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

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Using Canadian administrative data, I document that childbirth has substantial and persistent effects on women's firm performance and employees' outcomes. Over the five years after a founder's first birth, sales, assets, and profits fall by 15–25%. In contrast, performance in firms owned by fathers remains unchanged. The declines in firm outcomes spill over to employees of mother-owned firms, who experience a 4% reduction in earnings. Fertility among employees rises after the entrepreneur's childbirth, suggesting within-firm network effects in family formation. The penalties for mother-owned firms cannot be fully explained by household specialization based on labor market advantage. Childcare availability and progressive gender norms mitigate the adverse effect of childbirth on the entrepreneurship gap.

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I Introduction

Entrepreneurship plays a crucial role for economic growth. Young firms play a disproportionate role in creating new jobs and driving aggregate productivity dynamics (Haltiwanger, Jarmin, and Miranda, 2013; Andrews et al., 2022). However, women are still underrepresented in entrepreneurship. Despite some convergence over the past decades, a substantial gender gap remains in both the likelihood of women starting new firms and the performance of female-founded firms. The causes of these disparities are not entirely understood,[1] but their implications are potentially far-reaching. If women's underrepresentation in entrepreneurship reflects a misallocation of talent, it could have significant consequences for aggregate growth and innovation. This paper provides a novel explanation for the persistence of the entrepreneurship gender gap: children have a substantial effect on mothers' entrepreneurial activities, but not on fathers'.

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 impact extends beyond women's careers. If childbirth negatively affects firm performance—a result that would be consistent with evidence on the importance of founders for firm success (Smith et al., 2019; Becker and Hvide, 2022)—this suggests that childbirth effectively imposes a negative externality on the firm. This further raises the importance of policies aimed at closing gender gaps in entrepreneurship.

This paper studies the effect of children on women's entrepreneurial activity using rich administrative data from Canada. Using an event study design around the birth of the first child, I find that childbirth accounts for half of the gender gap in firm outcomes for entrepreneurial firms. Childbirth among women entrepreneurs generates large negative spillovers: firm sales drop by over 20% following childbirth, and workers' earnings drop by around 4%. Conversely, firms owned by

[1] Supply-side explanations emphasize the role of preferences and beliefs. Women's higher risk aversion may make entrepreneurship less attractive than wage employment, which offers a more stable income stream (Fossen, 2012; Caliendo, Fossen, and Kritikos, 2014). Gender stereotypes can also deter women from pursuing entrepreneurship, as it is often perceived as a male-dominated field (Yang and Aldrich, 2014; Yang and del Carmen Triana, 2019). Even when women do enter entrepreneurship, they may prioritize non-pecuniary goals, such as work-family balance, over firm growth (Burke, Fitzroy, and Nolan, 2002; Looze and Desai, 2020). Demand-side factors focus on frictions and discrimination. Female entrepreneurs face greater challenges in raising capital, partly due to investor biases (Guzman and Kacperczyk, 2019; Hebert, Forthcoming; Hebert, Tookes, and Yimfor, 2024). The problem is exacerbated in contexts in which investors are predominantly males, such as VC: male financiers show less interest in female-founded ventures and are less skilled in assessing their potential (Ewens and Townsend, 2020; Raina, 2021). The lack of female entrepreneurial role models further restricts women's opportunities to enter and succeed in business (Markussen and Røed, 2017; Mertz, Ronchi, and Salvestrini, 2024).

men show no significant performance decline after childbirth. In addition, I show that childcare availability (supplied by either retired grandparents or daycare centers) as well as more progressive gender norms significantly reduce the negative effect of childbirth on firm performance. 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 entrepreneurship requires longitudinal data that tracks individuals through childbirth events, along with firm-level information, including ownership, financials, and personnel data. I use the Canadian Employer-Employee Dynamics Database (CEEDD), a set of linkable administrative files compiled by Statistics Canada. The CEEDD is a matched employer-employee dataset derived from tax records, containing both demographic information on workers and detailed financial data on firms.

A unique advantage of the CEEDD is that it links matched worker-firm data with 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. I focus on entrepreneurs who started an incorporated business at least two years before having their first child. Using a matched event-study design that compares firms owned by women who become mothers to similar firms owned by women without children, I find that childbirth leads to a substantial deterioration in firm outcomes. In the 5 years following 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 profitable, with profit margins decreasing by 6%. Survival rates also decline, though the effect is modest. After 5 years, the likelihood of mother-owned firms remaining operational falls by approximately 4% relative to the control group.

Crucially, firm performance is virtually unaffected when a male founder, rather than a female founder, has a child. Men-owned and women-owned firms follow parallel trends up to the year of childbirth, but they sharply diverge afterward. While childbirth has no effect on men-owned firms, it leads to large, persistent declines for women-owned firms. The magnitude of the effect I find using fathers as the control group is very similar to that found using women without children as controls. 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.

I use the event study design around first childbirth as my main empirical strategy because it has the advantage of capturing the overall treatment effect of all children in the population. To mitigate concerns related to selection into parenthood, 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). Analyzing the impact of a third child through this IV approach, I find that childbirth affects firms owned by mothers, but the effects are smaller and recovery is quicker compared to the first child. Importantly, the IV estimates closely align with the event-study estimates around the third child, lending support to the validity of the event-study design.

The empirical patterns on firm performance suggest that entrepreneurial firms are vulnerable to disruptions in the supply of the founder's human capital. I examine how the impact of children varies across firms at different stages of their life cycle and I find that the effect is stronger for early-stage entrepreneurial firms (under 5 years old), confirming that young firms are especially dependent on the founder. In addition, it is specifically founders (rather than other firm investors) that drive the results. 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 and are not solely driven by low-value-added service industries.

The second part of the analysis examines how childbirth affects entrepreneurial careers. I first focus on mothers and fathers who were already entrepreneurs before childbirth and follow their income trajectories after parenthood. Prior to childbirth, mothers and fathers' incomes follow common trends, but their paths sharply diverge in the year of first childbirth. Fathers' total income remains stable, while mothers' declines by around 11%. This decline is largely driven by reductions in the wages and dividends that mothers extract from their firms.

The results presented so far apply to individuals who were already entrepreneurs before having their first child. But how does childbirth affect the probability that women will become entrepreneurs in the first place? Ex ante, this effect is ambiguous.[2] Entrepreneurship could be an attractive career path for mothers, offering greater flexibility (Yang, Kacperczyk, and Naldi, 2024; Gottlieb, Townsend, and Xu, 2022). However, entrepreneurs work longer hours than employees (Levine and Rubinstein, 2017), often with unpredictable schedules, driven by the need to capitalize on time-sensitive opportunities before they disappear. This could make entrepreneurship a greedy job (Goldin, 2014), incompatible with the commitments of motherhood. Tracing out dynamic

[2]To show this, in Appendix C I develop a simple model of occupational choice with children extending the canonical model in Lucas (1978).

effects around the first childbirth event, I find a marked negative effect of childbirth on women's probability of becoming entrepreneurs. Firm creation rates drop by more than 35% in the year of childbirth. While the effects gradually lessen in subsequent years, founding rates do not fully recover to pre-birth levels, potentially resulting in a "missing cohort" of female-founded firms.

The third set of main outcomes, after firm performance and entrepreneurial careers, concerns workers. I show that after the entrepreneur has a child, the firm's employees 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 that the control group. Furthermore, workers affected by entrepreneur's childbirth event are 1% more likely to experience unemployment. Overall, these findings indicate that the impact of childbirth extends beyond the mother-entrepreneur, generating spillovers onto employees, particularly younger ones.

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, without a deterioration in firm quality. The second potential explanation is that, after childbirth, couples need to specialize and choose to allocate tasks based on their comparative advantage. Since women are more likely to be the secondary earner, 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).

I find no evidence that mother-owned firms become less risky. The decline in firm outcomes appears to reflect a genuine drop in performance rather than a strategic shift toward lower-risk investments.

If household specialization were based purely on comparative advantage, the negative effects of childbirth should be smaller for female breadwinners, as their spouses would likely take on the majority of childcare responsibilities. While I find modest evidence that female breadwinners experience relatively better firm outcomes after childbirth, this group still faces significant penalties. Moreover, relative to couples with a male breadwinner, household income declines for couples with a female breadwinner, as the father's earnings do not increase enough to fully offset the mother's earnings losses. This pattern suggests that specialization based on labor market advantage alone cannot fully explain the division of labor after childbirth. Instead, gender norms may play a significant role.

To study the role of gender norms, I analyze a sample of second-generation immigrants to Canada and find that women from cultures with more traditional gender norms experience a

steeper decline in firm outcomes following childbirth, while there is no similar effect for fathers. This suggests that cultural expectations influence women's roles in childcare, reinforcing gendered divisions in household responsibilities.

To understand how family support networks influence entrepreneurial success, I link mothers to their own parents using tax identifiers. Grandparents, particularly grandmothers, are often relied upon for childcare, and proximity to them may boost mothers' business performance. I find that women who live near their parents see relatively better business outcomes after childbirth. 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.

The effects of grandmother's retirement are especially strong in municipalities with limited formal childcare availability. This suggests that family-provided childcare can substitute for formal services. To further explore the role of childcare expansion, I examine how expansions in formal childcare affect mothers' entrepreneurial outcomes. By analyzing increases in the density of childcare workers in municipalities and comparing the effects on mothers with young versus older children, I find that such expansions positively impact firm performance.

This paper contributes to two main strands of literature. The first is the literature on the gender gap in entrepreneurship. To the best of my knowledge, this is the first study to examine the role of childbirth in explaining the entrepreneurship gender gap, quantifying its impact on both women's entry into entrepreneurship and firm performance, while also documenting spillovers onto workers and extensively exploring the underlying mechanisms.

Several studies have begun exploring the link between motherhood and entrepreneurship. In recent work, Bonney, Pistaferri, and Voena (2025) provide evidence on the effect of business owners' childbirth on firm performance in Norway, finding similar results. Yang, Kacperczyk, and Naldi (2024) find that, in Sweden, mothers are more likely to enter entrepreneurship when labor market child penalties are high, suggesting that entrepreneurship can serve as a means of avoiding career disruptions. Other studies examine how access to reproductive healthcare, such as abortion and emergency contraception, affects female entrepreneurship (Zandberg, 2021; Core, 2024). However, these studies focus on reproductive choice rather than the aggregate impact of children on the entrepreneurship gender gap. My analysis differs by leveraging administrative data to provide a comprehensive assessment of the effects of motherhood on both firm performance and entrepreneurial participation. Relatedly, another strand of literature studies the effect of family policies, such as parental leave and maternity benefits, on female entrepreneurship (Gottlieb, Townsend, and Xu, 2022; Core and Karpati, 2024; Fontenay, 2024).

The second literature I contribute to is the one on the effect of childbirth on labor market

outcomes.[3] While much of this literature focuses on how children affect individual career outcomes, this paper shifts the focus to the broader spillover effects of childbirth when the individual is an entrepreneur. Evidence on such spillovers remains limited. An exception is Brenøe et al. (2024), who study the effects of female employees giving birth and taking parental leave on small firms and coworkers in Denmark, finding modest effects. By contrast, for entrepreneurial firms, which rely heavily on the founder, these spillover effects can be far more pronounced. Given the central role of entrepreneurs in driving job creation and economic growth, childbirth affects not only the entrepreneur's career trajectory but also firm growth and employees' earnings. Moreover, entrepreneurs are not subject to external workplace policies; they set their own schedules and rules, providing a unique setting to study child penalties in the absence of organizational constraints.

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.

[3] Child penalties account for most of the remaining gender gap in earnings, while differences in human capital between men and women have largely disappeared (Kleven, Landais, and Søgaard, 2019). Biological explanations have little support (Kleven, Landais, and Søgaard, 2021; Andresen and Nix, 2022b), while cultural norms strongly correlate with child penalties (Boelmann, Raute, and Schönberg, 2024; Kleven, 2022). The effectiveness of parental leave and childcare subsidies in reducing gender inequality remains debated: some studies find positive effects on female labor supply (Baker, Gruber, and Milligan, 2008; Andresen and Nix, 2022a), while others find minimal or no impact, often limited to single mothers (Nollenberger and Rodríguez-Planas, 2015; Kleven et al., 2024).

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 (the first year in which Schedule 50 ownership data became available). 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,[4] provided that ownership information is available within three years of the firm's founding.[5] 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 supple-

[4]Results are robust to using alternative ownership thresholds.

[5]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).

mental 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, 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 summary statistics for the firms (Panel A) and entrepreneurs (Panel B) in my analysis, measured two years prior to the first childbirth. Column (1) shows all mothers in the sample; columns (2) and (3) report summary statistics for the matched treated and control groups, respectively. Finally, column (4) and (5) display standardized mean differences and the ratio of variances between treated and control groups. These measures provide evidence on the balance achieved by the matching procedure.

Panel A shows that other-owned firms are very young—on average 2.6 years old at baseline—and small in scale.

Two years prior to childbirth, entrepreneurs in my sample are on average 31 years old and report $64,500 in individual income and $128,000 in household income (in 2012 dollars). This implies an average age at first birth of 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.[6] 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 female earnings distribution. The estimates in this paper capture the effects of

[6] Author's calculations using Statistics Canada's Table 11-10-0239-01.

childbirth on a select group with comparatively high levels of human and financial capital.

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.[7] 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. 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 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

[7] 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.

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 estimate the following event-study specification:

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

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, θ_k, measure the effect of children relative to θ_{-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, α_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:

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

where y_{ht} represents an outcome (e.g., earnings) for worker h in year t. α_h and λ_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 $R^k_{j(h)t} = \mathbf{1}\{t = t^*_{j(h)} + k\}$ are event-study indicators with $t^*_{j(h)}$ denoting the year of the entrepreneur's first childbirth. In the rare cases in which a worker is employed by multiple entrepreneurs who become mothers at different times, I let $t^*_{j(h)}$ be the earliest event. 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:

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

where y_{it} is equal to 1 if individual i starts a firm in year t. α_i and λ_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

The comparison between mothers and women without children allows us to understand the impact of childbirth on women. However, it does not speak directly to how parenthood affects the gender gap: fathers might experience similar effects (resulting in no gap) or, on the contrary, face little to no impact. In this section, I extend the analysis to fathers, following Kleven, Landais, and Søgaard

(2019).

I restrict the sample to individuals who become parents during the sample period and estimate variations of Equations 1 and 3, applied to parent-only samples, separately for mothers and fathers. 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.[8]

In this design, identification comes from comparing the trajectories of men and women after childbirth. Because both groups are affected by childbirth, P_k identifies the relative impact of children on mothers relative to fathers. This design does not separately identify the absolute effect of childbirth on fathers, since there is no untreated control group for them. To estimate the effect of childbirth on fathers, I use the matching algorithm described in Section III.A to construct a control group of men without children. As an alternative identification strategy, we can express P_k as the difference in outcomes between mothers and women without children, net of the difference between fathers and men without children.

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

$$\hat{\Delta} = \frac{E[P_k \cdot \tilde{y}^w_{jt}]}{E[\hat{y}^m_{jt}]} + \sum_q (\beta^m_q - \beta^w_q)\frac{E[X^m_{qjt}]}{E[\hat{y}^m_{jt}]} + \sum_q \beta^w_q \frac{E[X^m_{qjt}] - E[X^w_{qjt}]}{E[\hat{y}^m_{jt}]}. \tag{4}$$

P_k is the child penalty at event time k, $\tilde{y}^w_{jt}$ is the predicted counterfactual outcome for women (what women's outcomes would be absent childbirth), and $\hat{y}^m_{jt}$ 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

[8] 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: $P^g_k = \hat{\theta}k^g / \mathbb{E}[\tilde{y}jt^g | t = t^*_j + k]$. The difference $P_k = P^m_k - P^w_k$ represents the relative penalty that mothers experience due to childbirth.

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 5 shows the effect of childbirth on four main firm-level outcomes, using the estimation strategy in Section III.A. 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% decline, pointing to an efficiency loss rather than just scale reduction.

These estimates are conditional on firms remaining active.[9] I turn to the effect of childbirth on firm survival in Figure 2. 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%. This result highlights how firm survival, while commonly used in prior literature to assess

[9] In Figure A.1, I show results without conditioning on survival by imputing zeros for firms that exit and applying the inverse hyperbolic sine (IHS) transformation to outcome variables, defined as $\text{IHS}(x) = \ln\left(x + \sqrt{x^2+1}\right)$. This transformation approximates the log transformation for small positive values but is also defined for $x \leq 0$. Using this approach, I continue to find significant negative effects across all outcome variables.

entrepreneurial performance, is an inadequate measure: these firms may stay in business but exhibit signs of stagnation in terms of sales, profitability, and other performance measures. 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 financial setbacks.

The sustained declines in firm performance raises the question of which firms are most vulnerable to disruptions in the supply of the founder's human capital. In Figure 3, I analyze firms' life cycle, comparing young firms that experience the motherhood shock when they are at most 5 years old with older firms. While the overall pattern of performance decline holds for firms of all ages, the effect is larger in magnitude among young firms. For instance, looking at firm sales, we observe an immediate drop of 25 log points in the year of childbirth for the young group, more than double the decline experienced by older firms. This pattern suggests that early-stage ventures, which rely more heavily on the founder's direct involvement, are especially exposed to shocks that limit the founder's time and attention.

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, the broader economic implications may be less severe. The evidence, however, suggests otherwise. 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 4 shows that the largest impacts occur in sectors such as scientific research, manufacturing, and computer systems design-—rather than in 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.

A potential concern is that the effects of childbirth reflect endogenous timing. Women may, for example, anticipate business slowdowns and choose to have children when their firms are already expected to underperform. To mitigate this concern, Figure A.2 focuses on women who gave birth at age 35 or older and were unmarried and not cohabiting at the time they founded their firm. For this group, pregnancy timing is arguably less flexible: conception takes longer, reducing the ability to time childbirth around business conditions, and postponing is more costly.[10] I find that treated

[10]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).

and control firms, again, follow similar pre-birth trends, but outcomes diverge sharply in the year of childbirth, with even larger immediate 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.3. To define business cycles, I classify industry-year sales growth into terciles, using only firms owned by male entrepreneurs to avoid mechanical correlations with the effects of childbirth. I find that giving birth during a boom is especially costly: in the two years following childbirth, sales fall by 30 log points for mothers in expanding industries, compared to 20 log points for those in contracting ones, 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 strategic timing, as women do not systematically time childbirth to align with periods of lower opportunity costs, when penalties would be lower.

A natural question is whether first-time fathers experience similar effects. To answer this, I compare the effects of childbirth on mothers and fathers relative to women and men without children. Figure A.5 shows that fathers experience little to no impact across firm outcomes. Sales in firms owned by fathers dip slightly in the year of childbirth but see a modest increase relative to men without children in later years. Profit margins also see a small positive effect, while other outcomes remain unchanged.[11] To quantify how much childbirth contributes to the gender gap in firm outcomes, I apply a modified Oaxaca-Blinder decomposition, where the direct effect of children enters as a separate component alongside differences in observable characteristics and returns to these characteristics. The results show that childbirth accounts for 47% of the sales gap and 54% of the profit gap between male- and female-owned firms, pointing to its key role in driving performance differences.

The event study design around the first childbirth captures the overall effect of having children on entrepreneurial outcomes. 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.6 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 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

[11] As an alternative to this design, I use fathers as a direct control group for mothers, restricting the sample to parents only. This approach is common in child penalty studies. However, since fathers lack a corresponding control group, this method does not measure the direct effect of childbirth on men. Figure 6 shows that estimates remain nearly identical.

the event study design as a strategy for estimating the causal effects of childbirth on firm outcomes.

B. 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.[12]

In Figure 10, I compare mothers and fathers to a matched sample of women and men without children, respectively. 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 and fathers around childbirth, relative to their matches, irrespective of whether they are still entrepreneurs at any point. While mothers experience an average 11% decline in total income over the five years following childbirth compared to women without children, fathers show no such decline; instead, their total income trends slightly upward, increasing by 2.5%. This disparity is partly driven by a reduction in compensation (measured as the sum of wages and dividends paid to the entrepreneur) that mothers take from their firms after childbirth. Mothers experience a nearly 20% decline in compensation, while fathers see a 5% increase (panel (b)), mirroring the trends in firm performance.

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 37% decline relative to fathers, and subsequently tapers off, albeit without reverting to pre-birth levels. These results suggest that motherhood deters women from entrepreneurship, potentially resulting in a missing cohort of female-founded firms.

C. Worker outcomes

The existing literature on the effect of children focuses on how childbirth affects individual mothers' careers, but it generally overlooks potential spillovers to other employees within firms. This section

[12] Research on career disruptions has generally concentrated on job loss events due to plant closures and mass layoffs, which tend to affect lower-wage and less-skilled workers. These studies tell us little about how high-skilled women, particularly entrepreneurs, experience career disruptions. An exception is Fedyk and Hodson (2024), who focus on high-skill white-collar workers.

examines the effect of the entrepreneur's childbirth on the earnings and employment prospects of workers employed in these firms. The sample for this analysis includes workers who were employed in treated or in the matched sample of control firms for at least one year before the childbirth event.

I find that workers' careers are disrupted by the childbirth event. In panel (a) of Figure 9 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%. 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%.

Figure 8 shows results for log earnings separately by worker age and sex. Panel (a) shows that the effects are concentrated among young workers (those below the median age of 33 at the time of childbirth), consistent with younger workers being especially vulnerable to economic shocks (Kahn, 2010; Oreopoulos, Wachter, and Heisz, 2012). Panel (b) shows that both male and female workers experience a decline in earnings, with larger point estimates for men.

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.[13]

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, σ(ROA), measured as the standard deviation of ROA before and after childbirth. A decrease in σ(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 3 shows no significant change in the volatility of ROA or profits after childbirth. The leverage ratio, however, increases (Figure A.8 presents an event study showing that leverage starts increasing during the childbirth year). 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.

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,

[13] 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.

while the other assumes a greater share of childcare duties (Andresen and Nix, 2022b). 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 experience a decline in total family income, relative to couples where the husband was the breadwinner. This is driven by the fact female breadwinners suffer greater income losses than secondary earners (13% lower income than secondary earners) and their spouses do not fully compensate for this decline.

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 Søgaard, 2021; Andresen and Nix, 2022b), 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).[14]

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[15] (who, as Canadian citizens 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.7 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.

[14] 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).

[15] 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.

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.[16] 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[17]. 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. Figure A.9 presents event studies on sales and profits, showing that this mitigating effect 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. Panel B of Table 6 provides a corresponding test for fathers, showing that proximity to grandparents has no significant effect on their entrepreneurial outcomes post-childbirth.

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

[16] 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).

[17] 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 11. 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.[18]

Table A.2 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.[19] 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-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

[18] 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 (Figure A.10). This suggests that the results are not driven by broader family involvement but are specific to the caregiving support traditionally provided by grandmothers.

[19] 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.

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 show that childbirth leads to a sharp decline in women's likelihood of starting a business and a persistent deterioration in the performance of their existing 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. The negative spillovers extend beyond the entrepreneur herself, reducing earnings and increasing job displacement risk for employees of affected firms.

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.

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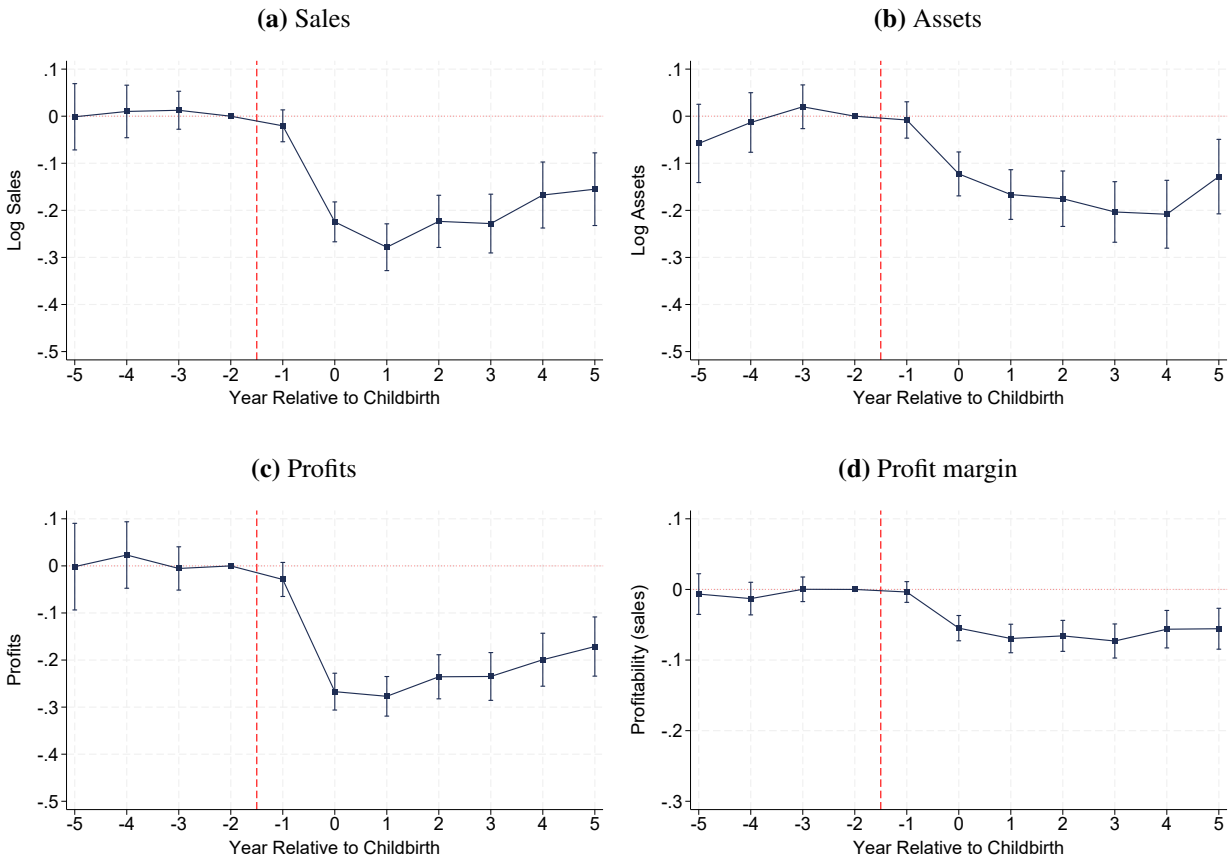
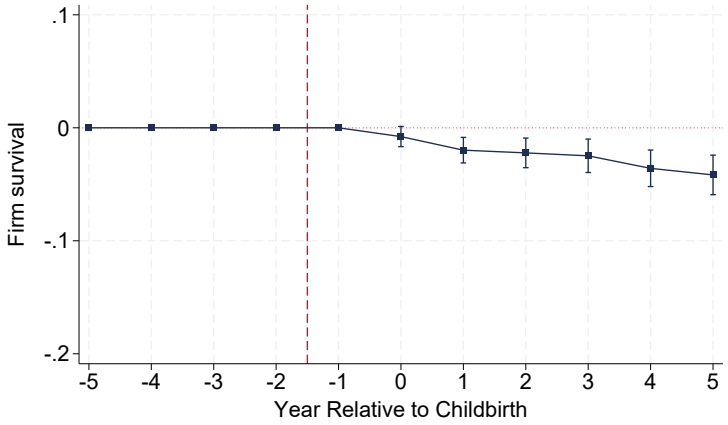
Figures

Figure 1: Effect of childbirth on firm outcomes



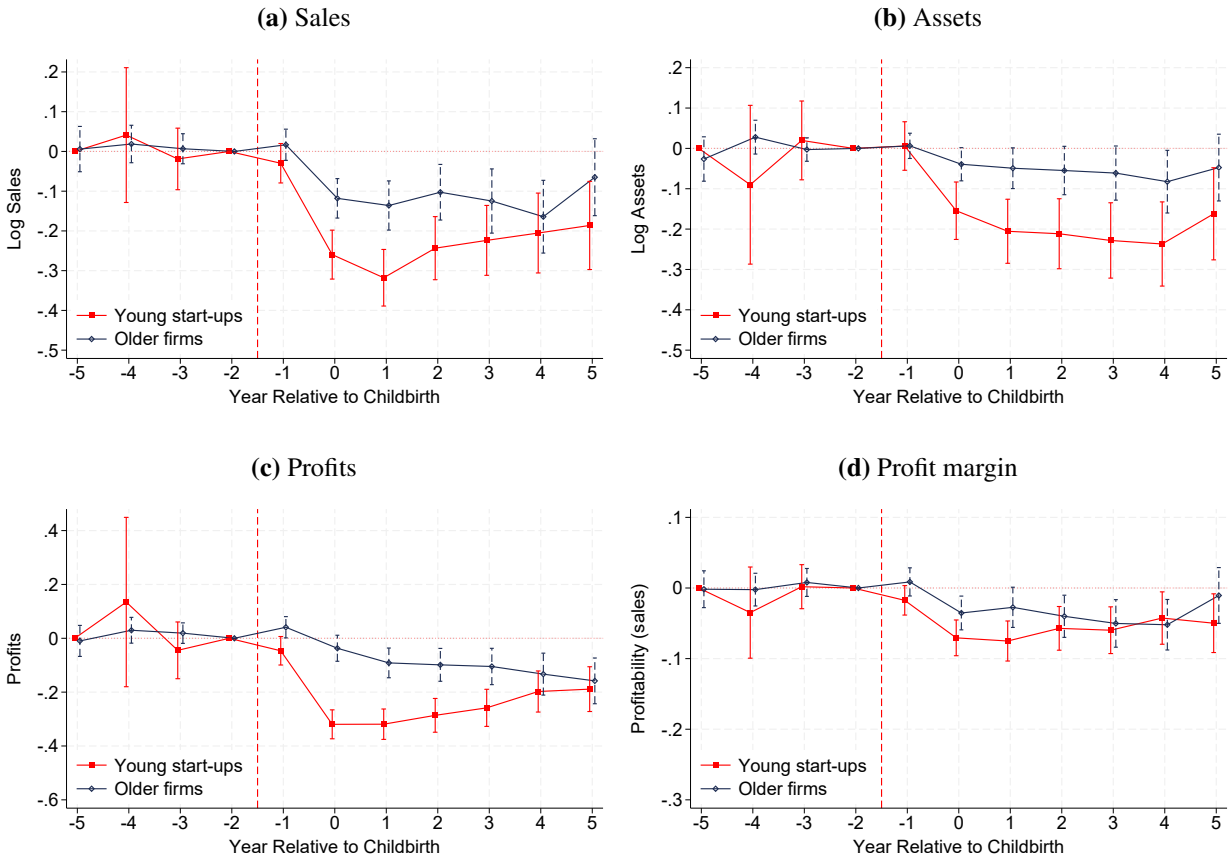
Notes: The graphs show event-study estimates obtained by fitting equation 1 on log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)). Year 0 is when the first childbirth event takes place. The treated group is a sample of firms owned by a female entrepreneur 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 × province × year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

Figure 2: Firm survival



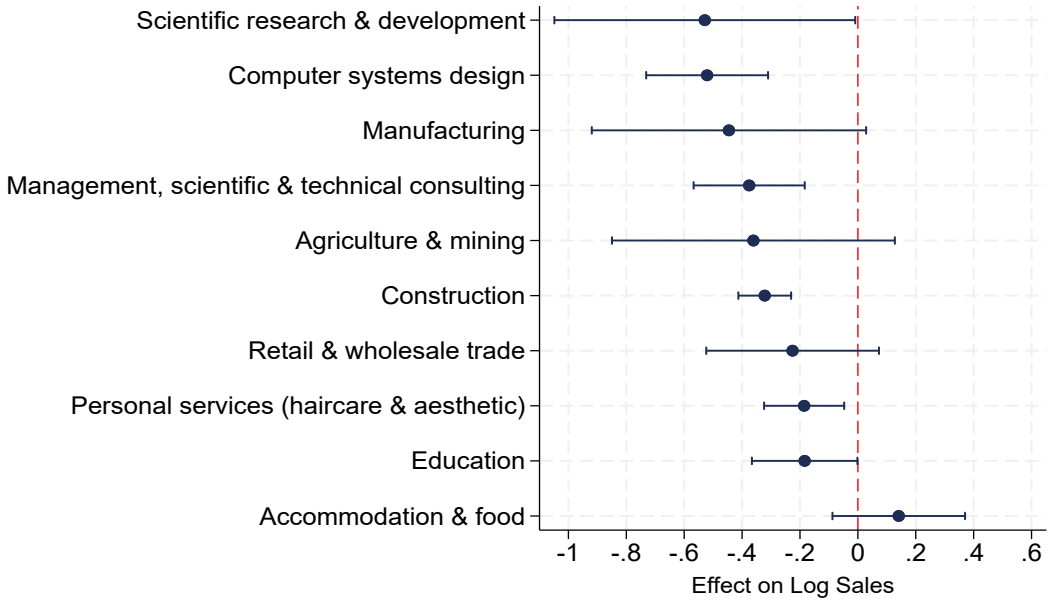
Notes: The graphs show event-study estimates obtained by fitting equation 1 on an indicator variable for firm survival. Year 0 is when the first childbirth event takes place. The treated group is a sample of firms owned by a female entrepreneur for at least two years before she had her first child. The 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 × province × year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

Figure 3: Effect of childbirth on firm outcomes by firm age



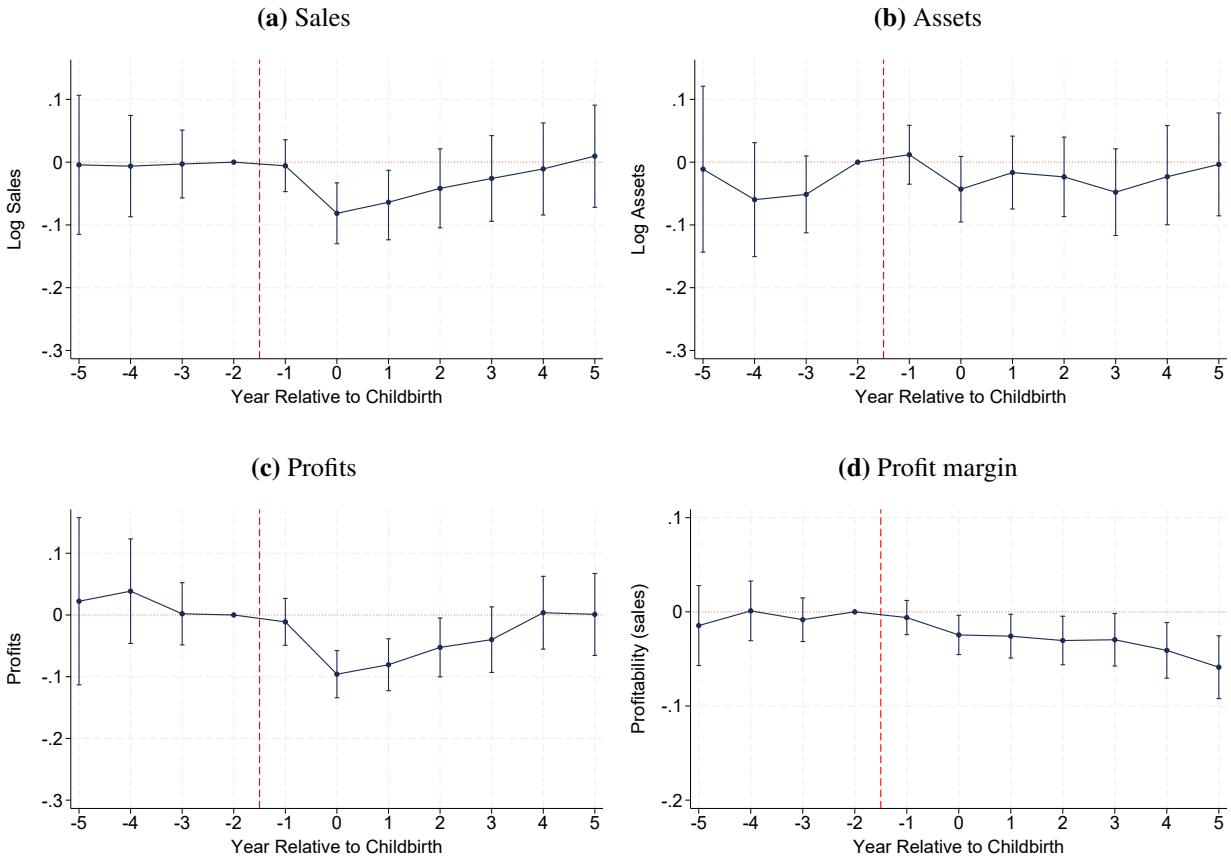
Notes: The graphs show event-study estimates obtained by fitting equation 1 on log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)), separately by firm age. Young start-ups are firms that experienced the entrepreneur's first childbirth when they were at most 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 × province × year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

Figure 4: Effect of childbirth on log sales by industry



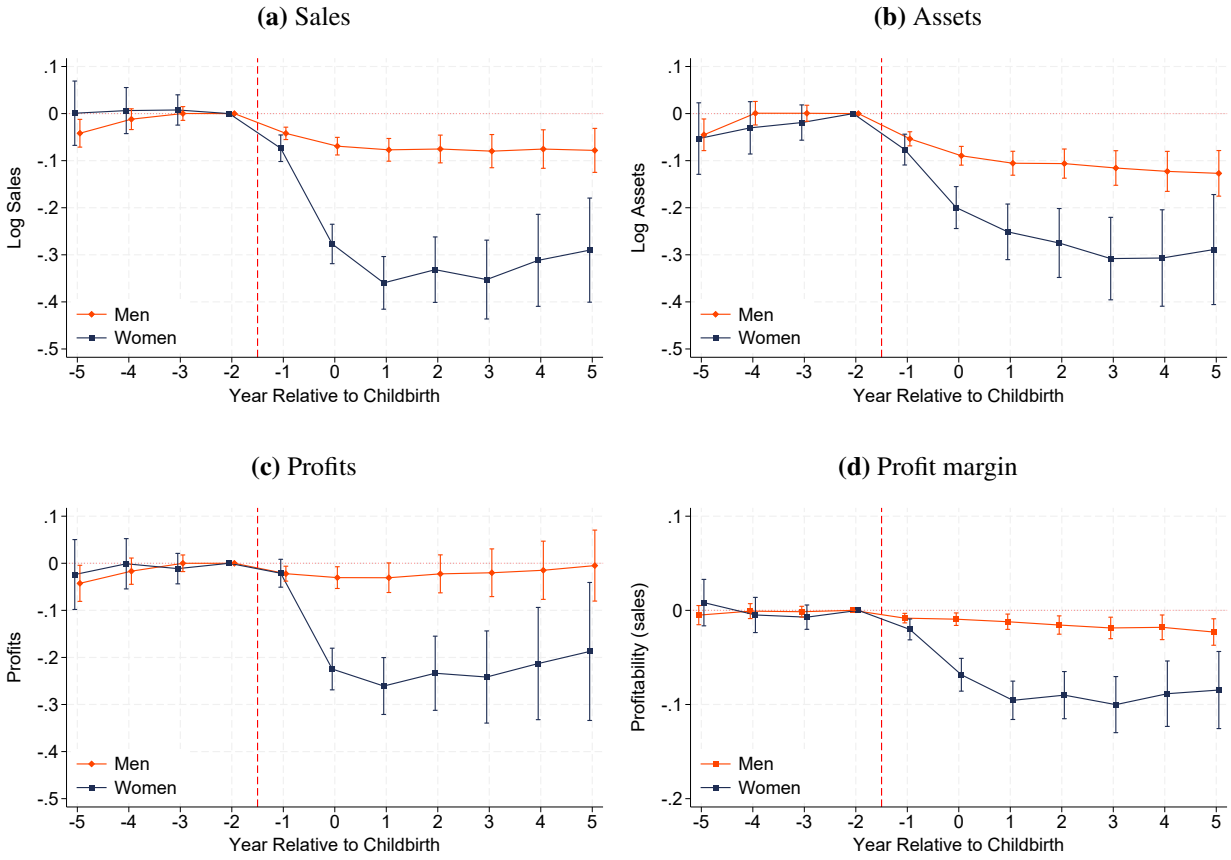
Notes: The graphs show event-study estimates obtained by fitting a two-period version of equation 1 on log sales, separately by industry. I report coefficients on the interaction $Post \times Mother_j$. Post is an indicator equal to 1 in the year of birth of the first child or after. The treated group 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 × province × 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 5: Effect of childbirth on firms owned by spouses



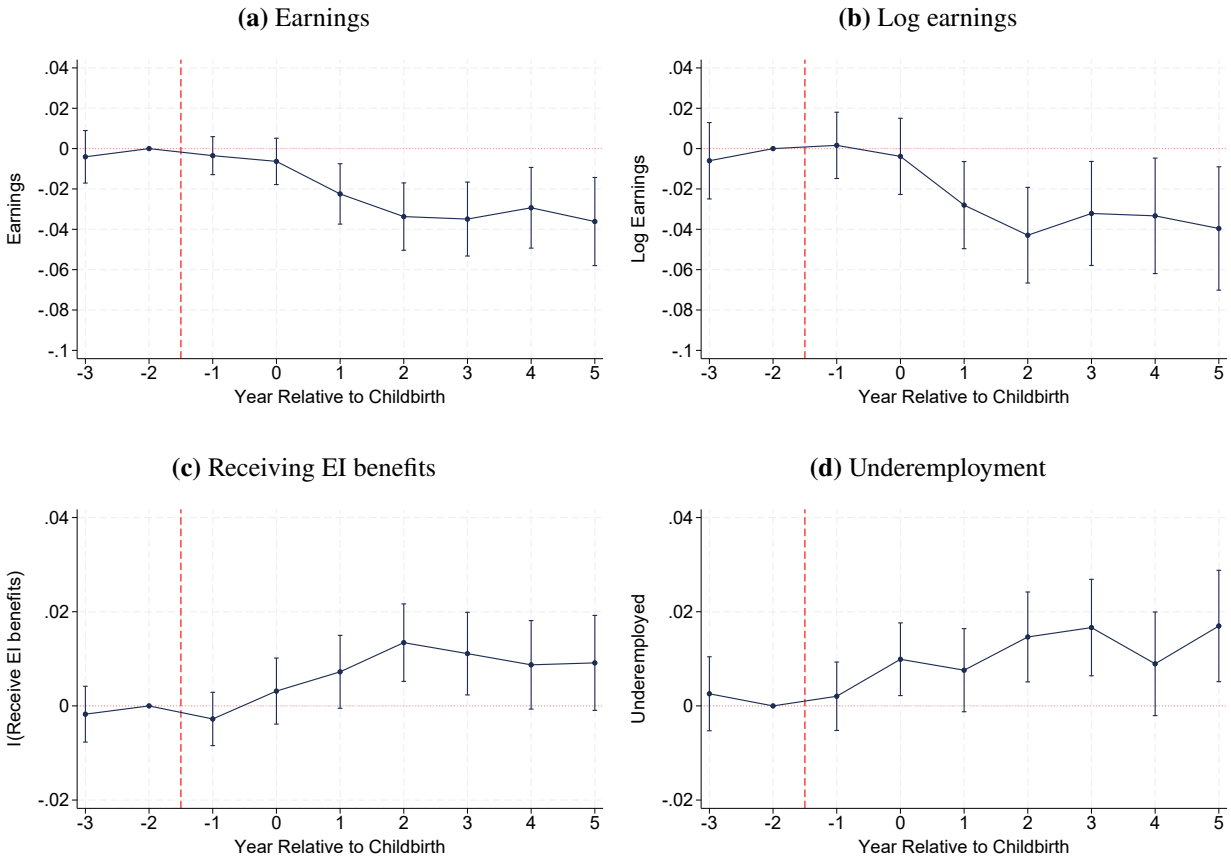
Notes: The graphs show event-study estimates obtained by fitting equation 1 on log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)). Year 0 is when the first childbirth event takes place. The treated group is a sample of firms owned by a couple for at least 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 × province × year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

Figure 6: Effect of childbirth on firm outcomes: mothers vs. fathers



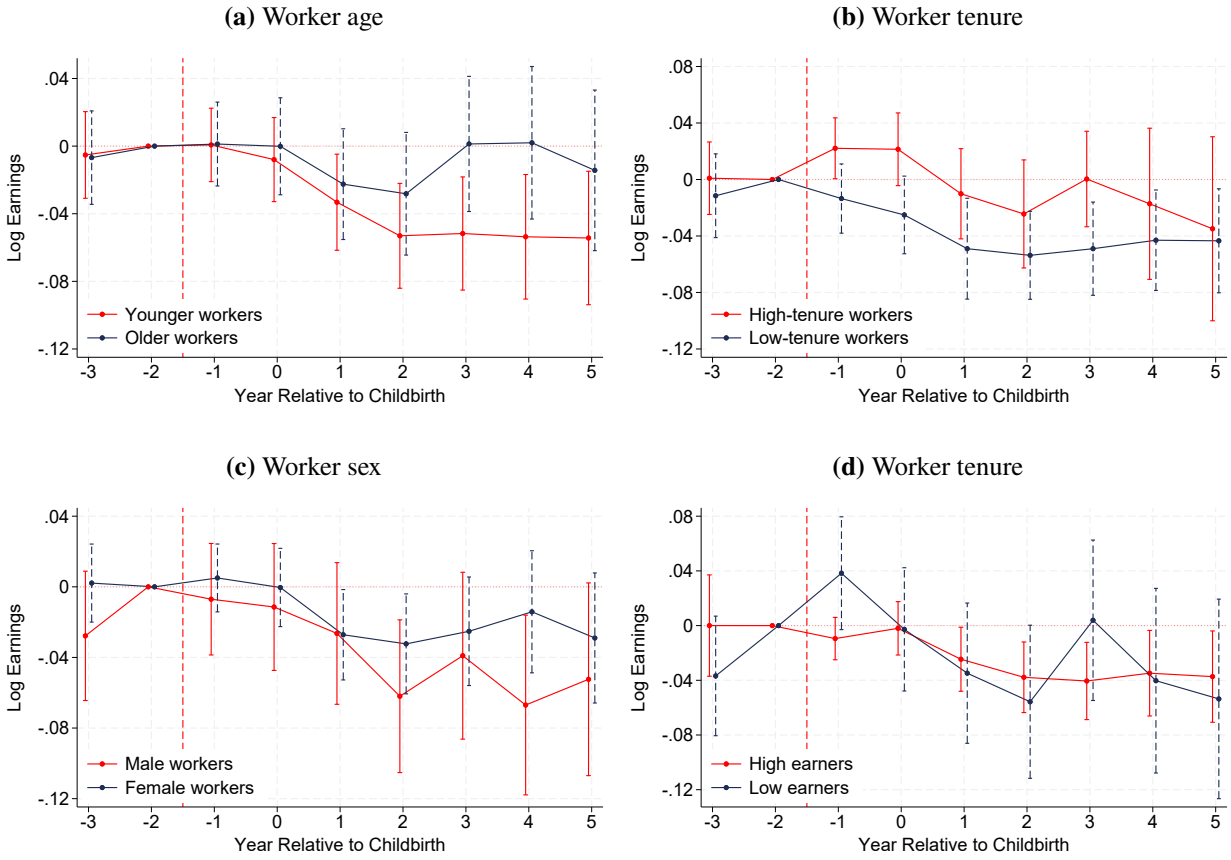
Notes: The graphs show event-study estimates obtained by estimating equation 1 on the sample restricted to parents, separately for mothers and fathers, following Kleven, Landais, and Søgaard (2019). Outcomes include log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (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 × province × year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

Figure 7: Effect of childbirth on workers' careers



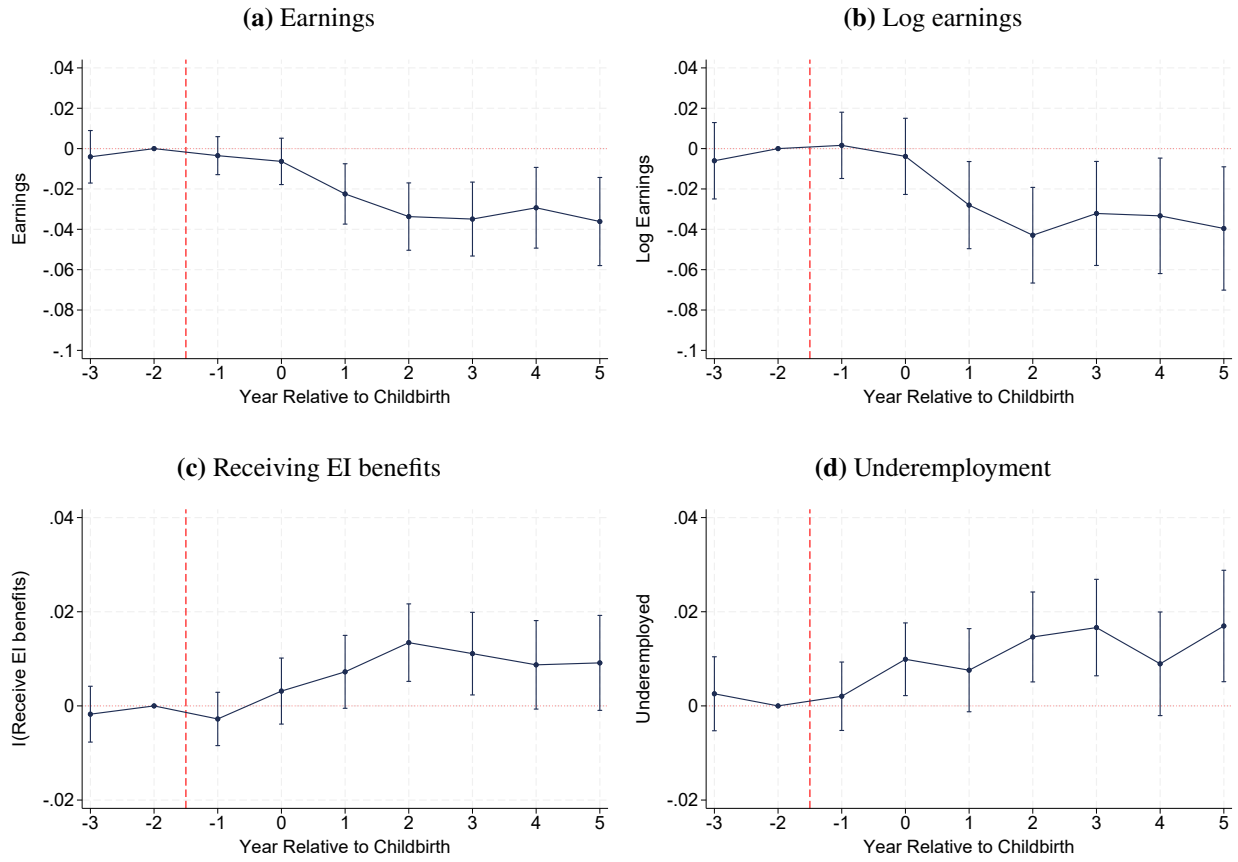
Notes: The graphs show event-study estimates obtained by fitting equation 2 on total earnings (panel (a)), log earnings (panel (b)), the probability of receiving EI benefits (panel (c)), and underemployment (panel (d)). Year 0 is when the entrepreneur's first childbirth event takes place. The treated 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 8: Heterogeneous effects of childbirth on workers' earnings



Notes: The graphs show event-study estimates obtained by fitting equation 2 on log earnings by worker age and sex. 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) shows results for workers who were above or below the median age of 33 when the entrepreneur had a child. Panel (b) shows the earnings effects for male vs. 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.

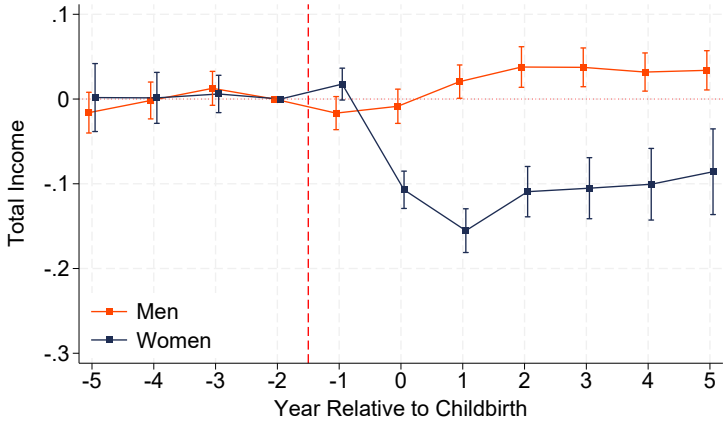
Figure 9: Effect of entrepreneur's childbirth on workers' fertility



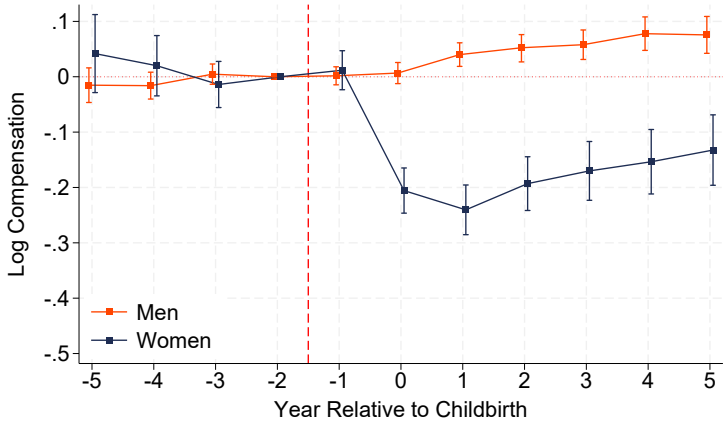
Notes: The graphs show event-study estimates obtained by fitting equation 2 on total earnings (panel (a)), log earnings (panel (b)), the probability of receiving EI benefits (panel (c)), and underemployment (panel (d)). Year 0 is when the entrepreneur's first childbirth event takes place. The treated 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 10: Effect of childbirth on entrepreneur's career outcomes

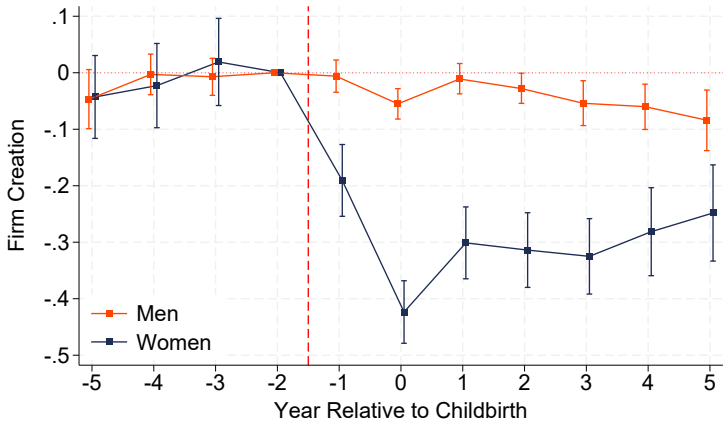
(a) Total income



(b) Entrepreneur's compensation

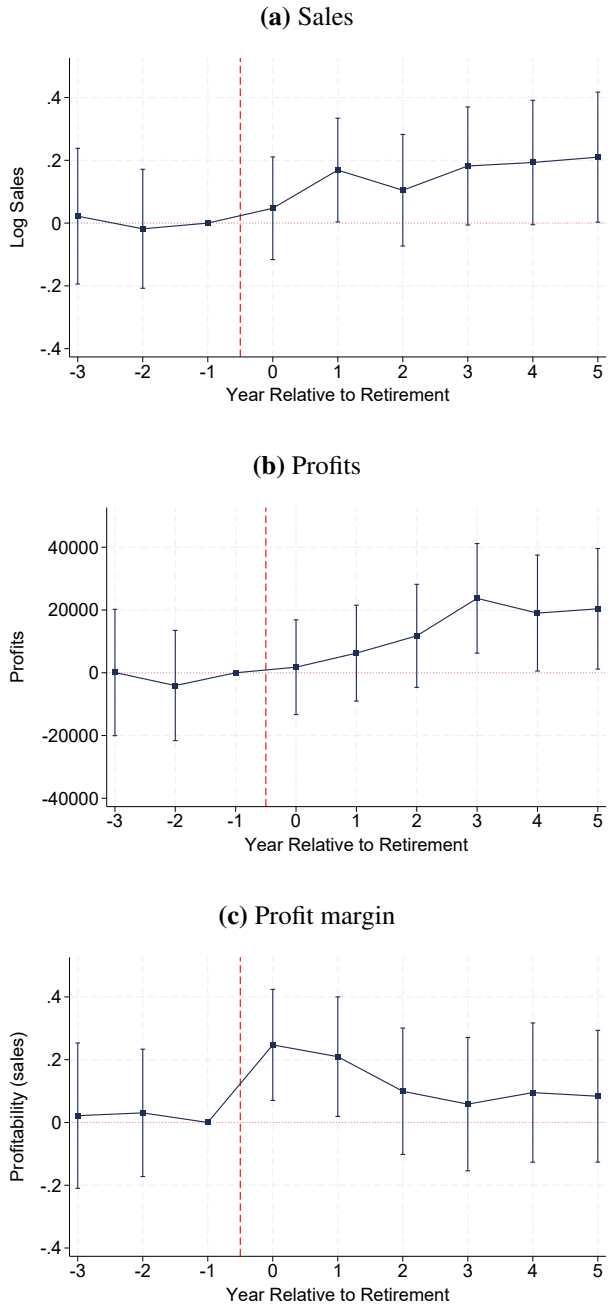


(c) Firm creation rates



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. 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 × province × 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)).

Figure 11: Effect of grandmother's retirement on mothers' firm outcomes



Notes: The graphs show event-study estimates around grandmother's retirement for log sales (panel (a)), profits (panel (b)), and profit margin (panel (c)). Year 0 is when the grandmother 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 mother, compared to a control group of women whose mother 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 a grandfather is also retired and lives in the same municipality. Firm and industry × year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

Tables

Table 1: Descriptive statistics

Panel A: firms

	(1) **All mothers**	(2) **Matched mothers**	(3) **Matched controls**	(4) **Standardized difference**	(5) **Variance ratio**
Firm age	2.6	2.7	2.6	0.05	1.10
	(2.1)	(2.1)	(2.0)		
No. owners	1.53	1.48	1.40	0.10	0.95
	(0.89)	(0.76)	(0.78)		
Equity share	78.2	80.4	83.2	-0.11	1.10
	(29.1)	(28.1)	(26.8)		
Log Sales	11.7	11.8	11.8	0.04	1.00
	(2.3)	(2.0)	(2.0)		
Log Assets	10.8	11.0	10.9	0.03	1.01
	(2.7)	(2.5)	(2.5)		
Net income (000)	30.5	40.7	40.0	0.01	1.01
	(82.4)	(90.8)	(90.4)		
Service sectors	94.5%	89.9%	89.9%	–	–
Number of observations	20,235	11,290	11,290		

Panel B: entrepreneurs

	(1) **All mothers**	(2) **Matched mothers**	(3) **Matched controls**	(4) **Standardized difference**	(5) **Variance ratio**
Age	31.1	31.7	32.4	-0.16	0.71
	(4.3)	(4.3)	(5.1)		
Total income (000)	64.5	71.1	70.6	0.01	1.28
	(116.0)	(111.6)	(98.5)		
Family income (000)	127.7	133.6	132.5	0.01	0.66
	(205.5)	(190.2)	(234.7)		
Married	65%	59%	59%	–	–
Number of observations	20,865	11,485	11,485		

Notes: This table presents summary statistics for firms (Panel A) and entrepreneurs (Panel B). Summary statistics are reported at the earliest between $t-2$ and $t-1$. Column (4) reports the standardized mean difference between the treated (T) and the control (C) samples, calculated as $(\bar{x}_T - \bar{x}_C)/\sqrt{s^2}$, where s^2 is the pooled variance. Column (5) reports the variance ratio, s_T^2/s_C^2. 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***	-29,147***	-0.059***	-0.180***	-42,764***	-0.055***
	(0.041)	(4,337)	(0.015)	(0.028)	(3,666)	(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: Firm risk taking

	(1) σ**(ROA)**	(2) σ**(Profits)**	(3) **Leverage**
Post × Mother	0.019	661	0.025**
	(1.017)	(837)	(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), σ(ROA), is the standard deviation of the return on assets, computed separately before and after childbirth. The dependent variable in column (2), σ(Profit), is the standard deviation of net income, calculated separately before and after childbirth, in constant 2012 dollars. The dependent varaible 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 iinclude 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 4: Specialization within the household

Panel A: firm outcomes

	Raw			Inverse Probability Weighting		
	(1) **Log Sales**	(2) **Profits**	(3) **Profit Margin**	(4) **Log Sales**	(5) **Profits**	(6) **Profit Margin**
Post × Mother	-0.345***	-16,486***	-0.078***	-0.348***	-22,310***	-0.077***
	(0.034)	(1,523)	(0.012)	(0.035)	(2,016)	(0.011)
Post × Mother × Main earner	0.153***	-5,987**	0.021	0.143***	1,111	0.014
	(0.045)	(2,516)	(0.016)	(0.048)	(2,704)	(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

Panel B: income

	(1) **Household Income**	(2) **Individual Income**	(3) **Spousal Income**
Post × Mother	0.073***	-0.069*	0.122***
	(0.016)	(0.039)	(0.017)
Post × Mother × Main earner	-0.067***	-0.130***	0.022
	(0.024)	(0.047)	(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**	-34,205***	-0.141**	-0.253***	-18,000***	-0.081***	0.176**	-1,953	0.027
	(0.123)	(4,705)	(0.061)	(0.088)	(3,582)	(0.028)	(0.070)	(5,718)	(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^2	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 D. 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

Panel A: mothers

	(1) **Log Sales**	(2) **Profits**	(3) **Profit Margin**
Post × Close to grandparents	0.133***	5,728**	0.071***
	(0.035)	(2,287)	(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

Panel B: fathers

	(1) **Log Sales**	(2) **Profits**	(3) **Profit Margin**
Post × Close to grandparents	0.019	-3,748***	0.007
	(0.019)	(1,338)	(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

Panel A: mothers

	(1) **Log Sales**	(2) **Profits**	(3) **Profit Margin**
Post expansion × Mother	-0.048	711	-0.054*
	(0.041)	(2,992)	(0.029)
Post expansion × Mother × Child under two	0.113**	4,625	0.072***
	(0.050)	(3,913)	(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

Panel B: mothers and fathers

	(1) **Log Sales**	(2) **Profits**	(3) **Profit Margin**
Post expansion × Father × Child under two	-0.028	-1,813	0.004
	(0.031)	(2,239)	(0.008)
Post expansion × Mother × Child under two	0.172***	11,494**	0.095***
	(0.050)	(4,819)	(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 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, men 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.

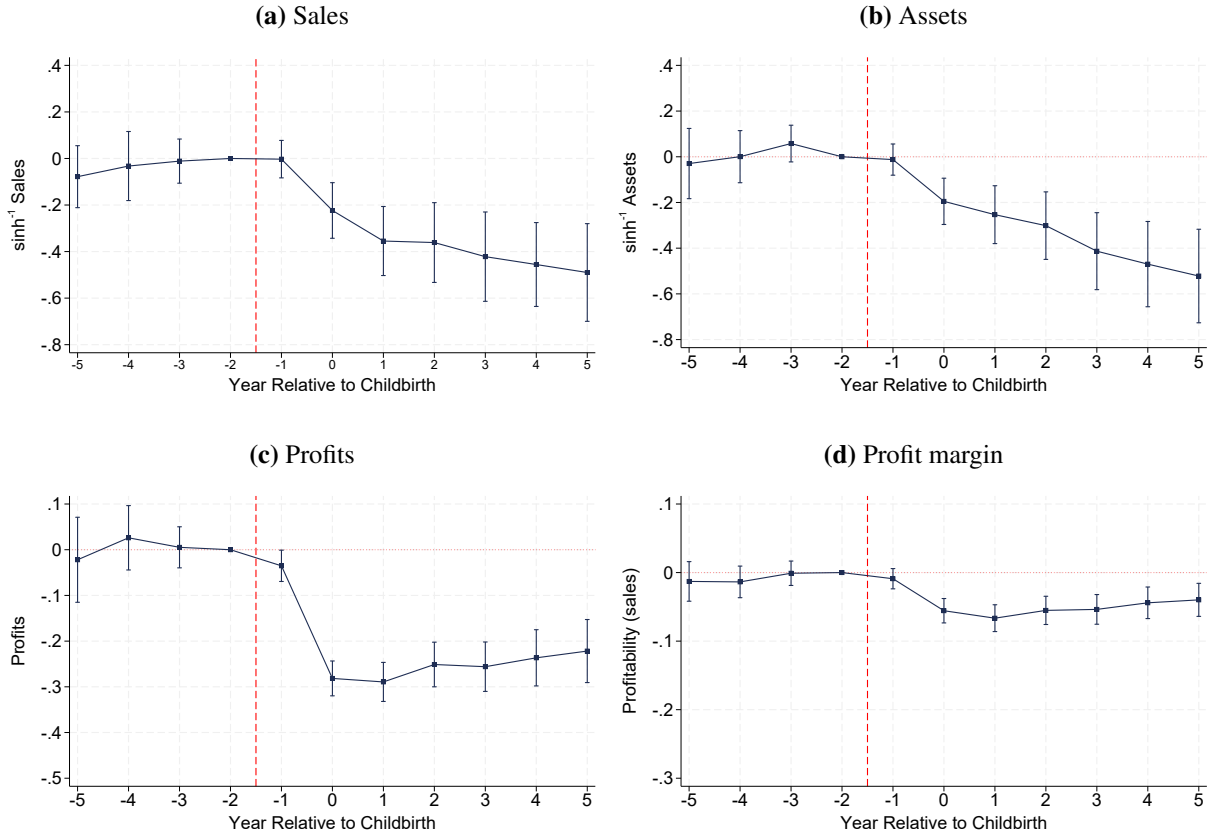
Internet Appendix to

"Minding Your Business or Your Child? Motherhood and the Entrepreneurship Gap"

Valentina Rutigliano
University of British Columbia

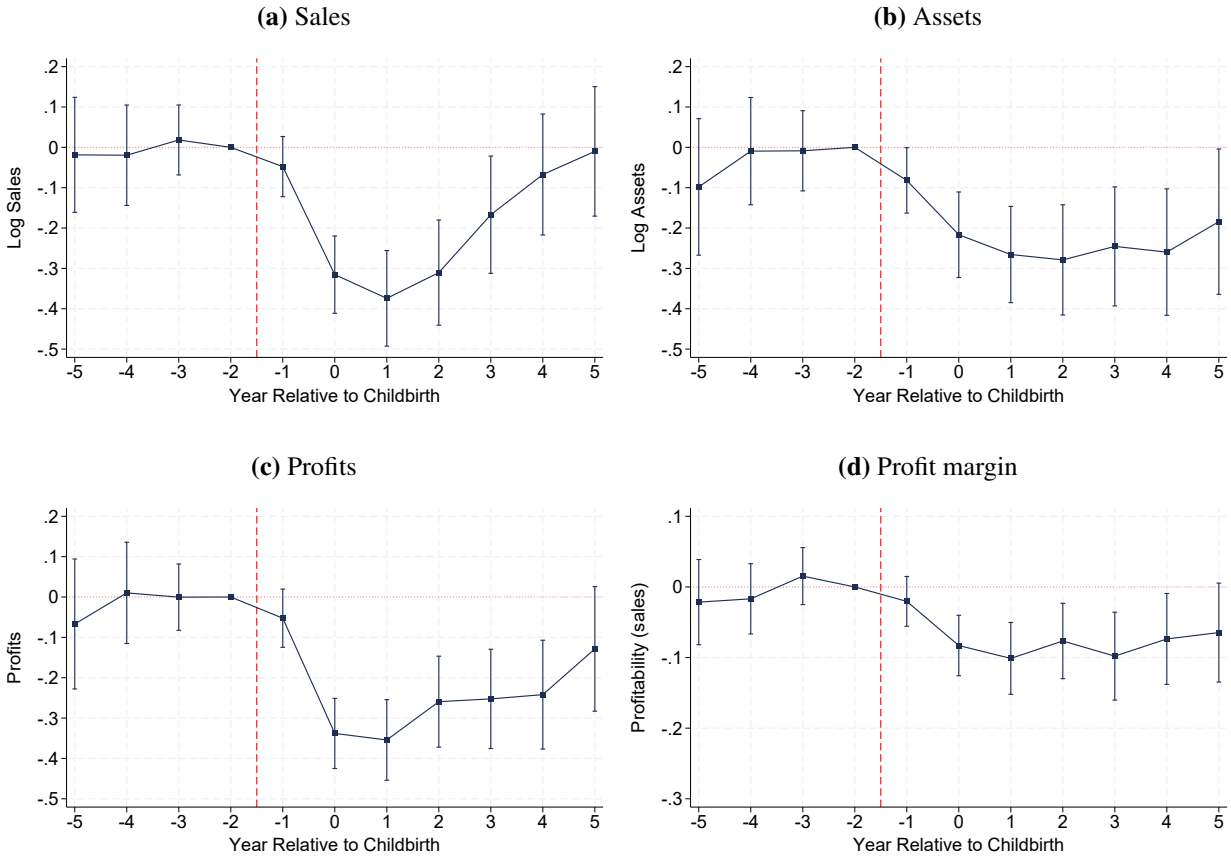
A Additional Figures and Tables

Figure A.1: Effect of childbirth on firm outcomes without conditioning on survival



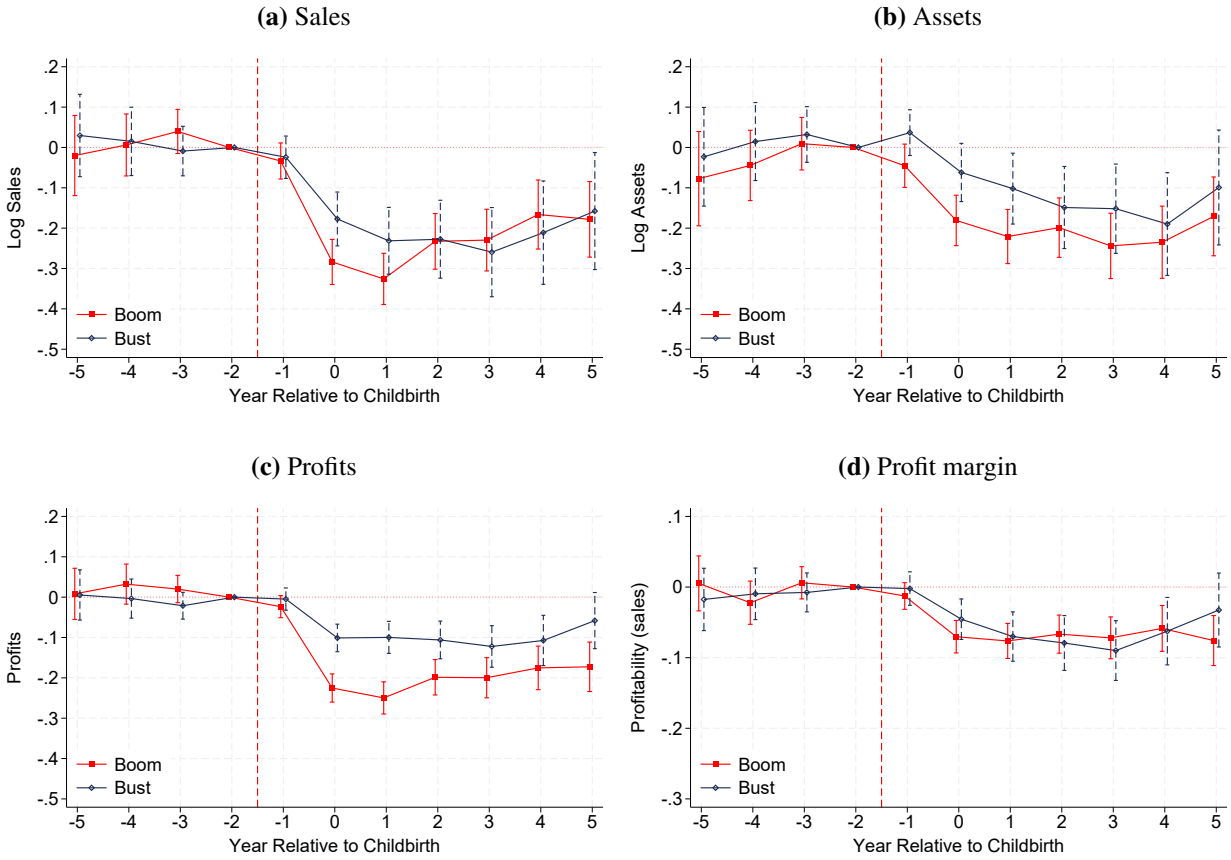
Notes: The graphs show event-study estimates obtained by fitting equation 1, without conditioning on firm survival. Firms that go out of business remain in the sample and their outcomes are set to 0. Logs are replaced by inverse hyperbolic sine. The control group is a matched sample of firms owned by women with zero observed fertility. Coefficients for profits are reported as a percentage of the counterfactual outcome absent children. Control variables include indicators for firm age, the number of firm owners, a polynomial for individual age, and marital status. Firm effects and industry × province × year fixed effects are included. I report 95% confidence intervals based on standard errors which are clustered at the firm level.

Figure A.2: 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 × province × year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

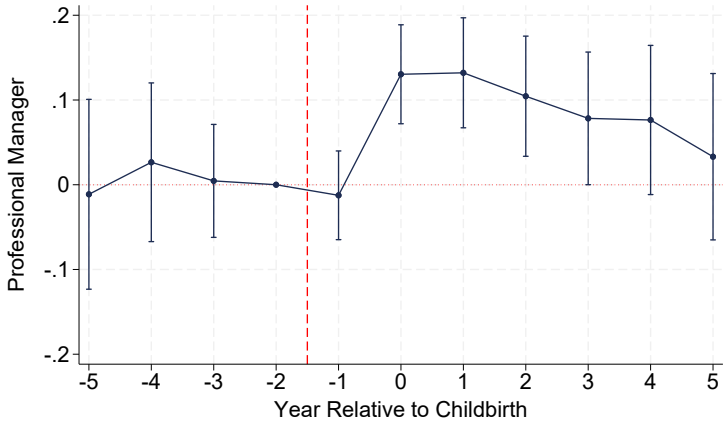
Figure A.3: Firm outcomes by business cycle



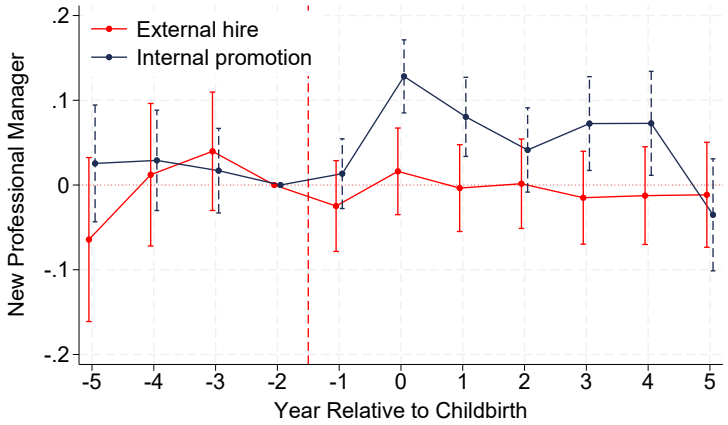
Notes: The graphs show event-study estimates obtained by fitting equation 1 on log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)), separately by industry performance in the year of the first childbirth. Booms are periods in which industry sales growth ranks 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 × province × year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

Figure A.4: Effect of childbirth on manager appointment

(a) Appointment of a professional manager

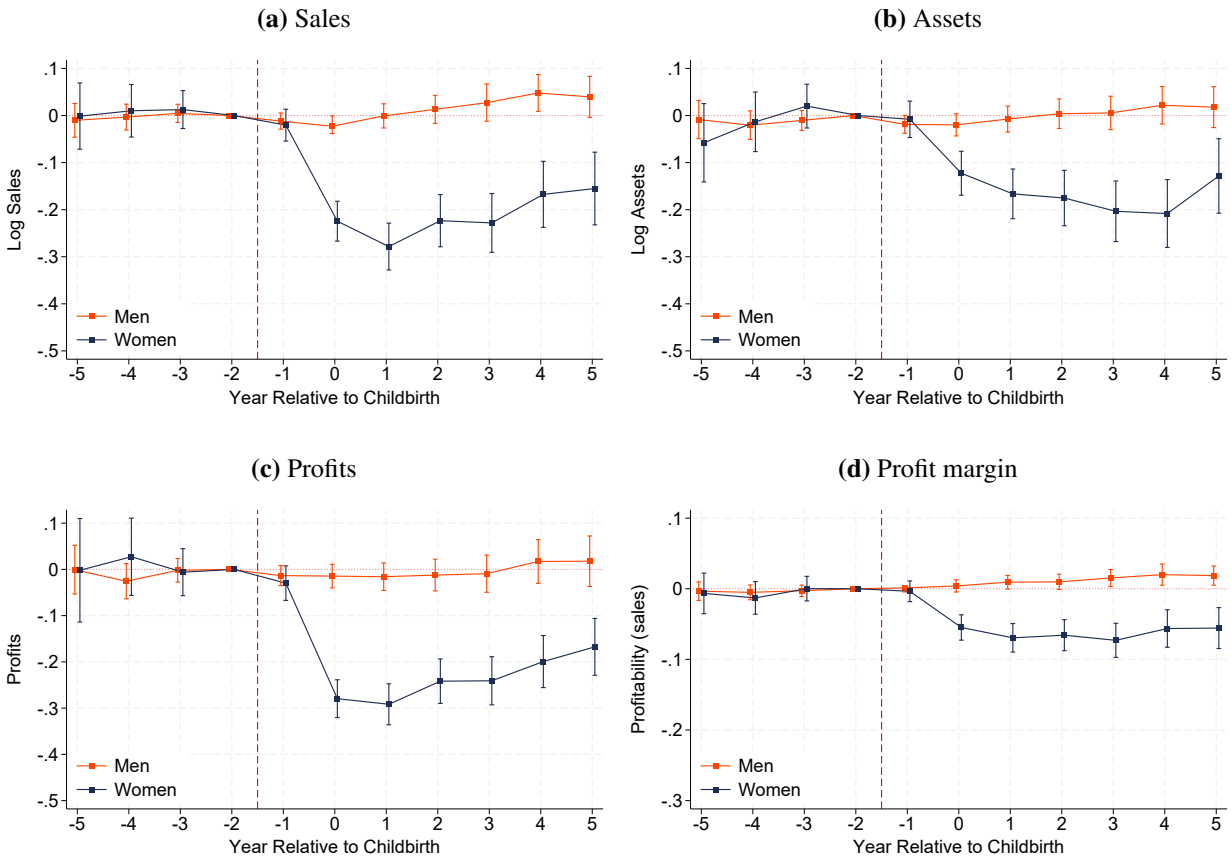


(b) Hiring a manager through external hire vs. internal promotion



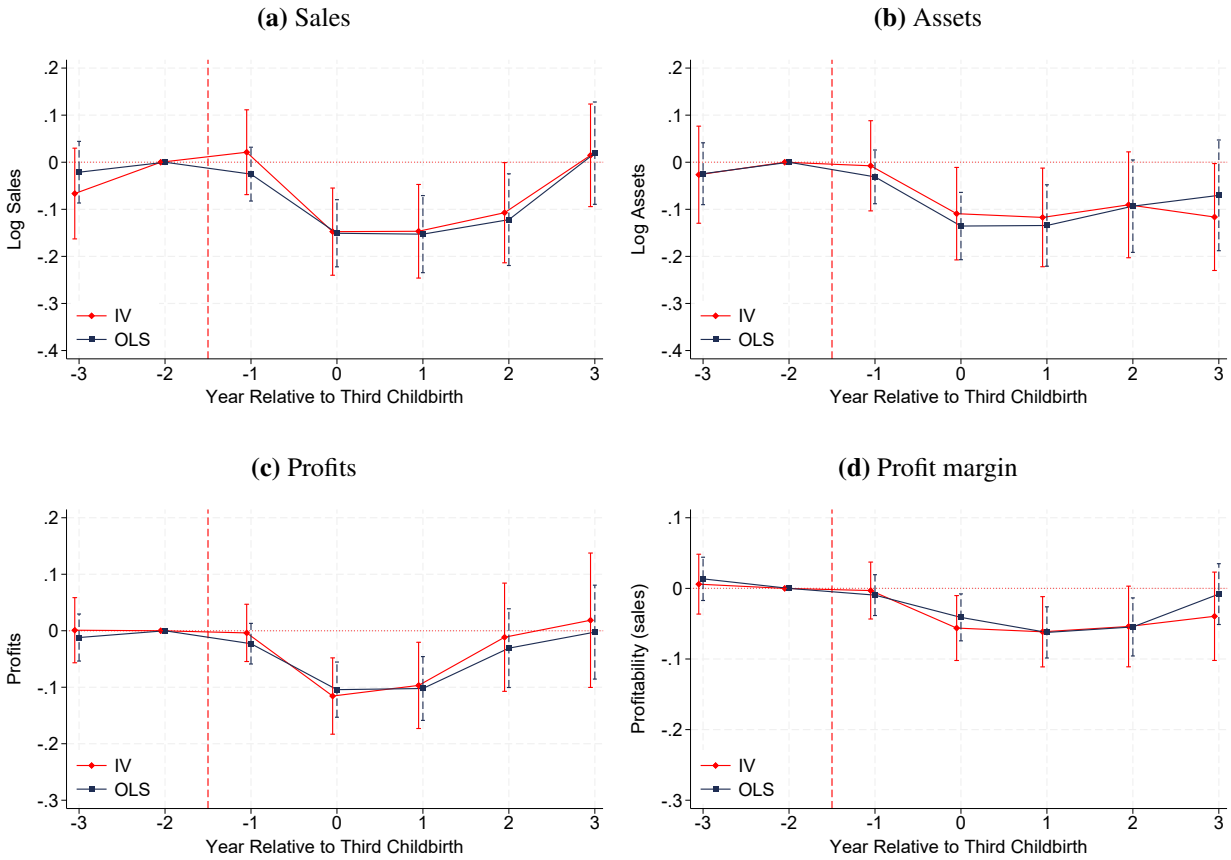
Notes: The graphs show event-study estimates obtained by fitting equation 1 on an indicator for whether the firm is professionally managed (panel (a)) and an indicator for whether the firm hires a manager through external hiring or internal promotion (panel (b)). A firm is defined as professionally managed 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 × province × 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 firm outcomes: mothers vs. fathers



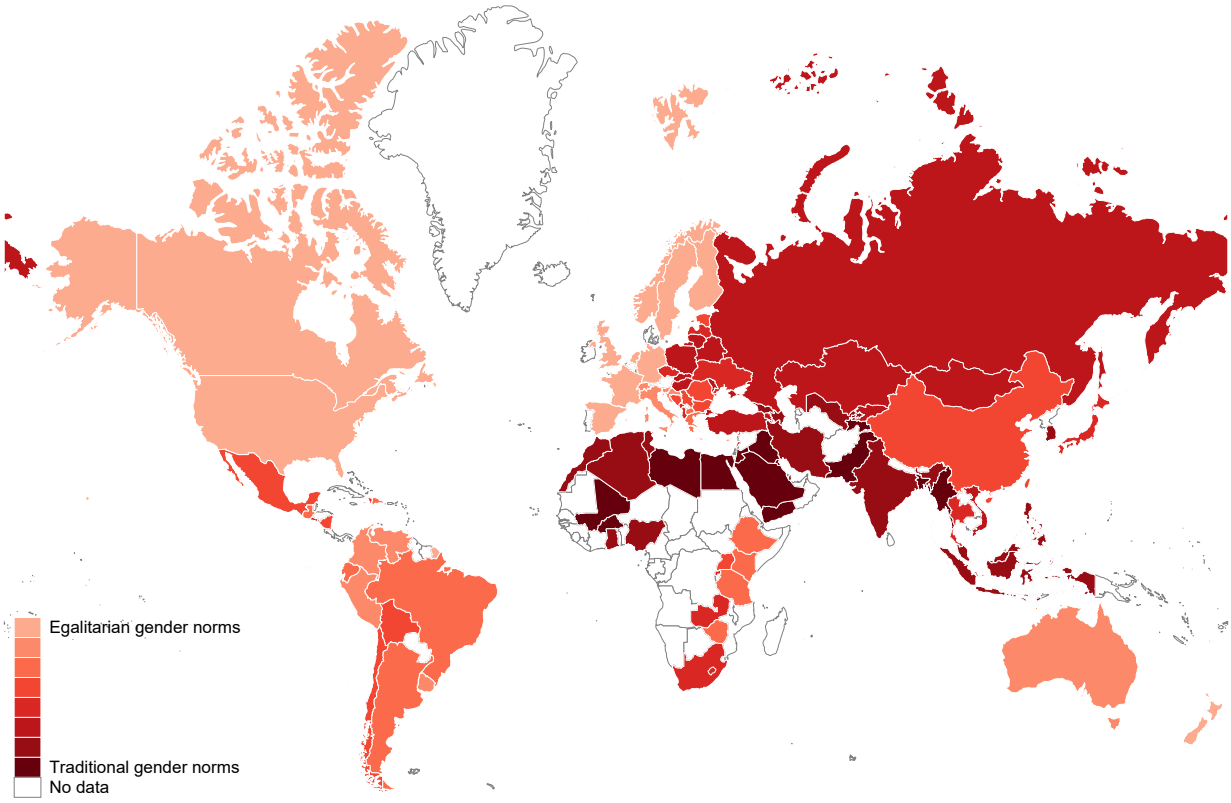
Notes: The graphs show event-study estimates obtained by fitting equation 1 on log sales (panel (a)), log assets (panel (b)), profits (panel (c)), and profit margin (panel (d)), separately for men and women. Year 0 is when the first childbirth event takes place. Coefficients for profits are reported 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 × province × 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 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 β_κ 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 × province × year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

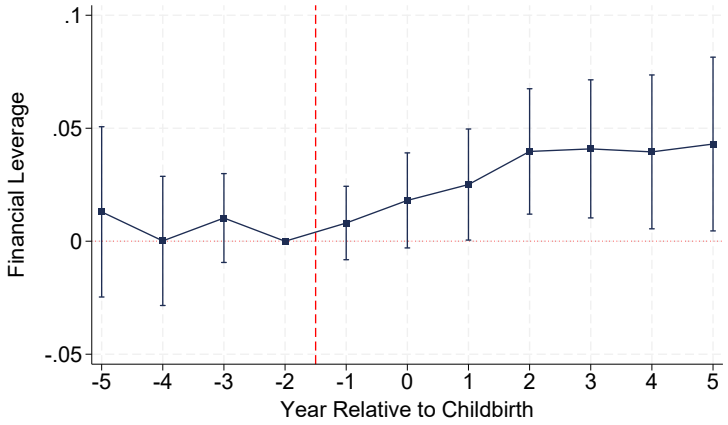
Figure A.7: Distribution of the gender progressivity index



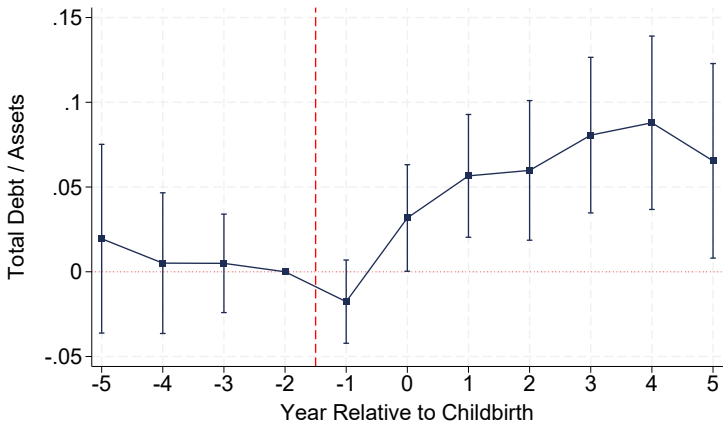
Notes: This figure depicts values of a gender progressivity index calculated using values from the World Values Survey. See Appendix D for details on index construction.

Figure A.8: Effect of childbirth on firm leverage

(a) Financial leverage



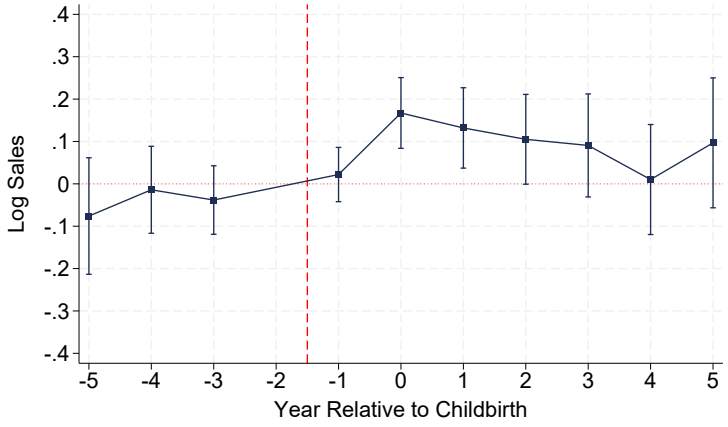
(b) Total debts / Assets



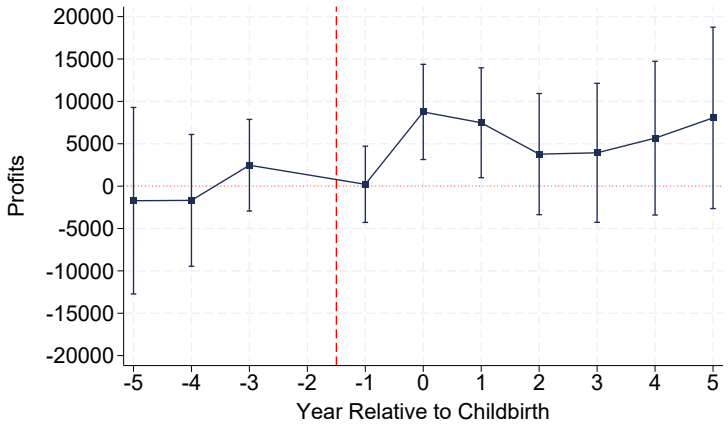
Notes: The graphs show event-study estimates obtained by fitting equation 1 on financial leverage (panel (a)) and the ratio of total debt to total assets (panel (b)). Financial leverage is the ratio of long term liabilities to total assets. Total debt is the difference between total assets and total equity. 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 × province × year fixed effects are included. I report 95% confidence intervals based on standard errors clustered at the firm level.

Figure A.9: Proximity to grandparents and mothers' firm outcomes: event study

(a) Sales

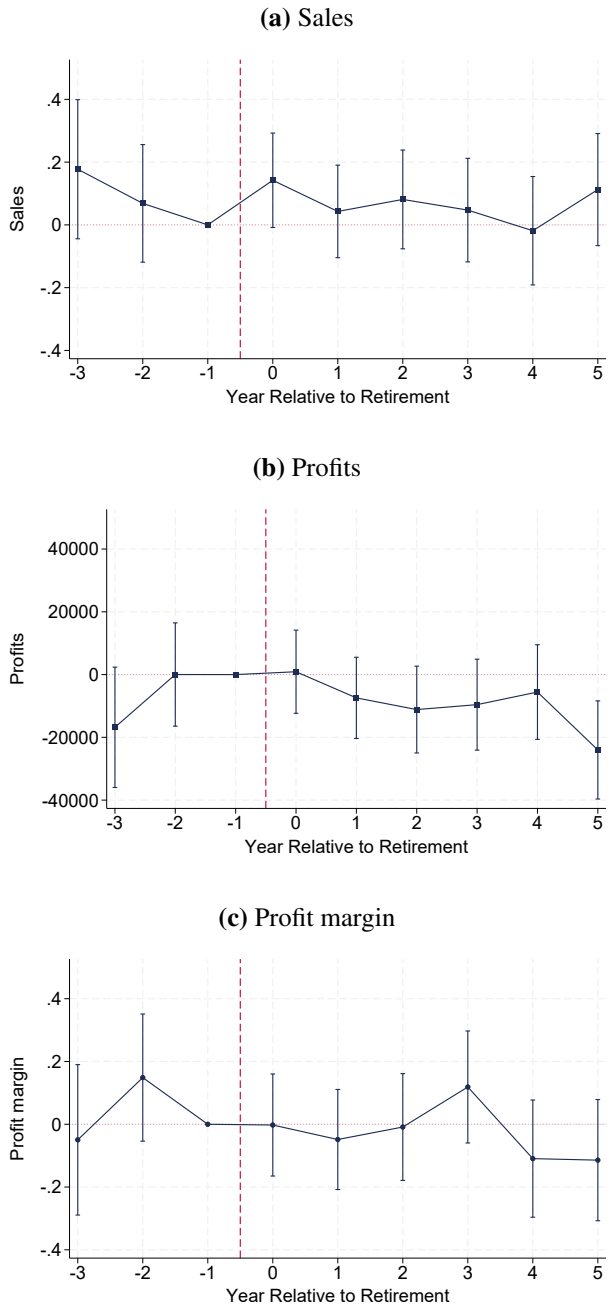


(b) Profits



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 × province × year fixed effects are included. I report 95% confidence intervals based on standard errors which are clustered at the firm level.

Figure A.10: Effect of grandfather's retirement on mothers' firm outcomes



Notes: The graphs show event-study estimates around grandfather's retirement for log sales (panel (a)), profits (panel (b)), and profit margin (panel (c)). Year 0 is when the grandfather 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 father, compared to a control group of women whose father 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 a grandfather is also retired and lives in the same municipality. Firm and industry × 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

Panel A: family size

	(1) **Third child**	(2) **Third child**	(3) **Third child**	(4) **Second child**
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) **Same sex**	(2) **Different sex**
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 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: Grandmother retirement and center-based childcare

	Log Sales	**Profits**	**Profit Margin**
Post × Close to grandma	0.217***	16,016**	0.144**
	(0.065)	(6,354)	(0.071)
Post × Close to grandma × High childcare	-0.176**	-16,515**	-0.212***
	(0.073)	(7,149)	(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).[20]

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) and (3) 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 (4) and (5) show that having a

[20] 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.

first-born 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 Søgaard (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:

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

where $y_{jt'}$ denotes an outcome for firm j in year t', α_j are firm fixed effects, and $\lambda_{s(j),p(j),t'}$ are province-by-industry-by-year fixed effects. The indicators $R^k_{jt'}$ denote event times relative to the third birth. Each indicator is instrumented by the interaction $R^k_{jt'} \times SameSex_j$, where $SameSex_j$ 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 Theoretical Framework

D 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%.

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