What Drives Child Penalties?

Evidence from a Global Organization*

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Abstract

This paper studies the impact of motherhood on women's career trajectories within a large international organization that operates under a unified institutional framework. Using rich administrative records from the World Bank Group, covering high-hierarchy staff based in the United States over the period 1988–2024, and an event-study difference-in-differences design, we document that motherhood generates persistent though modest wage penalties and substantial declines in promotion probabilities. Seven years after childbirth, mothers earn about 4–5 percent less and are far less likely to be promoted, while fathers are unaffected. These effects are not driven by lower performance; instead, they reflect changes in roles and assignments, including reduced project leadership and travel. We also find larger penalties for single mothers, less educated ones, and those in high-demand positions. Overall, these results suggest that family-friendly policies alone are insufficient without complementary changes in career incentives and evaluation practices.

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1 Introduction

Child penalties account for a large share of persistent gender gaps in earnings and representation in high-paying and leadership positions (Kleven et al., 2019b; Angelov et al., 2016; Olivetti and Petrongolo, 2017). Across countries, women experience sharp and lasting declines in earnings and career advancement following childbirth, while men's labor market trajectories remain largely unaffected (Kleven et al., 2019a; Kuziemko, 2018; Berniell et al., 2024a). Despite overwhelming evidence documenting these patterns, much less is known about the mechanisms through which these penalties emerge.

Child penalties may arise through multiple channels: parenthood can induce sorting into different roles or assignments, alter work inputs or outputs within jobs, or affect managerial and evaluation practices, inlcuding promotions. Most evidence relies on population-level data, which rarely allow comparison of employees performing the same tasks, facing the same incentives, and whose behavior and output can be observed. If career penalties depend on how work is organized, evaluated, and rewarded within firms, cross-country and cross-firm estimates confound the effects of parenthood with differences in institutional and organizational environments (for instance, if women who anticipate higher care demands sort into more flexible but lower-paying firms). Even the few recent studies that examine within-firm variation have focused mainly on employment, earnings, or promotions (Casarico and Lattanzio, 2023; Lucifora et al., 2021; Wilner, 2016). As a result, we know little about which remedial measures, such as task allocation, flexible work arrangements, or managerial and evaluation practices, are likely to be most effective in reducing gender gaps.

This paper studies how the arrival of children affects the earnings and career trajectories of highly skilled employees at the World Bank Group. Using rich administrative data and an event study difference in differences design that exploits variation in the timing of first childbirth and accommodates staggered treatment (de Chaisemartin and D'Haultfœuille, 2020), we estimate the career effects of parenthood and examine the mechanisms underlying child penalties. We first analyze impacts on earnings and promotions, then examine changes in work inputs and outputs, assess whether parenthood alters sorting across units and jobs, and finally explore heterogeneity by individual, job, unit, managerial characteristics, and inherited gender norms.

Our results show a modest but durable wage penalty and a substantial decline in promotion probability for mothers. Seven years after childbirth, women earn 4.7 percent less and they are almost half as likely to experience a promotion compared to the last year prior to birth. In contrast, no change is observed for fathers. The effects are not driven

by reductions in the quality of outputs: performance evaluations and project ratings remain largely unchanged. Instead, the penalty operates primarily through changes in roles and assignments: mothers become less likely to lead projects, supervise teams, or take on travel-intensive responsibilities, and over time they sort into positions with weaker promotion prospects. We also document important heterogeneity: penalties are larger for single mothers, for women in more demanding jobs, and for those taking longer leaves, while highly educated mothers are more protected. At the same time, we find no evidence that effects vary with exposure to social norms around gender roles, suggesting that organizational structures and job demands, rather than cultural attitudes, are the main forces shaping post-childbirth career trajectories.

This paper makes several contributions to the literature. To start, it sheds light on the mechanisms underlying child penalties through an analysis of within firm career dynamics around parenthood. While a small number of studies using matched employer employee or single employer data examine earnings or promotion gaps (Wilner, 2016; Lucifora et al., 2021; Almond et al., 2023), evidence on how penalties emerge within firms remains limited. Using rich personnel data, we study changes in promotions, performance measured by projects designed, supervision, and consultant hiring, work behavior including travel, leave use, and flexible work arrangements, as well as sorting across roles and units.

Second, we study how features of the work environment and management mediate the child penalty. While prior work emphasizes that flexible and family-friendly workplaces can attenuate gender gaps (Goldin, 2014; Abraham, 2017; Hotz et al., 2018), direct within-firm evidence remains scarce. We examine how job demands, flexibility, the composition of colleagues, and managers' characteristics shape post childbirth career penalties, and show that women disproportionately sort out of travel intensive and career accelerating roles, while managers play a limited role on average.

Third, we contribute to the literature on gender norms and labor market outcomes (Blau and Kahn, 2017; Olivetti and Petrongolo, 2017; Alesina et al., 2013; Fernández, 2013; Kleven, 2022; Kleven et al., 2024; Åslund et al., 2025). Exploiting the exceptional diversity of our setting, where employees from more than 190 countries operate under a common institutional and organizational environment, we assess whether inherited cultural norms and attitudes toward work life balance shape the magnitude of the child penalty. We find little evidence that differences in cultural background account for these patterns, suggesting an important role for job demands.

Finally, while our analysis focuses on a single global organization, the setting is informative for high skill employers, particularly multinational organizations, with stan-

dardized pay systems and centralized promotion rules. Our findings speak to a growing literature on gender gaps and career advancement within firms, complementing evidence from matched employer employee and single employer studies (Wilner, 2016; Almond et al., 2023; Azmat and Ferrer, 2017).

The remainder of the paper is organized as follows. Section 2 describes the institutional setting and the data used in the analysis. Section 3 outlines the empirical strategy. Section 4 presents the main results and explores the mechanisms underlying the estimated motherhood effect. Section 6 examines heterogeneity in these effects by mothers' characteristics, job, unit, and manager-level attributes, and social norms. Finally, Section 7 concludes.

2 Institutional setting and data

This section describes the context of this paper, highlighting the main institutional features of the WBG, and then details the data sources and key variables used in the empirical analysis.

2.1 Institutional setting

The World Bank Group is the world's largest multilateral development lender, with 189 member countries. Its mission is to reduce poverty and promote shared prosperity through financing, policy advice, and research. The institution employs approximately 15,000 staff, most based in Washington, DC, and has implemented projects in more than 140 countries. Staff may also hire Short-Term Consultants (STCs), temporary external hires contracted for a limited number of days to support their work.[1]

World Bank staff perform a wide range of professional tasks. Most are engaged in designing, supervising, and monitoring development projects in client countries. These operational roles involve coordinating with government counterparts, managing teams, overseeing disbursements, and ensuring compliance with safeguards, and are often travel-intensive since preparing and implementing projects requires extensive interaction with client governments. Because the Bank delivers its financing through projects, initiating and leading them, often with associated travel, is conducive to career progression. Other staff focus on analytical work, policy advice, or operational support. All staff are assigned to orga-

[1]While the World Bank Group workforce includes both staff and Short-Term Consultants (STCs), our data cover only staff members. We have limited information on STCs, whose annual number of contracted days varies but is capped (typically at 150 days), and who may be rehired in subsequent years.

nizational units and report to a manager responsible for task allocation, oversight, and performance evaluation.

Compensation follows a graded salary structure that varies by grade, experience, and performance. Grades range from A (entry-level support) to K (Vice President). Professional staff typically enter at Grades E or F and may advance to senior professional or managerial grades. Career progression is not automatic and depends on sustained performance and organizational needs.

Performance is assessed annually through a standardized system. Each staff member receives a rating on a five-point scale, where 1 denotes the lowest and 5 the highest. Ratings of 1–2 indicate unsatisfactory performance and may lead to termination if not improved. Most staff receive a rating of 3 (satisfactory), while ratings of 4–5 are reserved for a small share of employees whose performance exceeds expectations.

Performance ratings directly affect pay progression. They determine annual salary increases and influence promotion decisions. Ratings are assigned within distributional guidelines that cap the share of top ratings per unit, making evaluations inherently relative. Salary adjustments vary by year, reflecting inflation and budget constraints, and also depend on an employee's position within their grade: those at higher salary levels typically receive smaller percentage increases.

Promotions are associated with substantial pay increases,[2] and occur either through competitive processes—where staff apply for vacant positions at higher grades—or through in situ promotions within existing units. Both types of promotion depend on performance, experience, and managerial assessments, as well as on the availability of higher-grade positions. Consequently, career advancement reflects a combination of individual performance and institutional constraints.

Taken together, staff earnings can increase through two channels only: within-grade salary growth driven by performance ratings, or discrete pay jumps associated with promotion to a higher grade.[3] Absent promotion, earnings growth is therefore limited to within-grade adjustments tied to performance ratings.

The World Bank has generous childcare policies. The primary caregiver is entitled to 100 calendar days of paid leave and the secondary caregiver to 50 days of leave. In addition, financial support is available for child planning and various flexible work ar-

[2]Managers are allowed to grant a discretionary pay increase between 3 and 23% of a staff member's annual salary. In addition staff typically enter a lower part of the pay distribution in the next grade which automatically accelerates their pay progression in subsequent Overall Performance Evaluation cycles

[3]Although staff who believe their salary is significantly misaligned with their grade and qualifications may request an individual salary review, upward salary adjustments resulting from such reviews are very rare.

rangements, including are supported to help staff balance family and professional responsibilities. While not specifically designed to support childcare, these include a compressed work schedule, where staff can elect to work 9 hours a day for 9 consecutive days to then have a day off every second week. In addition staff can request permission from their managers to periodically work from home or even telecommute. Staff are entitled to a minimum of 26 working days of annual leave each year. Staff are also entitled to 15 working days of sick leave per year, and up to 5 days of short-term family leave. Overtime is not compensated for staff at grades GE and above. The World Bank also operates an on-site childcare center.

Importantly, the World Bank group is strongly committed to gender equity and actively monitors gender parity in promotions and compensation. It systematically monitors gender parity in hiring, promotions, and compensation through internal dashboards and annual reporting. These efforts include tracking representation at senior grades, analyzing pay gaps, and implementing corrective measures where disparities are identified. Gender equity objectives are embedded in HR policies and performance frameworks, and managers are held accountable for progress toward diversity targets.

2.2 Data

We combine administrative personnel records with survey, project, and country-level data to study career trajectories of employees at the World Bank Group (WBG). Our primary source is the Human Resources Longitudinal Dataset first compiled by Das and Joubert (2023), which originally covered fiscal years (FY) 1988–2015 and which we extend to FY2024.[4] The data cover all staff but exclude short-term consultants and contain rich sociodemographic, professional, and organizational information.

Sociodemographic variables include age, gender, marital status, nationality, education and household composition, which we use to identify employees' first births. Because actual birth dates are not recorded, a first birth is defined as the year in which the number of self-reported dependent children increases from zero to one (or more), a standard approach when vital records are unavailable (Marchionni and Pedrazzi, 2025).[5]

Professional and organizational characteristics include annual salary (net of taxes, in constant 2024 US dollars), grade, annual performance ratings, contract type, and

[4] A fiscal year runs from July of year t to June of year $t+1$. We refer to fiscal years by the calendar year in which they end.

[5] As a robustness check, we cross-validate first-birth identification with administrative parental leave records. Restricting attention to individuals observed from 2010 onward, 89% of mothers and 82% of fathers took parental leave around the time of birth, providing strong support for the accuracy of this identification.

duty station (Headquarters or Country Office). Changes in grade over time allow us to identify internal promotions, defined as transitions into grades GF and above, while annual performance ratings are available from 2000 onward.

We observe the job (position) held and the organizational unit to which each staff member is assigned. This enables tracking movements across positions and units, as well as characterize jobs (e.g., promotion or travel intensity) and units (e.g., gender/parent composition, prevalence of flexible work arrangements, lateral exit rates).[6] From 2014 onward, employees can be linked to their direct manager, allowing measurement of manager characteristics such as gender, parenthood status, and performance ratings.

To capture what staff do, we augment HR records with six additional annual data sources. First, we match employees to projects using the name of the Task Team Leader (TTL), capturing the number of projects they design and supervise, associated budgets, and ex-post outcome ratings.[7] Second, we link staff to short-term consultant contracts they initiate, recording annual counts, durations, and budgets from 2007 onward. Third, we identify staff listed as (co-)authors in the universe of Policy Research Working Papers, capturing the number of papers produced each year. Fourth, travel records (2010–2024) capture the number, duration, purpose, and destinations of official missions. Fifth, administrative leave records measure annual usage of sick, family, annual, parental, and other leave types.[8] Finally, we compile data on flexible work arrangements, including compressed schedules and telework.

In addition, we measure workplace attitudes using data from the Culture Wizard (CW) survey, conducted by RW3 Culture Wizard, a firm specialized in cultural assessments and diversity training.[9] About 6,000 employees completed the survey between 2017 and 2022.

In addition, using employees' nationality, we construct a gender-norms progressivity index following Kleven (2022), based on World Values Survey (2017–2022) questions regarding female employment and maternal work.[10]

Combining these sources, we construct an annual individual-level panel capturing demographics, earnings, promotions, productivity proxies, travel, leave usage, flexible work

[6] On average, units have 31 employees, and mobility across units is non-negligible, with about 22% of employees changing units per year.

[7] Projects rated "moderately satisfactory" or above—approximately 76% of rated projects—are classified as successful.

[8] Emergency and compensatory leave are negligible.

[9] The survey elicits employees' views along eight dimensions: Importance of Work, Change–Control–Risk, Collectivism, Hierarchy, Time Management, Transactional Orientation, Direct Communication, and Informal Communication.

[10] Robustness checks include alternative measures from the Global Gender Gap Index and country income levels.

arrangements, job, unit, and manager characteristics, as well as attitudes and country-specific gender norms. These data provide a granular view of career trajectories within a large global organization, enabling analysis of child penalties and the mechanisms by which they arise.

We focus on HQ-based employees who ever held professional, managerial, or executive roles (GE+ positions), capturing those with career trajectories most susceptible to child penalties.[11] After excluding employees with employment gaps around childbirth or insufficient observation windows, the final sample includes 2,013 mothers and 1,791 fathers. Depending on the outcome, the effective estimation sample may be smaller, as not all outcomes are available over the same time span and, even within a given period, not all individuals have complete information.[12]

Descriptive statistics

Table 1 reports summary statistics for individuals in our sample of interest, measured in the year prior to the birth of their first child, over the period 1988–2024 (although some variables, such as those related to work travel or leave usage, are only available for a shorter period). Overall, before the birth of their first child, women are on average 35.5 years old, 79% are married or partnered, and 20% have a PhD as their highest educational attainment. Men are about 1.4 years older than women, 10 percentage points more likely to be married, and 6 points more likely to have a PhD.

In terms of employment and career outcomes, in the year before becoming a parent, they earn annual salaries about 16,475 USD lower than men (126,164 USD compared to 142,639 USD for men).[13] Further, while mothers-to-be are less likely to have entered the organization through a highly selective recruitment program, there are no statistically significant differences in the probability of promotion between mothers- and fathers-to-be in the year prior to birth (0.10 vs. 0.09). Most first-time parents are concentrated in Grades F and G before becoming parents, although men are more likely to occupy higher-ranking positions within the organizational hierarchy.[14] [15] Women are 2 percentage

[11] Reporting in Country Offices is less reliable, as evidenced by a spike in reported dependent children in 2005 likely reflecting reporting changes rather than actual fertility.

[12] Both leave- and travel-related information are available for about 1,800 individuals in our sample. Information on consultants' hiring exists for approximately 2,100 individuals, while data about compressed schedules and telework are available for about 2,300 and 1,500 individuals, respectively. Finally, around 800 individuals in our sample responded to the Culture Wizard survey.

[13] Salaries are measured in constant 2024 US dollars.

[14] See Das and Joubert (2023) for an analysis of gender pay gaps across different positions within the World Bank Group.

[15] Column shares do not sum to 100 percent because, as noted above, our sample includes employees

points less likely to hold an open-ended contract, and also receive lower performance ratings, although the differences are small.

In terms of observable productivity measures, women are just as likely as men to initiate a new project (approved by the board) before the birth of their first child, but are less likely to be managing ongoing active projects.[16] In terms of output quality, we do not find significant differences between women and men in project performance (measured by either outcome rating received by led projects upon closure or the budget of new projects approved) or in the probability of managing external consultants. Yet, men are more likely to co-author a paper than women.

In addition, Table 1 examines differences in work-related travel–a central component in globally multinational firms and international organizations. Typically, staff in high-responsibility roles travel more, and such mobility is often necessary for project execution and career progression. Thus, travel frequency serves as a proxy for both role intensity and professional visibility. We do find gender differences on this dimension. Before childbirth, fathers travel more often than mothers, and when they do so, they travel for longer periods (more than two days), although the difference is not statistically significant, and visit two more countries on average. Leave-taking patterns also reflect gender differences: before childbirth, mothers-to-be take 3.6 more days of annual leave and 2 more days of sick or family-related leave per year than fathers. Further, women use home-based work more often than men (53% compared to 42%), while the opposite is true for compressed work schedules (43% of women vs. 50% of men).[17]

3 Empirical strategy

To estimate the causal effect of first childbirth on labor market outcomes, we rely on an event-study difference-in-differences (DiD) design centered around the birth of the first child. For each parent, the "event" is defined as the year of first childbirth, and event time τ measures the number of years relative to that birth. We examine labor market outcomes from four years before to eight years after childbirth, i.e., $\tau \in [-4, 8]$, allowing

who at some point reached senior professional or managerial grades; but they may have occupied lower-grade positions earlier in their careers.

[16] These measures are conditional on being in a unit that ever carried out a project.

[17] Under this compressed work schedule, employees can work an extra hour each day in exchange for one day off every two weeks. This type of schedule is more prevalent among higher-level positions, which suggests a possible trade-off between stability and career progression for women around the time of childbirth (see Figure A.2 in the Appendix). Indeed, while this arrangement can be beneficial for some, it may be inconvenient for parents, who often need day-to-day flexibility to manage caregiving responsibilities, such as taking their children to (and picking them up from) school.

Table 1: Summary statistics in the year before childbirth. Employees ever in professional, managerial or executive roles, based in Headquarters

	Mothers	Fathers	Diff	s.e.
Age	35.52	36.94	-1.43	0.16
Married / partnered	0.79	0.89	-0.10	0.01
Has doctoral degree	0.20	0.26	-0.06	0.02
Selective entry program	0.14	0.16	-0.02	0.01
Annual salary (USD)	126164	142639	-16475	1258
Promoted to higher position	0.10	0.09	0.01	0.01
At GE position	0.17	0.11	0.06	0.01
At GF position	0.39	0.43	-0.04	0.02
At GG position	0.23	0.31	-0.08	0.01
At GH position	0.02	0.05	-0.02	0.01
At GI-GK position	0.00	0.01	-0.00	0.00
Open-ended contract	0.55	0.57	-0.02	0.02
High performance ratings	0.41	0.45	-0.04	0.02
Pr. of initiating a new project	0.02	0.02	0.00	0.01
Pr. of managing at least 1 project	0.16	0.20	-0.04	0.01
Ex-post project outcome rating	0.08	0.07	0.00	0.02
Budget of new projects approved (million USD)	16.29	12.13	4.16	6.90
Working papers co-authored	0.04	0.10	-0.05	0.01
Pr. of hiring external consultants	0.09	0.09	0.00	0.01
Duration of work-related travels (days)	34.94	37.15	-2.21	2.19
Countries visited on work-related travels	8.42	10.38	-1.96	0.47
Sick and family leave (days/year)	4.23	2.30	1.93	0.23
Total leave (days/year)	24.83	21.25	3.58	0.54
Home-based work	0.53	0.42	0.12	0.03
Compressed work schedule	0.43	0.50	-0.07	0.02
Observations	2013	1791		

Note: The data cover the period 1988–2024, and the sample includes mothers aged 18–50 and fathers aged 18–60 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. Annual salary is net of taxes and measured in constant 2024 US dollars, as is the budget of new projects approved. The duration of work-related travel and the number of countries visited are conditional on travelling. Project and working papers-related measures are conditional on units that have ever held a project or published a working paper, respectively.

us to trace the dynamic evolution of earnings, promotions, and other outcomes around the transition into parenthood.

Our empirical implementation is based on the estimator proposed by de Chaisemartin and D'Haultfoeuille (2024), which delivers group-time average treatment effects that are robust to both dynamic treatment effects and heterogeneity in treatment timing. This estimator is particularly well suited to our setting, where individuals experience childbirth at different points in time and treatment effects may evolve over the event window. By construction, this approach mitigates methodological concerns present in Two-Way-Fixed-Effects (TWFE) estimates.[18]

We estimate the following specification:

$$y_{it\tau} = \sum_{\tau \neq -1} \delta_\tau \, \mathbb{I}(\tau = j) + \beta \, age_{it} + \eta_i + \theta_t + \epsilon_{it}, \tag{1}$$

where $y_{it\tau}$ denotes an outcome of interest for individual i in year t and event time τ. The coefficients δ_τ trace the dynamic response of labor market outcomes relative to the year prior to childbirth ($\tau = -1$, the omitted category), and ν_i and θ_t control for individual and year fixed effects, respectively. We run separate regressions for mothers and fathers in our sample of employees ever in professional, managerial, or executive roles, based in Headquarters. Importantly, individuals do not necessarily appear in the data throughout the entire observation window around childbirth, which means the analysis is based on an unbalanced panel of employees. The estimated coefficients are expressed relative to the year immediately preceding childbirth ($\tau = -1$).

In addition, we present all event-study effects in percentage terms to facilitate interpretation and comparability. Following Melentyeva and Riedel (2025), percentage changes are computed as:

$$P_\tau = \frac{\hat{\delta}\tau}{\mathbb{E}\left[Y\tau = -1 \mid a\right]}, \tag{2}$$

where $\mathbb{E}\left[Y_{\tau=-1} \mid a\right]$ denotes the average outcome in the pre-birth year, conditional on age-at-first-birth group. Under this normalization, coefficients are expressed relative to

[18] TWFE estimators may suffer from the so-called "forbidden comparisons" problem: when treatment timing varies across units, earlier-treated individuals may implicitly serve as controls for later-treated ones, even though they have already been exposed to treatment. For example, the estimated effect of parenthood at $\tau = 1$ on the probability of promotion may be obtained by comparing newly treated parents to workers who became parents several periods earlier and whose promotion probabilities are already depressed, rather than to workers who have not yet experienced childbirth and may still be on a higher pre-birth promotion trajectory. In the presence of dynamic or heterogeneous treatment effects, such comparisons can bias the estimated coefficients (Callaway and Sant'Anna, 2021; Goodman-Bacon, 2021). For this reason, our preferred estimates rely on the group-time average treatment effects delivered by the de Chaisemartin and D'Haultfoeuille (2024) estimator, which is robust to these concerns.

the year immediately preceding childbirth ($\tau = -1$), and divided by the average outcome conditional on age group in the pre-birth year to measure percentage changes relative to that baseline. As these averages may differ systematically by age at first birth, we compute them within five-year age-at-first-birth groups.As emphasized by Melentyeva and Riedel (2025), this scaling using pre-birth levels as the benchmark is preferable to alternative normalizations, as it directly captures the extent to which parenthood interrupts pre-existing labor market trajectories.[19]

The DiD design with staggered treatment timing identifies the effect of childbirth under two key conditions. First, outcomes for treated and not-yet-treated parents must follow parallel trends in the absence of childbirth. In our context, employees who never become parents are not an appropriate comparison group, as the decision to remain childless is likely correlated with career trajectories and labor market behavior. We therefore rely on workers who will eventually have children—the not-yet-treated—as the relevant control group.[20]

Second, the identification strategy requires the absence of anticipatory effects, meaning that labor market outcomes should not respond to childbirth prior to $\tau < 0$. In the context of fertility and career dynamics, anticipation may arise through both long-term and short-term channels (Melentyeva and Riedel, 2025). Concerns about long-term anticipation are mitigated in our setting by the nature of the sample, which consists of a relatively homogeneous group of career-oriented employees in hierarchical positions who all eventually become parents within the observation window. This homogeneity substantially reduces concerns that systematic differences in early-life career investments could bias the estimates.

Short-term anticipation refers to behavioral adjustments in periods immediately preceding childbirth. To assess this possibility, we examine whether changes in earnings or promotions prior to birth predict the timing of first parenthood. Figure A.3 in the Appendix reports estimates from regressions of an indicator for becoming a first-time mother or father on pre-birth changes in earnings and promotions, estimated over alternative pre-birth windows. The results support the no-anticipation assumption. For women, coefficients are consistently small and statistically insignificant across all windows. For men, we find a small positive association between prior promotions and the probability of becoming a father in one specification, but the effect is modest and not

[19] We define five-year age-at-first-birth groups and calculate the average outcome for each employee according to their age group.

[20] As an additional robustness check, we refine the control group by comparing employees of similar ages at the time of birth, following Melentyeva and Riedel (2025). This stacked DiD approach yields qualitatively similar estimates, although the reduced sample size results in noisier estimates.

robust across alternative windows.

A final concern relates to sample attrition. Our data track employees while they remain employed, but some individuals may leave the organization after childbirth. Figure A.5a in the Appendix shows that attrition is low: on average, 2.5 (4.7) percent of employees exit within three (five) years of the first birth, with exit rates consistently lower for mothers than for fathers.[21] To assess whether attrition is systematically related to pre-birth characteristics, Figure A.5b plots coefficients from regressions of the three-year post-birth exit probability on a set of pre-birth outcomes. Most coefficients are small and statistically insignificant, suggesting limited selective attrition. The few significant differences indicate that parents who exit tend to have weaker pre-birth labor market outcomes, implying that, if anything, our estimates are likely biased toward zero.

4 How large is the penalty?

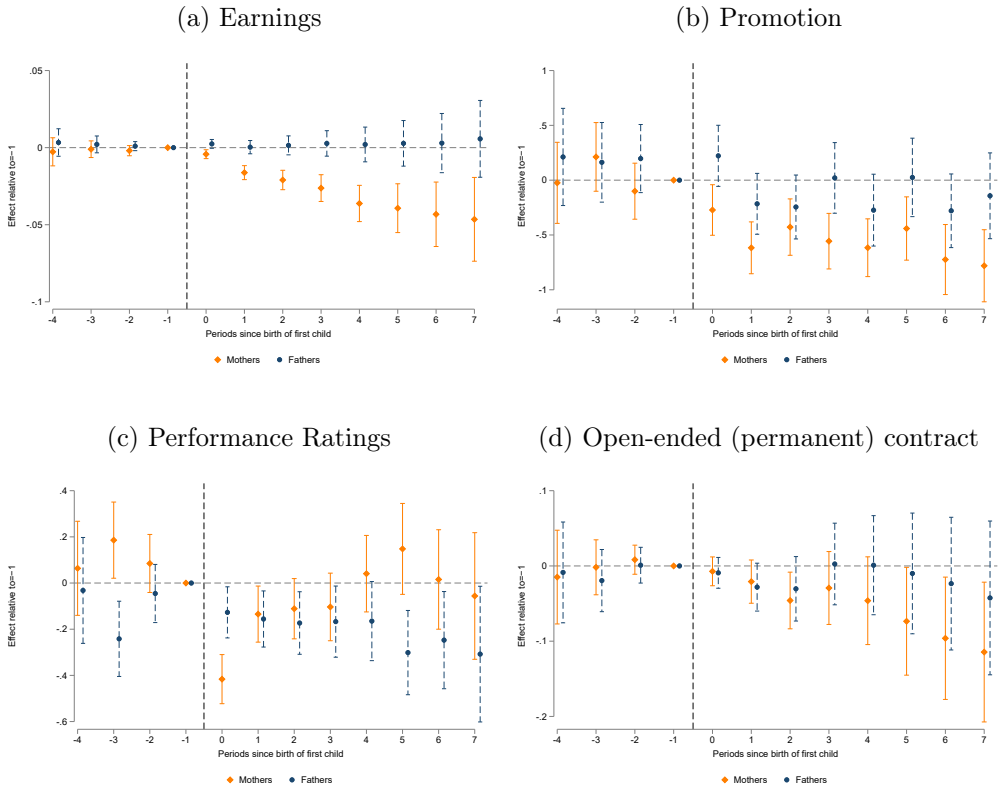
We now turn to our results. This section first document the existence of a child penalty in pay, promotion, performance ratings, and contract type. The next sections examine the drivers of the penalty. Figures 1a, 1b, 1c, and 1d present dynamic event-study estimates and 95 percent confidence intervals tracing earnings, promotions, performance ratings, and having a permanent contract, from four years before to eight years after the birth of the first child, controlling for age and time trends. Coefficients are expressed relative to the year immediately preceding childbirth ($\tau = -1$) and divided by the average outcome conditional on age group in the pre-birth year (see eq. 2) to measure percentage changes relative to that baseline.

Starting with earnings, pre-birth coefficients are small and statistically indistinguishable from zero for both women and men, consistent with the parallel-trends assumption. After childbirth, the earnings trajectories of mothers and fathers diverge sharply. Beginning in the year of birth, mothers' earnings grow more slowly than would be predicted by their pre-birth trajectory—they fall by roughly 1.6 percent relative to non-mothers—and the gap widens steadily over time. Seven years after childbirth, yearly mothers' earnings are approximately 4.7 percent below the level implied by their pre-birth earnings path. Cumulated over the seven years following childbirth, mothers earn a total of roughly USD 29,396 less than they would have earned had their pre-birth earnings trajectory continued. In contrast, fathers' earnings trajectories show no systematic response to childbirth. Averaging across the post-birth period, the implied child penalty, defined

[21] Figure A.4 in the Appendix reports exit rates for non-parents as a benchmark.

as the percentage difference between fathers' and mothers' earnings, is approximately 3 percent and statistically significant at the 5 percent level.[22]

Figure 1: Impact of first childbirth on career progression



Note: The sample includes mothers aged 18–50 and fathers aged 18–60 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. The data in panels (a), (b) and (c) cover the period 1988-2024 while panel (c) covers 2002–2022. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers controlling for age, individual fixed effects, and year fixed effects and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

The child-penalty estimates we obtain are smaller than those typically reported in the literature, which tends to estimate penalties for the labor force as a whole. For example, using administrative data Kleven et al. (2019b) document long-run earnings

[22]This value is computed as the simple average, across all post-birth periods, of the difference between the estimated coefficients for mothers and fathers (net of the pre-birth average, which is approximately zero for both groups).

penalties (measured as the average yearly penalty from 5 to 10 years after childbirth) of roughly 21 percent in Denmark, 27 percent in Sweden, and 31 percent in the United States. A more comparable benchmark is offered by Lucifora et al. (2021), who find a 9 percent post-birth earnings loss in a large French firm, close to our roughly 4.7 percent estimate. Our lower estimate likely reflects several features of the setting we study. To start with, the World Bank offers substantial workplace flexibility, generous parental-leave provisions, and is committed to gender equity, institutional features which likely mitigate some of the typical channels driving earnings losses around childbirth, such as job separation, involuntary reductions in hours, or downgrading to lower-paying firms or sectors.[23] Second, the workforce is selected, consisting of highly educated, career-oriented individuals, many of whom are expatriates. Third, population-level estimates may reflect heterogeneity across employers and worker–firm sorting, whereas comparing mothers within a single institutional framework reduces compositional differences that may inflate estimated penalties.

Mothers also experience a substantial and persistent decline in their probability of being promoted after childbirth, as is shown in Figure 1b. While pre-birth promotion trends do not differ by gender, promotion probabilities for mothers fall sharply after the first birth.

Relative to a pre-birth promotion rate of 10 percent, the promotion probability declines progressively after childbirth, with the gap reaching approximately 50 percent one year after childbirth and showing no signs of recovery within the observation window. By contrast, fathers' promotion probabilities show no statistically significant response to childbirth.[24] Interestingly, when the type of promotion is accounted for (whether in situ—within the same unit—or through an application process for a vacant position in a different unit), we find a penalty only for in situ promotions (Figure A.7). A plausible interpretation is that in situ promotions rely entirely on the discretion of the direct manager, whereas competitive promotions involve a more formal process with multiple evaluators [ASK YVES IF THIS IS CORRECT], which naturally dilutes any individual bias. Additionally, close coworkers and supervisors may update their beliefs about mothers' availability or commitment after childbirth (Correll et al., 2007), an effect that is more likely to operate in the in situ setting where daily interactions are more salient.

The promotion penalty may account for the observed divergence in mothers' and

[23] For example, only 27% of workers in the US have access to paid family leave benefits (U.S. Bureau of Labor Statistics, 2023)

[24] These findings are closely aligned with evidence from Lucifora et al. (2021), who show that the motherhood penalty within the organization is almost entirely driven by missed promotions and slower progression up the firm's internal job ladder, consistent with a "mommy track" mechanism.

fathers' earnings trajectories; however, parenthood may also slow earnings growth within a grade, given that yearly performance evaluations determine both promotion prospects and salary increases, even in the absence of a promotion (see Section 2.1). Figure 1c shows that women experience a significant decline in performance ratings only in the year of childbirth with no evidence of persistent effects thereafter. Fathers' ratings are slightly lower in the first five years post-birth but statistically indistinguishable from zero, and decline significantly only after year six. While these results should be interpreted cautiously given the presence of modest pre-trends for both mothers and fathers, the absence of persistent rating effects for women may partly reflect slower progression to higher grades, where evaluation standards tend to be more demanding. Overall, the evidence suggests that slower promotion prospects, rather than sustained within-grade earnings penalties resulting from lower performance ratings, are the primary driver of the child penalty for women.

Finally, Figure 1d examines contract stability. Women experience a noticeable decline in the likelihood of holding an open-ended (permanent) contract following childbirth. Men's probability of having a permanent contract also declines, but the estimated effect is virtually zero and statistically insignificant. Given the absence of pre-trends, we interpret these patterns as consistent with a motherhood penalty in contract stability.

Overall, childbirth coincides with a sustained divergence in the career trajectories of mothers and fathers. Mothers experience slower earnings growth following childbirth, with reduced promotion rates accounting for most of this divergence. Effects on within-grade earnings growth appear limited, as performance ratings decline only temporarily around childbirth. Mothers also experience a post-birth decline in contract stability relative to their pre-birth trajectory. By contrast, fathers' career outcomes show little systematic response to parenthood.

5 Mechanisms

Do the lower earnings growth, promotion prospects and lower performance ratings reflect changes in tasks and productivity, or rather changes in time use and work arrangements? To address this question, we first examine multiple proxies for both the quantity and quality of tasks and responsibilities that employees take on, using the same event-study framework applied to earnings and promotions. Next we turn to changes in time use and time management, sorting into different job types, and the role of managers.[25]

[25] Given that several of the variables we use to study potential mechanisms are available only for a more limited time period, the analysis that follows focuses on a slightly shorter window around the birth

5.1 Changes in tasks and productivity

We begin by examining whether parenthood reshapes the tasks and responsibilities that employees take on, and whether any such changes translate into differences in productivity. We do so using six measures capturing different aspects of staff activities: project initiation and supervision, projects' budget and ex-post outcome rating, co-authorship of working papers and external consultants contracting. Project-related outcomes are analyzed only for staff in units that ever managed projects, and working paper outcomes are only analyzed for staff in units that have ever produced working papers.

Figure 2a shows that parenthood substantially reduces women's propensity to originate World Bank projects and bring them to the Executive Board for approval as designer Task Team Leaders. In the year of birth, mothers are already about 40 percent less likely to initiate a new project relative to their pre-birth baseline, and the effect deepens over time. In contrast, fathers' likelihood of initiating new projects is unaffected throughout the post-birth period. This effect is substantively important, as bringing a project to the Board is a highly visible and time-intensive activity that requires extensive travel and client engagement, and is closely tied to lending volumes and career progression within the organization. We find no evidence that, conditional on having initiated a new project, the size of such projects changes after childbirth for either women or men, as shown in Figure 2c. However, quality at entry—measured by the rating received at Board approval—declines from year three onward, although estimated imprecisely (see Figure A.8), suggesting that the contraction in project origination may eventually also affect the preparation quality of the projects initiated by mothers.

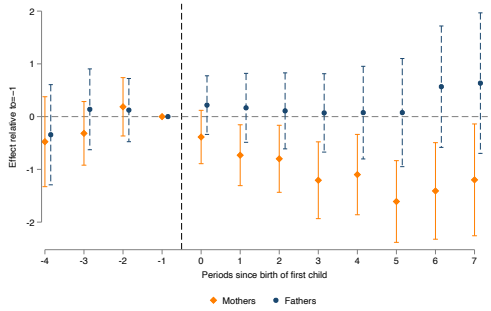
The likelihood of managing a project as a Supervisor Task Team Leader also declines after childbirth, as shown in Figure 2b. By year seven, mothers are approximately 26 percent less likely to manage at least one active project relative to their pre-birth baseline, although the effects are marginally non significant. Unlike project initiation, however, this reduction occurs for both mothers and fathers, and the difference between them is not statistically significant.

Turning to output quality, Figure 2d presents estimates for the probability that projects managed by staff receive a successful ex-post outcome rating from the Independent Evaluation Group—an independent, externally validated measure of project success. In the first two years after childbirth, ratings are largely stable for both mothers and fathers, consistent with the fact that projects closing in this period were typically initiated before the birth event, given the typical multi-year implementation cycles. From year

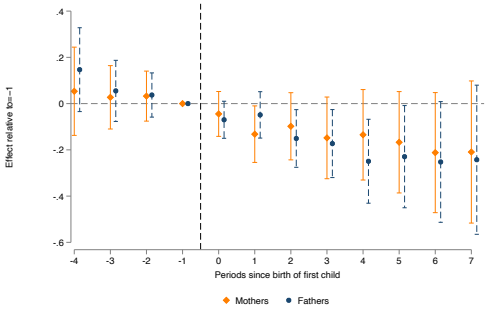
event for most variables.

Figure 2: Impact of First Childbirth on Output and Responsibilities

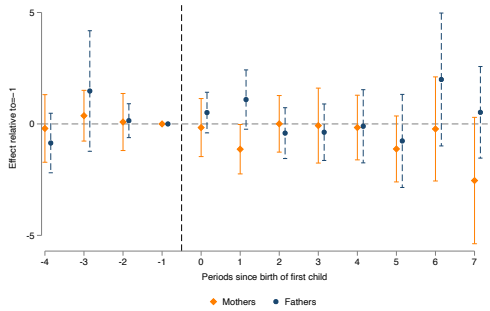
(a) Pr. of initiating a new project



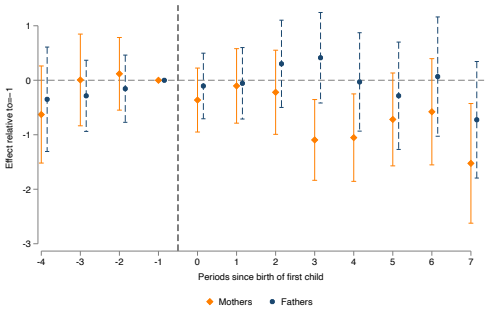
(b) Pr. of managing at least one project



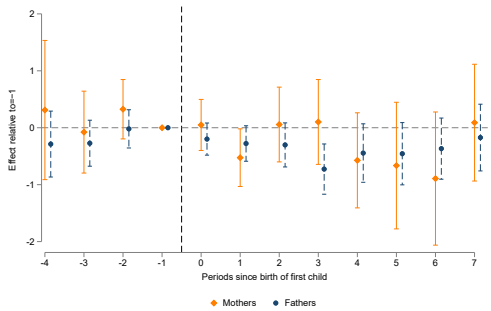
(c) Budget of newly approved projects



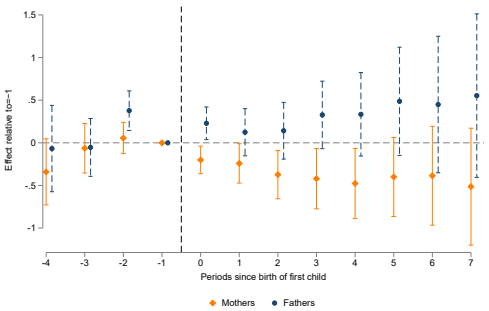
(d) Projects with successful ex-post rating



(e) Working papers co-authored



(f) Hiring external consultants



Notes: The sample includes mothers aged 18–50 and fathers aged 18–60 who are observed at least once before and once after childbirth, are ever employed in professional, managerial, or executive roles, and are based at Headquarters. Panels (a)–(c) and (b)-(d) use data from 1988–2020 and 1988–2023, respectively, and include staff in units that ever carried out a project. Panel (e) uses data from 1988–2024 and includes staff in units that ever produced a working paper; panel (f) covers 2007–2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers controlling for age, individual fixed effects, and year fixed effects and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

three onward, we observe a pattern of declining ratings for mothers, though estimates are somewhat imprecise.[26]

Figure 2e shows no statistiaclly significant impact of parenthood on co-authoring working papers, indicating that research output is also unaffected. Finally, Figure 2f examines supervisory responsibilities by assessing impacts on the propensity to manage at least one short-term consultant. Fathers become more likely to manage short-term consultants after childbirth, whereas mothers become progressively less likely to do so. On average, across the post-birth period, they are 37% less likely to supervise a consultant relative to non-mothers (a decrease of 3.4 percentage points from a baseline of 9 points, although the estimates are noisy and not statistically significant). Given that STCs might help with project design, this decline in the use of short term consultant is consistent with the results in Figures 2a and 2b): while project supervision declines for both, project design declines for women but not for men.

In summary, parenthood primarily reshapes the allocation of responsibilities rather than the immediate quality of outputs. Mothers become less likely to initiate new projects, and both mothers and fathers reduce direct project supervision. The quality of projects does not deteriorate immediately, consistent with the long implementation cycles of World Bank operations, though there is suggestive evidence of a lagged effect from year three onward. Fathers become more likely to manage short-term consultants after childbirth, while mothers become less likely to do so; although neither effect is individually statistically significant, the difference between them is. Overall, these patterns point to a parenthood-induced contraction in the scope of leadership roles for mothers, and anticipates the sorting patterns we examine in Section 5.3.

5.2 Changes in time use & work arrangements

Next, we examine whether parenthood affects how employees work and structure their time, focusing on changes in work inputs. To start with, Figure 3a shows a sharp decline in travel days for women following childbirth, while effects for men are much smaller. Beyond the natural decrease in the first year after birth, conditional on travelling, mothers reduce their days traveled by about 50 percent, and this reduction persists over time (on average, it represents 17 less days per year). Fathers, by contrast, experience only a modest and short-lived decline. In A.9 in the appendix, we show that conditional on traveling, both men and women visit fewer countries after becoming parents, although the

[26] In Appendix Figure A.8 we show that the probability of delay for projects led by new mothers increases during the first three years post childbirth, but this effect fades and becomes statistically insignificant thereafter.

reduction is larger for mothers. Moreover, mothers become about 10 percentage points less likely to travel for at least 60 days per year, whereas the small decline observed for fathers is statistically significant only in the birth year. These patterns are consistent with the task reallocation documented in Section 5.2: since project design—which declines for mothers but not fathers—is more travel-intensive than supervision, the asymmetric reduction in travel days across genders follows naturally from the differential impact of parenthood on project roles. This constraint is particularly salient in multinational enterprises and international organizations, where employees are typically expected to coordinate across time zones and undertake frequent international travel (Bøler et al., 2018; Hewlett and Rashid, 2010).

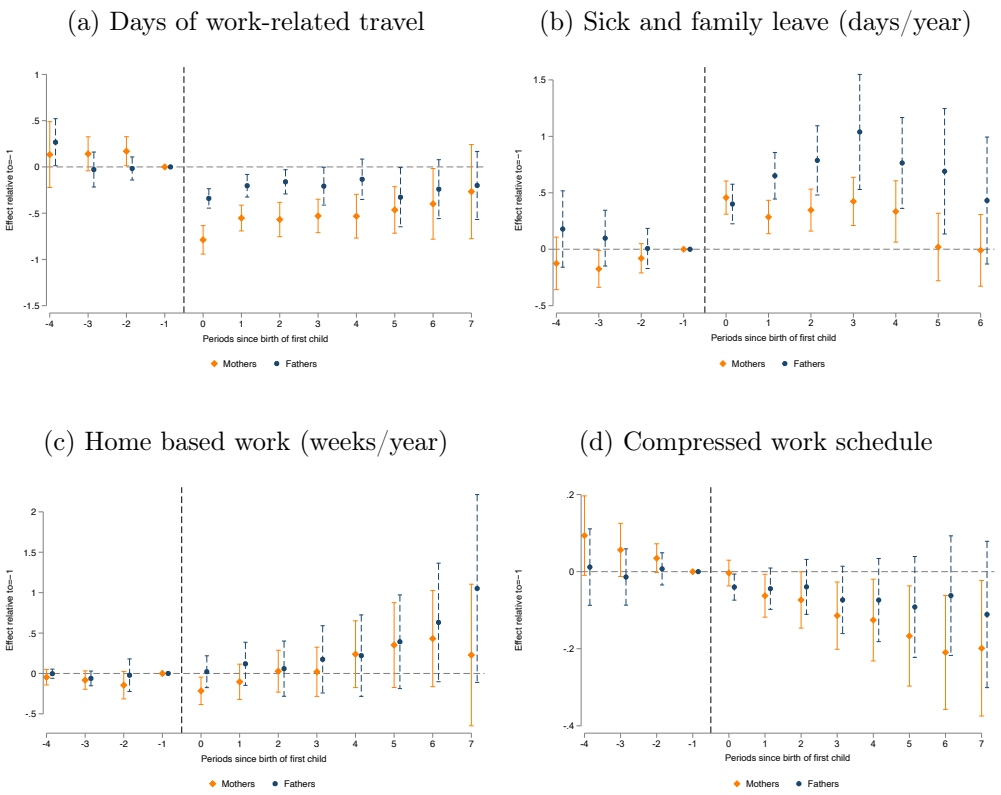
Second, Figure 3b shows that both mothers and fathers take more sick and family leave during the first years following childbirth, though these effects fade out and become statistically indistinguishable from zero toward the end of the analysis window. Notably, the increase is larger for fathers than for mothers. One possible explanation is that leave entitlements are capped, and men tend to use less sick and family leave prior to parenthood, leaving greater unused leave capacity that can be drawn upon after childbirth.

Figure 3c shows that both mothers and fathers increase their use of home-based work after becoming parents, with no statistically significant difference between them over the post-birth period (p-value = 0.4). While the absence of a gender gap in the use of home-based work after childbirth may seem surprising, it could reflect the fact that, as shown in Table 1, women already make substantially more use of home-based work prior to childbirth than men (53 versus 42 percent), leaving less room for a differential post-birth increase.

In contrast to home-based work, Figure 3d shows an asymmetric response in the adoption of compressed work schedules: mothers become about 20 percent less likely to use them after childbirth, while the change for fathers is smaller and not statistically significant. Compressed schedules require longer daily hours in exchange for a day off every two weeks. While intended to facilitate work–life balance, this trade-off may become less attractive once caregiving responsibilities intensify, which likely explains the divergence observed after childbirth.

In summary, parenthood reshapes work patterns asymmetrically. Mothers almost halve their work-related travel, and become less likely to adopt compressed work schedules that require extended daily office presence. Fathers, by contrast, exhibit only modest and transitory adjustments across both dimensions. While mothers start working more from home, this increase is not different from that of fathers. In addition, both mothers

Figure 3: Impact of first childbirth on work schedules



Note: The sample includes mothers aged 18–50 and fathers aged 18–60 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. The data in panels (a) to (c) cover the period 2010-2024, while in panel (d) cover the period 1994-2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers controlling for age, individual fixed effects, and year fixed effects and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

and fathers increase their use of sick and family leave in the years immediately following childbirth, with a somewhat larger increase among fathers. Taken together, these patterns are consistent with mothers absorbing a disproportionate share of caregiving responsibilities, with consequences that extend beyond the home and into their professional trajectories.

5.3 Sorting

The negative impact of motherhood on wages can also arise from sorting of mothers into lower-paying or lower-advancement positions within the organization. In particular, after childbirth, women may shift toward jobs that offer greater flexibility or better work-life balance, even if those are associated with slower career progression or lower compensation. While prior work has shown that sorting across firms contributes meaningfully to child penalties (Casarico and Lattanzio, 2023; Bruns, 2019), whether similar dynamics operate within a single organization—where institutional rules and pay structures are common to all employees—remains an open question. We examine this by tracking how the characteristics of the positions held by mothers and fathers evolve after childbirth.

In our sample, job changes around childbirth are common: 69% of women and 75% of men who become parents change jobs within three years—a level of mobility consistent with broader patterns in the organization, where around 80% of employees change jobs at least once over their careers. The key question, however, is not whether parents move but where they move to. If childbirth induces a reallocation toward positions offering greater temporal flexibility, lower travel requirements, or reduced managerial responsibilities, such sorting could itself generate a penalty in earnings and career progression (Goldin, 2014). We examine whether this is the case, and the extent to which such shifts help explain the motherhood penalty within the organization.

To measure job characteristics net of individual employees' choices, we estimate job fixed effects from the following regression, excluding parents from the estimation to ensure job attributes are not endogenously affected by parenthood:

$$Y_{ijt} = \beta_0 + \beta_1 \,\text{tenure}_i + \beta_2 \,\text{tenure}_i^2 + \gamma \text{position}_i + \delta_j + \lambda_t + \varepsilon_{ijt}, \tag{3}$$

where Y_{ijt} is an attribute of job j, for worker i in year t,δ_j denote job fixed effects, λ_t are year fixed effects and ε_{ijt} are idiosyncratic error terms. For each outcome Y—a job's propensity to lead to promotions, its travel intensity, the frequency of use of compressed work schedules or home-based work, and its gender composition—the estimated fixed effects δ_j capture the average level of that attribute inherent to the job, controlling for

employees' professional position, tenure, and common time shocks. We then discretize these job attributes into high and low categories using the median of the estimated fixed effects.[27] [28] We interpret these fixed effects as measures of a job's intrinsic attributes, and examine whether mothers and fathers sort into systematically different types of jobs after childbirth. When analyzing job composition in terms of the share of parents, we compute a leave-one-out job-level average, since by construction we cannot obtain job fixed effects from equation 3, which is estimated exclusively on non-parents.

Figure 4 shows patterns of post-childbirth job sorting across different job characteristics. Women and fathers increasingly move into positions with lower promotion potential: by year seven after birth, their likelihood of holding a high promotion potential job is around 10 percent below its pre-birth level. However, a clear gender divergence emerges for travel intensity. While fathers' coefficients remain close to zero or slightly increase in some periods, mothers steadily move out of high travel jobs, with the probability falling by roughly 30 percent by year seven.

However, for other job attributes, gender differences are virtually muted. While mothers gradually move into jobs where compressed work schedules are more common, this increase is not statistically different from zero. We do not find either a systematic sorting into jobs where working from home is more common (while there is a slight increase in later periods for fathers, it is overall statistically indistinguishable from that of mothers). Finally, we don't find evidence of parents sorting into jobs with a higher share of women, but we do observe a statistically significant decrease in the probability of moving to units with a higher share of mothers, for both mothers and fathers.

Taken together, these results suggest some reallocation along job characteristics. Specifically, mothers systematically move away from positions with high promotion potential and intensive travel requirements, while fathers' job sorting remains largely unchanged.[29]

We next ask whether job characteristics shape the motherhood earnings penalty, focusing on pre-birth job attributes to avoid endogenous sorting into more family-compatible roles over time. Focusing on women, Figure 5 examines heterogeneity in earnings effects by baseline job characteristics. We find sharp differences: mothers in more demanding jobs, whether defined by promotion potential or travel intensity, experience large penal-

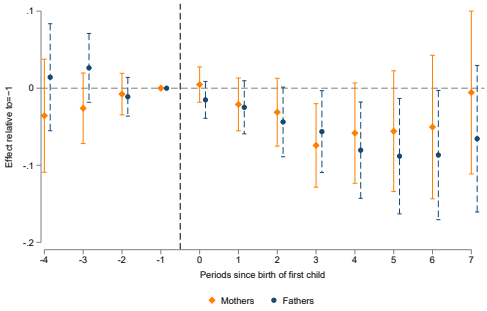
[27] See Åslund et al. (2025) and Casarico and Lattanzio (2023) for examples of similar approaches.

[28] Results are qualitatively unchanged when using the 75th percentile, rather than the median, as the cutoff.

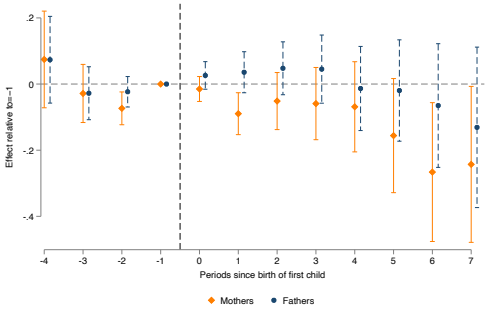
[29] We also examine whether mothers are more likely to supervise projects located in countries with smaller time-zone differences to accommodate more family-friendly schedules, but we find no systematic patterns.

Figure 4: Impact of first childbirth on job-level characteristics

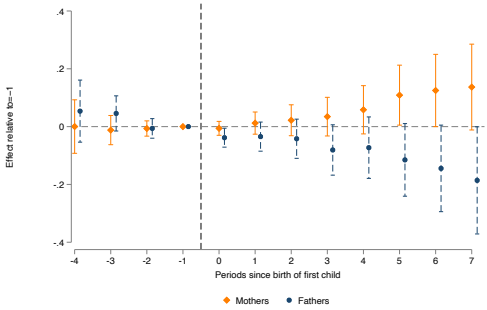
(a) High promotion potential job



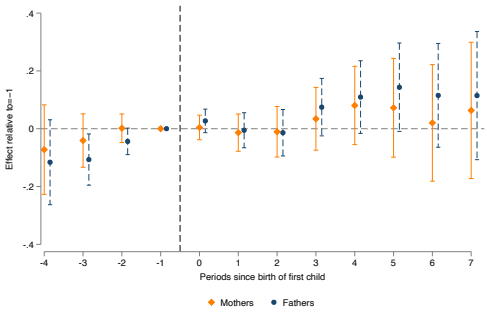
(b) High travel intensity job



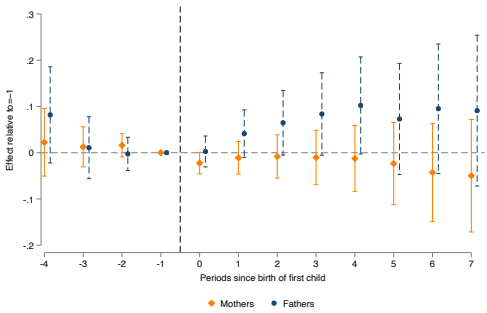
(c) Job w/ high use of compressed work schedule



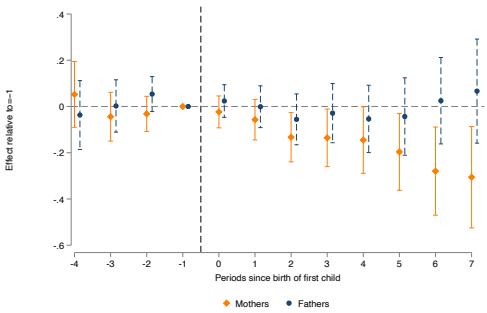
(d) Job w/ high use of home-based work



(e) Job w/ high share of women



(f) Job w/ high share of parents



Note: The sample includes mothers aged 18–50 and fathers aged 18–60 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. Data in panel (a), (e), and (f) cover the period 1988–2024 while data in panels (b) and (c) cover 2010–2024. The data in panel (d) cover the period 1993–2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers, controlling for age, individual fixed effects, and year fixed effects and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering. Jobs with a high level of a given variable are defined as those whose fixed effect is above the median across all jobs in a given year.

ties starting in the first year after birth. Mothers in high promotion potential jobs suffer an immediate penalty, but by the end of the observation window mothers in low promotion potential jobs face similar penalties. For jobs with higher travel demands, the initial penalty widens over time (and there is even a motherhood "premium" when travel demands are low). These patterns are consistent with recent evidence from multinational firms showing that rigid and demanding job environments amplify gender gaps following parenthood (van der Straaten et al., 2024).

Further, mothers in jobs with low use of home-based work face larger penalties, while no effect is detected in jobs where remote work is more common. Both mothers in high- and low-use alternative work schedule jobs face penalties, though, somewhat surprisingly, they are larger in the latter.[30] We also find statistically significant heterogeneity in post-birth earnings losses by the gender composition of the job, with penalties larger for mothers in jobs with a lower presence of other women. As for parental composition, the earnings penalty for mothers seems to be similar for those working with a higher or lower share of mothers. These heterogeneity patterns suggest that the motherhood penalty appears driven primarily by sorting across jobs with different promotion and travel demands.

6 Heterogeneity

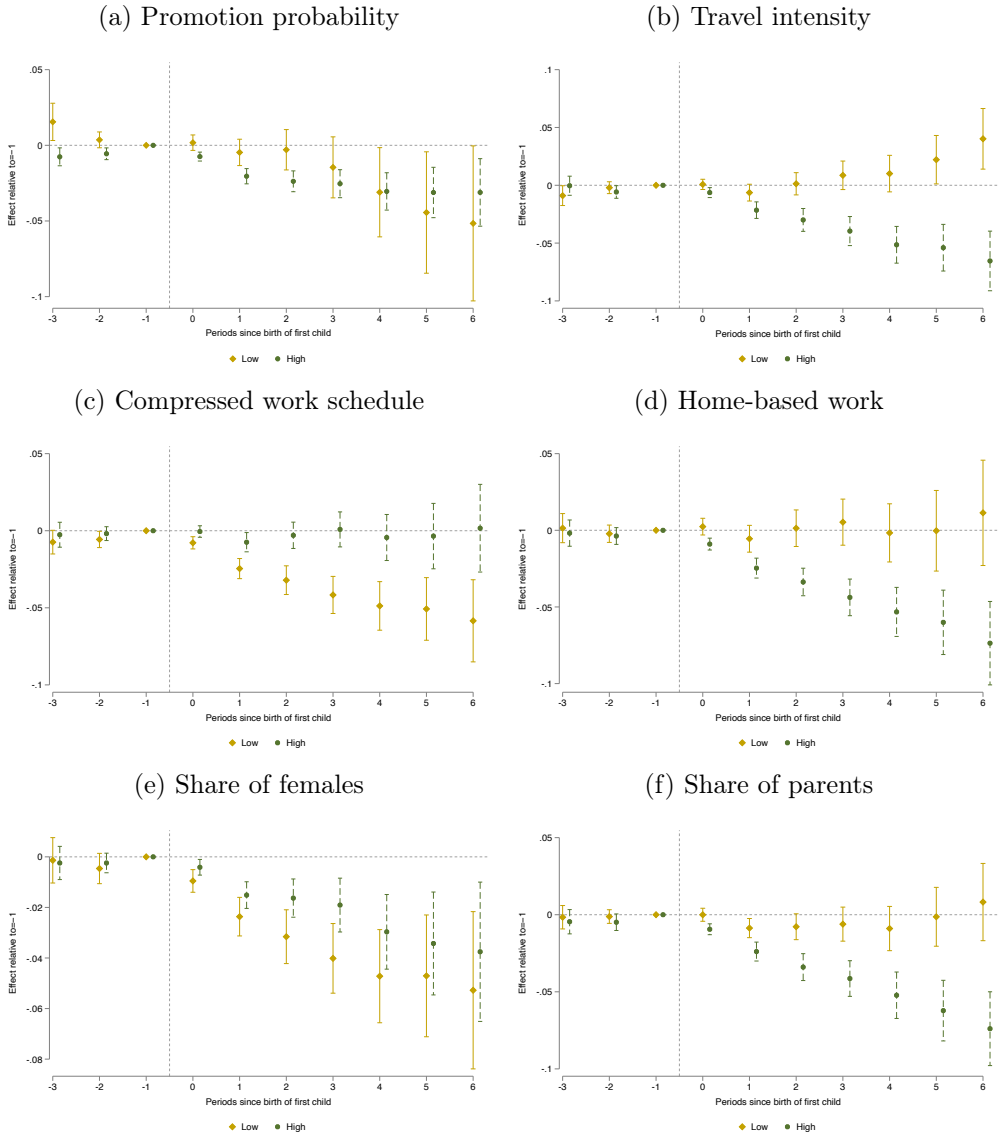
Whereas the previous section focuses on changes in work patterns and sorting, this section considers the role of managerial characteristics, culture, and individual attributes. To avoid potential endogeneity arising from post-birth characteristics being themselves affected by motherhood, we classify mothers based on characteristics measured prior to childbirth.

6.1 Do managers mediate the penalty?

Some literature has shown that managers have a strong influence on the job satisfaction and the performance of their workers (Hoffman and Tadelis, 2018; Shaw, 2019). A unique feature of our data is that it allows us to link each employee with her manager, and to explore whether managers' traits mediate these penalties. In Figure 6 we assess heterogeneity in the penalty according to different traits of staff's manager prior to giving birth. In particular, we focus on her manager's gender, parenthood status, performance, hard-working orientation (i.e., the extent to which the manager prioritizes career dedi-

[30] The penalty is also larger for mothers in jobs with low use of sick and family leave (Figure A.10).

Figure 5: Impact of first childbirth on women's annual salary, by job's pre-birth characteristics



Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. Data in panels (a) and (b) cover the period 1988-2024, while panel (c) covers the period 1993-2024 and panel (d) covers 2010-2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from a regression controlling for age, individual fixed effects, and year fixed effects, and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

cation and intensive labor-market commitment over family responsibilities and work-life balance), and prevailing gender norms in their country of origin, measured using the World Values Survey index.[31]

Overall, we find no meaningful differences in child penalties across these dimensions. Mothers face comparable declines in annual salary after childbirth regardless of whether their manager is a man or a woman, a parent or a non-parent, someone with a low or a high performance rating, someone who emphasizes long hours and strong work commitment or not, or someone coming from a more conservative or progressive country. These results suggest that manager-specific traits do not shape the magnitude of the motherhood earnings penalty, thus ruling out an important channel through which the child penalty could arise.

6.2 Do culture and norms predict the motherhood penalty?

A large literature has argued that child penalties tend to be larger in societies with more conservative gender norms, and that cultural attitudes toward maternal employment, caregiving, and the division of labor can shape mothers' labor market trajectories (Blau and Kahn, 2017; Olivetti and Petrongolo, 2017; Alesina et al., 2013; Fernández, 2013; Kleven, 2022). Yet, these studies cannot disentangle the role of "internal" norms (such as attitudes inherited from one's family or formed earlier in life) from that of "external" norms (e.g., soft norms embedded in the society, the labor market or the corporate environment, or hard norms encoded in laws and institutions). For instance, Kleven (2022) finds that the child penalty varies with the gender norms in individuals' U.S. state or country of origin even among workers residing in the same state, but cannot condition on people working within the same firm. In this sense, testing whether the child penalties vary with the individual staff's country-of-origin gender norms in our setting—where individuals work within a single organization—constitutes a particularly stringent test of the internal norms hypothesis.

To investigate this, we proxy gender norms in the country of origin with an index of gender norms progressivity following Kleven (2022), based on data from the World Values Survey. Specifically, we compute the share of respondents in each country who disagree with the following statements: (i) *"When jobs are scarce, men should have more right to a job than women,"* (ii) *"Being a housewife is just as fulfilling as working for pay,"* and (iii) *"Young children suffer when the mother works."* [32] The index value, widely used in

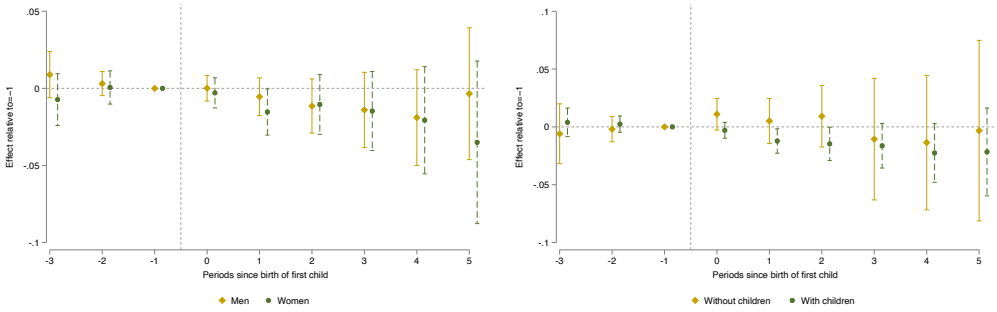
[31] In Appendix Figure A.13 we show that results are robust when managers' traits are measured contemporaneously.

[32] As a robustness check, we also used two alternative classifications of inherited gender norms. The

Figure 6: Impact of first childbirth on annual salary, by manager's pre-birth characteristics

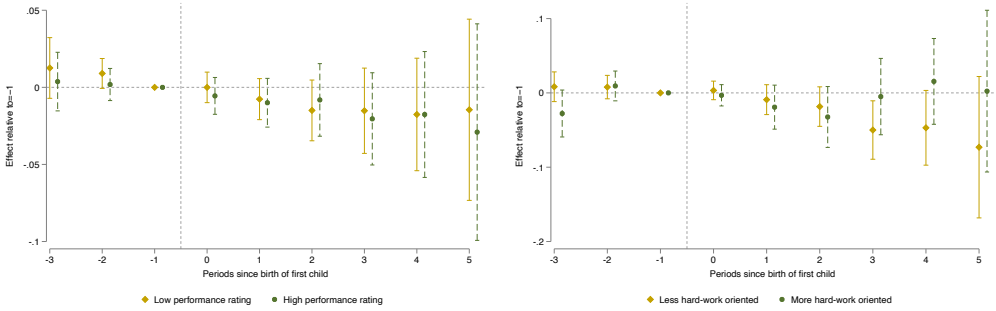
(a) Gender

(b) Parental status

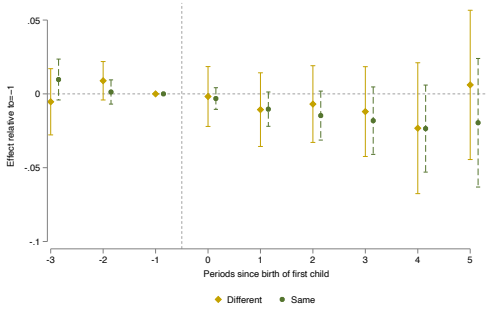


(c) Top performer (high rating)

(d) Hard-work orientation



(e) Gender norms (WVS-based index)



Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. Data cover the period 2014-2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers, controlling for age, individual fixed effects, and year fixed effects and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

the literature (Bussolo et al., 2024; Berniell et al., 2024b), ranges from 0.06 to 0.86, and captures the degree of endorsement of egalitarian gender norms.

The results shown in Figure 7 suggest that internal norms may not matter as much as previously thought: the penalty is remarkably similar across mothers from countries with more progressive or more conservative gender norms, regardless of the measure used. In this sense, our results resonate with Åslund et al. (2025), who also argue that, once individuals operate under the same rules, incentives, and workplace institutions, the influence of inherited cultural norms can become substantially attenuated. However, this does not necessarily mean that internal norms do not matter. It could still be that mothers (differently from fathers) reduced voluntarily their labor supply or shift voluntarily to less demanding units because of internal norms. Simply, our analysis suggests that it is not the inherited cultural components of those internal norms that matters.[33]

6.3 Which individual characteristics shape the motherhood penalty?

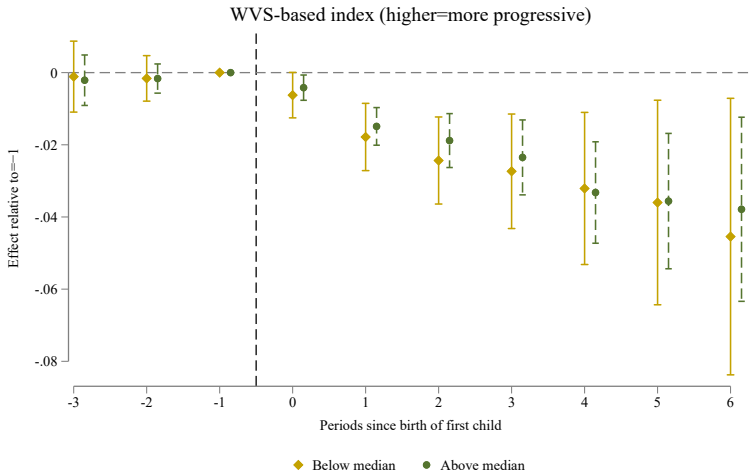
We examine whether the motherhood earnings penalty varies with women's characteristics. Figure 8a shows that mothers who were single in the year prior to childbirth experience larger earnings losses than married mothers: six years after the first birth, the penalty reaches about 6% for single mothers, compared to roughly 3% for married mothers. This pattern relates to a mixed literature, which documents opposite marital-status gradients in child penalties across countries, often attributed to differences in welfare systems; the extensive benefits and job protection offered by the institution we study place our setting closer to high-coverage welfare environments (Kleven et al., 2019b; Kleven, 2022). Further, the earnings penalty is mostly concentrated among women without a PhD, whereas mothers with doctoral degrees experience no statistically significant

first one, based on the Global Gender Gap (GGG) Index published by the World Economic Forum, and the second one dividing mothers according to whether they were born in an OECD country or not. The estimated penalties remain similar to those obtained using the WVS-based index. With a similar result, we also explored alternative proxies for inherited family norms using the "nuclear family" and "neolocality" indices constructed from the Ethnographic Atlas and reported in Bau and Fernández (2021). These indices capture the share of the population in each country whose traditional family institutions are characterized by nuclear family structures—where households are typically composed of the two spouses and their children, rather than extended kin—or by neolocal residence patterns, whereby newly married couples establish an independent household rather than co-residing with the family of the husband or the wife.

[33] An alternative interpretation is that the cultural component of the child penalty may diminish with education (or preferences related to career opportunities, mobility, or lifestyle that differentiate these employees from the average worker in their countries of origin): given the very high skill levels of workers in our sample relative to the general-population samples used in studies such as Kleven (2022), it is possible that education weakens the role of cultural norms in shaping post-birth labor market behavior.

Figure 7: Impact of first childbirth on annual salary, by gender norms in origin country

(a) Gender norms from World Values Survey index



Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. Data cover the period 1988-2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers controlling for age, individual fixed effects, and year fixed effects and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

change in annual salary (Figure 8b).

We also explore heterogeneity in the motherhood earnings penalty along dimensions that proxy for women's career commitment and attachment to the organization. Figure 8c compares mothers who took a "standard" maternity leave with those who took a longer leave for their first birth.[34] If staying out of employment for longer periods destroys human capital and slows career progression, then longer periods of leave could harm labor market prospects, and might signal a weaker job attachment.[35] The estimates show a small earnings decrease for women who take a standard leave, and a larger—though not statistically significant—decrease for mothers who opted for longer leaves. Figure 8d further shows that earnings penalties are concentrated among mothers with low pre-birth performance ratings. In terms of hard-work orientation, the decrease in earnings is slightly larger for those more hard-work oriented.[36] [37] Finally, Figure 8f presents heterogeneity in the child penalty in earnings by whether mothers ever worked, prior to childbirth, in norm-enforcing environments. In our institutional setting, these correspond to Human Resources (HR) units. The figure shows that the earnings penalty is concentrated among mothers without prior exposure to norm-enforcing environments, whereas the penalty for those with such exposure is smaller and not statistically significant. Estimates in the later post-birth years are noisier, likely reflecting the limited number of observations in that subgroup.

We additionally explore heterogeneity along three institution-specific dimensions that affect the timing and persistence of child penalties in Figure A.16. Having entered the institution through a selective entry program delays the onset of earnings losses but does not prevent them from eventually appearing. Prior country-office experience—a dimension that possibly reflects the presence (or absence of) local support networks—is associated with larger motherhood penalties, while holding an operational role prior to birth—which demand a lot of face-to-face interaction and client engagement—is associated with a similar short-run penalty but more persistent losses over time.

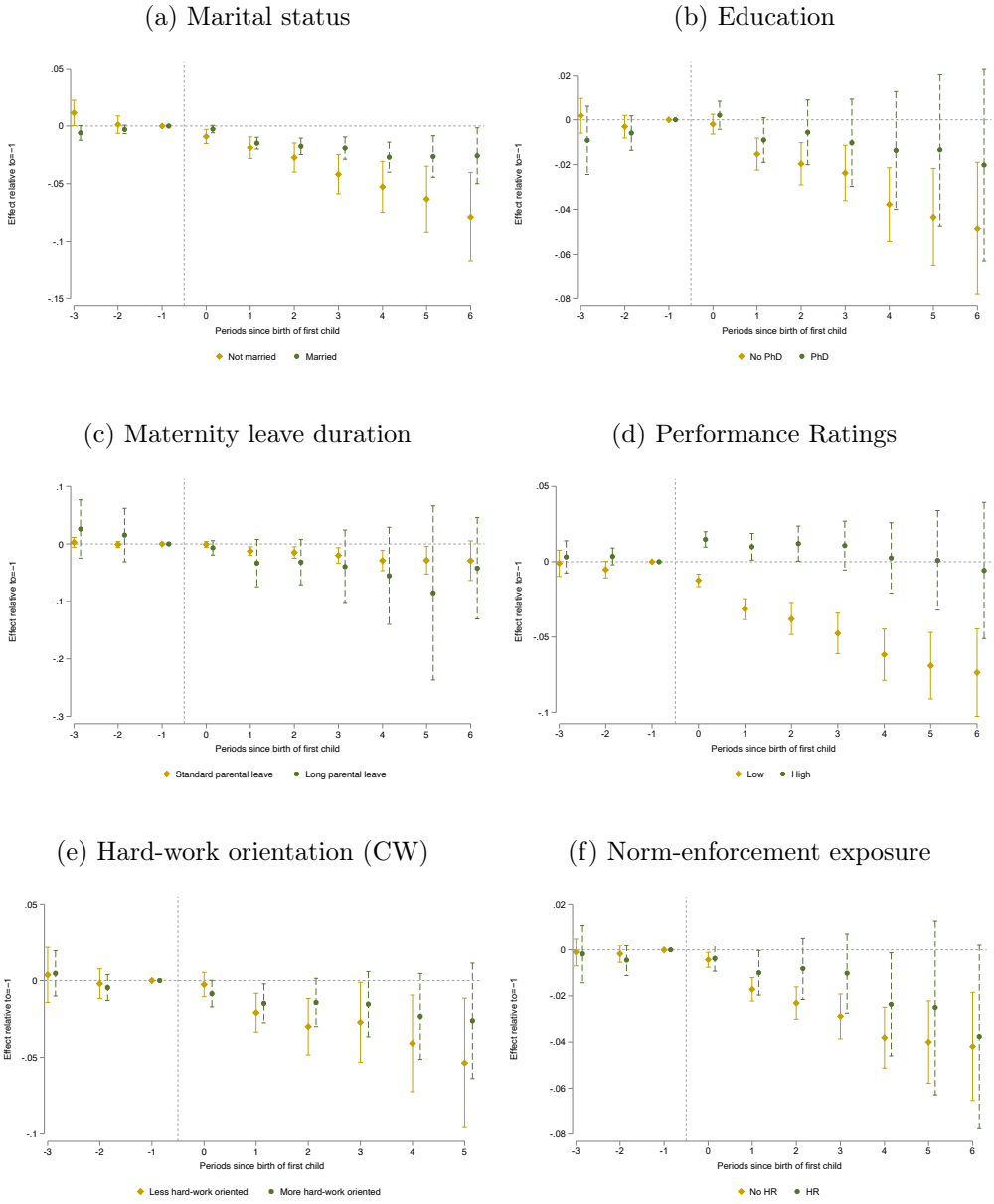
[34] We define standard maternity leave as the modal number of days in the data, which is 60 days until 2012, 70 days between 2013 and 2018 and 100 days from 2019 onwards.

[35] Naturally, leave duration is an endogenous post-birth choice, so a longer leave could also reflect health shocks or family circumstances.

[36] The CW survey also includes a subjective measure of time control and organization, ranging from 1 (more "fluid") to 10 (more "controlled"). Figure A.17 shows no systematic heterogeneity along this dimension.

[37] In Appendix Figure **??** we show that the results using contemporaneous mothers' characteristics are consistent with these, although less marked.

Figure 8: Impact of first childbirth on annual salary, by mothers' pre-birth characteristics



Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. Data cover the period 1988-2024. Mother characteristics are measured the year prior to birth. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers controlling for age, individual fixed effects, and year fixed effects, and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

7 Conclusion

This paper examines the career consequences of motherhood in a highly skilled, international organization that offers extensive family-friendly policies. Using administrative records from the World Bank Group and an event-study difference-in-differences design with staggered treatment timing, we document that motherhood continues to generate measurable and persistent career costs, even in a setting with generous benefits and formal commitments to gender equality. We find that, seven years after the first birth, mothers earn about 4–5 percent less than comparable non-mothers, and earnings losses continue to accumulate over time. While this penalty is relatively modest compared to estimates from other contexts, it is nonetheless meaningful and long-lasting. Further, we find stronger effects in career progression, with sizable and durable declines in promotion probabilities following childbirth.

The evidence on mechanisms indicates that these penalties are not primarily driven by reductions in output quality. We find little systematic change in ex post project evaluations or other measures of performance after childbirth. Instead, the effects operate largely through changes in responsibilities and job assignments. Mothers become less likely to lead projects, supervise consultants, and take on highly visible tasks, and they sharply reduce work-related travel. They are also more likely to transition into positions with lower travel intensity and weaker promotion prospects, consistent with an internal reallocation toward less demanding career tracks. These patterns point to task reassignment and changes in career paths—rather than declines in productivity—as the central drivers of the observed gaps.

We document larger effects for single mothers, for women who take longer parental leaves, those less educated, and those employed in positions with high travel requirements or steep promotion trajectories. Notably, however, we find no evidence that manager's traits mediate these penalties or that they vary with gender norms inherited from the country of origin. The absence of heterogeneity along these dimensions suggests that the mechanisms at play are more closely tied to organizational structures and job demands than to individual attitudes or background norms.

Overall, our findings highlight that even in workplaces with generous formal benefits and strong commitments to gender equity, motherhood can still carry professional costs. Family-friendly policies are necessary but not sufficient to eliminate career penalties if organizational practices continue to reward availability, visibility, and mobility. More broadly, the results underscore that reducing gender gaps in professional settings requires structural changes in how performance and potential are evaluated.

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Appendix

A Tables and figures

Figure A.1: Number of newborns per year in Headquarters and Country Offices

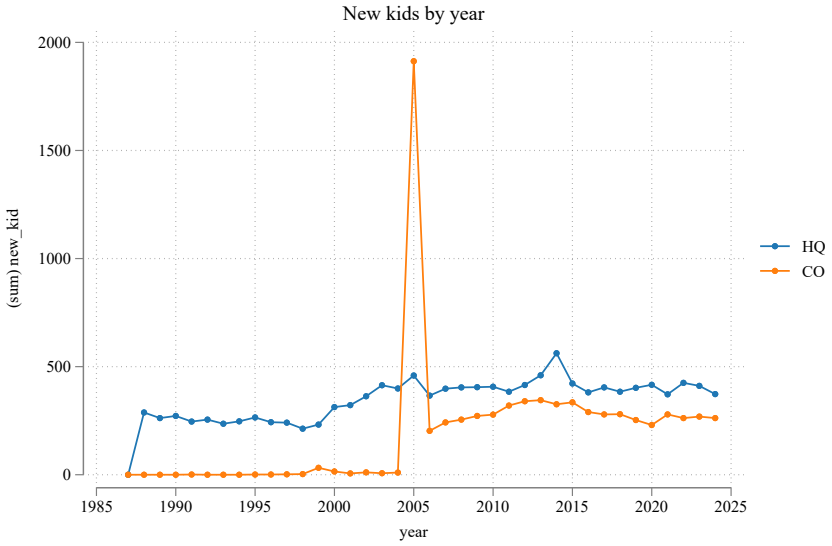


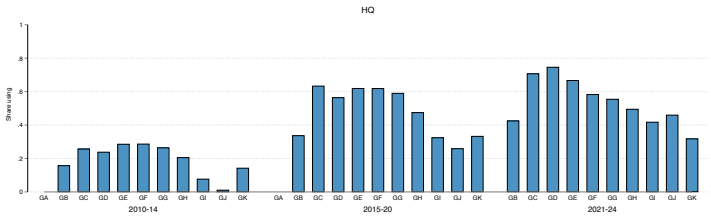
Table A.1: Sample sizes

	Female	**Male**	**Total**
Observations (UPI-year)	110221	127405	237626
Employees (UPI)	10020	13124	23144
Total first births	2391	2110	4501
Final first births sample	2013	1791	3804

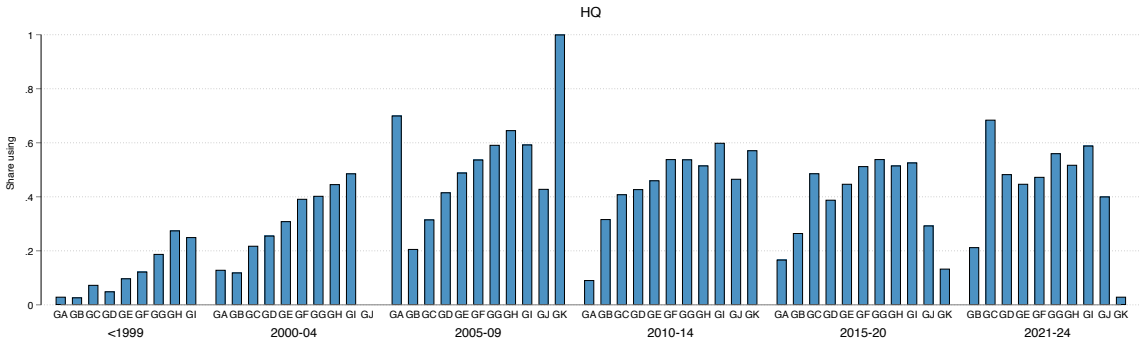
Notes: The numbers refer to employees based at Headquarters who ever held professional, managerial or executive roles.

Figure A.2: Percentage of staff using home-based work and compressed work schedules, by professional position

(a) Home-based work

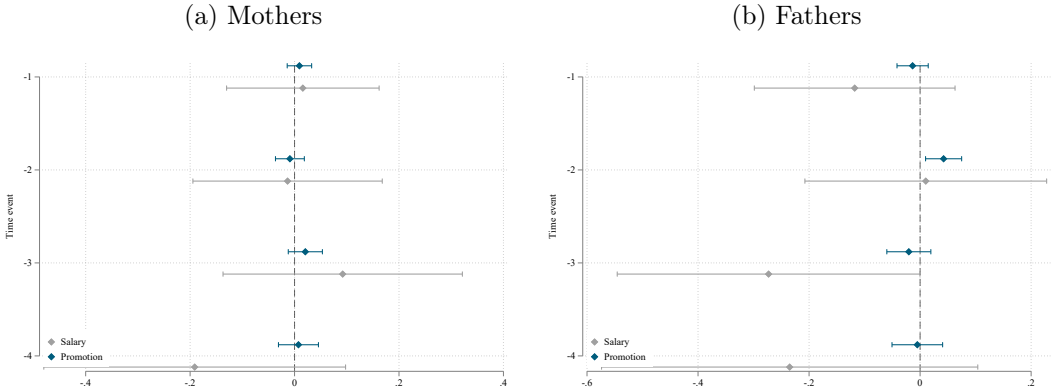


(b) Compressed work schedule



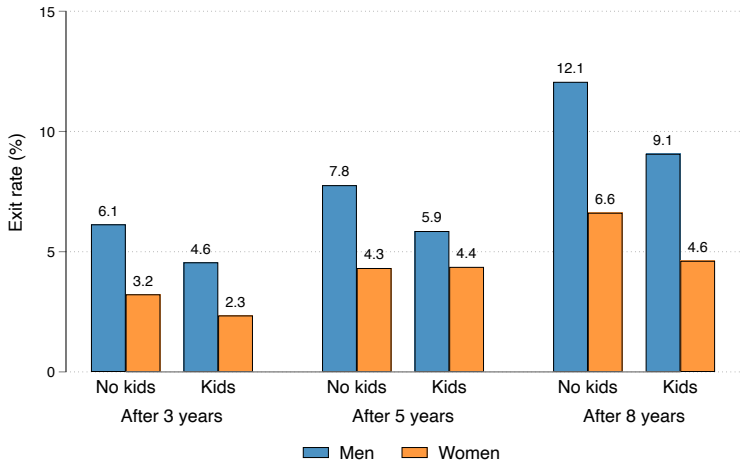
Note: Each bar represents a grade-position level, from GA (lowest) to GK (highest). Compressed work schedule in Panel (b) implies working one extra hour every day in exchange for one day off every two weeks. Data for home-based work is available starting in 2010 only.

Figure A.3: Pre-Birth Predictive Patterns in annual earnings and promotions



Note: This figure presents the estimated coefficients from regressions of the probability of being promoted and, separately, the log of earnings on an indicator for being a future mother or father, shown for mothers (panel a) and fathers (panel b). The specifications use only pre-birth periods and include worker, year, and age fixed effects. To assess the presence of differential pre-trends, we estimate the model using four alternative event-time windows: $\tau \in [-6, -4]$, $\tau \in [-6, -3]$, $\tau \in [-6, -2]$, and $\tau \in [-6, -1]$.

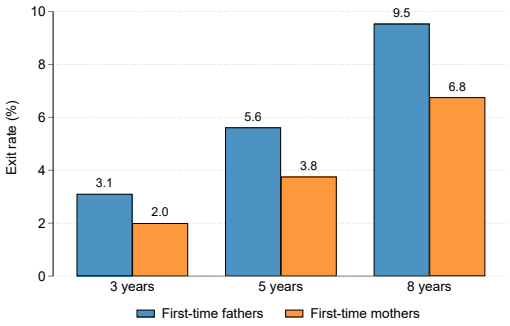
Figure A.4: Exit rates by gender and parenthood condition at age 35



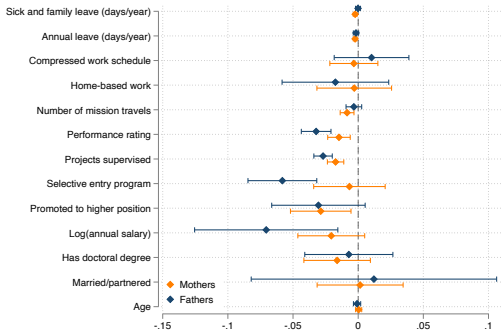
Note: Each bar shows the percentage of employees employed at age 35 who leave the organization within 3, 5, or 8 years after, by gender and by parenthood condition. The data cover the period 1987–2024, and the sample includes all workers aged 35 and above (with and without children), in professional or managerial positions.

Figure A.5: Probability of exit and correlation with individual characteristics

(a) Share exiting within X years of first child birth

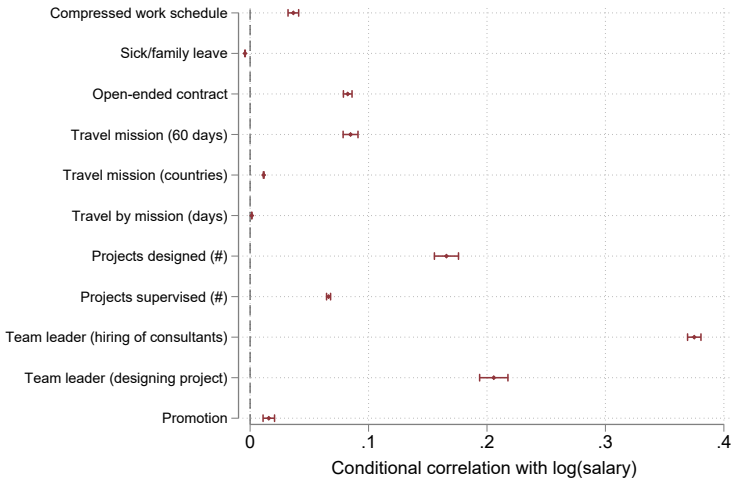


(b) Correlation between post-birth exit and pre-birth characteristics



Note: Each bar in Panel (a) shows the percentage of employees leaving the organization within 3, 5, or 8 years after having their first child. Panel (b) shows coefficients and 95% confidence intervals of a set of regressions of the probability of exiting the institution within the first three years after childbirth on each variable, controlling for year fixed effects and clustering standard errors at the individual level. The data cover the period 1987–2024, and the sample includes mothers and fathers observed at least once before and at least once after childbirth, and whose age at first childbirth is between 18 and 50 (18 and 60) years old).

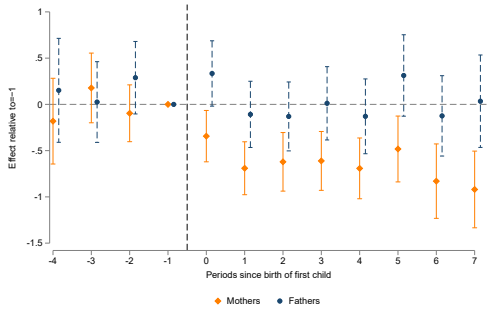
Figure A.6: Correlations between earnings (logs) and labor outcomes



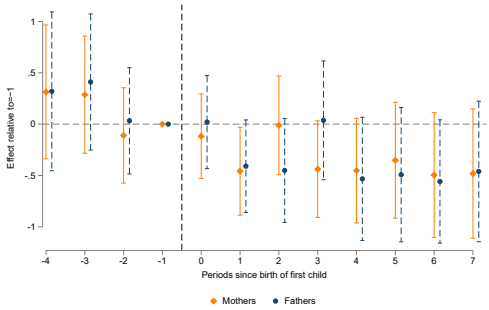
Note: The figure displays point estimates and 95% confidence intervals of a regressions of the log of annual earnings on each of the variables separately, controlling for age, gender, and including year and unit fixed effects.

Figure A.7: Impact of First Childbirth on in-situ vs. regular promotions

(a) Pr. of in-situ promotion



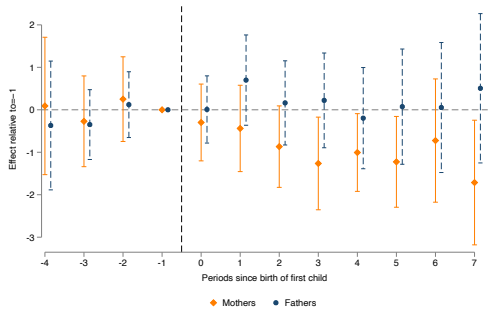
(b) Pr. of competitive promotion



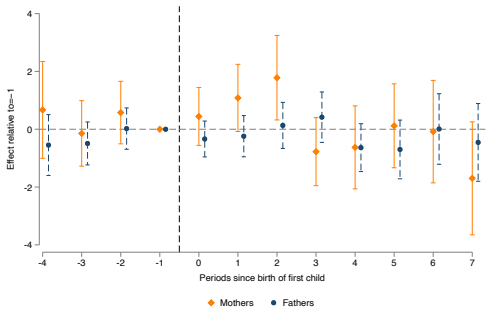
Notes: The sample includes mothers aged 18–50 and fathers aged 18–60 who are observed at least once before and once after childbirth, are ever employed in professional, managerial, or executive roles, and are based at Headquarters. The data cover the period 1988-2024. In-situ promotions are those taking place within the same unit, while competitive promotions are those where a unit change is involved. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers controlling for age, individual fixed effects, and year fixed effects and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

Figure A.8: Impact of first childbirth on other project-related measures

(a) Quality at entry for initiated projects



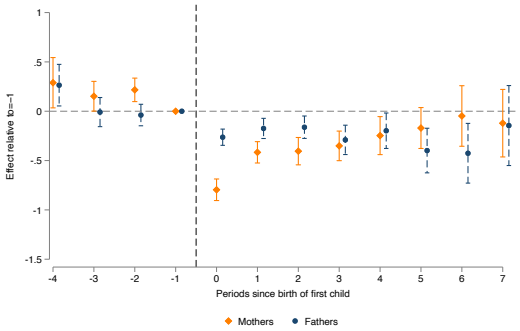
(b) Pr. of delay in closed projects



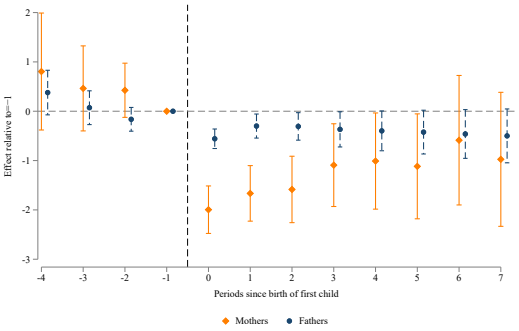
Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, who are ever employed in professional, managerial, or executive roles, and are based at Headquarters. The data cover the period 1988–2020 and include staff in units that ever carried out a project. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers controlling for age, individual fixed effects, and year fixed effects and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

Figure A.9: Impact of first childbirth on work-travel intensity

(a) Number of countries visited

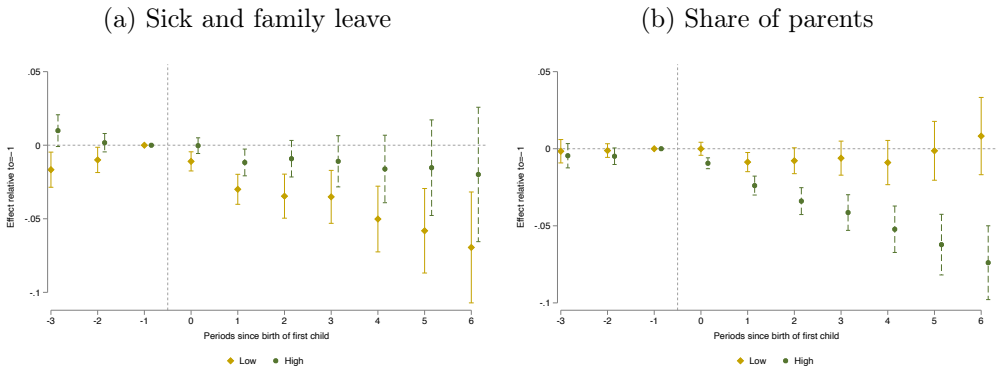


(b) Pr. of traveling for at least 60 days/year



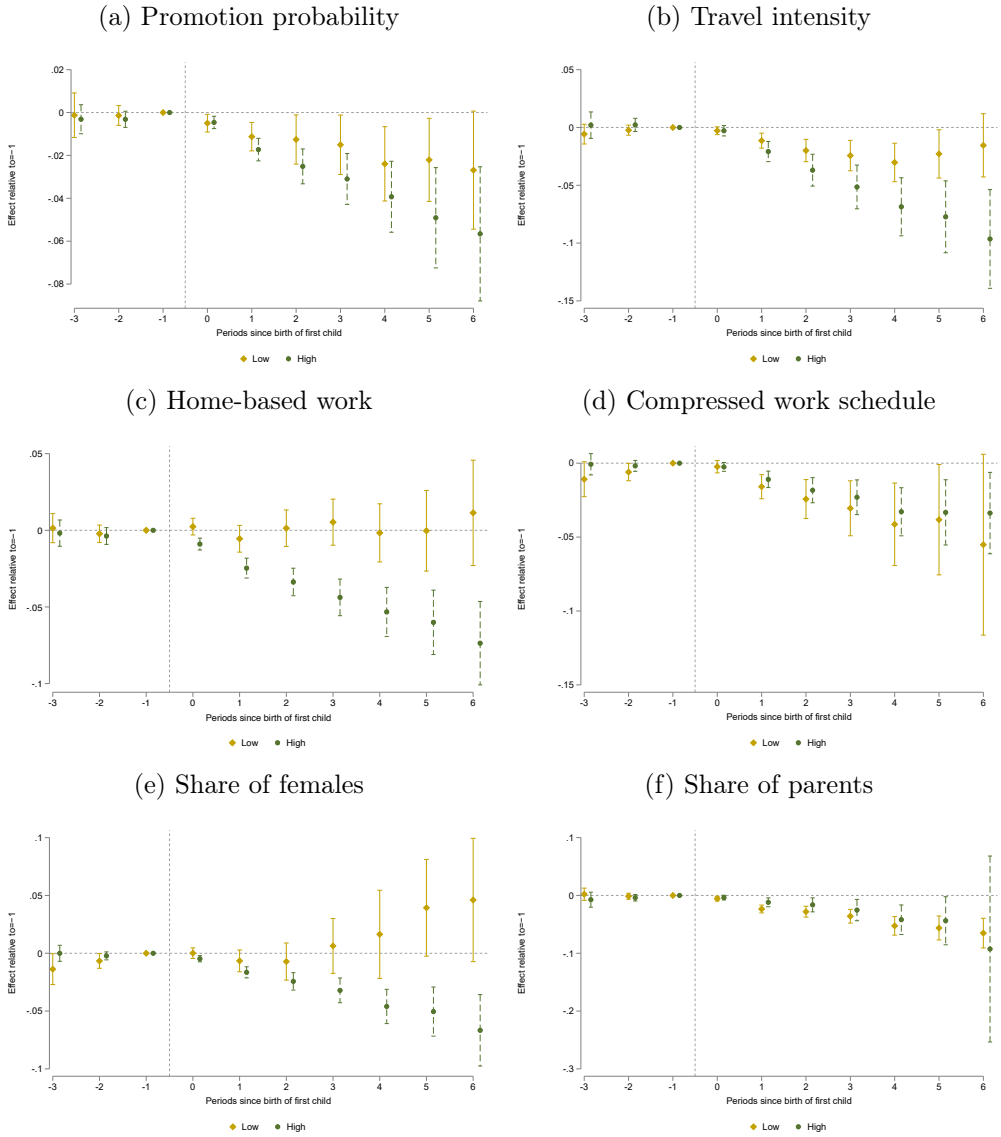
Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, who are ever employed in professional, managerial, or executive roles, and are based at Headquarters. The data cover the period 2010-2024. Both outcomes are conditional on travelling. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers controlling for age, individual fixed effects, and year fixed effects and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

Figure A.10: Impact of first childbirth on women's annual salary, by job's pre-birth characteristics



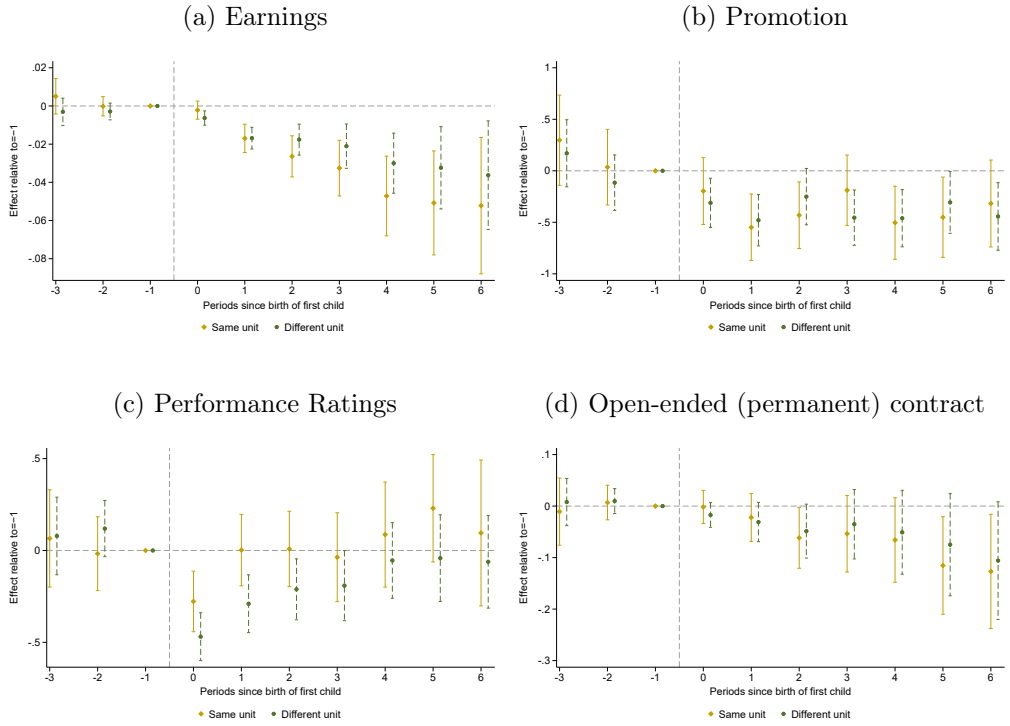
Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. Data in panels (a) and (b) cover the period 1988-2024, while panel (c) covers the period 1993-2024 and panel (d) covers 2010-2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from a regression controlling for age, individual fixed effects, and year fixed effects, and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

Figure A.11: Impact of first childbirth on women's annual salary, by contemporaneous job characteristics



Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. Data in panels (a) and (b) cover the period 1988-2024, while panel (c) covers the period 1993-2024 and panel (d) covers 2010-2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from a regression controlling for age, individual fixed effects, and year fixed effects, and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

Figure A.12: Impact of first childbirth on career progression, by switcher condition

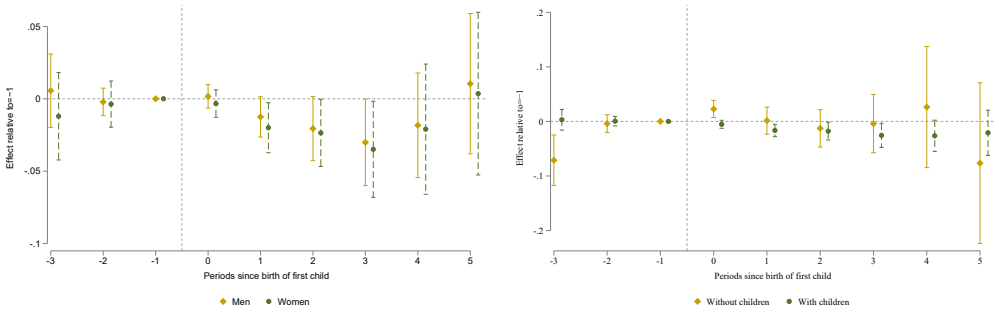


Note: The sample includes mothers aged 18–50 and fathers aged 18–60 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. The data in panels (a) and (b) cover the period 1988-2024 while panel (c) covers 2002–2022. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. **Coefficients are estimated from separate regressions for mothers and fathers and are expressed relative to the average pre-birth level of the outcome, computed within each gender-by-age-at-first-birth group.** The bars show 95% confidence intervals calculated using individual-level clustering. The specification controls for age, individual fixed effects, and year fixed effects.

Figure A.13: Impact of first childbirth on annual salary, by contemporaneous manager's characteristics

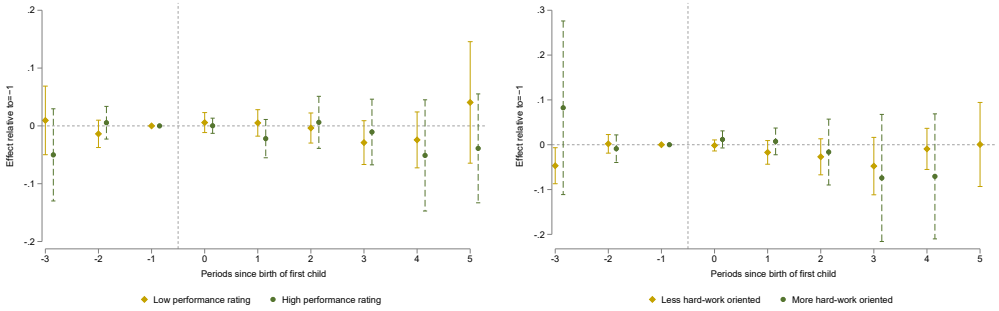
(a) Gender

(b) Parental status

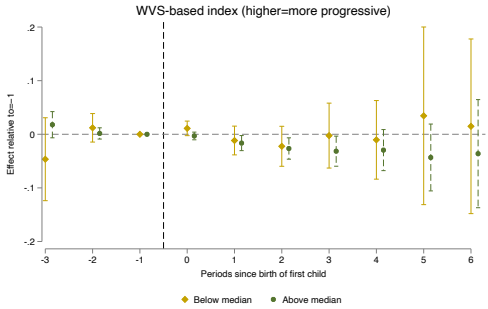


(c) Top performer (high rating)

(d) Hard-work orientation

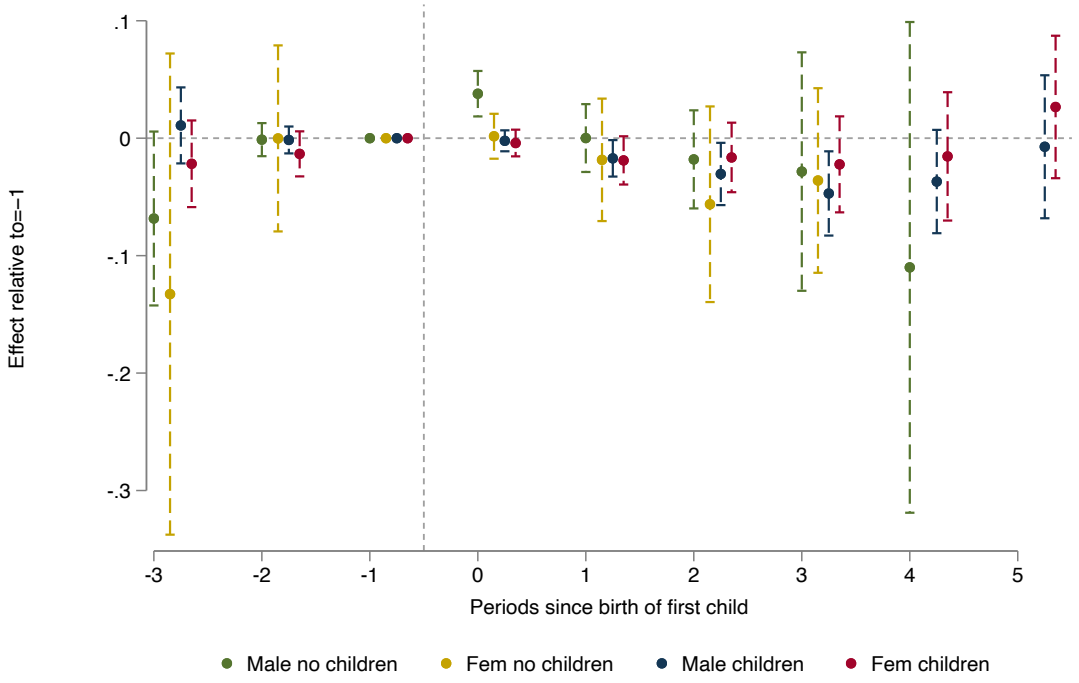


(e) Gender norms (WVS-based index)



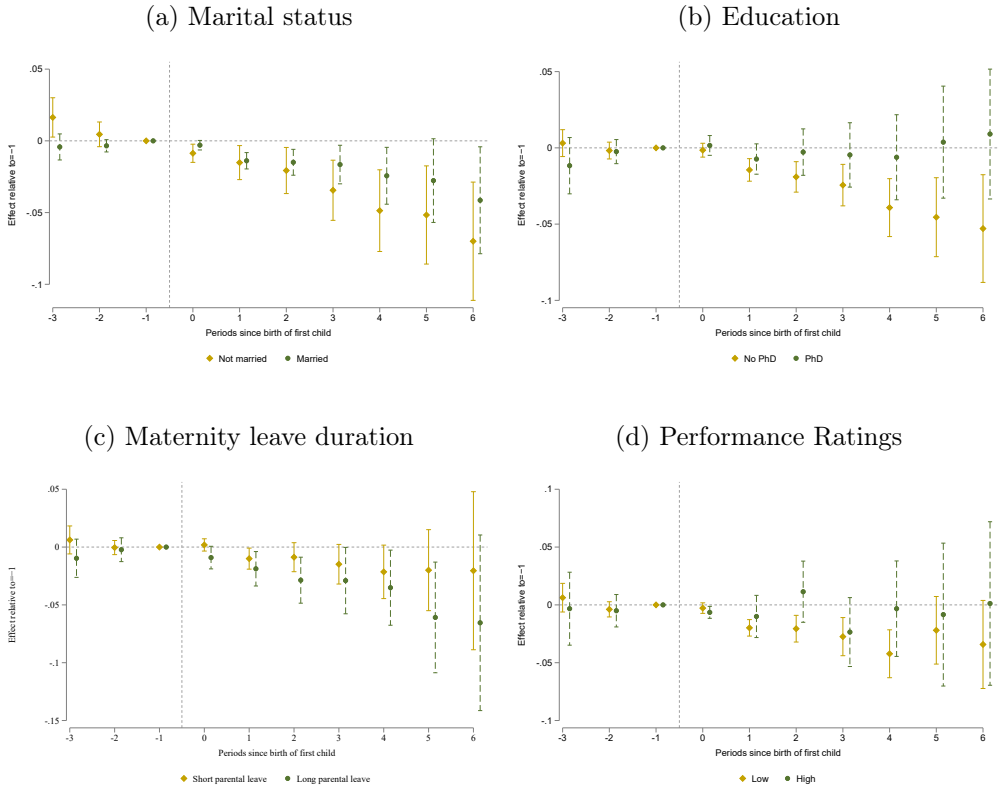
Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. Data cover the period 2014-2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers controlling for age, individual fixed effects, and year fixed effects and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

Figure A.14: Impact of first childbirth on annual salary, by manager's double gender and parental status



Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. The data cover the period 2014–2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. **Coefficients are estimated from separate regressions for mothers and fathers and are expressed relative to the average pre-birth level of the outcome, computed within each gender-by-age-at-first-birth group.** The bars show 95% confidence intervals calculated using individual-level clustering. The specification controls for age, individual fixed effects, and year fixed effects.

Figure A.15: Impact of first childbirth on annual salary, by contemporaneous mothers' characteristics

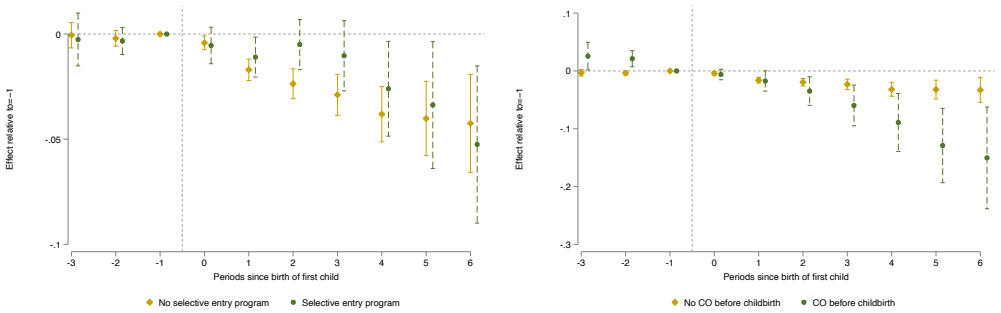


Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. Data cover the period 1988-2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers controlling for age, individual fixed effects, and year fixed effects and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

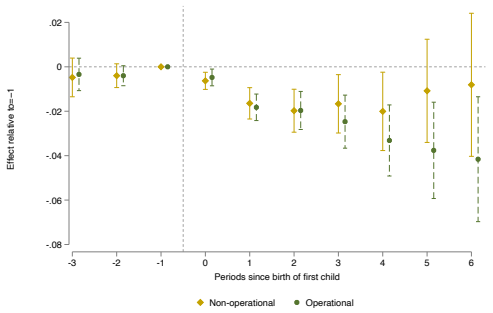
Figure A.16: Impact of first childbirth on annual salary, by mothers' pre-birth career experience

(a) Selective entry program

(b) Country office experience pre-birth

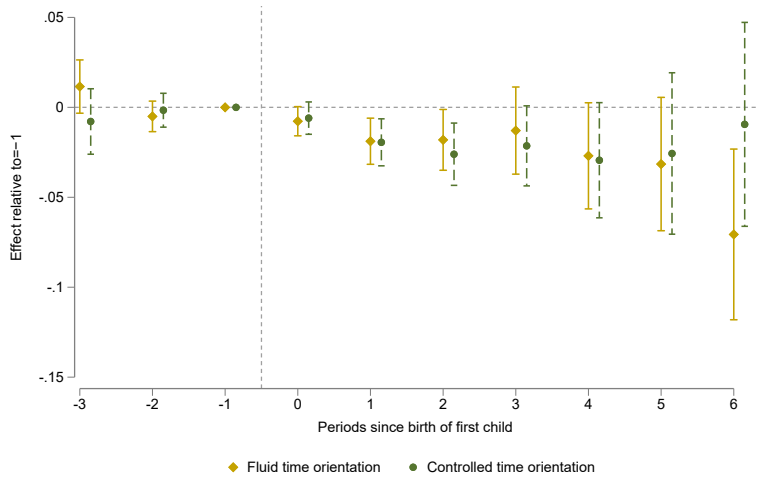


(c) Operational role



Note: The sample includes mothers aged 18–50 who are observed at least once before and at least once after childbirth, and who are ever employed in professional, managerial, or executive roles, based at Headquarters. Data cover the period 1988-2024. Each estimated coefficient captures the change in the outcome τ years relative to the year before childbirth, where $\tau = 0$ corresponds to the year of birth. Coefficients are estimated from separate regressions for mothers and fathers, controlling for age, individual fixed effects, and year fixed effects, and they are expressed relative to the average level of the outcome in the year prior to childbirth, computed within each gender-by-age-at-first-birth group. The bars show 95% confidence intervals calculated using individual-level clustering.

Figure A.17: Impact of first childbirth on annual salary, by CW time management



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