

DISCUSSION PAPER SERIES

IZA DP No. 18140

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## ABSTRACT

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# The Unequal Motherhood Penalty: Maternal Preferences and Education

We study how maternal preferences interact with education to shape the motherhood penalty. Using rich Finnish registry data and the quasi-random gender of the firstborn child, we show that mothers across education groups display a mild preference for daughters, reflected in their fertility and parental leave choices. Yet this shared preference translates into divergent long-run outcomes. Ten years after birth, highly educated mothers face a 10% larger earnings penalty if their firstborn is a son, whereas less educated mothers experience slightly higher penalties with daughters. These differences stem from distinct labor market adjustments: less educated mothers are marginally more likely to exit employment after having a daughter, while highly educated mothers with daughters disproportionately move into public-sector jobs, which offer a relative wage premium. Our findings demonstrate that similar parental preferences can generate contrasting long-term earnings dynamics across education groups, highlighting the role of maternal preferences and labor market sorting in shaping the motherhood penalty.

**JEL Classification:** J13, J16, J24, J42

**Keywords:** child penalty, gender wage gap, parental preferences, occupational sorting

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# 1 Introduction

Despite major advances in education and labor market participation, women continue to face a persistent gender pay gap, driven largely by the motherhood penalty, the earnings drop women, but not men, experience after childbirth (Angelov et al., 2016; Goldin, 2014, 2023; Kleven et al., 2019). This penalty has long-term consequences globally, both for individual welfare and for aggregate talent allocation (Goldin et al., 2022; Hsieh et al., 2019; Kleven et al., 2023). Importantly, the motherhood penalty is particularly severe among highly educated women. In professions such as law, finance, and business, rigid schedules make career interruptions disproportionately costly (Azmat and Ferrer, 2017; Bertrand et al., 2010; Bütkofer et al., 2018; Costa Dias et al., 2020; Kuziemko et al., 2018; Noonan et al., 2005; Olivetti et al., 2024). Rising female university attendance (OECD, 2024), increasing career-family trade-offs (Cortés and Pan, 2023), and fertility declines linked to unequal child care burdens (Doepke and Kindermann, 2019; Goldin, 2025) make it increasingly urgent to understand why motherhood penalties are most pronounced at the top of the skill distribution.

In this paper, we investigate why the motherhood penalty differs based on the interaction of two parental characteristics: maternal education and preferences. We exploit the quasi-random gender of the firstborn child to study how parents with and without a university degree adjust their labor market behavior after childbirth. By leveraging this natural experiment, we provide novel evidence on how similar underlying preferences of mothers—specifically, a mild preference for daughters—translate into divergent earnings trajectories across education groups. We use rich Finnish registry data covering men’s and women’s earnings and labor market participation from five years before to ten years after their first child’s birth. The dataset also includes demographics such as mother tongue, birthplace, and education history, and is linked to detailed parental leave records from Finland’s social insurance institution.

We first provide evidence that mothers have a slight preference for daughters. We follow Angrist and Evans (1998) and Dahl and Moretti (2008) and explore the fertility choices subsequent to the first child. The randomness of the gender of the firstborn child makes this event orthogonal to other parental and job characteristics, such as age at first birth and job-specific earnings trajectories. When having a firstborn son, there is an increase in the probability of having a second child by 0.9 percentage points (ppt) and when the first two children are males, there is a higher probability of having a third child by 14 ppt. This is true for both mothers with and without a university degree. Furthermore, we implement a new strategy to assess the preference for a daughter or a son: the length of parental leave taken. This method allows us to observe mothers’ and fathers’ revealed choices separately, and to do so at very early ages, when differences between girls and boys are not yet pronounced and parental inputs remain limited. We observe that mothers, both with graduate degree and not, spend an average of 6 days less in parental leave if the firstborn is a male in the period when children are aged between nine months to three years old. After empirically testing several hypotheses, we interpret this as evidence that mothers prefer spending more time out of work with daughters compared to sons, and hence as a preference of mothers for daughters. We do not find any evidence of preference for a specific gender for fathers.

To investigate the motherhood penalty we consider the earnings trajectories of men and women in the period around the first birth and compare them with those of men and women within the same group of educational attainment that are not parents *yet*

(Kleven et al., 2019). We add to this method by further dividing men’s and women’s earnings trajectories by whether their firstborn is a son or a daughter. By considering separately parents with different levels of education and by exploiting the randomness of the gender of firstborn children, we avoid some well-known issues in the estimation of the child penalty, such as the endogeneity of parental age and earnings profiles to firstborn timing (Bensnes et al., 2023; Kleven et al., 2019; Melentyeva and Riedel, 2023). We find that women with a university degree have a higher long-term child penalty if they have a firstborn son vs. a firstborn daughter: ten years after the birth of the child, having had a firstborn son results in a 10% (3.2 ppt) higher motherhood penalty compared to having had a firstborn daughter. Among women without a university degree, the gender of the firstborn does not significantly affect the child penalty. If anything, they face a slightly higher penalty when the firstborn is a girl, which is the opposite of the pattern seen for women with a university degree.

We investigate mechanisms that may explain these patterns. Our findings suggest that a preference for daughters influences women’s labor market trajectories differently depending on their level of education. Among women without a university degree, who generally display a weaker attachment to the labor market, the birth of a daughter is associated with a slightly higher probability of labor market exit. This pattern aligns with the larger earnings penalty observed for this group when the firstborn is a daughter, though the effect itself is modest and only marginally significant. For university-educated women, having a daughter substantially increases the likelihood of transitioning into public-sector employment. The magnitude and statistical significance of these estimates indicate that shifts in job sector are a central mechanism explaining the differential earnings penalty between mothers of firstborn daughters and sons. Indeed, we show that public-sector employment carries a wage premium for mothers, consistent with the smaller earnings penalty when the firstborn is a daughter.

We interpret both adjustments, labor force exit and public-sector switching, as reflecting an increased tendency to prioritize family over career when raising daughters. This interpretation can be understood in two compatible ways: on the one hand, mothers may be more inclined to devote time and resources to daughters, consistent with the documented preference for daughters in terms of fertility and parental leave choices; on the other hand, the birth of a daughter may reinforce traditional gender norms among mothers, as observed in other contexts (Bhalotra et al., 2025). Although we cannot empirically distinguish between these explanations, both highlight the importance of accounting for maternal preferences regarding work–family balance when analyzing mothers’ post-birth labor market trajectories.

We contribute to the motherhood penalty literature in three main ways. First, we move beyond documenting average effects by examining heterogeneity across subgroups and their underlying mechanisms. While prior work has shown that the labor market consequences of motherhood vary substantially across the skills distribution (e.g., Azmat and Ferrer, 2017; Bertrand et al., 2010; Bütkofer et al., 2018; Noonan et al., 2005), less is known about how individual preferences interact with occupational environments to generate these differences. We show that mothers across the education distribution share a preference for daughters, yet this preference has distinct implications. For less-educated mothers, the gender of the firstborn child has little effect on subsequent earnings. By contrast, for highly educated mothers, preferences shape outcomes: those with daughters incur smaller penalties because they are more likely to switch into the public sector, where jobs provide greater compatibility with family responsibilities and have a relative

wage premium. These results highlight that motherhood is particularly disruptive for highly educated women, whose careers are concentrated in high-skilled occupations that accommodate family–career balance poorly (Kuziemko et al., 2018). This interpretation is consistent with Bhalotra et al. (2025), who, though not focusing on parental education, document daughter-related earnings penalties in the UK that are largest among highly educated mothers. Together, the evidence underscores the central role of work environments in high-skilled jobs in amplifying the motherhood penalty, beyond country-specific cultural norms or institutional factors such as parental leave policies. The results point to relevant policy considerations. While preferences around family–career balance appear similar across education groups, substantial earnings penalties are borne mainly by highly educated mothers. Policies that reduce adjustment costs in high-skilled occupations, for example through flexible arrangements of the kind often available in the public sector, may therefore play an important role in addressing the motherhood penalty.

Our second contribution consists of methodological advancements for identification in the literature on the motherhood penalty across subgroups. Our paper demonstrates the potential for using idiosyncratic shocks in the context of investigating the determinants of the motherhood penalty to address econometric challenges common in the relevant literature, such as endogeneity at the time of the birth (Adams et al., 2024; Kleven et al., 2019). We adopt a novel strategy that uses the gender of the firstborn as an idiosyncratic shock to capture parental preferences and to examine how mothers’ labor market responses differ by education level. We are one of the first to use the gender of the firstborn to study parental labor market responses, alongside Bhalotra et al. (2025). The fact that the gender of the firstborn is as good as random and that we stratify the sample by parental education allows us to depart from assumptions on the exogeneity of first birth to parental age and expected earnings trajectories (Bensnes et al., 2023; Melentyeva and Riedel, 2023) as the comparison happens among parents that are similar with respect to these characteristics but for which the firstborn is a son or a daughter.

Our third contribution is the introduction of a novel proxy for parental gender preferences: the length of parental leave taken. Existing studies have used later-life measures such as subsequent fertility choices, parental well-being, or behavior to infer child gender preferences (e.g., Angrist and Evans, 1998; Dahl and Moretti, 2008). These typically capture preferences once children are older and gendered traits have emerged. While childbearing is a joint decision and thus does not easily reveal parental-specific preferences (Doepke and Kindermann, 2019), we attempt to disentangle maternal and paternal preferences by examining the duration of parental leave taken by each parent in response to the gender of the firstborn child. We show that leave length aligns with subsequent fertility decisions and argue that it offers a clean early-life measure of preferences. It captures maternal and paternal responses separately, before striking observable behavioral or cognitive differences between sons and daughters emerge and before differential patterns in parental investment by gender of the child become ingrained, making it a reliable indicator of parental preference.

The paper is organized as follows. Section 2 describes the institutional setting and data, section 3 discusses the methodology, section 4 presents the results and discusses the mechanisms, and section 5 concludes.

## 2 Institutional Background & Data

### 2.1 Institutional Background

Despite its reputation as a wealthy and gender-egalitarian country, Finland is not an exception to global trends. Like many other high-income nations, it has experienced a sustained decline in fertility rates and continues to exhibit significant gender gaps in the labor market. The total fertility rate has been falling steadily, reaching 1.26 in 2023, according to Statistics Finland, which is particularly concerning in the context of rapid population aging. Notably, fertility is higher among highly educated women (Virtanen et al., 2024). Although overall tertiary education attainment in Finland fell below the OECD average in 2023, women continue to outperform men in terms of educational attainment. Yet, these achievements do not translate into equal labor market outcomes. Finland's average gender pay gap stood at 16% in 2021, placing it 38th among OECD countries in terms of pay equality.<sup>1</sup> The gender wage gap is approximately 18%, a figure comparable to that of the United States (Paukkeri et al., 2024). Interestingly, Finland exhibits the highest average motherhood penalty among Nordic countries, with an employment loss of 43%, significantly higher than in Denmark (14%), Sweden (9%), and Norway (3%).<sup>2</sup>

In terms of the parental leave system, during the 2000s,<sup>3</sup> the period studied in this paper, parents could stay up to 3 years on parental leave with job security. The four-month maternity leave started, at the latest, one month before the pregnancy due date. After that period, parents could share six months of shared parental leave. However, the shared leave was mostly taken by mothers. This parental leave system provided benefits with a replacement rate of around 70% (90% after 2007) and declining with earnings. Following the parental leave period, when the child reached approximately nine months of age, parents became eligible for the Home Care Allowance (HCA). This benefit entitled recipients to a flat-rate payment, which could be supplemented by municipal top-ups (Kosonen, 2014). The HCA was payable until the child's third birthday but was discontinued if the child was enrolled in either public or private daycare.

### 2.2 Data & Descriptive Statistics

We use data from the social insurance institution of Finland (Kela) that contains detailed information on all types of leaves for both parents. The data includes the beginning and end date of each leave spell and its type. It covers 60% of all births from 2000 to 2009. The parental leave data was linked with registry data from Statistics Finland that contains background characteristics such as age, education, nationality, language, earnings, and employment status. The data covers the whole Finnish population across the period 1987-2019. The sample contains all first-time mothers who gave birth from 2000 to 2009 that appear in the Kela sample and for whom the father of the child can be identified. Same-gender couples and single mothers are excluded from our sample. These groups represent less than 5% of the total sample. Table B1 contains summary statistics of the merged sample with both Kela and Statistics Finland data of mothers and fathers

<sup>1</sup><https://data-explorer.oecd.org/>

<sup>2</sup><https://childpenaltyatlas.org/>

<sup>3</sup>Carnicelli (2024) provides a detailed description of the reforms in the 2000s and a history of family leave policies in Finland.

one year prior to the birth of their first child. We report the characteristics of the entire sample and, separately, for mothers with and without a university degree.

Given the focus on different groups of parents by their education, we report several statistics that are relevant with respect to this dimension. University-educated parents are defined as those who achieved at least an undergraduate university degree one year before giving birth. The percentage of mothers with a degree in our sample is 29.9% vs. 22.3% for fathers. There is some homogamy in terms of education. While 61.5% of parents have no degree, the share of couples where both have a degree is 13.7%, where the father has a degree and the mother has not is 8.6%, and where the mother has a degree and the father has not is 16.2%.

One important characteristic in which mothers with and without tertiary education differ is the age at first birth; higher-educated women have their first child at, on average, age 30, almost 3 years older than women without tertiary education. In Figure A1, the density of age at first birth is plotted for mothers and fathers by education level. The age differences in first birth by education level are very relevant to take into account when investigating the child penalty. This is especially important when combined with the fact that parents with different levels of education have different age-earning profiles, so that age at first birth is likely to be systematically related to earnings potential (Adams et al., 2024; Adda et al., 2017; Bütkofer et al., 2018). Indeed, Figure A2 shows that in our sample of parents, the earnings trajectories of men and women with a university degree are much steeper than those of men and women without a university degree. Analyzing these two groups of parents (with and without a university degree) separately is relevant for investigating how a similar shock, such as the gender of the firstborn child, differently impacts women's and men's trajectories within groups, without confounding other effects such as age of birth and earnings trajectories.

### 3 Empirical Framework

#### 3.1 Estimation of Preferences for Child's Gender

The literature has mainly used three different strategies to extrapolate parental preferences for the gender of a child. The first one has focused on investigating differences in health outcomes of daughters versus sons. This method has been used especially in developing countries, where sons are found to have better health outcomes due to, for example, higher levels of nutrition and vaccination rates (Barcellos et al., 2014; Borooah, 2004; Ganatra and Hirve, 1994; Gupta, 1987; Pande, 2003; Jayachandran and Kuziemko, 2011). The second way of depicting parental preferences is based on parental happiness and behavior. Kohler et al. (2005) report higher happiness among fathers after a first-born son vs. a daughter in Denmark. Fathers in the U.S. generally show no differences in well-being when spending time with sons versus daughters, except among Asian fathers, who report significantly lower stress with sons (Song and Gao, 2023). Other studies have interpreted the reduction in fathers' involvement in crime after the birth of a son as a paternal preference towards sons (Dasgupta et al., 2022; Dustmann and Landersø, 2021). Arnaboldi et al. (2024) show that parents' portfolio choices are affected by the gender of their firstborn child. The final way of identifying parental preferences for daughters or sons has been by fertility rates based on the gender of the first (or last) child, or by the combination of siblings' gender. Depending on the country and period studied, different conclusions have been reached. Using the firstborn child gender strategy, Dahl and

Moretti (2008) document a preference for sons in the U.S. before 2000, while Blau et al. (2020) provide evidence of a reversal of this preference in favor of daughters after 2000. Similarly, Ichino et al. (2014) show that in the UK, Italy, and Sweden, a preference for daughters has emerged, as women are more likely to have additional children following the birth of a firstborn son.

To investigate whether there is a statistically significant difference in the behavioral response of parents to the birth of a son vs. a daughter, we consider fertility responses to the gender of firstborn children as in Dahl and Moretti (2008).<sup>4</sup> We thus estimate the following equation:

$$y_i = \beta \text{Son}_i + \Gamma X_i + \varepsilon_i \quad (1)$$

where  $y_i$  is the outcome variable,  $\text{Son}_i$  is a dummy variable that takes value one if the firstborn is male and  $X_i$  is a set of covariates such as parent's level of education, mother tongue (Finnish or Swedish), employment status, age, region and year of birth. We use this specification to study whether having a son as a firstborn affects future fertility realizations.  $y_i$  represents a dummy variable indicating whether the mother had another child, or a continuous variable indicating the total number of children (total fertility).

The main identifying assumption for  $\beta$  in Equation 1 to interpret it as the effect of having had a firstborn son is that the gender of the firstborn is random. We present some evidence supporting that the gender of the firstborn is as good as random in Figure A3. More specifically, none of the observable characteristics of parents is statistically significantly correlated with firstborn gender, and the magnitude of the coefficients is very low. Given the reciprocity of unobservable to observable characteristics (Altonji and Mansfield, 2018), we can reasonably argue that the randomness assumption holds as well for unobservable characteristics.

We propose a new approach to identify parental preferences towards a particular gender of children, which is parental leave choices for the firstborn.<sup>5</sup> We believe that this is a promising way to measure parental preferences because parental leave choices are usually made at very early ages when children's skills differences of sons and daughters are not yet very pronounced; therefore, they are likely to be less affected by parents' reactions to potential differences in how sons and daughters develop and by potential differential parental investment.<sup>6</sup> This makes these choices more exogenous compared to other methods of measuring parental preferences, which might be influenced by variations in the developmental trajectories and characteristics of sons and daughters and by parental investment. Finally, with parental leave choices we can distinguish preferences of mothers and fathers. Appendix C presents a simple model to understand how differences in child gender preferences can lead to differences in length of parental leave taking. In this case,  $y_i$  in Equation 1 corresponds to the number of days of annual leave taken by mothers and fathers after the birth of the firstborn child.

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<sup>4</sup>We also implement a specification where we consider the gender combination of the first two children as in Angrist and Evans (1998).

<sup>5</sup>Post-birth employment behavior has been used to identify individuals' preferences in other contexts. For example, length of timing of return to work after childbirth has been used as an indication of less traditional gender norms in Boelmann et al. (2021).

<sup>6</sup>See Baker and Milligan (2016) for a review on the biological and psychosocial determinants of differences in sons' and daughters' development and the role that parental investment plays in it.

### 3.2 Estimation of the Motherhood Penalty

To estimate the motherhood penalty and examine how it varies by the gender of the firstborn child and maternal education level, we adopt the event-study framework used by Kleven et al. (2019). Specifically, we compare average earnings trajectories of mothers and fathers around the time of their first child's birth to those of individuals who have *not yet* become parents over the same period. Unlike standard child penalty analyses, we additionally disaggregate our estimates by the gender of the firstborn child.

Our primary estimation strategy is based on the following event-study specification:

$$Y_{ist}^{pc} = \sum_{j \neq -1} \alpha_j^{pc} \cdot \mathbb{1}(t = j) + \sum_k \beta_k^{pc} \cdot \mathbb{1}(age_{is} = k) + \sum_y \gamma_y^{pc} \cdot \mathbb{1}(year = y) + \varepsilon_{ist}^{pc} \quad (2)$$

In this equation,  $Y_{ist}^{pc}$  denotes the outcome of interest (e.g., annual earnings) for individual  $i$ , of parent gender  $p$  and firstborn child gender  $c$ , in calendar year  $s$ , and event time  $t$ , defined as years relative to the birth of the first child. The specification includes fixed effects for age and calendar year to control for lifecycle earnings dynamics and macroeconomic conditions or other aggregate shocks. The omitted event year is  $j = -1$ , the year immediately preceding childbirth, which normalizes the pre-birth level and allows each  $\alpha_j^{pc}$  to be interpreted as the deviation from this baseline. Following Kleven et al. (2019), we convert level estimates into percentage terms to provide a more interpretable measure of the earnings gap attributable to parenthood as shown in Equation 2, formally:

$$P_t^{pc} = \frac{\alpha_j^{pc}}{\mathbb{E} [\bar{Y}_{ist}^{pc} \mid t = j]} \quad (3)$$

While the event-study design is widely used to estimate child penalties, it relies on several strong identifying assumptions, such as the timing of birth must be exogenous, i.e. must be unrelated to unobserved determinants of labor market outcomes, and in the absence of childbirth, treated and control individuals should have followed similar earnings trajectories, i.e. the parallel trend assumption (Adams et al., 2024; Bensnes et al., 2023; Kleven et al., 2019; Melentyeva and Riedel, 2023). These assumptions are frequently violated. Accumulating more education results in delaying childbirth and experiencing more stable pre-parenthood earnings trajectories (Goldin et al., 2022; Herr, 2015; James and Vujić, 2019). Adams et al. (2024) document that highly educated women often have children shortly after graduating, a period when earnings growth is steep. If this is not adequately accounted for, standard event studies may confound the effects of childbirth with lifecycle earnings dynamics. Additionally, timing and spacing of births vary across education levels, influencing the duration and intensity of career interruptions (e.g., through parental leave), and leading to systematically different exposure to post-birth penalties. As a result, aggregate models may obscure important sources of heterogeneity.

To address these challenges and improve causal identification, we enhance the standard event-study design in two key ways:

- (i) *Stratification by Maternal Education.* We estimate Equation 2 separately for mothers with and without a university degree. This allows us to account for differences in pre-parenthood earnings potential, fertility timing, and labor market attachment between educational groups. By restricting comparisons within more homogeneous subpopulations, we weaken the requirement that childbirth timing is exogenous and

reduce the risk of confounding due to career-stage differences. This approach aligns with the insights of Adams et al. (2024), who emphasize the importance of accounting for education-linked fertility dynamics, and with Goldin (2014) and Angelov et al. (2016), who document substantial heterogeneity in women’s earnings trajectories by education level.

- (ii) *Quasi-Experimental Variation from Firstborn Child Gender.* In addition to stratifying by education, we exploit the idiosyncrasy of the firstborn gender as an exogenous source of variation. As shown by previous studies (e.g. Dahl and Moretti, 2008; Lundborg et al., 2017), and confirmed in our own data, the gender of the first child is uncorrelated with parental characteristics. This allows us to assess whether mothers of sons and daughters experience systematically different earnings penalties. If earnings diverge post-birth by child gender, but pre-birth trends are parallel, this supports a causal interpretation and suggests that differential behavioral responses, rather than selection, are driving the observed gaps in labor market trajectories post-birth.

In sum, our approach extends the standard event-study framework to address selection and unobserved heterogeneity. By comparing mothers of sons and daughters within education strata, we do not require the timing of childbirth to be exogenous for the entire sample but only assume that, within education groups, childbirth timing is not systematically related to unobserved characteristics, a weaker assumption. We also assume that, within each education group, in the absence of childbirth, parents of firstborn sons and daughters would have followed similar earnings trajectories. Given that child gender is random, this assumption is relatively weak and testable through pre-trend analysis. These two features of our event-study address the primary concerns in the recent literature on the child penalty and causal inference about endogeneity of birth to education, age, and earnings trajectories allowing a more robust and causally credible estimation of the motherhood penalty (Bensnes et al., 2023; Melentyeva and Riedel, 2023). This estimation framework further offers new insights into the intersection of behavioral mechanisms and institutional factors in shaping women’s post-parenthood labor market outcomes across different education groups.

## 4 Results

### 4.1 Parental Preferences for Child’s Gender

Panel A of Table 1 presents estimates of the effect of the firstborn’s gender on subsequent fertility. We find that having a male firstborn increases the probability of having a second child by 0.89 ppt. If both first and second children are male, the probability of having a third child rises by 14 ppt. Overall, women with a firstborn son exhibit a 1.2 ppt higher total fertility compared to those with a firstborn daughter. There is no statistically significant difference in birth spacing<sup>7</sup> between the first and second child based on the gender of the firstborn. Panel B of Table 1 shows that fertility behavior does not differ significantly by maternal education level, except in the likelihood of having a third child

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<sup>7</sup> Adams et al. (2024) show that in Denmark birth spacing differs by mothers’ education levels and can partly explain why highly educated women, despite later entry into motherhood, experience large immediate earnings penalties.

when the first two children are male. University-educated women are 4 ppt less likely to have a third child under this condition compared to women without a degree. Nonetheless, the probability of having a third child in this group remains positive (11.6 ppt) and statistically significant at 1% level.

Our results indicate a preference for daughters and are consistent with existing evidence. Andersson et al. (2006), by looking at third-born gender, show that pre-2000, Finland was an outlier in terms of preferring sons compared to the other Nordic countries (Denmark, Norway and Sweden). Riukula (2024) shows that while in the 1960s-1980s there was a preference for sons in Finland, in the 1990s a neutral environment and in the 2000s and 2010s a slight preference for daughters emerged. This is consistent with some supplementary analysis that we provide in the Appendix. Figure A4 plots the probability of different outcomes to occur following the birth of a firstborn son from 1996 to 2010 while controlling for several characteristics to take into account changes in the population composition. There is an increasing trend from mid-2000 to have more children and to reduce the spacing between first and second birth if the firstborn is a son versus a daughter, which is statistically significant in the last few years considered.

Table 1: Firstborn Child's Gender and Subsequent Fertility

<b>Panel A</b>	2 or more kids	Third child	Total fertility	Spacing (days)
Son	0.0089** (0.0036)		0.0124* (0.0066)	-3.2279 (6.3051)
Two son		0.1409*** (0.0047)		
Average	0.62	0.18	1.85	1038.75
N	60435	59161	60435	33934

<b>Panel B</b>				
Son	0.0083* (0.0044)		0.0114 (0.0080)	-1.4960 (8.1528)
Degree	0.2823*** (0.0255)	0.0941*** (0.0210)	0.4212*** (0.0464)	11.4156 (43.6848)
Son × Degree	0.0019 (0.0076)		0.0029 (0.0139)	-4.3095 (12.8603)
Two Sons		0.1557*** (0.0059)		
Two Sons × Degree		-0.0401*** (0.0095)		
Average	0.62	0.18	1.85	1038.75
N	60435	59161	60435	33934

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

*Note:* Control variables include dummies for education, mother tongue (Finnish or Swedish), employment status, age, and region of both parents. All regressions include year fixed effects and are restricted to firstborn children.

Table 2 investigates whether the gender of the firstborn child influences the length of maternal leave as per: (1) parental leave, (2) home care allowance (HCA), and (3) the

combined duration of both. Panel A of Table 2 shows that, on average, mothers take 6 fewer days of leave if their firstborn is a son, an effect primarily driven by reduced uptake of HCA, which is available from the child's age of nine months until age three. We further explore heterogeneity by interacting the firstborn's gender with maternal education. Across all education levels, mothers take approximately 135 days of parental leave before the child reaches nine months of age. However, mothers with a degree spend about 25% fewer days on HCA compared to less-educated mothers (see Table B2), likely due to higher opportunity costs, as HCA is not income-based. Panel B of Table 2 reports the estimates of the interaction term Son  $\times$  Degree. There is no statistically significant difference in the maternal leave response between education groups. If anything, university-educated mothers of sons take 0.79 fewer days of leave than their less-educated counterparts, a difference significant at the 10% level.

Table 2: Mothers' Leave by Firstborn Child's Gender

Panel A	Parental leave		HCA			Total
Son	0.3915*	0.3880*	-6.5521***	-6.1986***	-6.1605***	-5.8105***
	(0.21)	(0.22)	(2.11)	(2.08)	(2.12)	(2.09)
Controls	No	Yes	No	Yes	No	Yes
Average	135.3	135.3	412.9	412.9	548.2	548.2
N	69849	69180	69849	69180	69849	69180

Panel B						
Son	0.61**	0.62**	-6.72***	-6.67***	-6.11**	-6.06**
	(0.25)	(0.26)	(2.57)	(2.56)	(2.58)	(2.58)
Degree	0.08	0.25	-64.65***	-47.14***	-64.57***	-46.89***
	(0.34)	(0.37)	(3.17)	(3.43)	(3.19)	(3.45)
Son $\times$ degree	-0.77	-0.79*	1.20	1.26	0.43	0.47
	(0.47)	(0.48)	(4.37)	(4.36)	(4.40)	(4.38)
Controls	No	Yes	No	Yes	No	Yes
Average	135.3	135.3	412.9	412.9	548.2	548.2
N	69849	69180	69849	69180	69849	69180

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

*Note:* Control variables include dummies for education, mother tongue (Finnish or Swedish), employment status, age, and region of both parents. All regressions include year fixed effects and are restricted to firstborn children.

Table 3 reports father's parental leave duration by the gender of the firstborn. Column (1) considers total days of leave, column (2) focuses on joint leave with the mother, and column (3) examines leave taken by the father alone. Looking at the different margins of leave-take for fathers could be relevant as there is growing evidence of fathers taking leave during the summer holiday season or during major sports events (Andresen and Nix, 2025; Carnicelli et al., 2024; González et al., 2024). Panel A of Table 3 shows that while all coefficients are positive, there is no robust evidence suggesting that fathers take longer leave for firstborn sons. Panel B of Table 3 shows that when interacted with paternal education, fathers of sons who hold a degree tend to take slightly fewer days of leave across all margins. However, these differences are not statistically significant. We

interpret this as a lack of evidence of a preference for a particular gender among fathers while acknowledging that the lack of significance may reflect the short duration of paternal leave in the period under study.

Table 3: Fathers' Leave by Firstborn Child's Gender

Panel A	Any leave		With mother		Without mother	
Son	0.1833 (0.1719)	0.1588 (0.1703)	0.0549* (0.0328)	0.0515 (0.0327)	0.1284 (0.1694)	0.1073 (0.1677)
Controls	No	Yes	No	Yes	No	Yes
Average	21.2	21.2	14.8	14.8	6.4	6.4
N	45664	45569	45664	45569	45664	45569

Panel B	Any leave		With mother		Without mother	
Son	0.2398 (0.1927)	0.2214 (0.1910)	0.0734* (0.0380)	0.0703* (0.0379)	0.1664 (0.1903)	0.1511 (0.1887)
Degree	3.7183*** (0.2923)	2.8975** (1.1797)	-0.2879*** (0.0543)	-1.0510*** (0.2149)	4.0063*** (0.2855)	3.9485*** (1.1596)
Son × Degree	-0.2144 (0.4130)	-0.2403 (0.4107)	-0.0717 (0.0753)	-0.0722 (0.0751)	-0.1427 (0.4045)	-0.1681 (0.4022)
Controls	No	Yes	No	Yes	No	Yes
Average	21.2	21.2	14.8	14.8	6.4	6.4
N	45664	45569	45664	45569	45664	45569

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

*Note:* Control variables include dummies for education, mother tongue (Finnish or Swedish), employment status, age, and region of both parents. All regressions include year fixed effects and are restricted to firstborn children.

We consider whether mothers' longer leave with daughters could be linked to relationship dynamics. Prior studies suggest that the gender of the firstborn may influence partnership stability (e.g., Lundberg and Rose, 2003; Lundberg, 2005; Lundberg et al., 2007). We test whether cohabitation between biological parents (indicated by sharing the same family code) is affected by the child's gender. As shown in Figure A5, the probability of cohabitation increases prior to birth and declines thereafter, but trends do not differ significantly by the gender of the firstborn five years before and ten years after the birth of the first child.

Health differences between sons and daughters may also influence parental leave if, for example, daughters have more health issues in early childhood. We investigate this using sick leave benefit data. In Finland, either parent may take leave when a child is ill, but the data do not specify whether sick leave is taken for their own or the child's illness. Moreover, some employers provide private sick leave, creating potential measurement error. However, as these characteristics are orthogonal to the child's gender, they would likely increase standard errors rather than introduce bias. Figure A6 shows that mothers take more sick leave during the year of childbirth. Across the entire period considered, there is no significant difference between male and female firstborns. This suggests that health differences between firstborn daughters and sons do not seem to explain the observed leave patterns.

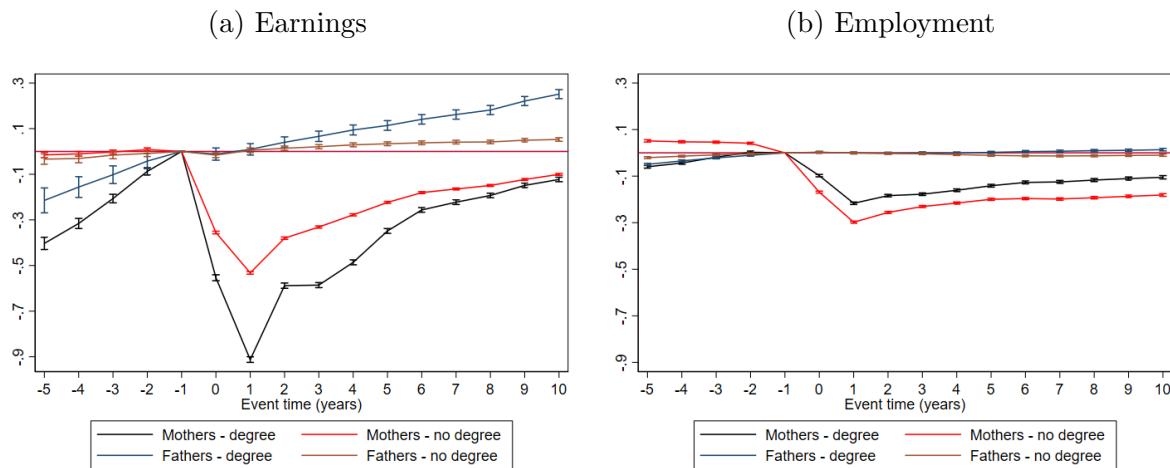
Taken together, the evidence in this section suggests a mild preference for daughters, as reflected in longer parental leave for mothers with firstborn daughters and higher subsequent fertility when the firstborn is male. These facts are valid for both women with and without a tertiary education.

## 4.2 The Motherhood Penalty by Maternal Education and First-born Gender

In this section, we present a series of estimates of the child penalty, progressively adding detail and comparisons within more homogeneous groups. Figure Figure A7 reports event study estimates for the full sample of parents, covering the fifteen years around the birth of the first child. For mothers, the average child penalty in employment remains stable at around 23% over the entire period, while the average earnings penalty is also about 23 ppt during the ten years following birth, in line with previous evidence (Sieppi and Pehkonen, 2019).

Figure 1 shows the event study analysis for earnings and employment fifteen years around the birth of the first child separating parents by the mother's education one year before birth. From these figures it is clear that the child penalty is actually a motherhood penalty in both groups. Both in terms of earnings and employment, mothers, but not fathers, experience a large drop in earnings and employment following the birth of the first-child which persists up to ten years after giving birth. Fathers maintain the same pre-birth trajectories in employment and earnings. In terms of earnings, one year after giving birth, mothers with a degree experience a particularly important drop in earnings (91%) compared to mothers without a degree (53%), possibly due to their higher earnings. However, the child penalty across the two education groups converges ten years after giving birth. In terms of employment, the child penalty is higher among non-graduate mothers. The trends in post-birth employment of university educated and non-university educated women remains parallel across the ten post-birth years observed. Ten years after giving birth the employment child penalty is 10% for university educated women and 18% for non-university educated women.

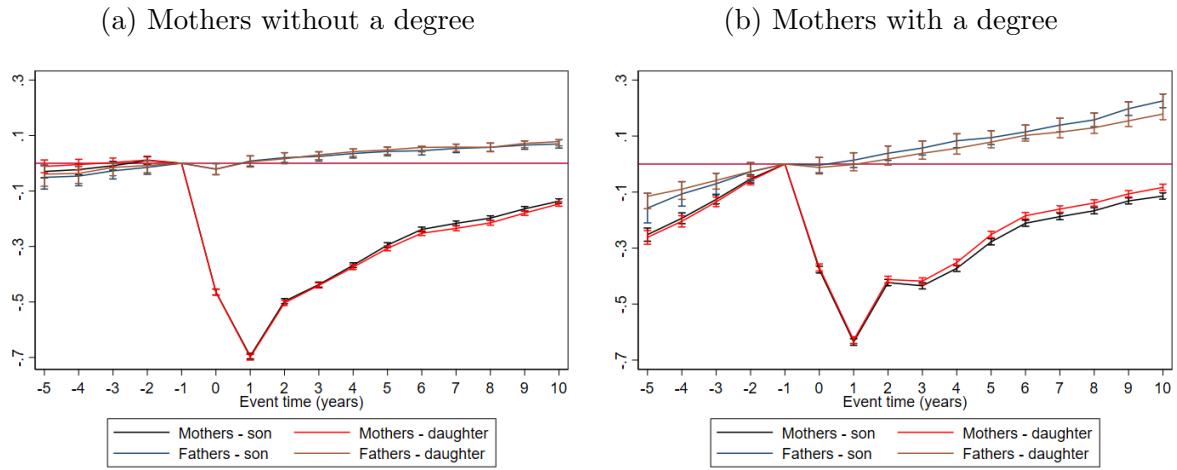
Figure 1: Childhood Penalty by Maternal Education



*Note:* Event study results, in percentage points, with earnings (left) and employment (right) as an outcome with year and age fixed effects. The vertical lines represent the 95% confidence intervals.

We focus on the earnings and estimate the child penalty by parental education and the gender of the firstborn child. Figure 2a and Figure 2b show earnings trajectories for mothers and fathers without and with a university degree, respectively. Heterogeneity by child gender emerges only for university-educated women. For mothers without university education, earnings trajectories are largely similar regardless of whether the firstborn is a son or daughter. Among university-educated mothers, a divergence emerges within three years of birth: those with sons incur systematically larger penalties. By year ten, they earn 3 ppt less than their counterparts with daughters, equivalent to roughly 10% of the overall child penalty.

Figure 2: Earnings by Maternal Education and Firstborn Child's Gender



*Note:* Event study results, in percentage points, with earnings as an outcome with year and age fixed effects. The vertical lines represent the 95% confidence intervals.

Tables B3 and B4 report the difference between son vs. daughter firstborn estimates of the earning penalty within each maternal education group. Among mothers with a university degree, the penalty associated with having a firstborn son increases from 1.7 ppt in year three to 3.1 ppt in year ten and is constantly statistically significant in this period. In contrast, among mothers without a tertiary qualification, the pattern is reversed, albeit less pronounced: mothers of daughters face a slightly higher, and marginally statistically significant penalty of 1.2 ppt in year five, which narrows to 0.99 ppt by year ten.

#### 4.2.1 Robustness Checks

Following Adams et al. (2024), we estimate an alternative specification of the child penalty in earnings by augmenting our baseline model in Equation 2 with fixed effects for the year in which the highest qualification was obtained. The results remain very similar. This can be seen by comparing the figures that summarize differences in the estimated impact on earnings of a firstborn son between mothers and non-mothers (yet) across education levels (Figure A8f and Figure A8a). These findings support the validity of our strategy of splitting the sample into mothers with and without a university degree, consistent with the approach in Melentyeva and Riedel (2023).

Owing to the generosity of the Finnish welfare state, the child penalty in disposable income is attenuated relative to that in earnings. Nonetheless, when estimating the penalty

with relation to disposable income rather than earnings, we observe similar heterogeneity by maternal education and firstborn gender. Figure A8g illustrates this by reporting differences in the estimated coefficients of having a firstborn son on mothers' disposable income between mothers and non-mothers (yet) by degree- and non-degree holders.

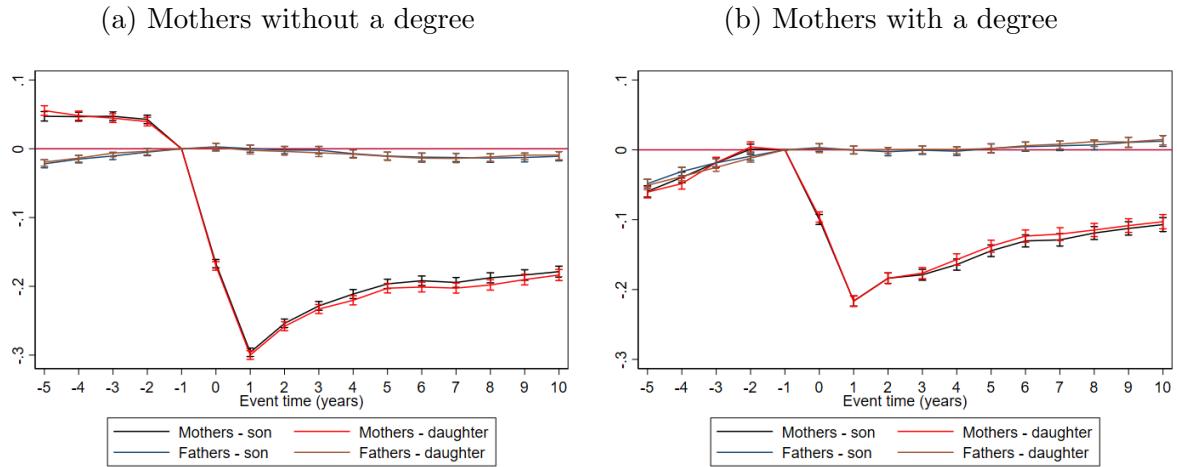
### 4.3 Mechanisms

We have shown that both mothers with and without tertiary education seem to have a preference for daughters as they both respond similarly to the birth of a firstborn son vs. daughter in terms of maternity leave duration and subsequent fertility. Given that a firstborn son increases the chances of subsequent births, we descriptively investigate the trajectories of earnings and employment by number of children. Figure A10 shows the average earnings and employment trajectories for mothers by education level based on whether they have one, two, or three and more children. Among mothers with only one child, earnings typically recover around four years after birth, coinciding with the end of eligibility for the Home Care Allowance (HCA). This recovery is not observed for mothers with multiple children. For those with two children, earnings begin to catch up to those of one-child mothers only after about eight years. This convergence does not materialize with regard to employment. Mothers with three or more children face a persistent earnings and employment gap that does not close even ten years after the first birth.

The patterns in earnings and employment for women with different number of children are very similar between women with and without tertiary education, although the levels differ. This suggests that additional childbearing prolongs the child penalty. Since women who have a son as their first child are more likely to have additional children, it is unsurprising that earnings penalties are larger in this case. This, however, fails to explain the differential patterns in earnings child penalty by maternal education and gender of the firstborn child. We therefore explore whether post-birth labor market adjustments, commonly cited as key drivers of the motherhood penalty (e.g., Cortés and Pan, 2023), differ by maternal education and firstborn gender. These adjustments can occur along the extensive margin (labor force participation) and the intensive margin (e.g., reduced hours worked, changes in industry and occupation). In our data we can investigate labor force participation and type of employment, i.e. whether in the private or public sector.

Figure 3 examines the child penalty in terms of employment rates. While the general pattern shows a reduction in maternal employment after childbirth, among tertiary educated women, there is no evidence of a significant difference between firstborn sons and daughters. Among non tertiary educated mothers, we find a weak tendency to exit the labor market that is smaller than a percentage point for firstborn daughters vs. sons in the fourth to eighth years after giving birth, although only marginally statistically significant in certain years (see also Figure A8b). Summing up, differential changes post-birth in maternal labor force participation in response to a firstborn son vs. daughter do not seem to exist, especially among tertiary educated women, and hence cannot explain the child penalty in earnings by firstborn gender for this group of women.

Figure 3: Employment by Maternal Education and Firstborn Child's Gender



*Note:* Event study results, in percentage points, with employment as an outcome with year and age fixed effects. The vertical lines represent the 95% confidence intervals.

Next, we investigate sectoral shifts in employment, focusing on whether working in the private or public sector. This is a relevant margin to explore around birth because these two sectors differ especially in terms of their offers of family-friendly conditions, which are more pronounced in the public sector.<sup>8</sup> Public sector jobs tend to be more compatible with family responsibilities than private sector jobs. Across countries, the public sector is characterized by shorter standard working hours, stronger collective agreements on parental leave, and more predictable schedules, all of which contribute to greater work-family balance (Goldin, 2014; Mauno et al., 2005). According to the Finnish labor force survey, from 2009 to 2024, employees from the private sector worked an average of 1595 hours per year. In the same period, public employees worked 1497 hours per year. These institutional differences are particularly salient for university-educated women. Register-based evidence shows that female-dominated fields with high public sector employment shares, such as education and health, exhibit both higher fertility levels and a smaller fertility decline than private-sector oriented fields like ICT and business (Hellstrand et al., 2024). For highly educated mothers, the high opportunity costs of “greedy work” in the private sector (Goldin, 2021) may increase the appeal of public-sector jobs, which typically offer shorter hours, more predictable schedules, and stronger family-friendly policies.

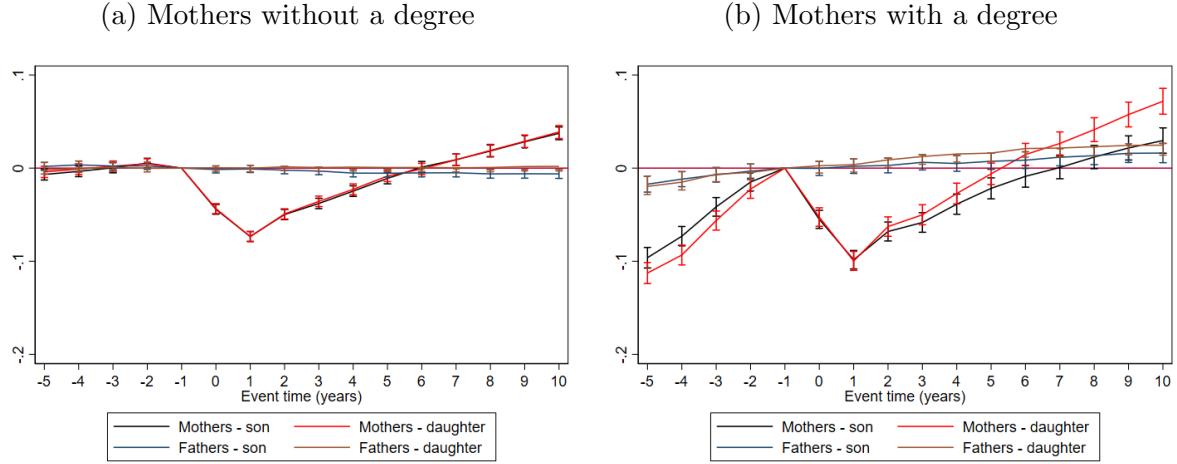
Figure 4 shows that, among mothers with a university degree, having a firstborn daughter increases the likelihood of working in the public sector, particularly around the time of school entry of the firstborn child. This pattern is not evident among less educated mothers. At six and ten years after giving birth, university educated mothers of daughters (sons) are more likely to work in the public sector by 1.4% (-0.8%) and 7.1% (2.9%).<sup>9</sup> We can interpret this fact as university-educated mothers of firstborn daughters being more likely to seek employment better aligned with work-family balance since public jobs are more family friendly. We cannot disentangle the main determinants of this shift, nevertheless, this is consistent both with mothers preferring daughters and hence wanting

<sup>8</sup>We also investigated changes in region and firm without finding relevant patterns by parental education and gender of the firstborn child.

<sup>9</sup>Figure 4 considers the whole sample of parents for the estimation, i.e. both those who are in the labor force and not. Figure A11 includes the sample of individuals who are employed only. The results are similar, although there is no pronounced dip in employment after birth.

to invest more time with them and mothers becoming more traditional in their gender norms when having a daughter (Bhalotra et al., 2025) and hence giving higher priority to family time.

Figure 4: Public Employment by Maternal Education and Firstborn Child's Gender



*Note:* Event study results. Outcome variable has value one if the person is working for a Government authority, a Government enterprise, or a public corporation. Unemployed and out of the labor market individuals are included in the sample. The vertical lines represent the 95% confidence intervals.

To understand the impact of switching to the public sector on the motherhood penalty, we run a wage regression with different specifications including worker, year, age, firm, and region fixed effects. The econometric specification is similar to the one used in Rattsø and Stokke (2024) on our sample of parents. Even if the private sector wages are higher than public sector wages for the whole economy (Maczulskij, 2013; Maczulskij and Viinikainen, 2024), our results on Table 4 show that working in the public vs. private sector results in a wage premium in our sample. This is true for both women with and without a university degree, and the magnitude of the premium increases when controlling for the full set of fixed effects, suggesting a negative selection in terms of worker's, area's and industry's characteristics, such as their productivity.

Table 4: Female Wage Regressions of Public vs. Private Jobs

<b>Panel A</b>	ln wage				
	(1)	(2)	(3)	(4)	(5)
Public	0.0436*** (0.0028)	0.0591*** (0.0028)	0.1910*** (0.0041)	0.1899*** (0.0041)	0.2728*** (0.0299)
Degree	0.3314*** (0.0031)	0.3226*** (0.0031)	0.5037*** (0.0055)	0.5069*** (0.0056)	0.4612*** (0.0054)
Constant	9.5296*** (0.0023)	9.5274*** (0.0023)	9.4033*** (0.0027)	9.4024*** (0.0027)	9.4192*** (0.0118)
<i>N</i>	1247614	1247614	1244730	1244730	1203580

<b>Panel B</b>	ln wage	ln wage	ln wage	ln wage	ln wage
	(1)	(2)	(3)	(4)	(5)
Public	0.0621*** (0.0036)	0.0718*** (0.0036)	0.1535*** (0.0052)	0.1536*** (0.0052)	0.2125*** (0.0304)
Degree	0.3476*** (0.0044)	0.3337*** (0.0043)	0.4699*** (0.0065)	0.4743*** (0.0065)	0.4008*** (0.0064)
Public $\times$ Degree	-0.0393*** (0.0054)	-0.0269*** (0.0054)	0.0842*** (0.0074)	0.0813*** (0.0074)	0.1316*** (0.0076)
Constant	9.5239*** (0.0026)	9.5235*** (0.0025)	9.4143*** (0.0029)	9.4131*** (0.0029)	9.4404*** (0.0120)
<i>N</i>	1247614	1247614	1244730	1244730	1203580
Year & age FE	✓	✓	✓	✓	✓
Region FE		✓	✓		✓
Worker FE			✓	✓	✓
Firm FE					✓

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

*Note:* Log wage regression results with age, year, region, worker, and firm fixed effects. All specifications use the main sample used to compute the child penalty.

Our findings suggest that the greater long-term earnings penalty experienced by university-educated mothers of firstborn sons cannot be explained by differences in leave duration, fertility behavior, child health, or couple stability.<sup>10</sup> Instead, the heterogeneity appears to stem from labor market adjustments following childbirth. We provide suggestive evidence that the preference for daughters manifests itself differently for women with different levels of education. Among women with no tertiary education, who exhibit overall a lower labor attachment, having a firstborn son results in a slightly lower earnings child penalty in the long term. The only mechanism that partly can explain this is a higher labor market exit rate when having a firstborn daughter. For women with tertiary education, the preference for daughters results in a higher likelihood to switch to public-sector jobs that are overall more family-oriented and better paid than the private sector. This results in a considerably lower earnings child penalty when having a firstborn daughter in the long-run. Our findings point to the relevance of considering the interac-

<sup>10</sup>We have shown earlier that potential confounding mechanisms—such as fertility responses (Table 1), parental leave length (Table 2), union stability (Figure A5), and child health (Figure A6)—do not vary systematically by the gender of the firstborn across educational groups.

tions of individual preferences with the job attributes to better understand the roots of the motherhood penalty and its heterogeneity across different groups.

## 5 Conclusion

Despite substantial progress in education and labor market participation, motherhood remains a central driver of gender inequality. Our study shows that maternal preferences, specifically a mild preference for daughters, interact with maternal education to generate divergent long-run penalties. Highly educated mothers of sons face the steepest losses, while less-educated mothers of daughters experience modestly larger penalties. We identify the main mechanisms as the public-sector switching among university-educated mothers.

These findings underscore that similar underlying preferences can yield very different outcomes depending on job characteristics and career stakes. They highlight the importance of designing policies that reduce the career costs of family formation in high-skilled occupations, where “greedy work” structures amplify penalties (Goldin, 2021). More generally, they suggest that understanding the motherhood penalty requires integrating both structural constraints and parental preferences. Future research should further explore how beliefs about children, family, and career interact with occupational features to shape women’s post-birth trajectories. Doing so is critical for informing policy reforms aimed at reducing gender gaps and improving the allocation of talent in the labor market.

## References

Adams, A., Jensen, M. F., and Petrongolo, B. (2024). Birth timing and spacing: Implications for parental leave dynamics and child penalties. Technical report, Technical Report.

Adda, J., Dustmann, C., and Stevens, K. (2017). The career costs of children. *Journal of Political Economy*, 125(2):293–337.

Altonji, J. G. and Mansfield, R. K. (2018). Estimating group effects using averages of observables to control for sorting on unobservables: School and neighborhood effects. *American Economic Review*, 108(10):2902–2946.

Andersson, G., Hank, K., Rønse, M., and Vikat, A. (2006). Gendering family composition: Sex preferences for children and childbearing behavior in the nordic countries. *Demography*, 43(2):255–267.

Andresen, M. E. and Nix, E. (2025). You can't force me into caregiving: Paternity leave and the child penalty. *The Economic Journal*.

Angelov, N., Johansson, P., and Lindahl, E. (2016). Parenthood and the gender gap in pay. *Journal of labor economics*, 34(3):545–579.

Angrist, J. D. and Evans, W. N. (1998). Children and their parents' labor supply: Evidence from exogenous variation in family size. *The American Economic Review*, 88(3):450–477.

Arnaboldi, F., Beccalli, E., and Gioia, F. (2024). Is it a boy or a girl? newborn gender and household portfolio decisions. *European Financial Management*, 30(4):2095–2134.

Azmat, G. and Ferrer, R. (2017). Gender gaps in performance: Evidence from young lawyers. *Journal of Political Economy*, 125(5):1306–1355.

Baker, M. and Milligan, K. (2016). Boy-girl differences in parental time investments: Evidence from three countries. *Journal of Human capital*, 10(4):399–441.

Barcellos, S. H., Carvalho, L. S., and Lleras-Muney, A. (2014). Child gender and parental investments in india: Are boys and girls treated differently? *American Economic Journal: Applied Economics*, 6(1):157–189.

Bensnes, S., Huitfeldt, I., and Leuven, E. (2023). Reconciling estimates of the long-term earnings effect of fertility. Technical report, Institute of Labor Economics (IZA).

Bertrand, M., Goldin, C., and Katz, L. F. (2010). Dynamics of the gender gap for young professionals in the financial and corporate sectors. *American economic journal: applied economics*, 2(3):228–255.

Bhalotra, S. R., Clarke, D., and Nazarova, A. (2025). The daughter penalty. (17817).

Blau, F. D., Kahn, L. M., Brummund, P., Cook, J., and Larson-Koester, M. (2020). Is there still son preference in the united states? *Journal of Population Economics*, 33:709–750.

Boelmann, B., Raute, A., and Schonberg, U. (2021). Wind of change? cultural determinants of maternal labor supply.

Borooah, V. K. (2004). Gender bias among children in india in their diet and immunisation against disease. *Social science & medicine*, 58(9):1719–1731.

Bütikofer, A., Jensen, S., and Salvanes, K. G. (2018). The role of parenthood on the gender gap among top earners. *European Economic Review*, 109:103–123.

Carnicelli, L. (2024). *Studies on labor force participation and paternity leave reforms*. Phd thesis, University of Helsinki. Available at <https://helda.helsinki.fi/items/66433145-3adc-4317-a476-8897bd2df9e6>.

Carnicelli, L., Miettinen, A., Ravaska, T., Räsänen, T., and Saarikallio-Torp, M. (2024). Impacts of a paternity leave reform: Exploring seasonality and heterogeneity in fathers' take-up of parental leave.

Cortés, P. and Pan, J. (2023). Children and the remaining gender gaps in the labor market. *Journal of Economic Literature*, 61(4):1359–1409.

Costa Dias, M., Joyce, R., and Parodi, F. (2020). The gender pay gap in the uk: children and experience in work. *Oxford Review of Economic Policy*, 36(4):855–881.

Dahl, G. B. and Moretti, E. (2008). The demand for sons. *The review of economic studies*, 75(4):1085–1120.

Dasgupta, K., Diegmann, A., Kirchmaier, T., and Plum, A. (2022). The gender reveal: The effect of sons on young fathers' criminal behavior and labor market activities. *Labour Economics*, 78:102224.

Doepke, M. and Kindermann, F. (2019). Bargaining over babies: Theory, evidence, and policy implications. *American Economic Review*, 109(9):3264–3306.

Dustmann, C. and Landersø, R. (2021). Child's gender, young fathers' crime, and spillover effects in criminal behavior. *Journal of Political Economy*, 129(12):3261–3301.

Ganatra, B. and Hirve, S. (1994). Male bias in health care utilization for under-fives in a rural community in western india. *Bulletin of the World Health Organization*, 72(1):101.

Goldin, C. (2014). A grand gender convergence: Its last chapter. *American Economic Review*, 104(4):1091–1119.

Goldin, C. (2021). *Career and family: Women's century-long journey toward equity*. Princeton University Press.

Goldin, C. (2023). Why women won. Working Paper 31762, National Bureau of Economic Research.

Goldin, C. (2025). Babies and the macroeconomy. *Economica*, 92(367):675–700.

Goldin, C., Kerr, S. P., and Olivetti, C. (2022). When the kids grow up: women's employment and earnings across the family cycle. Technical report, National Bureau of Economic Research.

González, L., Guirola, L., and Hospido, L. (2024). Fathers' time-use while on paternity leave: Childcare or leisure? Technical report, Barcelona School of Economics.

Gupta, M. D. (1987). Selective discrimination against female children in rural punjab, india. *Population and development review*, pages 77–100.

Hellstrand, J., Miettinen, A., Nisén, J., and Rotkirch, A. (2024). Fertility variation by field of education and occupational sector in finland: 2010–2019. *European Sociological Review*, 40(3):325–343.

Herr, J. L. (2015). The labor supply effects of delayed first birth. *American Economic Review*, 105(5):630–637.

Hsieh, C.-T., Hurst, E., Jones, C. I., and Klenow, P. J. (2019). The allocation of talent and us economic growth. *Econometrica*, 87(5):1439–1474.

Ichino, A., Lindström, E.-A., and Viviano, E. (2014). Hidden consequences of a first-born boy for mothers. *Economics Letters*, 123(3):274–278.

James, J. and Vujić, S. (2019). From high school to the high chair: Education and fertility timing. *Economics of Education Review*, 69:1–24.

Jayachandran, S. and Kuziemko, I. (2011). Why do mothers breastfeed girls less than boys? evidence and implications for child health in india. *The Quarterly journal of economics*, 126(3):1485–1538.

Kleven, H., Landais, C., and Leite-Mariante, G. (2023). The child penalty atlas. Technical report, National Bureau of Economic Research.

Kleven, H., Landais, C., and Søgaard, J. E. (2019). Children and gender inequality: Evidence from denmark. *American Economic Journal: Applied Economics*, 11(4):181–209.

Kohler, H.-P., Behrman, J. R., and Skytthe, A. (2005). Partner+ children= happiness? the effects of partnerships and fertility on well-being. *Population and development review*, 31(3):407–445.

Kosonen, T. (2014). To work or not to work? the effect of childcare subsidies on the labour supply of parents. *The BE Journal of Economic Analysis & Policy*, 14(3):817–848.

Kuziemko, I., Pan, J., Shen, J., and Washington, E. (2018). The mommy effect: Do women anticipate the employment effects of motherhood? Technical report, National Bureau of Economic Research.

Lundberg, S. (2005). Sons, daughters, and parental behaviour. *Oxford Review of Economic Policy*, 21(3):340–356.

Lundberg, S., McLanahan, S., and Rose, E. (2007). Child gender and father involvement in fragile families. *Demography*, 44:79–92.

Lundberg, S. and Rose, E. (2003). Child gender and the transition to marriage. *Demography*, 40(2):333–349.

Lundborg, P., Plug, E., and Rasmussen, A. W. (2017). Can women have children and a career? iv evidence from ivf treatments. *American Economic Review*, 107(6):1611–1637.

Maczulskij, T. (2013). Employment sector and pay gaps: genetic and environmental influences. *Labour Economics*, 23:89–96.

Maczulskij, T. and Viinikainen, J. (2024). Personality and public sector employment in finland. *Labour*, 38(1):122–149.

Mauno, S., Kinnunen, U., and Pyykkö, M. (2005). Does work–family conflict mediate the relationship between work and family roles and psychological well-being? a study of finnish public and private sector employees. *Community, Work & Family*, 8(2):211–232.

Melentyeva, V. and Riedel, L. (2023). Child penalty estimation and mothers’ age at first birth. Technical report, ECONtribute Discussion Paper.

Noonan, M. C., Corcoran, M. E., and Courant, P. N. (2005). Pay differences among the highly trained: Cohort differences in the sex gap in lawyers’ earnings. *Social forces*, 84(2):853–872.

OECD (2024). *Education at a Glance 2024: OECD Indicators*. OECD Publishing, Paris.

Olivetti, C., Pan, J., and Petrongolo, B. (2024). The evolution of gender in the labor market. In *Handbook of Labor Economics*, volume 5, pages 619–677. Elsevier.

Pande, R. P. (2003). Selective gender differences in childhood nutrition and immunization in rural india: the role of siblings. *Demography*, 40(3):395–418.

Paukkeri, T., Ravaska, T., and Riihelä, M. (2024). Examining inequalities: from labour markets to social outcomes in finland. *Fiscal Studies*, 45(2):225–241.

Rattsø, J. and Stokke, H. E. (2024). Public sector wage compression and wage inequality: gender and geographic heterogeneity. *Oxford Economic Papers*, 76(3):722–740.

Riukula, K. (2024). Preference for sons: still a trend? evidence from individual-level data from finland, 1960–2015. *Review of Economics of the Household*, pages 1–23.

Sieppi, A. and Pehkonen, J. (2019). Parenthood and gender inequality: Population-based evidence on the child penalty in Finland. *Economics Letters*, 182:5–9.

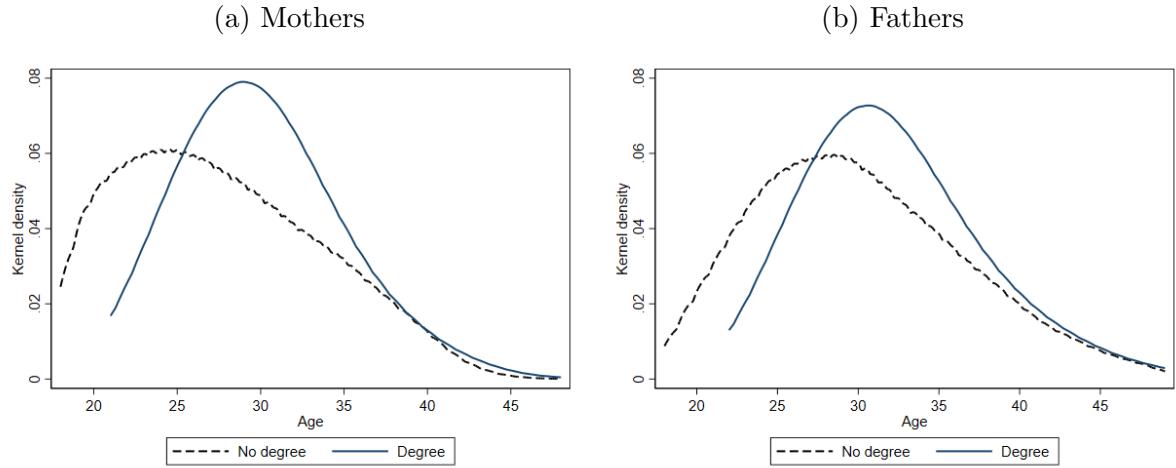
Song, Y. and Gao, J. (2023). Do fathers have son preference in the united states? evidence from paternal subjective well-being. *Review of Economics of the Household*, 21(3):1083–1117.

Virtanen, H., Silliman, M., Kuuppelomäki, T., and Huttunen, K. (2024). Education, gender, and family formation. Technical report, CESifo Working Paper.

# Appendix

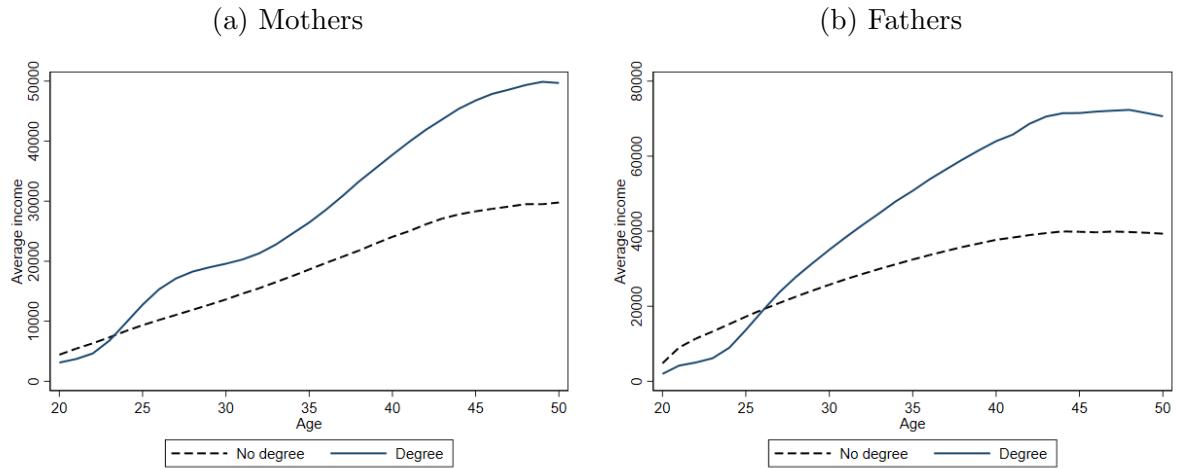
## A Figures

Figure A1: Age at First Birth of Mothers and Father by Education



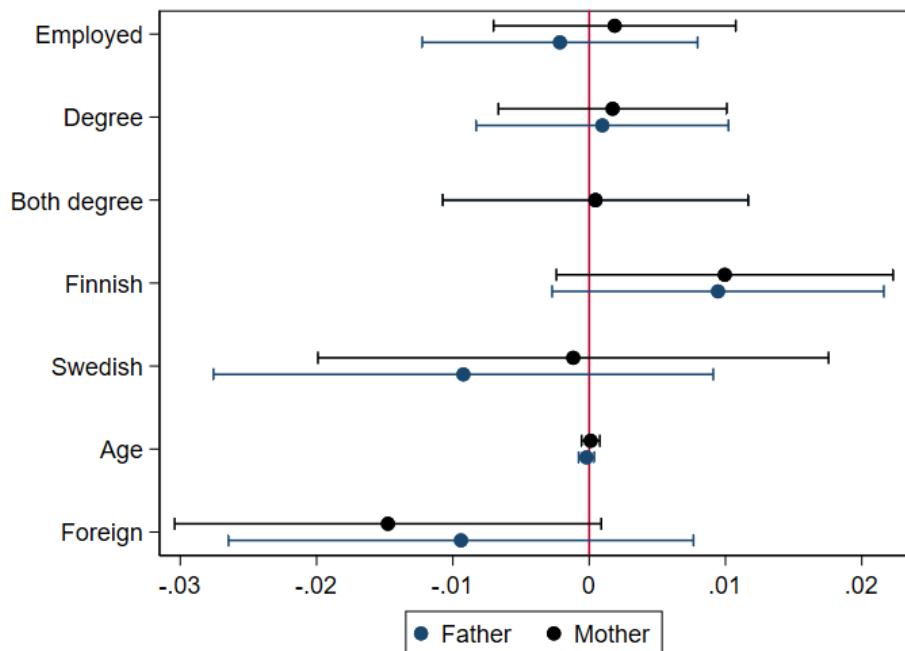
Note: Kernel density of first-time mothers and fathers age by education.

Figure A2: Earnings Trajectories of Mothers and Father by Education



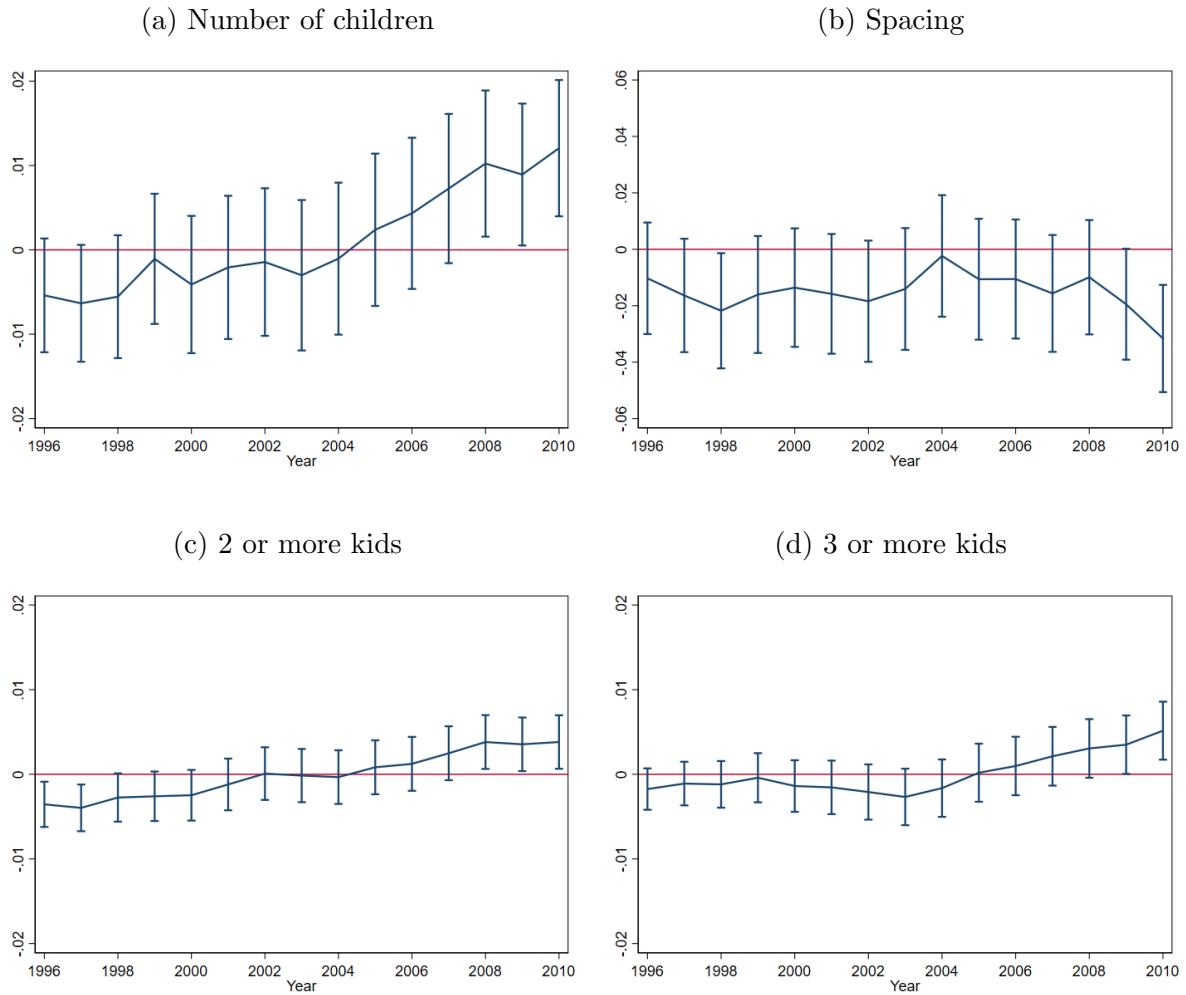
Note: Average earnings of mothers and fathers by age and education.

Figure A3: Firstborn Child's Gender and Parents' Characteristics



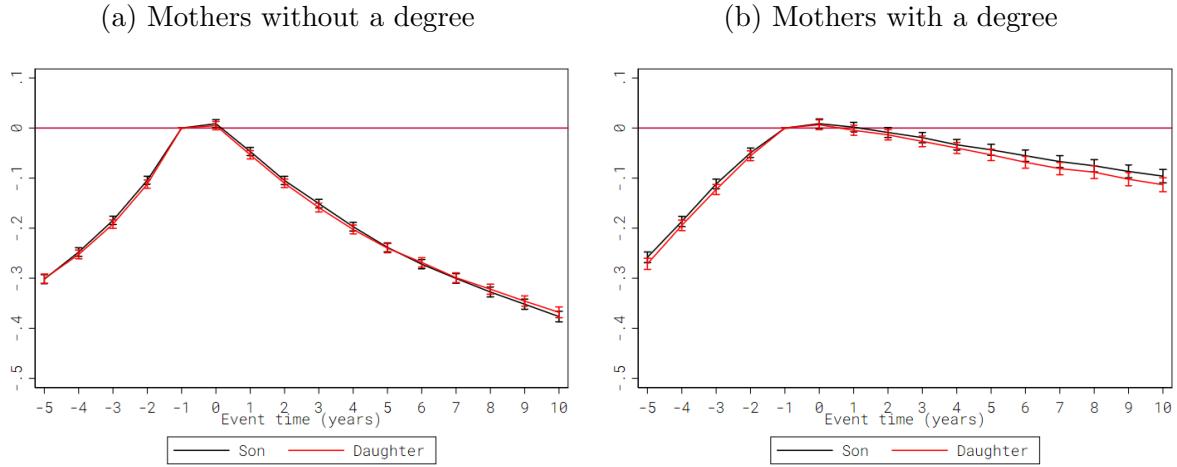
*Note:* The figure plots the coefficients of having a firstborn son on parents characteristics. Each coefficient comes from a different regression. Horizontal bars represent 95% confidence intervals.

Figure A4: Evolution of Child Preferences 1996-2010: Fertility Outcomes After Birth of Firstborn Son



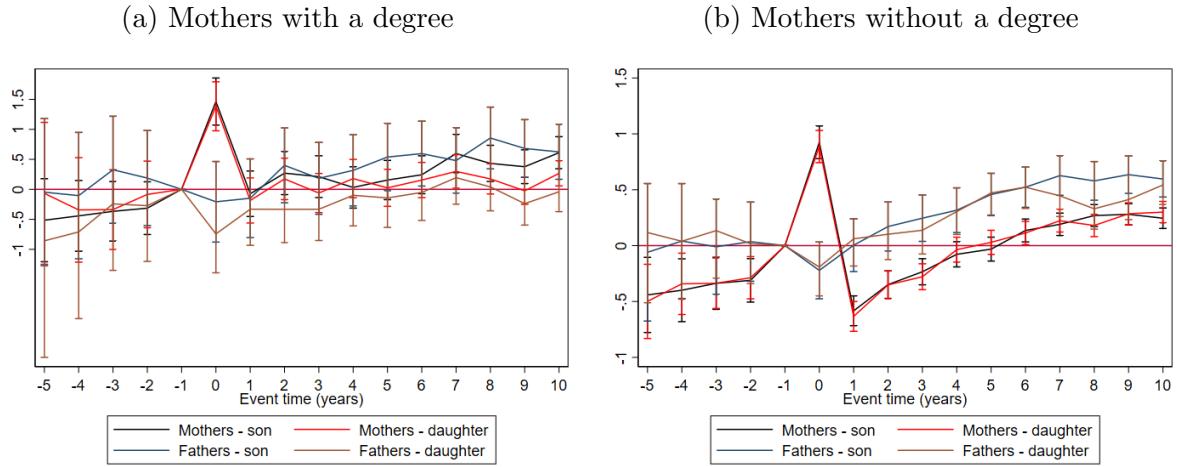
*Note:* Control variables used in the estimation include dummies for education, mother tongue (Finnish or Swedish), employment status, age, and region of both parents. All regressions include year fixed effects and are restricted to firstborn children. Vertical bars represent 95% confidence intervals.

Figure A5: Union Stability by Maternal Education and Firstborn Child's Gender



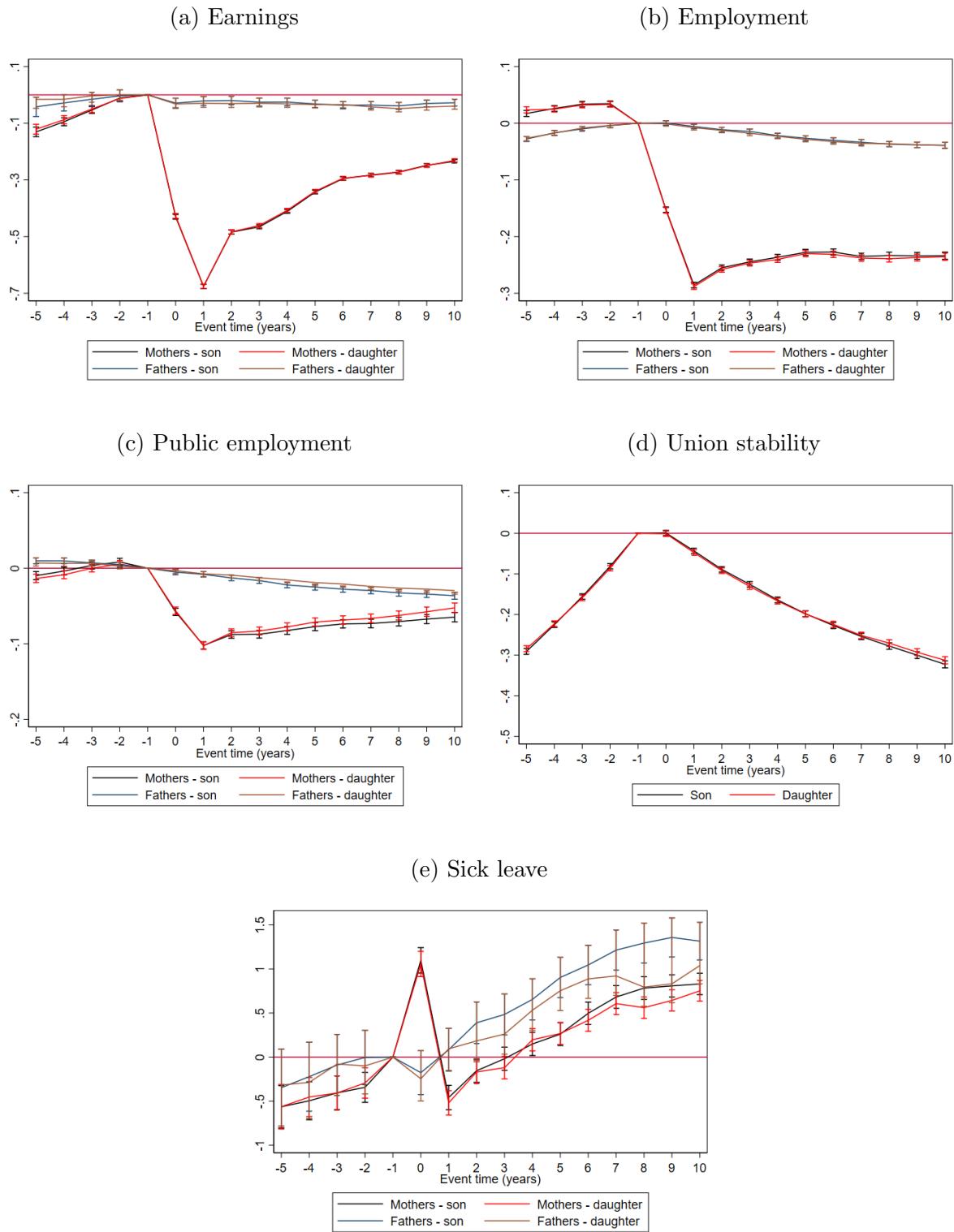
*Note:* Event study results on union stability where the outcome variable takes value one if the couple is married or cohabiting. All regressions include year fixed effects and are restricted to firstborn children. The vertical lines represent the 95% confidence intervals.

Figure A6: Sick Leave by Maternal Education and Firstborn Child's Gender



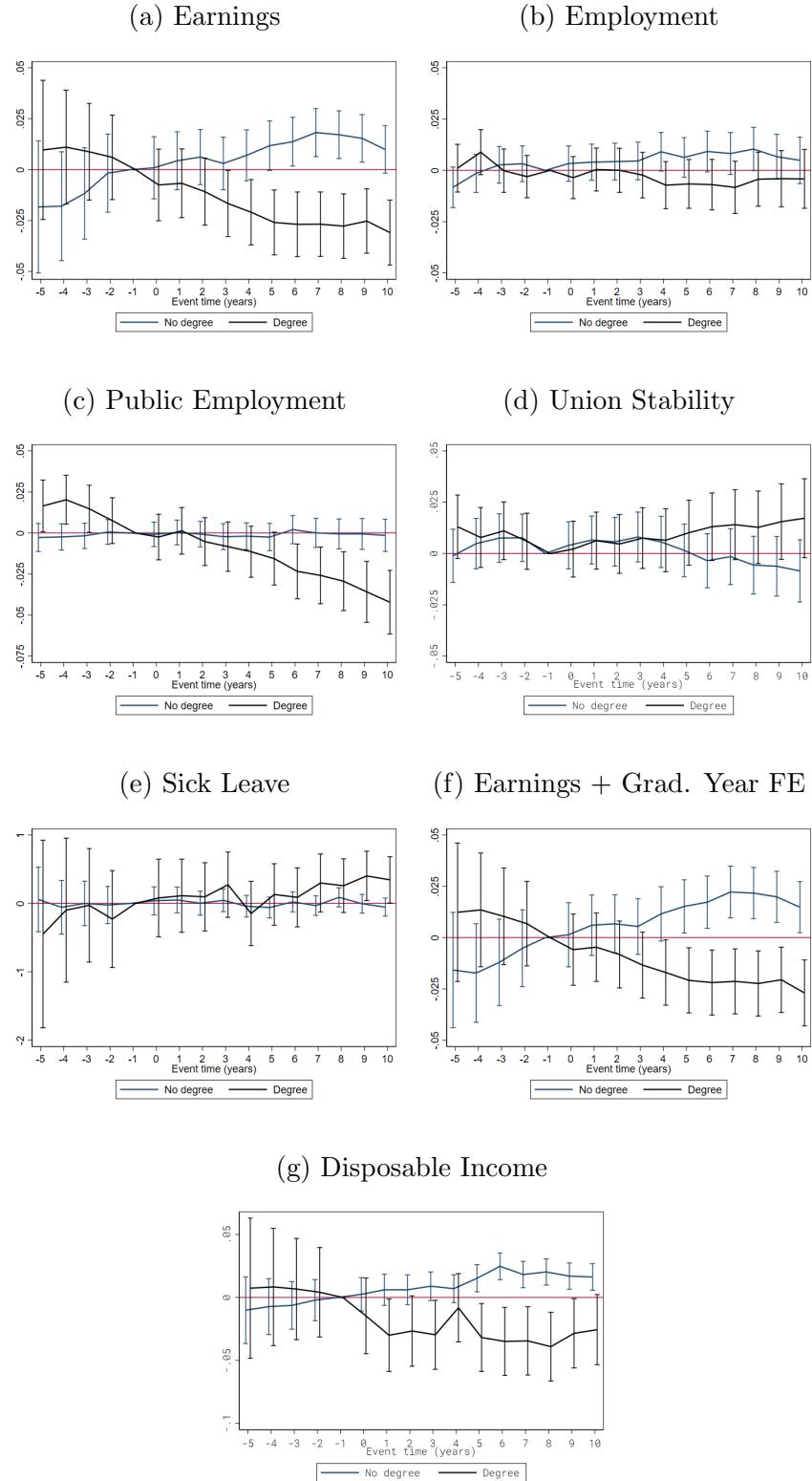
*Note:* Event study results on the amount of sick leave received with year and age fixed effects. The vertical lines represent the 95% confidence intervals.

Figure A7: Main Outcomes by Firstborn Child's Gender



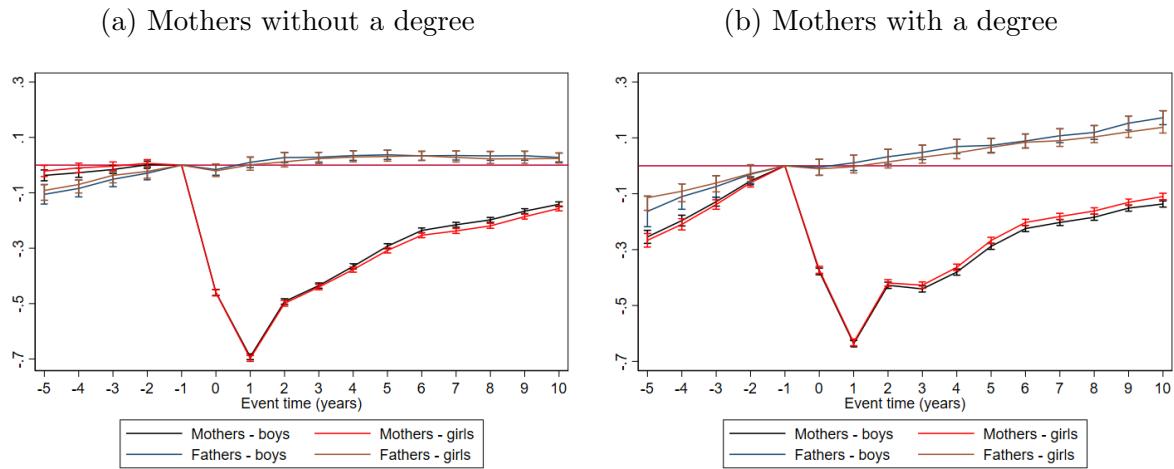
Note: Event study results for the whole sample with year and age fixed effects. The vertical lines represent the 95% confidence intervals.

Figure A8: Mothers' Main Outcomes – Difference Firstborn Son vs. Daughter



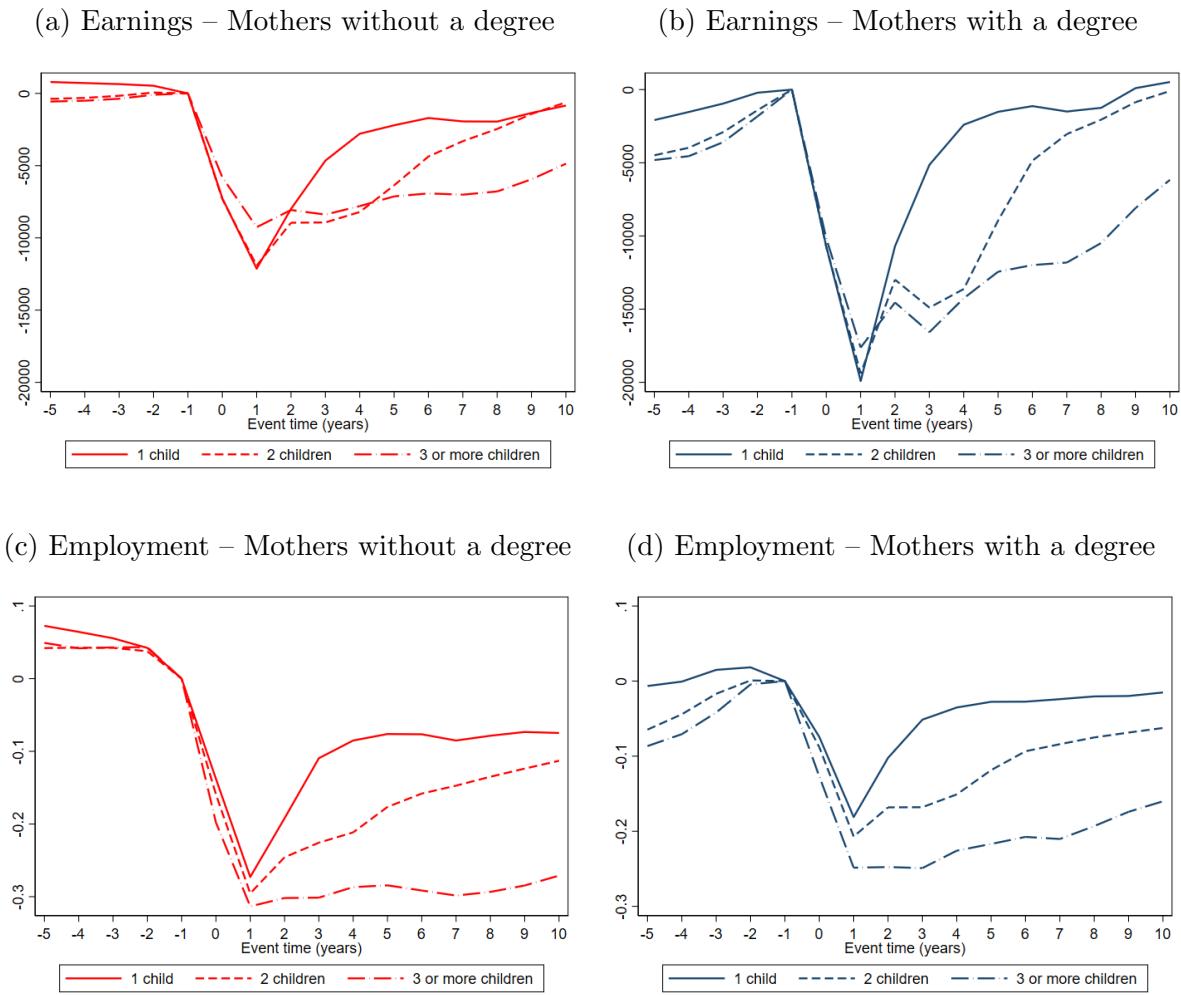
*Note:* The graphs show the differences between the estimates of having a son for mothers and not mothers yet by maternal education. The vertical lines represent the 95% confidence intervals.

Figure A9: Earnings by Education and Child's Gender with Year of Graduation FE



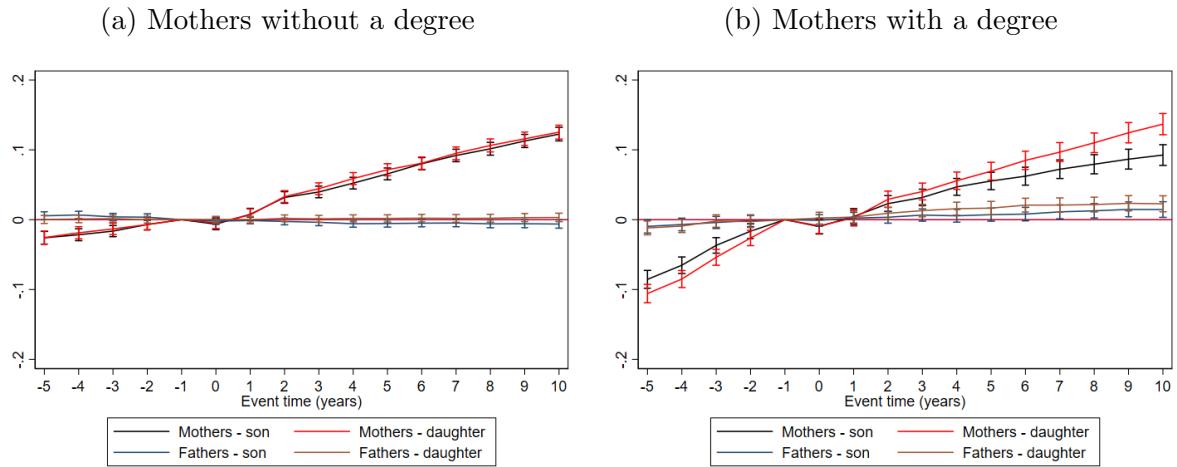
*Note:* Event study results on earnings using the specification based on Adams et al. (2024). The vertical lines represent the 95% confidence intervals.

Figure A10: Mothers' Earnings and Employment Trajectories by Number of Children



*Note:* Panels a and b show the average earnings by event date, year of birth of the first child, and total fertility. Panels c and d show the employment rate by event time and total fertility.

Figure A11: Public Employment by Maternal Education and Firstborn Child's Gender – Only Employed Individuals



*Note:* Event study results. Outcome variable has value one if the person is working for a Government authority, a Government enterprise, or Public corporation. Only employed individuals were considered in the regression. The vertical lines represent the 95% confidence intervals.

## B Tables

Table B1: Summary Statistics

	Mothers		Fathers	
	mean	sd	mean	sd
Employed (%)	75.58	(42.96)	83.61	(37.02)
Age	28.14	(5.74)	30.79	(6.74)
Bachelors degree (%)	29.96	(45.81)	22.33	(41.65)
Finnish (%)	89.47	(30.69)	89.97	(30.04)
Swedish (%)	4.37	(20.44)	4.63	(21.01)
Public job (%)	22.11	(41.50)	11.23	(31.58)
Earnings (€)	17852.93	(13601.13)	25499.62	(18040.41)
Disposable income (€)	15238.30	(8566.36)	20250.43	(11934.64)
Public wages (€)	23883.00	(9602.56)	28891.71	(14628.70)
Private wages (€)	21680.82	(12685.38)	28901.98	(17376.05)
Observations	64541		64541	
<b>Degree</b>				
Employed (%)	90.49	(29.33)	94.27	(23.24)
Age	29.96	(4.17)	32.45	(5.49)
Finnish (%)	90.49	(29.34)	90.23	(29.69)
Swedish (%)	5.78	(23.33)	6.22	(24.16)
Public job (%)	38.12	(48.57)	22.02	(41.44)
Earnings (€)	26762.30	(14246.16)	38161.98	(20334.18)
Disposable income (€)	20479.83	(9033.73)	27804.15	(13857.23)
Public wages (€)	27413.49	(10254.24)	34523.17	(16055.07)
Private wages (€)	29229.21	(14365.51)	40578.83	(20120.99)
Observations	19334		14415	
<b>No degree</b>				
Employed (%)	69.21	(46.16)	80.54	(39.59)
Age	27.36	(6.13)	30.32	(6.98)
Finnish (%)	89.04	(31.24)	89.89	(30.14)
Swedish (%)	3.76	(19.03)	4.17	(19.99)
Public job (%)	15.27	(35.97)	8.13	(27.33)
Earnings (€)	14042.59	(11351.01)	21858.24	(15517.14)
Disposable income (€)	12960.37	(7258.12)	18062.47	(10332.54)
Public wages (€)	20092.67	(7111.77)	24428.75	(11589.12)
Private wages (€)	18451.77	(10328.70)	25186.40	(14560.02)
Observations	45207		50126	

Table B2: Parents's Average Leave by Maternal Education and Firstborn Child's Gender

**Panel A: Mothers**

	Daughter		Son	
	mean	sd	mean	sd
Parental leave	135.60	(28.28)	135.24	(28.13)
HCA	339.36	(257.51)	337.22	(254.46)
Total	474.94	(258.69)	472.23	(255.48)
Observations	17771		18655	

**Without Degree**

	mean	sd	mean	sd
Parental leave	135.45	(28.18)	135.67	(28.24)
HCA	447.66	(301.81)	441.94	(299.82)
Total	582.92	(302.97)	577.52	(300.94)
Observations	42323		43717	

**Panel B: Fathers**

	Daughter		Son	
	mean	sd	mean	sd
With Degree				
Any leave	23.16	(19.96)	23.40	(20.53)
With mother	14.47	(3.70)	14.49	(3.68)
Without mother	8.69	(19.31)	8.90	(19.90)
Observations	11693		12183	

**Without Degree**

	mean	sd	mean	sd
Any leave	19.48	(17.44)	19.70	(18.16)
With mother	14.81	(3.57)	14.83	(3.55)
Without mother	4.67	(17.05)	4.87	(17.85)
Observations	32448		33867	

Table B3: Difference of Son-Daughter Estimates for Maternal Earnings, Employment and Public-Employment: Mothers with a degree

Time	Earnings	SE	Employment	SE	Public employment	SE
-5	0.0096	0.0174	0.0011	0.0059	0.0203**	0.0094
-4	0.0110	0.0143	0.0089	0.0056	0.0198**	0.0086
-3	0.0087	0.0121	-0.0002	0.0054	0.0171**	0.0081
-2	0.0060	0.0106	-0.0031	0.0052	0.0098	0.0078
0	-0.0075	0.0090	-0.0035	0.0052	-0.0010	0.0078
1	-0.0067	0.0086	0.0004	0.0053	0.0019	0.0083
2	-0.0108	0.0084	0.0000	0.0055	-0.0062	0.0084
3	-0.0167**	0.0083	-0.0023	0.0057	-0.0085	0.0086
4	-0.0209**	0.0082	-0.0072	0.0059	-0.0088	0.0088
5	-0.0260***	0.0081	-0.0066	0.0061	-0.0140	0.0091
6	-0.0269***	0.0081	-0.0070	0.0063	-0.0227**	0.0094
7	-0.0268***	0.0081	-0.0083	0.0065	-0.0245**	0.0097
8	-0.0278***	0.0081	-0.0043	0.0067	-0.0307***	0.0100
9	-0.0253***	0.0081	-0.0040	0.0070	-0.0378***	0.0104
10	-0.0309***	0.0081	-0.0042	0.0073	-0.0443***	0.0108

*Note:* \* p<0.10, \*\* p<0.05, \*\*\* p<0.01. Table shows the coefficients depicted in Figure A8a for earnings, employment, and public employment for mothers with a degree.

Table B4: Difference of Son-Daughter Estimates for Maternal Earnings, Employment and Public-Employment: Mothers without a degree

Time	Earnings	SE	Employment	SE	Public employment	SE
-5	-0.0183	0.0165	-0.0083	0.0050	-0.0004	0.0067
-4	-0.0180	0.0136	-0.0015	0.0047	-0.0028	0.0062
-3	-0.0117	0.0114	0.0027	0.0046	-0.0031	0.0058
-2	-0.0018	0.0098	0.0032	0.0044	-0.0000	0.0056
0	0.0009	0.0078	0.0033	0.0044	-0.0018	0.0058
1	0.0043	0.0073	0.0040	0.0045	0.0009	0.0062
2	0.0062	0.0069	0.0043	0.0046	-0.0013	0.0060
3	0.0030	0.0066	0.0046	0.0047	-0.0046	0.0060
4	0.0070	0.0064	0.0091*	0.0048	-0.0066	0.0061
5	0.0117*	0.0062	0.0063	0.0049	-0.0060	0.0062
6	0.0137**	0.0061	0.0092*	0.0051	-0.0007	0.0063
7	0.0182***	0.0060	0.0082	0.0052	-0.0031	0.0065
8	0.0171***	0.0060	0.0104*	0.0054	-0.0048	0.0067
9	0.0153**	0.0060	0.0067	0.0056	-0.0031	0.0069
10	0.0099*	0.0060	0.0049	0.0058	-0.0028	0.0071

*Note:* \* p<0.10, \*\* p<0.05, \*\*\* p<0.01. Table shows the coefficients depicted in Figure A8a for earnings, employment, and public employment for mothers without a degree.

## C Appendix: Model

### Parental Leave and Preferences for Son/Daughter

We introduce a simple model to understand how differences in child gender preferences can lead to differences in parental leave taking. The model is based on the one in Cortés and Pan (2023). Parent  $i$  chooses how much to work at the market wage  $w_i$  and how much time to spend taking care of the child. The parameter  $\beta_i^g$ , where  $g \in (\text{son}; \text{daughter})$ , determines the utility the parents can get from being at home with their child.

$$\max_{h_i} w_i h_i + w_j h_j + \beta_i^g \ln(\alpha_i(1 - h_i) + \alpha_j(1 - h_j)) \quad (4)$$

Let us assume for simplicity (and based on the data observation that mothers overall take a greater proportion of parental leave compared to fathers) that the father works full time, so that the mother has to choose:

$$\max_{h_i} w_i h_i + w_j + \beta_i^g \ln(\alpha_i(1 - h_i)) \quad (5)$$

which results in the following optimal allocation:

$$h_i^* = 1 - \frac{\beta_i^g}{w_i} \quad (6)$$

if mothers prefer daughters from sons ( $\beta_i^{\text{daughter}} > \beta_i^{\text{son}}$ ), then they will stay more at home when their child is a daughter.