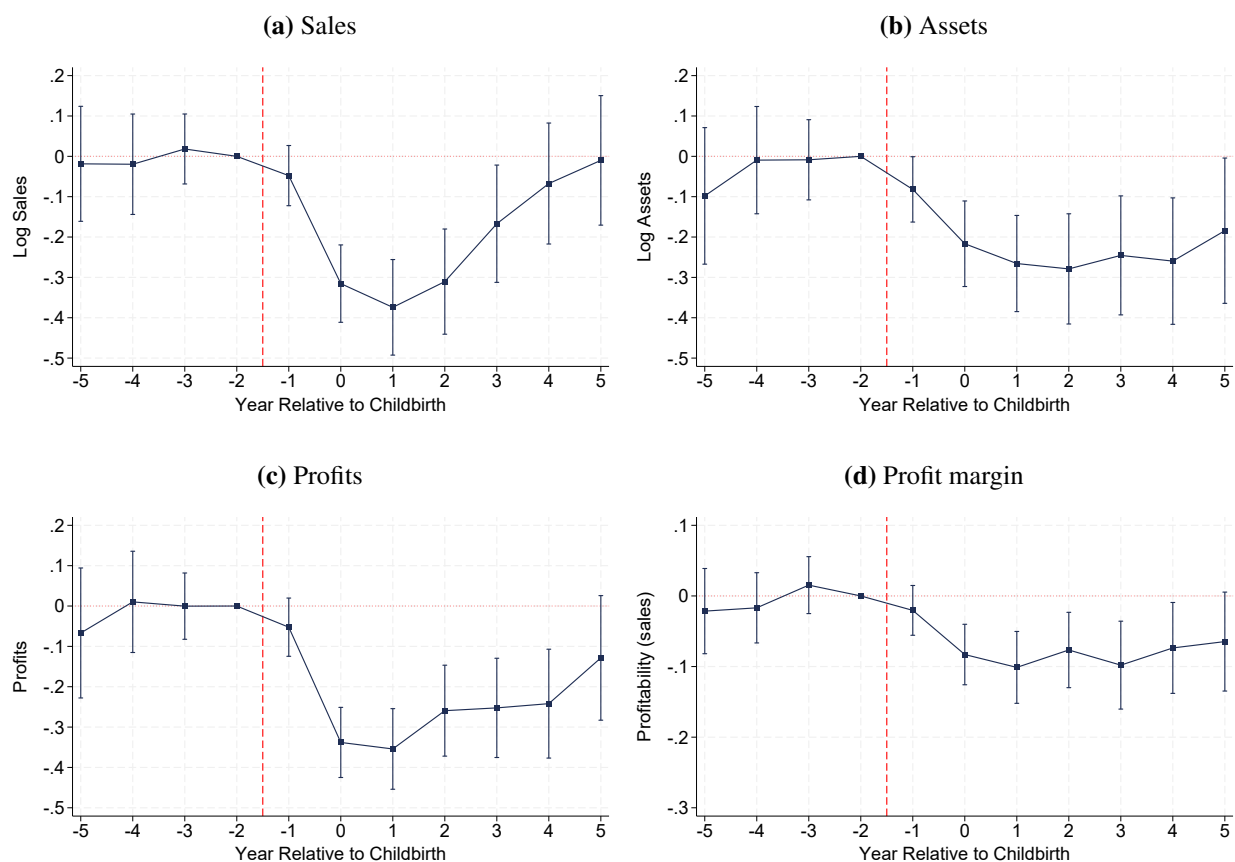
*Notes:* The graphs show event-study estimates obtained by fitting equation 1 on an indicator for whether the firm is professionally managed (panel (a)) and an indicator for whether the firm hires a manager through external hiring or internal promotion (panel (b)). A firm is defined as professionally managed if the highest paid employee in the firm is not an owner. Year 0 is when the first childbirth event takes place. The treated group is a sample of firms owned by a female entrepreneur for at least two years before she had her first child. The control group is a matched sample of firms owned by female entrepreneurs with zero observed fertility. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

**Figure A.6: Effect of childbirth on firms owned by spouses**



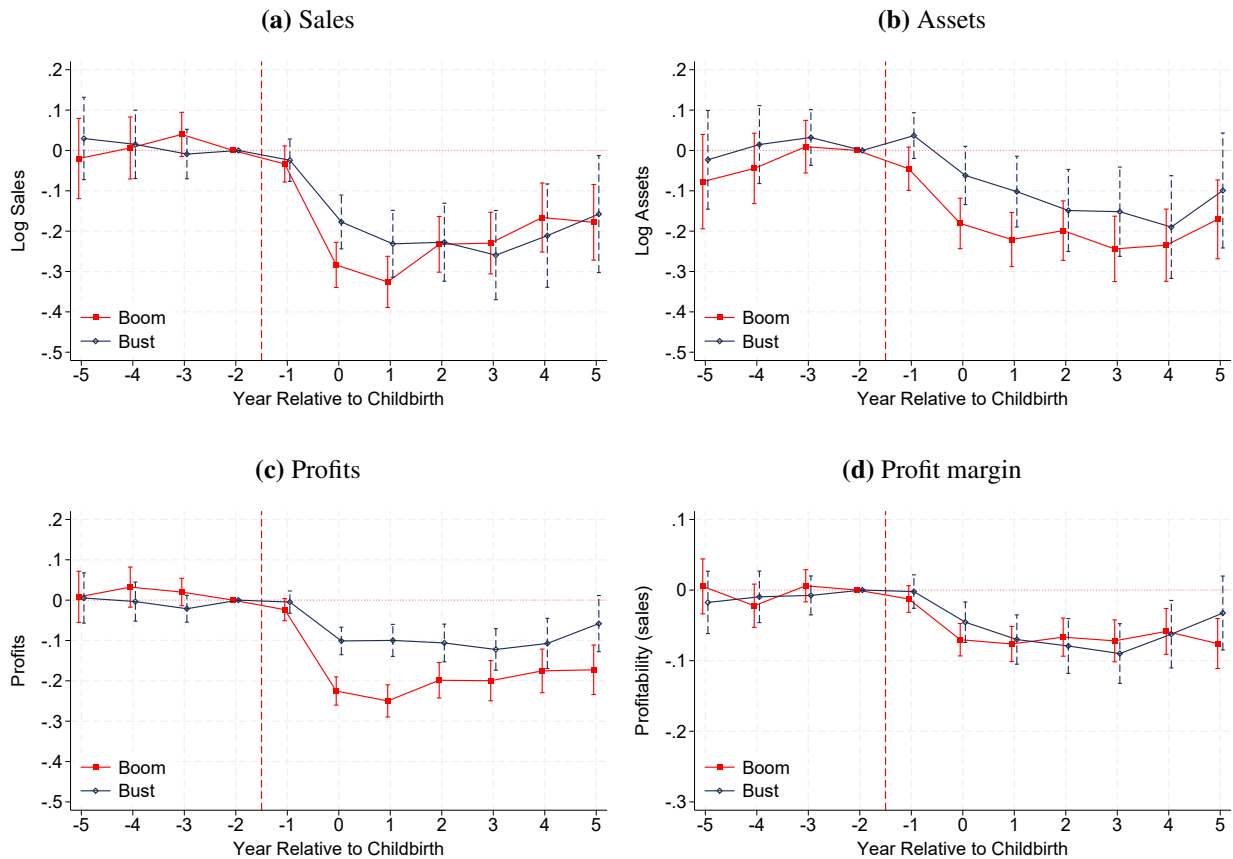
*Notes:* The graphs show event-study estimates obtained by fitting equation 1 on log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)). Year 0 is when the first childbirth event takes place. The treated group is a sample of firms owned by a couple for at least two years before they had their first child. The control group is a matched sample of firms owned by couples with zero observed fertility. Coefficients for profits are reported as a percentage of the counterfactual outcome absent children. Profit margin is the ratio of profits to sales. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

**Figure A.7: Effect of childbirth on firm outcomes for women over 35**



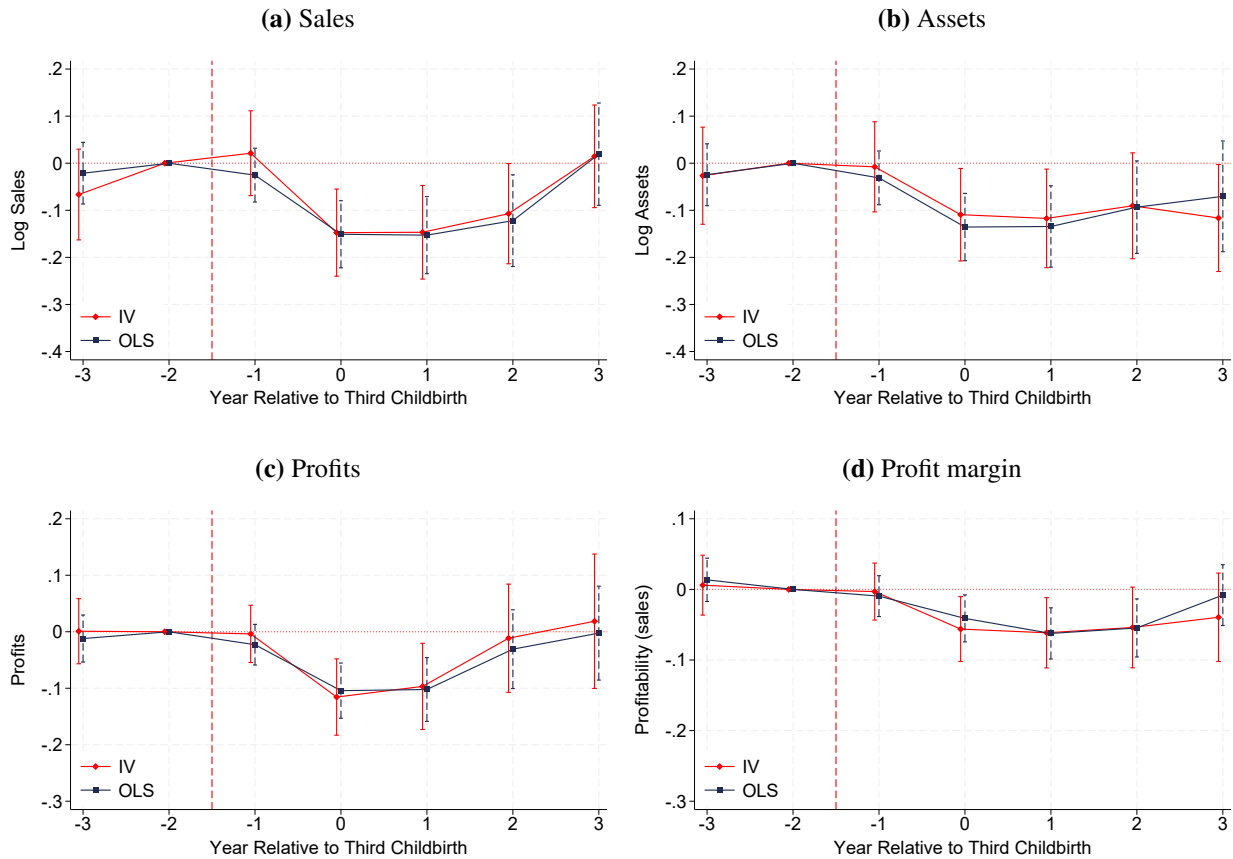
*Notes:* The graphs show event-study estimates obtained by fitting equation 1 on log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)). The sample is restricted to women who were over 35 when they had their first child and were single (not married or cohabiting) when they started their firm. Year 0 is when the first childbirth event takes place. The treated group is a sample of firms owned by a female entrepreneur for at least two years before she had her first child. The control group is a matched sample of firms owned by female entrepreneurs with zero observed fertility. Coefficients for profits are reported as a percentage of the counterfactual outcome absent children. Profit margin is the ratio of profits to sales. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

**Figure A.8: Firm outcomes by business cycle**



*Notes:* The graphs show event-study estimates obtained by fitting equation 1 on log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)), separately by industry performance in the year of the first childbirth. Booms are periods in which industry sales growth ranks in the upper tercile of all industry-years, while busts are periods of growth in the lower tercile. Only firms owned by male entrepreneurs are used to construct the terciles. Year 0 is when the first childbirth event takes place. The treated group is a sample of firms owned by a female entrepreneur for at least two years before she had her first child. The control group is a matched sample of firms owned by female entrepreneurs with zero observed fertility. Coefficients for profits are reported as a percentage of the counterfactual outcome absent children. Profit margin is the ratio of profits to sales. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

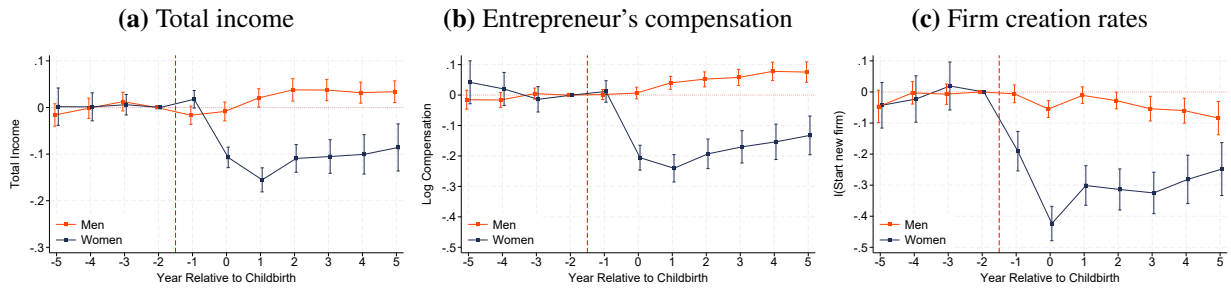
**Figure A.9: Effect of childbirth on firm outcomes: sibling sex mix IV vs. OLS**



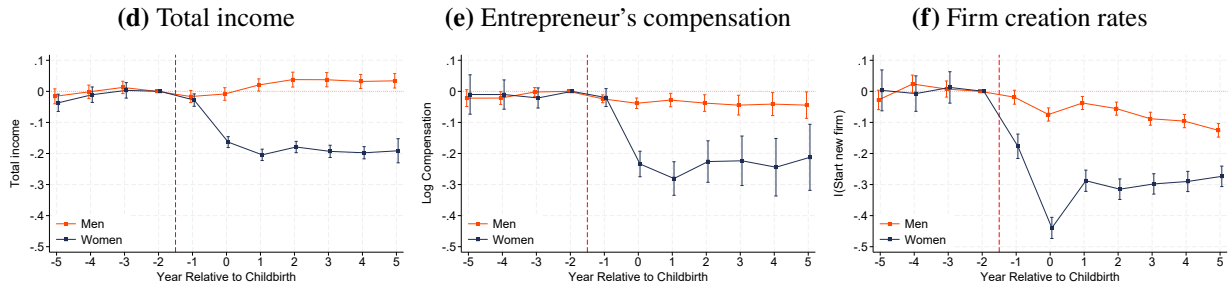
*Notes:* The graphs compare event-study estimates around third childbirth using an instrumental variable and OLS. The dependent variables are log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)). Year 0 is when the first childbirth event takes place. For the IV design, I report event time coefficients  $\beta_k$  estimated from equation 5. The instrumental variable specification is based on the sex mix of the first two children as instrument for the birth of a third child. Coefficients for profits are reported as a percentage of the counterfactual outcome absent children. Profit margin is the ratio of profits to sales. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, marital status, a dummy to indicate whether the individual already had their first child, and binned event time dummies with respect to the second child. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

**Figure A.10: Gender gap in the effect of childbirth on entrepreneurial career outcomes**

**A. Matched samples**



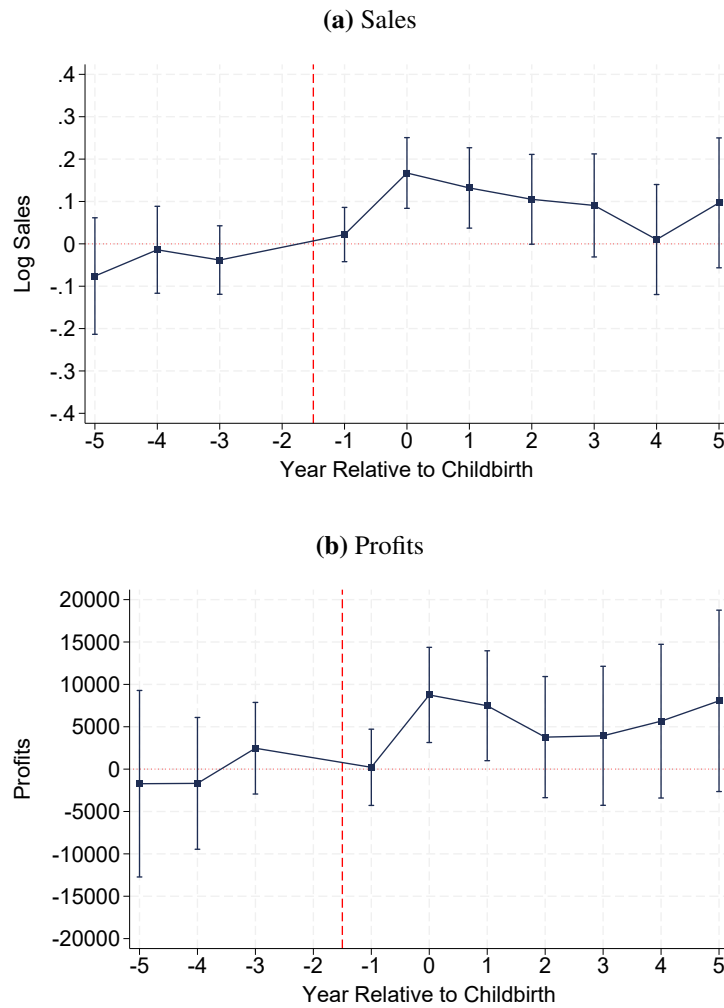
**B. Parents only**



*Notes:* The graphs show the effect of childbirth on entrepreneurial career outcomes, separately by gender. Year 0 is when the first childbirth event takes place. In the top panel, Panel (a) and (b) report coefficients obtained by fitting variations of equation 1, for the sample of individuals who were entrepreneurs for at least two years before the first childbirth event. In panel (a), total income is income from all sources, irrespective of whether the individual is still an entrepreneur at any point. Coefficients are reported as a percentage of the counterfactual outcome absent children. Control variables include a polynomial for individual age and marital status. Individual and year fixed effects are included. In panel (b), entrepreneurs' compensation is the sum of wages and dividends entrepreneurs take from their firms (conditional on the firm being active). Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. Panel (c) reports event-study estimates obtained fitting equation 3, separately by gender, irrespective of any entrepreneurial experience prior to childbirth. Coefficients are reported as a percentage of the counterfactual outcome absent children. Control variables include indicators for individual age and marital status. Individual and year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the individual level (panel (a) and (c)) and at the firm level (panel (b)). In the bottom panel, I repeat the same estimation on the sample of parents only, following [Kleven, Landais, and Sogaard \(2019\)](#).



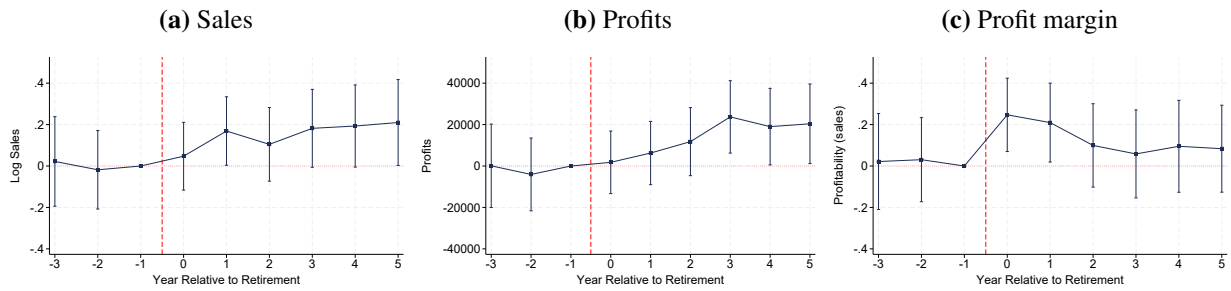
**Figure A.12: Proximity to grandparents and mothers' firm outcomes: event study**



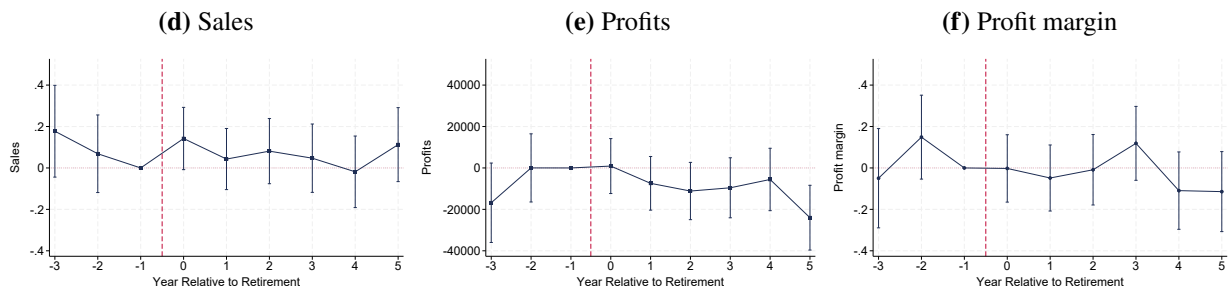
*Notes:* This figure depicts coefficients for the interaction of event time indicators relative to first childbirth and an indicator for proximity to grandparents, showing dynamic effects for the specification in Table 6. Firm effects and industry  $\times$  province  $\times$  year fixed effects are included. I report 95% confidence intervals based on standard errors which are clustered at the firm level.

**Figure A.13: Effect of grandparents' retirement on mothers' firm outcomes**

**A. Grandmother's retirement**



**B. Grandfather's retirement**



*Notes:* The graphs show event-study estimates around grandmother's (top panel) and grandfather's (bottom panel) retirement for log sales (panel (a)), profits (panel (b)), and profit margin (panel (c)). Year 0 is when the grandparent (i.e., the entrepreneur's parent) retires. The sample includes mother entrepreneurs who can be matched to their own family of origin through tax files. The treated group includes women who live in the same municipality as their parent, compared to a control group of women whose parent lives in a different municipality. Coefficients for profits are reported in real terms (2012 CPI). Profit margin is the ratio of profits to sales. Control variables include indicators for firm age, a polynomial for entrepreneur's age, and indicators for whether or not the other grandparent is also retired and lives in the same municipality. Firm and industry  $\times$  year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

**Table A.1: Children's sex mix and family size**

<i>Panel A: family size</i>				
	(1)	(2)	(3)	(4)
	<b>Third child</b>	<b>Third child</b>	<b>Third child</b>	<b>Second child</b>
Same sex	0.047*** (0.006)			
Two sons		0.045*** (0.008)		
Two daughters		0.049*** (0.008)		
First-born daughter			0.001 (0.002)	0.002 (0.004)
Controls	Yes	Yes	Yes	Yes
Province × year effects	Yes	Yes	Yes	Yes
$R^2$	0.020	0.020	0.042	0.207
Number of observations	77,260	77,260	253,500	253,500

*Panel B: descriptive statistics*

		(1)	(2)
		<b>Same sex</b>	<b>Different sex</b>
Married	%	84.0	83.9
Age	mean	33.8	33.7
	SD	5.0	5.0
Age at first childbirth	mean	30.0	30.0
	SD	3.1	3.1
Age at second childbirth	mean	32.8	32.8
	SD	3.3	3.2
Individual income	mean	68,911	69,624
	SD	99,975	126,787
Family income	mean	155,693	160,529
	SD	211,794	324,260
Number of observations		62,760	63,370

*Notes:* This table provides evidence on the same-sex instrumental variable. Panel A presents regression estimates examining the effect of children's sex mix on family size. Column (1) shows the effect of having two children of the same sex on the probability of having a third child, for a sample of female entrepreneurs with at least two children. Column (2) decomposes the effect in column (1) into the effect of having two sons vs. two daughters. Columns (3) and (4) show the effect of having a first-born daughter on the probability of having a third and second child, respectively, for the whole sample of female entrepreneurs who are mothers. Controls include marital status and a polynomial for age. Standard errors are reported in parenthesis and are clustered at the individual level. \* indicates statistical significance at the 10% level, \*\* at the 5% level, and \*\*\* at the 1% level. Panel B shows descriptive statistics for the sample of women with two children, separately by the sex mix of the first two children. Individual and family income are reported in real terms (2012 CPI). The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

**Table A.2: Co-founders and firm outcomes**

	(1)	(2)	(3)
		<b>Log Sales</b>	<b>Profits</b>
			<b>Profit Margin</b>
Post × Mother	-0.266*** (0.021)	-20,793*** (1324)	-0.069*** (0.008)
Post × Mother × Co-founder	0.212*** (0.042)	13,404*** (2,596)	0.044*** (0.015)
Controls	Yes	Yes	Yes
Industry × province × year effects	Yes	Yes	Yes
Firm effects	Yes	Yes	Yes
$R^2$	0.777	0.785	0.619
Number of observations	154,460	154,460	154,460

*Notes:* This table presents regression estimates examining variation in mothers' outcomes depending on the presence of a co-founder. "Post" is an indicator equal to 1 in the year of birth of the first child or after. "Co-founder" is an indicator equal to 1 if the firm has a co-founder the year prior to childbirth. Profits are expressed in constant 2012 dollars. Controls include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Standard errors are reported in parenthesis and clustered at the firm level. \* indicates statistical significance at the 10% level, \*\* at the 5% level, and \*\*\* at the 1% level. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

**Table A.3: Firm risk taking**

	(1)	(2)	(3)
	$\sigma(\text{ROA})$	$\sigma(\text{Profits})$	<b>Leverage</b>
Post × Mother	0.019 (1.017)	661 (837)	0.025** (0.011)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Industry × province × year FE	Yes	Yes	Yes
Number of observations	157,470	157,470	157,470

*Notes:* This table examines the impact of childbirth on firm risk-taking. The treated group is a sample of firms owned by a female entrepreneur for at least two years before she had her first child. The control group is a matched sample of firms owned by female entrepreneurs with zero observed fertility. "Post" is an indicator equal to 1 in the year of birth of the first child or after. The dependent variable in column (1),  $\sigma(\text{ROA})$ , is the standard deviation of the return on assets, computed separately before and after childbirth. The dependent variable in column (2),  $\sigma(\text{Profit})$ , is the standard deviation of net income, calculated separately before and after childbirth, in constant 2012 dollars. The dependent variable in column (3), Leverage, is the ratio of total long term liabilities to total assets, reflecting the firm's reliance on debt financing. Control variables include firm age, the number of owners, and marital status. Standard errors are clustered at the firm level. \* indicates statistical significance at the 10% level, \*\* at the 5% level, and \*\*\* at the 1% level. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

**Table A.4: Grandmother retirement and center-based childcare**

	<b>Log Sales</b>	<b>Profits</b>	<b>Profit Margin</b>
Post × Close to grandma	0.217*** (0.065)	16,016** (6,354)	0.144** (0.071)
Post × Close to grandma × High childcare	-0.176** (0.073)	-16,515** (7,149)	-0.212*** (0.080)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Industry × year FE	Yes	Yes	Yes
Municipality × year FE	Yes	Yes	Yes
Number of observations	37,190	37,190	37,190

*Notes:* This table examines the effect of grandmother retirement on firm outcomes, using a triple difference design. “Post retirement” is an indicator equal to 1 in the year of retirement or after. “Close to grandparents” is equal to 1 if the grandparents live in the same municipality as the parent. High childcare refers to municipalities with above median center-based childcare provision. Profits are expressed in constant 2012 dollars. Controls include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. \* indicates statistical significance at the 10% level, \*\* at the 5% level, and \*\*\* at the 1% level. The numbers of observations are rounded to the nearest five to comply with the confidentiality requirements of Statistics Canada.

## B Same Sex Instrument

A key challenge in estimating the effects of childbirth on firm outcomes is selection: women who become mothers may differ systematically from those who do not in ways that are unobservable and correlated with firm performance. To address this concern, I adopt the instrumental variable approach first proposed by [Angrist and Evans \(1998\)](#), using the sex composition of the first two children to generate plausibly exogenous variation in family size. This approach exploits parents' preference for a mixed-sex composition in children: parents whose first two children are of the same sex are significantly more likely to have a third child than those with one child of each sex.

Preference for variety, which has been documented in many contexts, also holds for parents in Canada. [Table A.1](#) reports the relationship between children's sex composition and family size. Column (1) shows that having two children of the same sex increases the probability of having a third child by 4.7 percentage points. Given a base rate of 12.6% in this sample, this corresponds to an increase of nearly 37%.

For this instrument to be valid, it must satisfy two key assumptions. First, the sex of the first two children must be as good as randomly assigned. Second, the instrument has to satisfy the exclusion restriction, requiring that the sex of the first two children must not directly affect entrepreneurial outcomes, except through its impact on the likelihood of having a third child. This assumption could be violated, for example, if parents systematically invest more time or resources into raising children of one sex over the other, particularly boys ([Dahl and Moretti, 2008](#)).<sup>16</sup>

While these assumptions cannot be tested directly, I present evidence that supports their plausibility. First, I show that women who had two same-sex children are observationally similar to women who had two opposite-sex children. Panel B of [Table A.1](#) reports descriptive statistics for women with two children, stratified by the sex composition of the first two. The two groups are virtually identical in age, age at childbirth, marital status, and both individual and family income, supporting the random assignment assumption. Moreover, I find no evidence of a systematic preference for sons among Canadian parents during the sample period. Columns (2) of Panel A show that the increase in third-birth probability is similar whether parents have two boys (4.5 percentage points) or two girls (4.9 percentage points), consistent with a preference for mixed-sex composition rather than for a particular gender. Columns (3) and (4) show that having a first-born

---

<sup>16</sup>An additional assumption often required for interpreting instrumental variable estimates as local average treatment effects is the monotonicity condition, which rules out the presence of "defiers"—individuals who would take the treatment only when not encouraged by the instrument. In this setting, defiers are individuals who prefer exactly two children of a particular sex, so that having two boys or two girls decreases the probability of having a third child. Even though the presence of defiers cannot be tested, [De Chaisemartin \(2017\)](#) shows that it is possible to identify causal estimates under weaker assumptions than the absence of defiers and that the sufficient conditions are likely to hold in the context of the sibling sex mix instrument.

daughter has no significant effect on the probability of having a second or third child.

To estimate the dynamic effect of having a third child, I implement an instrumental variables event study design following [Kleven, Landais, and Sjøgaard \(2019\)](#). I restrict the sample to women who had their first child during the sample years and had at least two children by the end of the sample period. This setup ensures that all individuals in the estimation sample were at risk of having a third child, even if they had none or only one child in a given year. Specifically, I estimate the following regression:

$$y_{jt'} = \alpha_j + \lambda_{s(j),p(j),t'} + \sum_{k=a}^b \beta_k R_{jt'}^k + X'_{jt'} \gamma + \epsilon_{jt'}, \quad (5)$$

where  $y_{jt'}$  denotes an outcome for firm  $j$  in year  $t'$ ,  $\alpha_j$  are firm fixed effects, and  $\lambda_{s(j),p(j),t'}$  are province-by-industry-by-year fixed effects. The indicators  $R_{jt'}^k$  denote event times relative to the third birth. Each indicator is instrumented by the interaction  $R_{jt'}^k \times \text{SameSex}_j$ , where  $\text{SameSex}_j$  is equal to 1 if the first two children are of the same sex. The control vector  $X'_{jt'}$  includes the same covariates used in Equation 1, along with binned event time indicators around the second child's birth (to account for any effects of the most recent prior birth) and an indicator for whether the entrepreneur already had their first child.

To assess the validity of the event study approach, I estimate dynamic effects around the birth of the third child using both OLS and IV specifications of Equation 5. The close similarity between the two sets of estimates across event time reinforces the credibility of the event study design as a tool for estimating the effects of childbirth on firm outcomes.

## C Gender Progressivity Index

The World Values Survey (WVS) includes several questions designed to gauge individuals' attitudes toward gender roles. These questions may ask respondents to agree or disagree with statements related to gender equality, traditional gender roles, and women's roles in society. I consider the following questions or statements:

1. A working mother can establish just as warm and secure a relationship with her children as a mother who does not work.
2. Both the husband and wife should contribute to household income.
3. When jobs are scarce, men should have more right to a job than women.
4. On the whole, men make better political leaders than women do.
5. A university education is more important for a boy than for a girl.
6. On the whole, men make better business executives than women do.
7. If a woman earns more money than her husband, it's almost certain to cause problems.
8. When a mother works for pay, the children suffer.
9. Do you think that a woman has to have children in order to be fulfilled or is this not necessary?

Not all questions are asked in each survey wave, but all the questions I include were present in at least three waves. To create a single index, I aggregate the answers in several steps. First, I code the answers to all questions so that a higher score represents more egalitarian attitudes. Second, for each wave, I calculate a country's score as the standardized deviation from the average score of that wave. Using the deviation from the average helps account for changes in gender norms over time and ensure fair comparisons between countries surveyed in different years. Finally, for countries surveyed in multiple waves, I average the score across waves.

Cultural values are remarkably stable over time: the correlation of the index across different time periods within countries is 86%. I alternatively compute the index only using questions 3, 4, and 5, which were included in each wave except the first. The correlation between the two indexes is 96%.

## **Additional References**

- Dahl, G.B. and E. Moretti. 2008. The demand for sons. *The Review of Economic Studies* 75(4), pp. 1085-1120.
- De Chaisemartin, C. 2017. Tolerating defiance? Local average treatment effects without monotonicity. *Quantitative Economics* 8(2), pp. 367-396.