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DISCUSSION PAPER SERIES

IZA DP No. 17455

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ABSTRACT

Child Penalties, Child Outcomes, and Family Culture*

This paper analyzes how the "child penalty" associated with career interruptions for women after becoming a mother is influenced by preferences absorbed during childhood, and how the child penalty, in turn, is related to the quantity and quality (education) of her own children. Using linked administrative data on Israeli parents and children, the analysis shows that mothers who grew up in larger and more traditional families marry men from larger families, and together they have more children. Growing up with more siblings is also associated with a larger child penalty for a mother in earnings and employment, as well as in terms of commuting less and moving to "mother friendly" firms at the expense of higher wage firms. The results also indicate that the child penalty produces two opposing effects on child human capital – a negative impact due to the loss of parental income, and a positive influence of increased maternal time away from work. Overall, the evidence suggests that the family preferences and norms absorbed during childhood significantly influence a woman's choices of spouse, fertility, and child penalty later in life – but with little overall impact on her children's high school achievements.

JEL Classification: J12, J13, J16, J22, J24, J31, J62
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1 Introduction

The impact of the first child on the career paths of women, commonly referred to as the "child penalty," has garnered significant attention in the recent literature on gender inequality. The differential impact of parenthood on mothers versus fathers is recognized as a major factor perpetuating gender inequality in the labor markets of developed countries, accounting for a substantial portion of the unexplained gender gap in earnings.[1]

According to Kleven, Landais, and Søgaard (2019), the child penalty was responsible for only 40 percent of the gender wage gap in Denmark in 1980, and rose to 80 percent as of 2013. For the United States, Cortés and Pan (2023) find that two-thirds of the gender gap in earnings is due to the differential impact of children on the labor market outcomes of women versus men. Even after the dramatic increases in recent decades in female education and female labor force participation, research on the persistence of significant gender gaps in labor market outcomes is increasingly focussed on the changes in the career decisions of women after the birth of their first child.

To explain the existence of child penalties, even when young women are more educated than young men, the recent literature focusses on the difficulties mothers face in terms of balancing a career with raising children. The evidence suggests that mothers play a larger parenting role relative to fathers, even to this day, due to cultural norms and possibly gender differences in biology, preferences, productivity at home, productivity in the labor market, and discrimination. Parenthood leads to a significant decline in the labor supply for new mothers, but not for new fathers, on the extensive and intensive margin for several years. Even new mothers that maintain their labor market participation make adjustments to accommodate their work-life balance. The evidence shows that new mothers trade higher-paying jobs for lower-paying positions that offer more work flexibility, less work hours, and other family-friendly amenities (Kleven, Landais, and Søgaard (2019); Hotz, Johansson, and Karimi (2018); Manning and Petrongolo (2008); Goldin, (2014); and Goldin and Katz (2016)).[2] However, there are mixed results on the effectiveness of

[1] For example, see Angelov, Johansson, and Lindahl (2016); Kleven, Landais, and Søgaard (2019); Kleven, Landais, Posch, Steinhauer, and Zweimüller (2019); Cortés and Pan (2023); and Fitzenberger, Sommerfeld, and Steffes (2013).
[2] For example, Hotz, Johansson, and Karimi (2018) show that new mothers move to jobs associated with a larger share of workers who are female, new mothers, and work part-time. Pertold-Gebicka, Pertold, and Gupta (2016) examine employment adjustments around motherhood in Denmark and find that women are more likely to switch from private- to public-sector jobs after the birth of a child. Boinet, Norris, and Romiti (2024) suggest that, prior to becoming a

parental leave and childcare policies to incentivize new mothers to maintain their labor force activity after giving birth to their first child. (Cortés and Pan (2023) and Baertsch and Sandner (2024)).

Recent studies have found that the physical act (and burden) of giving birth plays little role in sharply altering a woman's career trajectory after the birth of her first child. Kleven, Landais, and Søgaard (2021) compare biological to adoptive parents, and find similar child penalties for both sets of parents. Andresen and Nix (2022) also compare the child penalties between adoptive and biological parents, as well as heterosexual versus same-sex couples. Their analysis finds little differences in the child penalties for adoptive and biological parents, and they also find that both mothers in same-sex couples display signficant child penalties, as do mothers in heterosexual couples. These results suggest that the act of giving birth, or the biological link between mother and child, are not the dominant factors underlying child penalties. These patterns indirectly suggest a potentially important role for gender norms, preferences, and labor market discrimination against mothers.

A few recent papers examine how cultural norms about gender roles influence the extent of the career interuption for new mothers. Boinet, Norris, and Romiti (2024) use a representative panel survey of the UK population to show that women with more traditional views experience significantly larger child penalties. Jessen (2022) finds lower child penalties for new mothers in East Germany relative to those in West Germany, and argues that these differences are due to stronger egalitarian gender norms in East Germany. Boelmann, Raute, and Schönberg (2021) demonstrate the persistence of cultural upbringing by showing that migrants from East Germany who give birth in West Germany, where gender differences in parental roles are more pronounced, return to work earlier and work longer hours than their West German counterparts. Kleven (2023) uses a similar approach for the US and finds that the child penalty for mothers who move across states or immigrate from abroad is strongly related to the average child penalty in their state or country of birth, conditional on their current state of residence. Kleven et. al. (2019) show that in more traditional families, where the cumulated labor supply from 1964 to 1979 of the mother is much smaller than that of the father, the daughter incurs a larger child penalty when she becomes

mother, traditional women self-select into occupations more conducive to balancing family responsibilities, that in turn have a substantial impact on their earnings trajectory in response to motherhood.

a mother herself. Kleven, Olivero, and Patacchini (2024) find that exposure to more peers with working mothers during adolescence is negatively related to child penalties later in life. The evidence in these studies suggests that childhood exposure to gendered roles in parenting plays an important role in shaping the future child penalties experienced by women when they become mothers.

Our study builds on this literature by focusing more directly on the intergenerational transmission of preferences for family size. Kleven, Landais, and Søgaard (2019) shows that mothers who have more children exhibit larger child penalties after their first birth. This is almost mechanically true – if a mother tends to take maternity leave, and perhaps some additional time off, after the birth of each child. However, the literature has not emphasized the role that a woman's desired family size plays in shaping her career trajectory after the birth of her first child. The analysis in this paper shows that a woman's preferences regarding the size of the family she creates in adulthood are largely shaped during her childhood.

The goal of this paper is to understand how growing up in a larger family affects a woman's choice of spouse and desired number of children, and how these decisions are associated with her "child penalty" in career outcomes and the eventual academic performance of her children in high school. The analysis reveals that certain characteristics of a woman's childhood upbringing, which were determined well before the woman thought about getting married or having children, are very strongly associated with who she marries, how many kids she has, and the extent of her career interruption after becoming a mother. In addition, we show how these decisions and outcomes produce conflicting effects on the human capital of her children at the end of high school.

The empirical analysis uses linked administrative data on Israeli parents and their children, along with individual-level information on marital status, earnings, place of residence, educational outcomes, and firms. This data allows us to analyze "child penalties" using the "event study" approach used in the literature (Kleven et. al. (2019)) for a variety of outcomes including wages, employment, industry characteristics, and firm characteristics. By linking cross-sectional data from the 2008 Israel Census with administrative data, we are also able to examine more "child penalty" outcomes such as commuting time, occupation, and hours worked. Using cross-sectional census data to perform an event-study analysis is typically problematic, since information on the

future fertility of women in the sample without children is missing in the data. By matching a cross-section of women with information about the births of all her children (both before and after the 2008 Census), we show that an analysis of "child penalties" with this type of data yields similar results to using panel data from administrative sources.

The event study analysis demonstrates that in Israel, as in other developed countries, the earnings gap between men and women widens significantly after the birth of the first child and does not converge over the following ten years. Our analysis reveals that the earnings penalty is primarily driven by labor supply factors (employment status, months worked, and hours worked), while parenthood does not seem to have a differential impact on men and women in terms of hourly wages for those that continue working.[3]

Our rich source of data allows us to augment these results with other outcomes that help understand the mechanisms behind the child penalties in earnings. After the birth of their first child, women (who do not drop out of the labor force) tend to move into the public sector and to firms with a larger share of female workers and young mothers. New mothers also increasingly move to lower paying firms (a lower "AKM" firm wage fixed-effect) and to firms that are closer to home (i.e. shorter commute times).[4] In addition, new mothers are increasingly employed in industries with more part-time workers and more female workers. These patterns demonstrate that women tend to gravitate toward more "family-friendly" firms and industries at the expense of higher paying jobs. These findings are consistent with the literature highlighting the importance of job flexibility and "family friendliness" in gender inequality (Manning and Petrongolo (2008); Goldin (2014); Goldin and Katz (2016); and Kleven et. al. (2019)).

However, the analysis shows that the extent of the child penalty for several of these outcomes varies significantly with the family size of the mother in her childhood home (i.e. number of her siblings). Growing up with more siblings during childhood amplifies the career disruptions later on as an adult for a new mother in terms of: total earnings, wages, commuting distance, share of

[3] We also examine the differences in child penalties between women with and without college degrees. Our findings indicate that women without a college degree experience a significantly higher (both economically and statistically) child penalty in earnings than those with a college degree. These differences primarily stem from adjustments on the extensive margin (employment status) rather than the intensive margin (hours worked).
[4] AKM firm wage fixed-effects refers to Abowd, Kramarz, and Margolis (1999).

female workers at work, and the AKM firm wage fixed-effect. The effects are not only statistically significant, but also economically meaningful. For example, women with no siblings face an average wage decline of about 20.3 percent after the birth of their first child, compared to a 32.9 percent decline for women with three siblings. Similar patterns are found for the earnings penalty, which takes into account periods of non-employment.

These patterns are consistent with the idea that women who grew up in larger families have stronger preferences to create larger families as a parent. A woman's number of siblings is strongly related to the number of her children, as well as her husband's number of siblings (even after controlling for the education and ethnicity of both the husband and wife). The latter finding indicates that women with stronger preferences for larger families marry men with similar preferences, and together they have large families where the mother makes more dramatic changes in her career development in terms of working less and trading-off higher paying jobs for more family-friendly firms that are closer to home. That is, the extent of a woman's interruption in her career trajectory after her first child is born is largely determined before having children – in the way she was raised and in her choice of husband with similar preferences.

Our data also allows us to examine how a woman's "child penalty" affects the academic achievements of her children in high school. Since women who grew up in larger families are shown to create larger families themselves and display larger "child penalties," the literature on the "quantity-quality" tradeoff in human capital suggests that women with larger child penalties may have children with lower academic achievements.[5] To test this prediction, we examine the association between a mother's child penalty and her children's future educational achievements. To the best of our knowledge, this is the first paper to directly examine this relationship. To do this, we develop a methodology to calculate the individual-level earnings child penalty based on the event study approach of Kleven et. al. (2019). We then investigate how a woman's earnings penalty is associated with her children's performance on the national matriculation exams taken in Israel during high school.

Our findings indicate that a larger child penalty for a mother is associated with lower child outcomes on the high school matriculation exams. However, the estimates are not large in

[5] See Becker, Murphy and Tamura (1990) and Moav (2005).

magnitude. The average child penalty in earnings is 0.23 (a 23 percent decline in earnings), and according to our results, a 0.46 increase in this measure (which is twice the average and approximately one standard deviation) is associated with: a 1.7 percentage point decrease in the probability of her child passing the matriculation exams; a 0.18 point decrease in the overall matriculation score; a 1.4 percentage point decrease in the likelihood of scoring above 90; a 0.06 percentage point decrease in the likelihood of scoring above 100; and a 1.3 point decrease in the math component score. These findings, which are not affected by controlling for the number of the mother's children, are very small in magnitude, suggesting that there is little evidence for a quantity-quality tradeoff in Israel. This result is consistent with the findings in Angrist, Lavy, and Schlosser (2010).

In addition, the analysis reveals that the child penalty produces two opposing effects on the human capital of children. A larger career interuption for a new mother lowers total parental income for the family, potentially hurting the human capital development of the children. At the same time, a higher child penalty implies more interaction time between the mother and her children, which could benefit the children. We examine these mechanisms by adding a control for total parental income into the specification, which reveals a positive association between the size of the mother's child penalty and her child's academic performance in high school. In this specification, the estimested effect of parental income is significantly positive as well, suggesting that the loss of parental income due to a higher child penalty for the mother lowers child outcomes, but more interaction time with the mother benefits the child. The results suggest that these opposing effects roughly cancel each other out, since the total effect of a higher child penalty is negative but close to zero in magnitude. These findings suggest that a higher child penalty for the mother is not only associated with having more children, but the increased interaction time between a mother and her children is a way for her to raise a larger family without a large negative impact on her children's outcomes due to the lower financial resources for the family.

Overall, this study contributes to the burgeoning literature on "child penalties" in several ways. First, this is the first paper to examine how child penalties for a new mother impact her children's human capital. Second, this paper highlights the influence of a woman's own childhood upbringing in shaping her preferences for family size – which affects her choice of husband, her career interuption after becoming a mother for the first time, and eventual number of children.

These findings contribute to the literature on the intergenerational transmission of cultural norms (Fernández, 2011). The analysis also examines several measures of child penalties for new mothers that are not widely available: the AKM firm wage fixed-effect, commuting time, and job characteristics like the percent female workers, percent young mothers, and percent working part-time. The analysis of these measures reveals a consistent story whereby women who grew up in larger families marry men who also grew up in larger families, and together they create families with more children who are not impacted very negatively by the loss of income due to their mother's career interuption – since the mother makes several adjustments in terms of trading off higher wages for more family-friendly career options.

The paper is divided into two parts. The first part presents an analysis of the child penalty for new mothers in terms of standard labor market outcomes like earnings and employment, as well as additional career choices related to the potential trade-off between high wage firms and more family-friendly places of work. This analysis also examines the interaction of these career adjustments with characteristics of the woman's upbringing like the number of her siblings (and the number of her husband's siblings) and her ethnic background. The second part of the paper analyzes how a mother's child penalty in earnings impacts the quantity and quality (academic achievements) of her children. The two analyses require different samples. The first analysis requires data on the labor market activity of mothers before and after giving birth for the first time, while the second analysis requires data on child outcomes in high school linked to a measure of the mother's child earnings penalty estimated from information dating back to the years before and after the birth of the mother's first child. Due to the different sample and data requirements for each analysis, we present the data and estimation for each analysis separately.

2 The Child Penalty and Family Culture

This section presents the analysis of a woman's child penalty after the birth of her first child, using several different measures of career outcomes and adjustments. The analysis also examines how a woman's career interruption caused by motherhood interacts with characteristics of her own childhood upbringing (the number of siblings during her childhood) and ethnicity. The interaction

of a new mother's child penalty with characteristics of her husband's upbringing is explored as well. Using a broad array of career outcomes, this section demonstrates how characteristics determined well before a woman has children are associated with the extent of her career interruption after becoming a mother.

2.1 Data

The analysis in this section is performed with two main data sets: Israeli administrative panel data and cross-sectional data from the 2008 Israel Census. The administrative panel data is used to measure most of the career outcomes used in the analysis, but there are labor market outcomes that are only available in the 2008 Israel Census. Information from the administrative data on all births for each woman in the Census sample is merged with the 2008 Israel Census, so a standard event-study analysis (with events defined by time periods relative to the woman's first birth) is possible. For labor market outcomes available in both data sets (administrative panel data and the Census data), the results are very similar, which demonstrates the "proof of concept" of using cross-sectional data matched with additional information on future births.

The sample used with the administrative panel data is restricted to non-ultra-orthodox Jewish individuals from the Population Registry who had their first child between ages 22 and 45 and between the years 1990 and 2005.[6] The administrative data includes education outcomes for each individual from records obtained from the Ministry of Education.[7] This data is merged with each individual's income, using the Individual Income Registry for five years before to ten years after the birth of the person's first child.[8] For employed individuals, we use linked employer-employee data that contains information on each worker's sector (public/private), industry, and firm

[6] The Population Registry provides demographic information such as birth year, sex, origin, and ethnicity. Additionally, for each individual, the registry includes the identification numbers for each individual's mother and father, allowing us to link individuals to their family members, including siblings.

[7] The categories of education levels are defined as: less than eight years of education, more than eight years without a high school diploma, high school diploma without passing the matriculation exams, high school diploma with passing the matriculation exams, non-academic post-secondary diploma, bachelor's degree, master's degree, and doctoral degree.

[8] The Individual Income Registry is based on tax reports submitted to the Israeli Treasury. The registry provides yearly income data, including both employees and the self-employed, for all working individuals between 1985 to 2019. All earnings and wage variables data are adjusted by the Consumer Price Index (CPI), using 2019 as the base year.

identification number. Information on the earnings of each worker by firm allows us to compute firm wage fixed-effects, which will be referred to as AKM firm effects (Abowd, Kramarz, and Margolis (1999)).[9]

In order to focus on career interruptions after becoming a parent for the first time, the sample excludes individuals who did not work in the year prior to the birth of their first child, leaving 537,182 individuals in our sample (265,093 women and 272,089 men). For these individuals, a panel data set is constructed using each year between $t = -5$ (five years before the first birth) and $t = 10$ (ten years after). Descriptive statistics for the main variables used in the analysis are found in Table 1. The table shows, as expected, that women's earnings and wages are substantially lower than those of men, despite a much higher proportion of women holding a college degree (48 percent for women versus 37 percent for men). The average age at first birth is 27.9 for women and 29.8 for men. Women work at firms that have much lower AKM firm wage fixed-effects, a much higher share of female workers (62 percent relative to 33 percent for men), and a higher share of young mothers.[10] Women are also more likely to work in an industry in the public sector and with a larger share of female workers.

To expand the set of outcomes studied in the analysis, the 2008 Israel Census is merged at the individual level with the administrative data described above. In particular, this enables us to determine the year of the first child's birth for all individuals in the 2008 Census, even for women who gave birth to their first child after 2008. This analysis is also restricted to non-ultra-orthodox Jewish individuals who had their first child between ages 22 and 45, but this sample includes only those whose first birth occurred between five years before the census to ten years after the census (i.e., between 2003 to 2018). This cross-sectional sample includes 115,016 individuals (58,713 women and 56,303 men). Descriptive statistics appear in Table 2, showing that all labor supply measures (hours worked, months worked, and employment status) are higher for men. Women also spend less time commuting (i.e. they work closer to home) and are more likely to work in an industry with a higher share of part-time workers. These variables, along with hours worked, are

[9] To calculate AKM firm wage fixed-effects, we first identify the largest connected set of workers within our employer-employee linked data. Next, we perform a regression of log wages on several variables: age, age squared, age cubed, and fixed-effects for the individual, year, and firm. The firm AKM effects are represented by the coefficients for the firm fixed-effects in this regression model.

[10] We define young mothers as women with at least one child under the age of 10.

not available in the administrative data, but will help fill out the broader picture of how women adjust their career trajectories after the birth of their first child.

The analysis focuses on how a woman's childhood upbringing is related to the changes in her career choices after becoming a mother for the first time. To capture variation in how a woman was raised, we focus on how many siblings she grew up with. Gould et. al. (2020) shows that households with more children display stronger differences in parental roles between mothers and fathers. In particular, mothers spend more time with the children relative to fathers in families with more children. Therefore, growing up in a larger family is likely to instill a greater sense of gendered parental roles, and also influence preferences for family size once the child becomes an adult.

Table 3 presents evidence consistent these ideas. These descriptive regressions show that a woman's fertility is significantly and positively related to how many siblings she grew up with. This relationship holds even after controlling for a woman's education level, religiosity, and ethnicity (families from Asia-Africa are typically larger and more traditional). Adding a control for earnings does not affect the estimated coefficient as well. Overall, Table 3 shows that women who grew up with more siblings create larger families when they become adults.

Evidence for the idea that this pattern is due to preferences acquired during childhood can be found in Table 4. This table presents a descriptive regression of a woman's number of siblings in her childhood family on the number of her husband's siblings during his childhood. These two variables are strongly and positively related to one another, and this finding is not sensitive to adding controls for the education levels of each partner. The size of the coefficient is reduced when ethnic and religiosity controls are added, but there remains a positive and significant relationship between the wife and husband in terms of the size of their childhood family. Even before having any children, women who come from larger families marry men who come from larger families, and as shown in Table 3 above, together they produce families with more children. These findings suggest a strong level of assortative mating on preferences regarding family size.

In this section, we explore how these preferences for family size, absorbed during childhood, affect a woman's career path after giving birth for the first time. Then, in Section 3, we examine how

the extent of her career interruption relates not only to the quantity of children she produces, but also to the quality of her children in terms of their academic achievements.

2.2 The Child Penalty in Labor Outcomes

2.2.1 Event-Study Methodology

To investigate the overall impact of the arrival of the first child on women's and men's labor market outcomes, we adopt the event-study methodology of Kleven, Landais, and Søgaard (2019). We define the time period in which each individual has their first child as t = 0, and define each time period as the number of years relative to this baseline period. We then estimate changes in various labor outcomes for event times from $t = -5$ to $t = 10$. For the outcome variables obtained from the administrative panel data, we use the following model:

$$(1) \quad Y_{ist}^{g} = \sum_{j \neq -1} \alpha_j^g * \mathbf{I}[j = t] + D_{it}^{Age} + D_{it}^{Year} + v_{ist}^{g},$$

where Y_{ist}^{g} represents the outcome of interest for individual i of gender g in year s and at event time period t. The terms $\mathbf{I}[j = t]$ represent event time period dummy variables, while D_{it}^{Age} and D_{it}^{Year} represent fixed effects for age and year, respectively. We omit event time $t = -1$ to serve as the reference period. Thus, the event time coefficients, $\hat{\alpha}_t^g$, indicate the predicted value of the outcome at event time t relative to one year before the birth of an individual's first child, after controlling for age and year fixed effects.

For variables obtained from the cross-sectional 2008 Census data, we apply a similar model with corresponding notation:

$$(2) \quad Y_{is}^{g} = \sum_{j \neq -1} \alpha_j^g * \mathbf{I}[j = t] + D_{i}^{Age} + v_{is}^{g}.$$

Note that this approach is feasible because (after linking with the demographic information in the administrative data) the individual's event time period (i.e., how many years before or after the birth of their first child) is known, even for those who have not yet had a child by the 2008 Census survey year.

For outcomes that are binary, measured as percentages, or using logs (such as employment status, firm AKM, firm-level female share of workers, employment in the public sector, etc.), we report $\hat{\alpha}_t^g$ to reflect the impact of having children on these outcomes. For outcomes measured in levels (such as earnings, hours worked, commuting distance, etc.), we follow Kleven et. al. (2019) and convert the event time coefficients into percentages using the following formula:

$$(3) \quad P_t^g \equiv \frac{\hat{\alpha}_t^g}{E\left[\hat{Y}_{ist}^g | t\right] - \hat{\alpha}_t^g}$$

where $\hat{Y}_{ist}^g$ is the predicted outcome from equation (1) for each woman/man, and $E\left[\hat{Y}_{ist}^g | t\right]$ represents the average predicted outcome for all individuals at time t. The denominator of Equation (3) thus reflects the average counterfactual outcome for women at time *t* in the absence of children.[11]

2.2.2 Estimation of Child Penalties

Figure 1 illustrates the estimated impact of the first child on men's and women's earnings. Panel A shows that, according to the administrative panel data, the trends in earnings (relative to the base period in $t = -1$) for men and women are similar before the onset of parenthood. However, after the first child's birth, men's earnings stay relatively constant, while women's earnings drop sharply and remain significantly below pre-birth levels for the next decade. This pattern is similar to that observed by Kleven et. al. (2019) with administrative data from Denmark, although the Israeli data shows a more pronounced upward trend in the pre-birth period for both genders. Panel B presents results for the same outcome using the cross-sectional 2008 Israel census (using reported earnings from the census), showing a similar trend to the administrative findings. The similarity of the results for the child penalty in earnings across the two different types of data sources validates the analysis of outcomes available only in the cross-sectional census data.

Figure 2 examines the child penalty for other labor market outcomes. Panel A shows that the career interruption in yearly wage income for women is similar to that in overall earnings (which

[11] For certain outcomes, we avoid specifying equation (1) in logs in order to keep individuals in the sample with a value of zero for the outcome of interest (earnings equal to zero, for example).

includes zero earnings for non-workers) in Figure 1, although the drop is slightly smaller.[12] Panel B reveals no significant child penalty in hourly wages, suggesting that the drop in earnings after a woman's first child is born is due largely to labor supply decisions. The lack of a significant drop in hourly wages after becoming a mother contrasts with the findings in Kleven et. al. (2019) using Danish data, which displayed a relatively small but statistically significant drop in the hourly wage after giving birth.

Panels C through E in Figure 2 demonstrate a sharp child penalty for several dimensions of labor supply decisions – employment status, months worked, and hours worked. As noted above, these outcomes are primarily responsible for the earnings penalty of new mothers, since hourly wages appear to be similar after becoming a mother.

Kleven et. al. (2019) highlighted that having children impacts the job characteristics of women compared to men, leading them to prioritize family-friendly amenities over monetary rewards. Specifically, they found that after the birth of the first child, women fall behind men in occupational rank and in the likelihood of becoming managers. Women also tend to transition to jobs in the public sector and to firms with a higher presence of women with young children in management positions.

We expand on their work by exploring child penalties across additional labor market outcomes for the mother, as well as several characteristics of the firm and industry. These results are presented in Figures 3 and 4. Figure 3 shows that after childbirth, women move to jobs closer to home, reducing their commuting time, while men move to jobs further from home. Relative to men, women also move to firms with lower AKM wage fixed-effects and higher shares of workers that are women and young mothers. Figure 4 shows that women also tend to move to industries in the public sector and with a higher share of women and part-time workers. However, it is important to note that the pre-birth trends are not identical for men and women across all outcomes, particularly for the firm and industry share of workers that are female.

Figure 5 breaks down the results by the education level of the mother. Panel A shows that the child penalty for women without a college degree is significantly larger (both statistically and

[12] The yearly wage variable is the same as yearly earnings after omitting years with no income.

economically) than for women with a college degree. Panels B and C illustrate the child penalty in labor supply outcomes – employment status and hours worked. The drop in employment status after giving birth is much sharper for less-educated women, but both groups display a similar drop in hours worked (although a bit larger for college educated women). These findings suggest that the larger earnings penalty for less-educated women is mostly due to differences on the extensive margin of labor supply (employment status). One interpretation for these patterns could be that low-wage women tend to drop out of the labor force more after giving birth in order to reduce the costs of childcare, while women from a higher socioeconomic background have greater resources to balance the time constraints of a career with motherhood, along with financing the costs of external childcare.

Overall, Figures 1 to 5 show that women from all education groups exhibit severe career interruptions after the birth of their first child in terms of earnings. The sharp and persistent drop in earnings after becoming is mother is due to several factors: a fall in labor supply accompanied by a transition of working women from higher paying jobs to lower paying jobs with shorter commutes, more flexible hours, and more attractive amenities for women and young mothers.

2.3 Family Preferences and Child Penalties

A few recent studies examine how cultural norms regarding gender roles influence the size of the child penalty for new mothers. Two papers exploit variation between East and West Germany, with West Germany displaying larger differences in parental roles for mothers versus fathers. Women raised in East Germany, even those that move to West Germany, tend to exhibit weaker career interuptions after becoming a parent for the first time (Boelmann, Raute, and Schönberg (2021) and Jessen (2022)). For women who move across states in the United States, Kleven (2023) shows that a woman's child penalty is more strongly associated with the child penalty for women in her state of birth compared to her state of residence. Kleven et. al. (2019) show that larger differences in the labor supply of a woman's father compared to her mother (between 1964 and 1979) lead to a larger child penalty after becoming a mother.

These findings suggest that women develop preferences regarding gender roles in parenthood by absorbing what they observe during their childhood. This section builds on this literature by

focusing on a woman's preferences for family size. It is almost a mechanical relationship that having more children will lead to a larger child penalty in earnings and employment, given that most women take maternity leave and often make further labor market adjustments after the birth of each child. Although Kleven et. al. (2019) showed that larger child penalties are associated with having more children, this relationship has not been emphasized and explored in the literature.

This section explores the role of cultural norms during childhood on a women's preferences regarding family size. As shown above, women who grew up in larger families (more siblings) marry men from larger families, and this relationship holds even after controlling for matching based on education, level of religiosity, and ethnicity. This pattern of assortative mating suggests that women develop preferences for larger families during childhood by growing up in larger families. As noted above, the data reveal this to be the case – women who grew up in larger families not only marry men from larger families, but together they create larger families. The goal of this section is to examine how these preferences, largely influenced by the childhood environment, impact the child penalty of career interruptions depicted in the previous section.

2.3.1 Event Study Regression with a Compact Specification

The goal of this section is to examine whether a woman's child penalty in career adjustments after giving birth to her first child interact with the size of her family during childhood (number of siblings). One way to do this is simply to interact a woman's sibling size with the event period dummy variables in equation (1). However, this specification would entail many interaction coefficients that may be cumbersome to interpret. Given that the child penalties in our analysis, and in the literature, tend to be rather permanent and sustained for several periods after the first child is born, we estimate an equation which creates a summary "post birth" dummy variable which captures the long-term child penalty of the outcome variable. This variable is then interacted with a woman's childhood family size (number of her siblings). Specifically, we estimate the following equation:

$$(4)\quad Y_{it} = \beta_0 + \beta_1 Post_{it} + \beta_2 SiblingSize_i + \beta_3 Post_{it} * SiblingSize_i + D_{it}^{Age} + D_{it}^{Year} + \epsilon_{it},$$

where Y_{it} is the outcome of interest of woman i in year t; $Post_{it}$ is a binary variable equal to 1 if woman i in year t already experienced her first birth and 0 otherwise; $SiblingSize_i$ is the number of siblings in woman i's family during childhood (including her); and D_{it}^{Age} and D_{it}^{Year} are sets of fixed effects for age and year. For each woman, the sample includes up to five years before the birth of her first child and ten years afterwards.

The main coefficient of interest is β_3, which represents how the child penalty in outcome Y varies with the woman's sibling size in her childhood home. In a compact way, this coefficient captures the impact of family cultural influences during childhood on the shape of a woman's career trajectory after becoming a mother for the first time.

2.3.2 Estimates of Child Penalties Interacted with a Woman's Sibling Size

Columns 1-3 in Table 5 present the estimates of equation (4) for earnings as the outcome variable, using the administrative panel data. Column 1 includes only the post-birth variable, which shows that a woman's earnings penalty on average stands at 22,225 NIS (New Israeli Shekel). This value represents a 30.0 percent drop relative to the average earnings of working women one year prior to the birth of a first child (74,208 NIS), which is consistent with our findings from Section 2.2.2. Column 2 shows that women who grew up in larger families have lower earnings, but column 3 demonstrates that this pattern is largely due to the adjustment that women from larger families make after giving birth for the first time. The main coefficient of interest in column 3 is negative and significant, indicating that women who grew up in larger families display much larger child penalties in earnings after their first child is born. For example, women without siblings face an average penalty of only 15,288 NIS, while women with three siblings face an average penalty of 23,571 NIS.[13]

Columns 4 to 6 of Table 5 replicate the analysis using log wages as the outcome variable (wages are defined only for workers with positive earnings). The results align with the earnings findings,

[13] Interestingly, the census data shows that the differences in the child penalty in earnings by the number of siblings a woman has are primarily driven by variations in hourly wages, rather than by labor supply factors such as employment status or hours worked (see Appendix Table A.1). This finding is consistent with the results (below) indicating that women with more siblings display stronger tendencies to move to lower-paying, mother-friendly jobs after giving birth for the first time.

indicating a significantly larger penalty for women from larger families. Specifically, a woman who grew up without siblings incurs a 20.3 percent decline in wages after her first birth, compared to a 32.9 decline for a woman with three siblings. These differences are significant in the statistical sense and in magnitude.

As discussed in Section 2.2.2, after giving birth for the first time, women move to more "mother friendly" firms that higher more women, are closer to home, and are more accommodating to part-time work and career interruptions. Table 6 presents the results of Equation (4) for the firm and industry characteristics, and demonstrates that some of these patterns are stronger for women who grew up in larger families. Specifically, a woman's career interruption rises with her sibling size in terms of the AKM firm wage fixed-effect, commuting distance, and the female share in her industry and firm.[14] Since a woman's family size during childhood was determined well before she became a mother, and is highly correlated with the number of children she has as an adult, the patterns in Tables 5 and 6 suggest an important role that preferences about family culture absorbed during childhood play in determining a woman's career adjustments during motherhood. This interpretation is reinforced by the robust pattern across the different labor market outcomes: women with stronger preferences for larger families are earning less and commuting less – but working more at lower-paying, female-friendly firms and industries.

Further support for this interpretation is provided by looking at the sibling size of the husband. As noted above, women who grew up in larger families marry men who grew up in larger families, and this result is robust to controlling for assortative matching on education, religiosity, and ethnicity. Men and women appear to be matching on preferences over family size, and consistent with this hypothesis, women from larger families also have larger families themselves. Table 7 extends the analysis by examining how a woman's child penalties interact with the sibling size of her husband (the father of her first child) instead of her own sibling size.

The results are very similar to those in Tables 5 and 6. Women who marry men from larger families have larger interruptions in terms of earnings and wages, and increasingly work at firms

[14] Note that in other outcomes such as public sector employment and the share of part-time workers in an industry, there is no statistically significant variation based on the number of siblings a woman has (see column 5-6 in Table 6).

with lower AKM wage fixed-effects but are closer to home and employ proportionally more female workers. Interestingly, the main interaction coefficients in Table 7 are similar in magnitude to those in Tables 5 and 6 which used the woman's sibling size instead of the husband's.

Although the characteristics of a husband represent an endogenous choice made by each woman, it is important to note that these choices occur before a woman typically has her first child and makes dynamic decisions about career choices during motherhood. Overall, the results in Table 7 strongly suggest that women raised to have certain preferences regarding family size and culture marry men with similar values, and this has a substantial effect on the woman's child penalty after her first birth and on the number of births after that. That is, to understand the extent and the variation of child penalties among women, the analysis points to a large role for norms about family culture absorbed during childhood.

2.3.3 Estimates of Child Penalties Interacted with Ethnic Origin

To further explore the relationship between a woman's child penalty and the family norms in her childhood, we examine differences in child penalties by continent of origin. We do this by using a model similar to Equation (4), but replacing the $SiblingSize_i$ variable with $Origin_i$, which represents the continent of origin of woman i. Specifically, $Origin_i$ is set to 1 for women of African and Asian descent (Sephardic Jews) and 0 otherwise (capturing mostly Ashkenazi Jews of European or American descent). Sephardic Jews, who originate from more traditional countries, are generally considered more traditional in religious and cultural practices. Thus, our approach closely aligns with the analysis in recent studies exploiting cultural differences across states in the US or between East and West Germany (Boelmann, Raute, and Schonberg (2021), Jessen (2022), and Kleven (2023)).

The results, presented in Table 8, are consistent with these previous studies. The child penalty, both in terms of earnings and wages, is nearly twice as large for Sephardic women compared to Ashkenazi women. Once again, these disparities are largely driven by differences in hourly wages (see Appendix Table A.2). Moreover, Appendix Table A.3 shows that the child penalty in terms of the AKM firm wage fixed-effect is relatively large for Sephardic women, in contrast to Ashkenazi women who display no child penalty in firm-level wages. Additionally, the tendency

of working women to move to industries with a higher share of part-time workers is considerably more pronounced for Sephardic women.[15] These findings lend further support to the idea that childhood family preferences and norms significantly impact a woman's career decisions later in life after becoming a mother for the first time.

3 The Mother's Child Penalty and Child Outcomes

The previous section established the important role that preferences absorbed during childhood play in determining a woman's choice of husband, number of children they have together, and the extent of a woman's career interruption during motherhood. The strong correlation between child quantity and child penalties is well established, but little is known about the relationship between child penalties and child quality. To the best of our knowledge, this is the first study to directly examine this relationship. To do this, we link the child penalty in earnings for each woman with the high school achievements of her children.

3.1 Data

3.1.1 Estimating the Individual-Level Child Penalty in Earnings

The analysis in the previous section estimated the magnitude of child penalties in the aggregate, and how they systematically vary by the woman's sibling size or ethnic origin. This section examines the link between a specific woman's child penalty with the outcomes of her children. Therefore, we need to estimate the child penalty at the individual level for each mother.

To do this, we focus on women who had their first child between 1990 and 2005, ensuring we have earnings data for five years before their first birth and a sufficient number of years afterwards.[16] We exclude women without children and those who had their first child before age 22 or after age

[15] However, Appendix Table A.3 shows that for other outcomes, such as commuting distance, the proportion of female workers in firms and industries, and employment in the public sector, we observe no significant differences in child penalty patterns between Sephardic and Ashkenazi women.
[16] Note that in all analyses we control for the fixed-effect for the year of the mother's first birth.

45.[17] We exclude women whose earnings in the year before their first birth were less than 15 percent of the median income for that year (this also excludes those who did not work at all in that year).

To calculate the child penalty for each woman, we implement a strategy similar to Kleven et. al. (2019), but with modifications needed to estimate the child penalty at the individual level. Specifically, we run the following regression:

$$(5) \quad earnings_{it} = \beta_0 + \beta_1 age_{it} + \beta_1 age_{it}^2 + \delta_t + \gamma_i + \alpha_i * D_i * Post_{it} + u_{it},$$

where $earnings_{it}$ represents the earnings of woman i in year t; age_{it} and age_{it}^2 are age and age-squared of woman i in year t; δ_t denotes year fixed effects; γ_i denotes individual fixed effects; D_i are dummy variables for each woman *i*; and $Post_{it}$ is a binary variable equal to 1 if year t is after the first birth of woman i, and 0 otherwise. We then retain the coefficients of the interaction $D_i * Post_{it}$, denoted by α_i.

Similar to section 2.2, we specify the equation in levels rather than logs in order to include observations for each person in periods when their earnings equal zero due to non-employment. The child penalty for each woman *i* is estimated as:

$$(6) \quad P_i \equiv \frac{-\alpha_i}{E_{t=0-9}[\widehat{earnings}_{it}] - \alpha_i},$$

where $\widehat{earnings}_{it}$ denotes the predicted earnings from Equation (5) and $E_{t=0-9}[\widehat{earnings}_{it}]$ is the average predicted earnings for woman i in the ten years after her first birth. Thus, $E_{t=0-9}[\widehat{earnings}_{it}] - \alpha_i$ represents the counterfactual predicted income of woman i if she did not have children. We multiply α_i by -1 so that a higher P_i represents a larger child penalty for woman *i*. This strategy yields a mean child penalty in earnings of 0.23 (which is comparable to the aggregate child penalty found in Section 2.2.2) and standard deviation of 0.44 (see Table 9).

[17] As noted previously, the earnings variable represents income from employment and self-employment for years with registered income, and is equal to zero for years without registered income.

3.1.2 Child-Level Data Linked with Mothers

To examine the relationship between a mother's child penalty and the academic achievements of her children in high school, we construct an administrative cross-sectional dataset at the child-level (using information from the Ministry of Education as described in Section 2.1). This sample is restricted to the non-ultra-Orthodox Jewish population, and includes only *first-born* children who were born between 1990 and 1999 (269,408 children).[18] The focus on first-born children is designed to abstract from confounding issues related to birth-order effects, although similar findings are found for all children.

The data contains information on the high school achievements of each child. In particular, we focus on the child's performance on the matriculation exams taken during high school – the overall grade, the grade on the math component, and whether the student passed or failed. The matriculation exams are a set of national standardized tests that high school students take at the end of their secondary education. These exams are a critical part of the Israeli education system and play a significant role in determining a student's eligibility for enrolling in higher education. The sample of children is matched to information on his/her parents using administrative sources, including parental educational attainment, birth year of their first child, sibling size, income, and the mother's estimated child penalty (described in Section 3.1.1).

Descriptive statistics for the sample, which includes 120,151 children, are presented in Table 9. The table indicates that 85 percent of the children passed their matriculation exams, with an average score of 93. Approximately half of the children achieved a score above 90, while 25 percent scored higher than 100. The average grade on the math component is 88.

[18] We exclude cohorts prior to 1990 due to limitations in the data on parental income needed to estimate the mother's child penalty, and child cohorts born after 1999 since they will not be old enough in our data to see information on their high school outcomes.

3.2 The Effect of the Child Penalty on Child Outcomes

This section explores the empirical relationship between a mother's child penalty and her child's performance on the matriculation exams in high school. This connection is estimated with the following model:

$$(7) \quad Y_i = \beta_0 + \beta_1 P_i + \beta_2 X_i + \epsilon_i,$$

where Y_i is a matriculation outcome of a first child i; P_i is the earnings penalty of child i's mother (described in Section 3.1.1); and X_i is a vector of fixed effects including child i's birth year, sex, number of siblings, father's continent of origin, and the highest education degree of each parent.

As shown in Panel A of Table 10, a higher child penalty for a woman is associated with lower matriculation scores for her first child. Specifically, an increase of 0.46 in the mother's child penalty (which is equivalent to twice the average penalty and also approximately one standard deviation) is associated with a 1.7 percentage point decrease in the probability of her child passing the matriculation exams; a 0.18 point decrease in the overall matriculation score; a 1.4 percentage point decrease in the likelihood of scoring above 90; a 0.06 percentage point decrease in the likelihood of scoring above 100; and a 1.3 point decrease in the score on the math component. These findings indicate that a larger career interruption for a mother decreases child performance on the matriculation exams, but the sizes of these effects are quite small. The exercise described above uses a change in the child penalty which is double the average child penalty, and this dramatic change reduces the overall score on the matriculation exams by 0.18 compared to a mean score of 93 and a standard deviation of 10.9. The estimated effects are negative, but the magnitudes are essentially close to zero.

It is important to note that the specification in equation (7) is estimating a reduced form effect of the mother's child penalty on child outcomes. A larger child penalty for a mother, almost by definition, entails a drop in parental income which is likely to reduce child academic performance. At the same time, it is possible that a larger child penalty represents more time interaction between a mother and child, and perhaps a shift in household consumption patterns towards children (both quantity and quality), which could benefit children.

To separate these mechanisms, the average incomes of the child's mother and father in the ten years post-birth are added to the specification in Panel B of Table 10. As expected, the loss of parental income due to a higher child earnings penalty for the mother has a significant, negative impact on her child's outcomes. However, conditional on the income of each parent, the coefficient on the mother's child penalty is positive and significant. Specifically, an increase of 0.46 in the mother's child penalty is now associated with a 1.1 percentage point increase in the probability of her child passing the matriculation exams; a 0.7 point increase in their matriculation score; a 2.7 percentage point increase in the likelihood of scoring above 90; and a 1.0 point increase in the math score. Another notable finding is that while the incomes of both parents are positively associated with their child's educational achievements, the association with maternal income is significantly stronger.

The results from Panels A and B of Table 10 provide evidence for the idea that a mother's career interruption affects child outcomes through two main channels. The "income channel" negatively affects children's educational achievements, due to lower parental income and household financial resources for raising children. At the same time, there appears to be a positive "investment channel" whereby a larger child penalty benefits children through larger investments in parental time and perhaps other non-monetary activities and decisions. According to the results in Table 10, neither of these mechanisms are empirically very large. However, they work in opposite directions and essentially cancel each other out in the aggregate, leading to a negative but very small overall effect on children's outcomes.

To examine if there is heterogeneity in our findings, Appendix Tables A.4 and A.5 present the results separately for children with a college educated mother and for children with a less-educated mother. These tables show that the estimated effect of a mother's child penalty on her child's high school achievements (both the negative association before controlling for the income channel and the positive association after controlling for it) is considerably stronger for children with a non-college educated mother. This finding suggests that both the income and investment channels are more pronounced among children with a less-educated mother. Subsequently, Appendix Tables A.6 and A.7 show that the negative effect before controlling for parental income is similar for both girls and boys. However, after controlling for parental income, the positive effect is somewhat

larger for girls, suggesting that both the income and investment channels are more pronounced for girls.

Next, we explore the heterogeneity of the effects across families with different ethnic and religious backgrounds. Families that are more religious and/or have roots in Asia-Africa countries (i.e. Sephardic Jews) tend to have larger families and exhibit more traditional patterns of family life. Tables A.8 and A.9 compare secular and religious children. Before controlling for parental post-birth income, the negative effect of the mother's child penalty on matriculation achievements is slightly larger for secular children. However, after controlling for parental income, the positive effect is substantially greater for secular children. This suggests that the investment channel is stronger for secular children, as is the loss in parental income due to maternal career interruptions. Tables A.10 and A.11 compare the results across the two main ethnic groups: those of European and American descent (Ashkenazi Jews) with those of African and Asian descent (Sephardic Jews). The results suggest that both "income channel" and "investment channel" are slightly more pronounced for Sephardic children.

To test the sensitivity of the results, we examine whether the main findings are robust to adding controls for parental incomes before the first child is born, and also to including all children in the sample, rather than just the first-born. Appendix Table A.12 presents our main specification, but with Panel B now controlling for the income of the parents from five years before to ten years after the first birth, rather than only post-birth income. The results remain consistent with those obtained when controlling only for post-birth income, which alleviates concerns that the positive estimate on the child penalty, once controlling for post-birth income, merely reflects the positive influence of a mother's pre-motherhood income. Additionally, Appendix Table A.13 shows that the results are similar when including all children in the analysis, not just the first-born.

Overall, the results in this section show that a larger career interruption for a mother has little impact on the human capital of her children by the end of high school due to two offsetting mechanisms. These findings have important implications regarding the issue of whether there is a "quantity-quality tradeoff" in Israel.[19] A higher child penalty experienced by women is almost mechanically linked to the number of children they have, as mothers typically take maternity leave,

[19] Guo, Yi, & Zhang (2022) present a recent review of the child quality-quantity tradeoff literature.

and may also take additional time off, after the birth of each child.[20] Given that a larger child penalty is associated with having more children, but with limited impact on child outcomes, these results imply that there is little, if any, evidence in favor of a "quantity-quality tradeoff." Further evidence for this interpretation is found in Table 12, which shows that the estimates in Table 10 are not affected when excluding the control for the child's number of siblings, and by Table 13 which shows that there is actually a positive relationship between number of siblings and the matriculation scores of the first child.

Thus, the analysis presents little evidence to suggest an inverse relationship between child quantity and quality, which is consistent with the findings in Angrist, Lavy, and Schlosser (2010). The "quantity-quality" literature is typically concerned with the growth and development of less-developed countries, and therefore, perhaps not particularly relevant for Israel in recent decades. However, the findings in this section suggest why a quantity-quality tradeoff in children may be less relevant for developed countries. In a modern economy, families that want more children can do so with a larger career interruption by the mother, but the larger child penalty in earnings yields almost no overall impact on the human capital of children due to the offsetting mechanisms described above. In this manner, a family can increase child quantity without a meaningful reduction in child quality.

4 Conclusion

This paper analyzes the career interruptions of women after becoming mothers using detailed information from linked administrative records about individuals from population records, tax authorities, educational institutions, firms, and census surveys. The analysis shows that Israeli women display the typical "child penalty" after becoming a mother for the first time in earnings and employment, as seen in other developed countries. In addition, we leverage the extensive detail in our data sources to reveal that women who stay in the workforce after the birth of their first child increasingly tradeoff working at higher-paying firms to work at firms and industries that

[20] Table 11 presents descriptive regressions supporting this notion, showing a significant association between a woman's child penalty and her number of children.

pay lower wages, are closer to home, and are more attractive to women, part-time workers, and new mothers.

The analysis shows that the career interruption due to motherhood is heavily influenced by the childhood environment in which a woman was raised. In particular, a woman's career choices after giving birth are very strongly influenced by the number of siblings she grew up with, and also by the ethnic and cultural origins of her parents.

Therefore, to understand the extent and nature of the career adjustments that women make in the aftermath of becoming a mother for the first time, this paper shows that a large part of this decision process is due to preferences regarding family size and family culture absorbed during childhood. Women who grew up in larger families marry men from larger families, and together they create large families. A larger number of children, in turn, is associated with a larger career interruption by the new mother. In this manner, a woman's behavior after becoming a mother is heavily influenced by factors determined many years before she actually becomes a mother.

However, a mother's child penalty in earnings produces two opposing effects on the human capital development of her children. A larger child penalty in earnings, almost by definition, leads to lower family income and financial resources, which has a detrimental effect on the high school outcomes of children. However, a larger career interruption by the mother may be associated with more parental time with children, and perhaps a shift in other family resources towards child development. For example, families with more children may locate to areas closer to good schools, but further away from high wage job opportunities for working mothers. More parental time and a shift of family resources towards child investments could benefit the high school performance of children.

The analysis reveals evidence for both of these opposing effects. After controlling for the positive effect of parental income on child academic outcomes, a mother's child penalty in earnings has a positive effect on her children's human capital. In practice, the two mechanisms essentially offset each other, producing a negative reduced-form effect of the mother's child earnings penalty on the high school outcomes of children (not controlling for parental income), but with a magnitude close

to zero. To our knowledge, this is the first paper analyzing the effect of child penalties on the academic outcomes of children.

These findings have implications regarding attempts to reduce child penalties for mothers through public policies regarding family leave, workplace flexibility, and other accommodations to balance work with parental responsibilities. In addition, the analysis helps understand why the quantity-quantity tradeoff in children may be very relevant for developing countries, but with little supporting evidence in developed countries like Israel (Angrist, Lavy, and Schlosser (2010)). In a developing country, a family may be faced with hard constraints and tradeoffs between investing in child quantity versus the education of their children. However, in developed countries, a family may not face such binding constraints and tradeoffs, since education is provided publicly. Also, as this study shows, families may be able to increase their quantity of children with a larger child penalty by the mother (or father), but the larger child penalty has offsetting effects on the human capital development of the children. Since these two opposing mechanisms largely cancel each other out, this creates an opportunity to have more children without a reduction in their human capital development.

Bibliography

Abowd, J. M., Kramarz, F., and Margolis, D. N. (1999). High wage workers and high wage firms. *Econometrica 67.2*, 251-333.

Andresen, M. E., and Nix, E. (2022). What causes the child penalty? Evidence from adopting and same-sex couples. *Journal of Labor Economics 40(4)*, 971-1004.

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., Lavy, V., and Schlosser, A. (2010). Multiple experiments for the causal link between the quantity and quality of children. *Journal of Labor Economics 28, no. 4*, 773-824.

Baertsch, Laurenz and Sandner, Malte. (2024). Reducing the Child Penalty by Incentivizing Maternal Part-Time Work?, IZA Discussion Paper No. 17109.

Becker, Gary S., Kevin M. Murphy, and Robert Tamura. (1990). "Human capital, fertility, and economic growth," *Journal of Political Economy*, 98(5 part 2), S12–37.

Boelmann, Barbara, Raute, Anna, and Schönberg, Uta. (2021). Wind of change? Cultural determinants of maternal labor supply. CEPR Discussion Paper No. 16149.

Boinet, Césarine, Jonathan Norris, and Agnese Romiti. The Motherhood Penalty: Gender Norms, Occupational Sorting, and Labor Supply. No. 17334. Institute of Labor Economics (IZA), 2024.

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

Fernández, R. (2011). Does culture matter? *Handbook of Social Economics 1*, 481-510.

Fitzenberger, Bernd, Katrin Sommerfeld, and Susanne Steffes. 2013. "Causal Effects on Employment After First Birth—A Dynamic Treatment Approach." *Labour Economics* 25: 49–62.

Goldin, C. (2014). A Grand Gender Convergence: Its Last Chapter. *American Economic Review 104.4*, 1091-1119.

Goldin, C., and Katz, L. F. (2016). A most egalitarian profession: pharmacy and the evolution of a family-friendly occupation. *Journal of Labor Economics 34.3*, 705-746.

Gould, Eric D., Avi Simhon, and Bruce A. Weinberg. 2020. "Does parental quality matter? Evidence on the transmission of human capital using variation in parental influence from death, divorce, and family size", *Journal of Labor Economics* 38 (2), 569-610.

Guo, R., Yi, J., and Zhang, J. (2022). The Child Quantity–Quality Trade-off. *Handbook of Labor, Human Resources and Population Economics*, 1-23.

Hotz, V. Joseph, Per Johansson, and Arizo Karimi. 2018. "Parenthood, Family Friendly Workplaces, and the Gender Gaps in Early Work Careers." NBER Working Paper 24173.

Jessen, Jonas. (2022). Culture, children and couple gender inequality, European Economic Review, Volume 150, 2022, Article 104310.

Kleven, H. J. (2023). The geography of child penalties and gender norms: A pseudo-event study approach. *National Bureau of Economic Research*.

Kleven, Henrik, Camille Landais, and Jakob Egholt Søgaard. (2019). Children and gender inequality: Evidence from Denmark. *American Economic Journal: Applied Economics*, 11 (4), 181-209.

Kleven, Henrik, Camille Landais, and Jakob Egholt Søgaard. (2021). Does biology drive child penalties? Evidence from biological and adoptive families. *American Economic Review: Insights*, 3 (2):183–98.

Kleven, Henrik, Giulia Olivero, and Eleonora Patacchini. Child Penalties and Parental Role Models: Classroom Exposure Effects. No. w33002. National Bureau of Economic Research, 2024.

Kleven, H., Landais, C., Posch, J., Steinhauer, A., and Zweimüller, J. (2019). Child penalties across countries: Evidence and explanations. *AEA Papers and Proceedings, vol. 109*, 122-126.

Manning, A., and Petrongolo, B. (2008). The part-time pay penalty for women in Britain. *The Economic Journal 118.526*, F28-F51.

Moav, Omer. 2005. "Cheap Children and the Persistence of Poverty," *The Economic Journal*, 115: 88-110

Pertold-Gebicka, Barbara, Filip Pertold, and Nabanita Datta Gupta. 2016. "Employment Adjustments around Childbirth." IZA Discussion Paper 9685.

Figure 1—Impact of Children on Women's Earnings

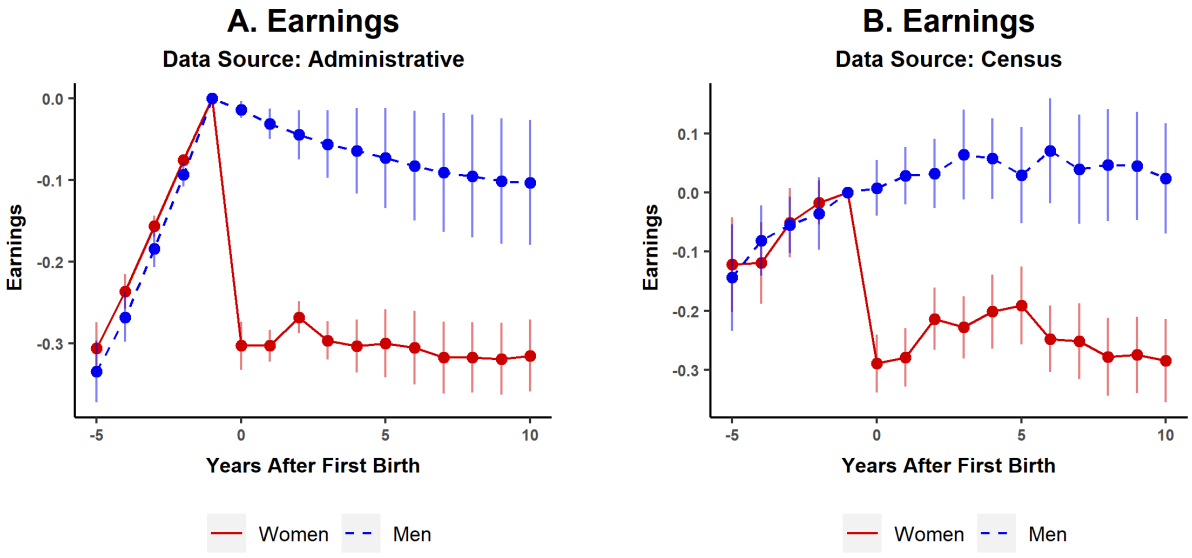

Figure 2—Impact of Children on Components of Earnings

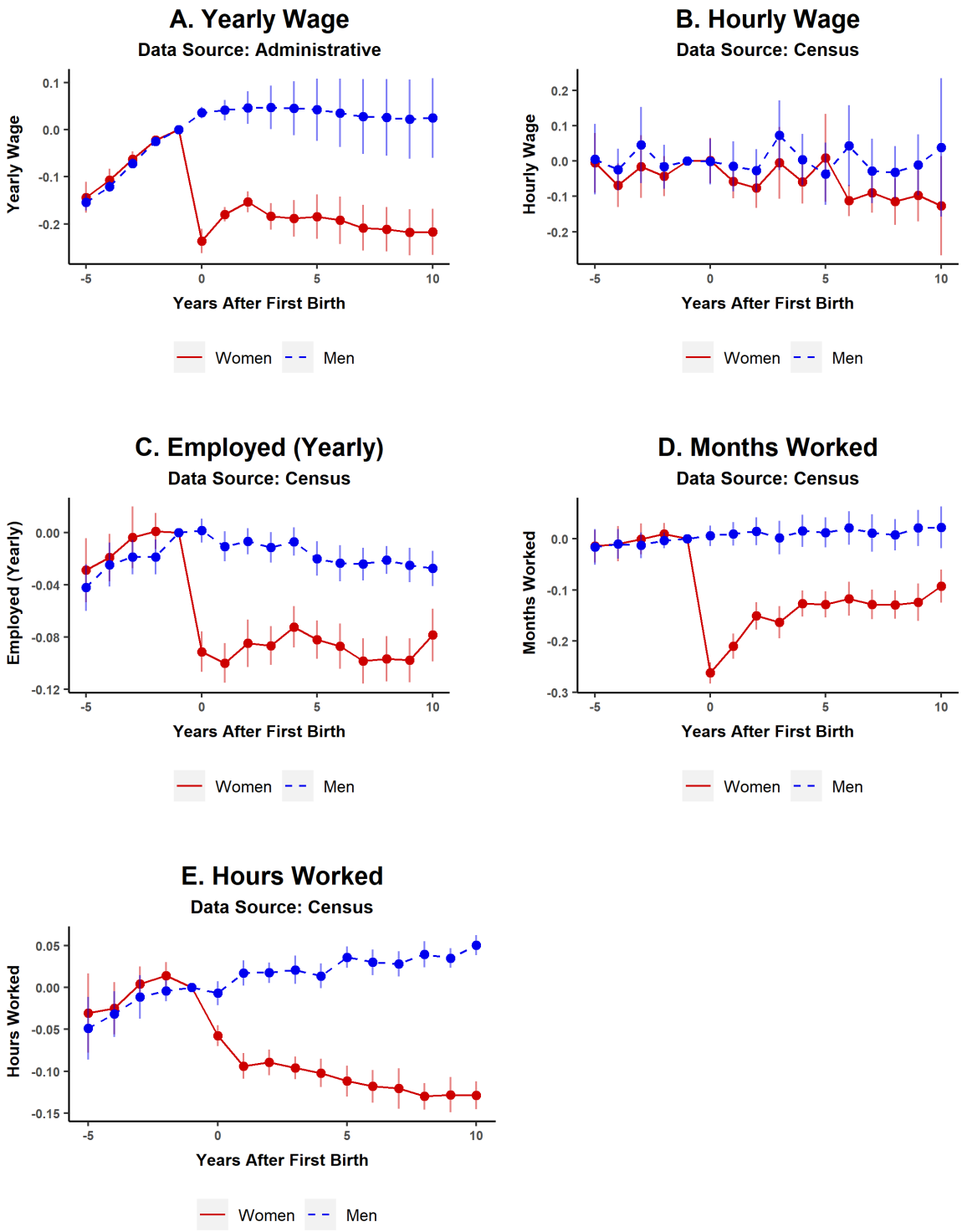

Figure 3—Impact of Children on Firm Characteristics

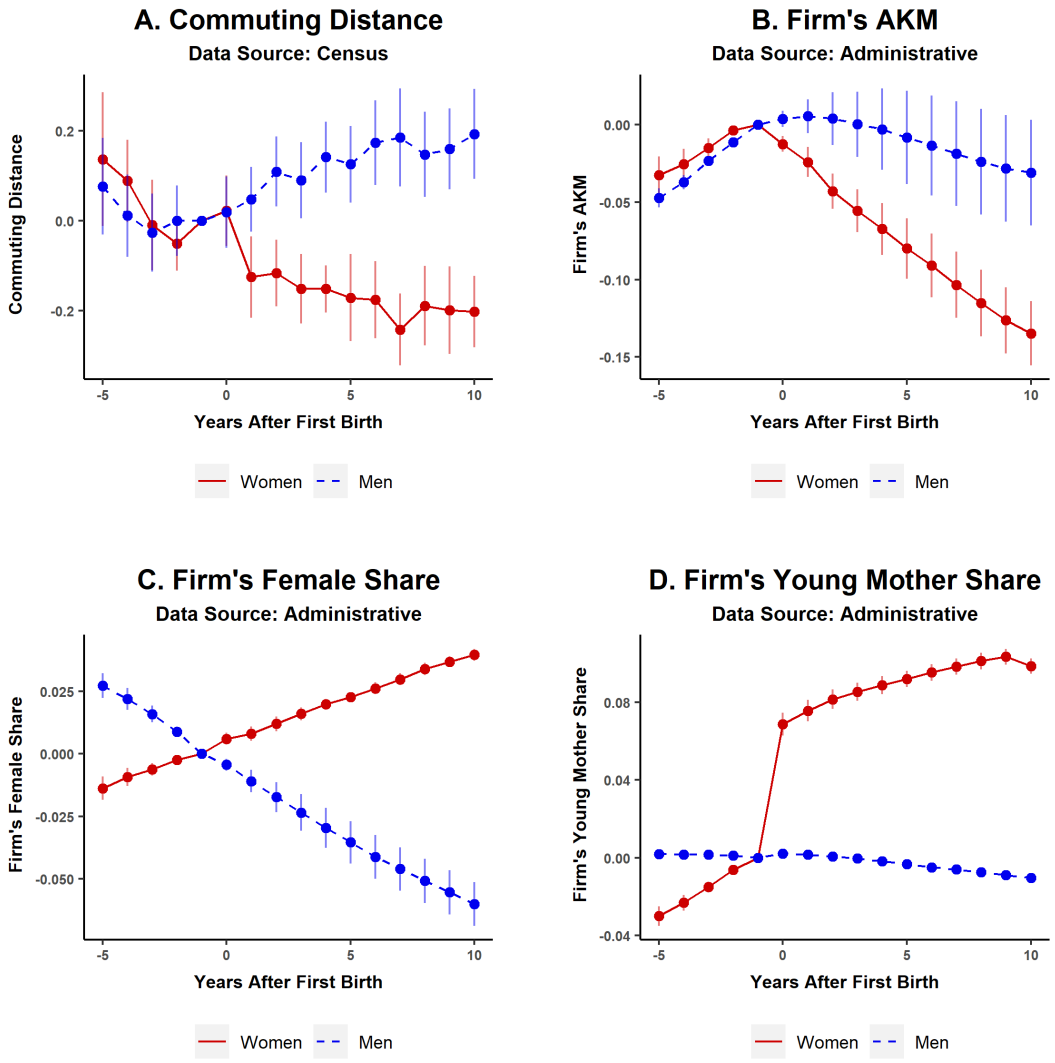

Figure 4—Impact of Children on Industry Characteristics

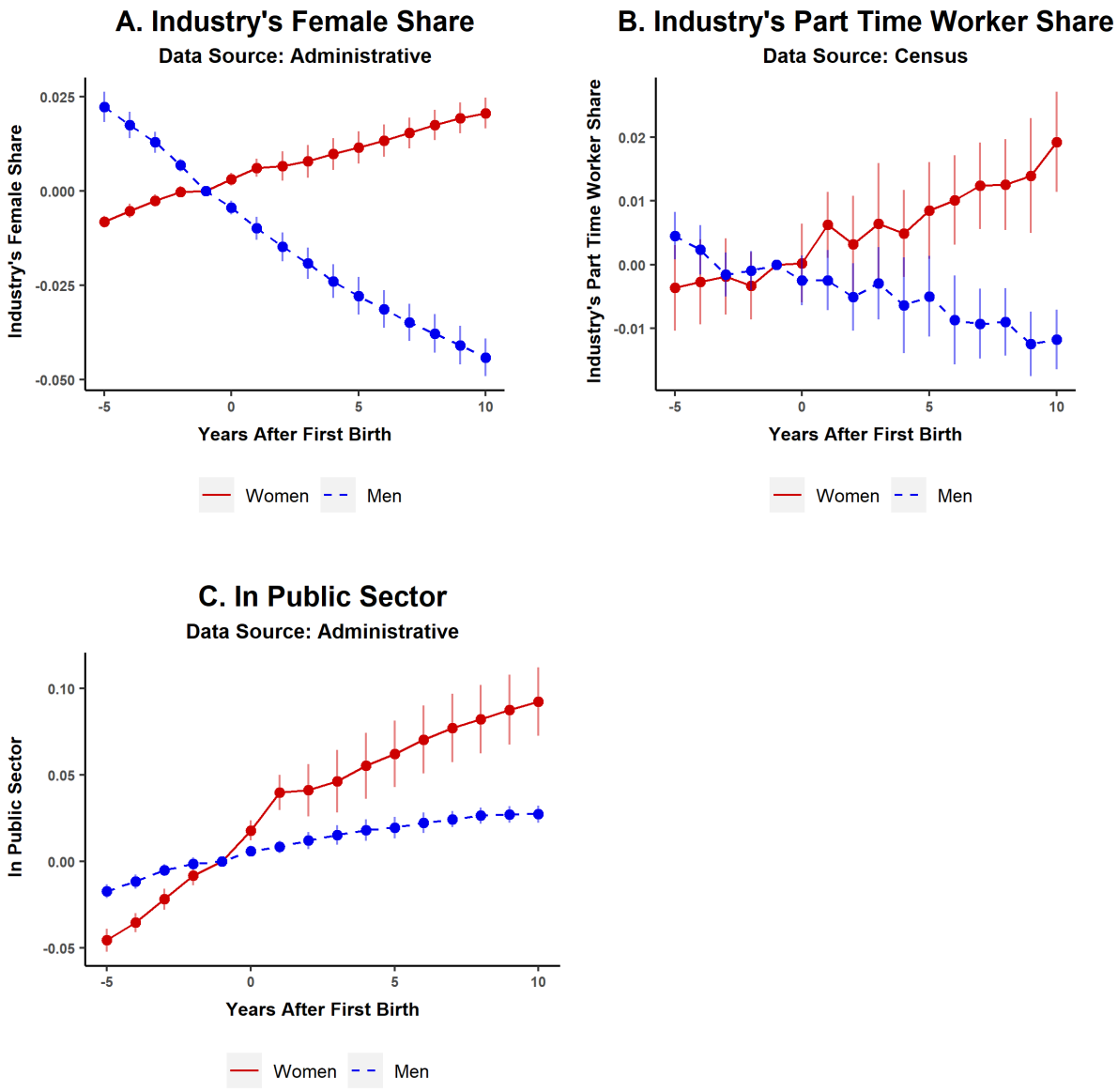

Figure 5—Women's Child Penalty by Education Level

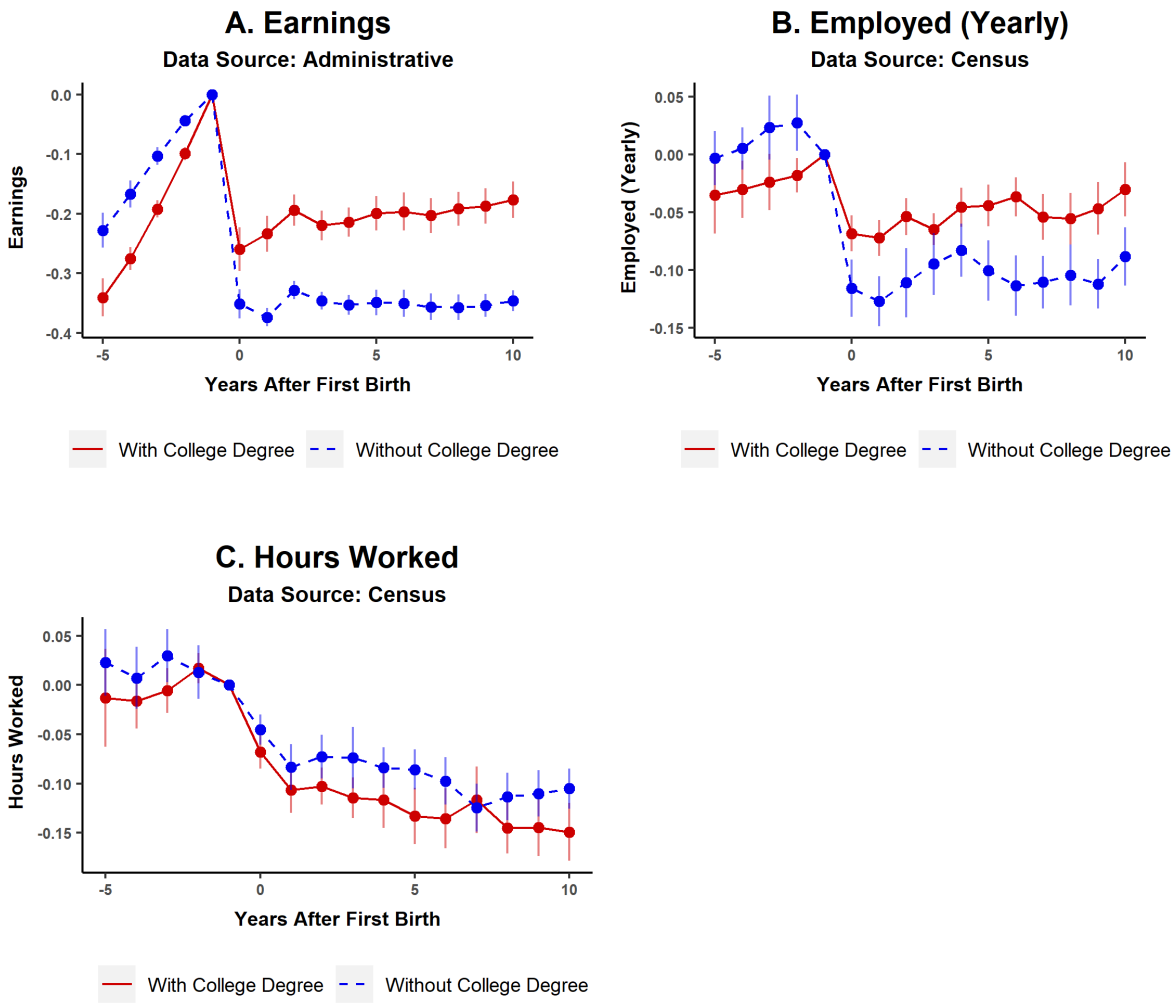

Table 1—Descriptive Statistics (Administrative Panel Data)

	(1)	(2)	(3)
	Mean	Median	SD
		A. Women	
Yearly Earnings (NIS)	69,665	54,610	98,067
Yearly Wage (NIS)	81,124	64,443	101,338
Firm AKM	0.01	0.00	0.39
Firm Share - Female	0.62	0.65	0.24
Firm Share - Young Mothers	0.25	0.22	0.17
Industry Share - Female	0.55	0.57	0.17
Works in the Public Sector	0.32	0.00	0.47
Age at First Birth	27.9	27.0	4.0
Has a College Degree	0.48	0.00	0.50
Individuals		265,093	
Observations (Individual by Year)		4,241,488	
		B. Men	
Yearly Earnings (NIS)	132,554	99,852	198,671
Yearly Wage (NIS)	150,279	113,472	205,145
Firm AKM	0.162	0.17	0.454
Firm Share - Female	0.33	0.29	0.23
Firm Share - Young Mothers	0.12	0.10	0.11
Industry Share - Female	0.42	0.39	0.18
Works in the Public Sector	0.18	0.0	0.39
Age at First Birth	29.8	29.0	4.1
Has a College Degree	0.37	0.0	0.48
Individuals		272,089	
Observations (Individual by Year)		4,353,424	

Notes : Sample includes non-ultra-orthodox Jewish individuals from the administrative data who who had their first child between ages 22 and 45 and between the years 1990 and 2005 (see Section 2.1 for more information).

Table 2—Descriptive Statistics (Census Cross-Sectional Data)

	(1)	(2)	(3)
	Mean	Median	SD
		A. Women	
Yearly Earnings (NIS)	67,276	51,108	73,040
Yearly Wage (NIS)	73,329	56,095	73,287
Hourly Wage (NIS)	53.4	40.1	88.99
Month Worked	8.6	11.0	4.425
Employed (Yearly)	0.85	1.00	0.359
Hours Worked (Weekly)	37.1	40.0	11.738
Commuting Distance (KM)	13.7	7.2	21.92
Industry Share - Part-Time Workers	0.18	0.13	0.107
Age at First Birth	28.7	28.0	4.186
Has an Academic Degree	0.55	1.00	0.498
Observations (Individual by Year)		58,713	
		B. Men	
Yearly Earnings (NIS)	132,254	96,745	132,923
Yearly Wage (NIS)	138,076	101,400	132,825
Hourly Wage (NIS)	73.3	51.3	141.0
Month Worked	9.4	12.0	4.3
Employed (Yearly)	0.90	1.00	0.30
Hours Worked (Weekly)	47.7	48.0	12.2
Commuting Distance (KM)	18.5	10.1	25.5
Industry Share - Part-Time Workers	0.13	0.13	0.08
Age at First Birth	30.6	30.0	4.2
Has an Academic Degree	0.42	0.00	0.49
Observations (Individual by Year)		56,303	

Notes : Sample includes non-ultra-orthodox Jewish individuals from the 2008 Census who who had their first child between ages 22 and 45 and between the years 2003 and 2018 (see Section 2.1 for more information).

Table 3—Mother's Sibling Size and Fertility

	(1)	(2)	(3)	(4)	(5)
	Mother's Number of Children				
Mother's Sibling Size	0.096***	0.099***	0.111***	0.104***	0.060***
	(0.008)	(0.008)	(0.007)	(0.006)	(0.004)
Earnings (before + after)				-0.006***	-0.003***
				(0.001)	(0.001)
Mother's Birth Year	Yes	Yes	Yes	Yes	Yes
Birth Year of First Child	Yes	Yes	Yes	Yes	Yes
Mother is Asia-Africa Origin		Yes	Yes	Yes	Yes
Mother's highest degree			Yes	Yes	Yes
Mother is religious					Yes
Observations	265,093	256,133	251,596	201,886	200,105

Notes: Each column represents a separate OLS regression with the mother's number of children as the dependent variable. Standard errors are in parentheses. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes women from the administrative dataset (see Panel A of Table 1 for descriptive statistics).

Table 4—Assortative Mating in Sibling Size

	(1)	(2)	(3)	(4)	(5)
	Wife's Sibling Size				
Husband's Sibling Size	0.247*** (0.004)	0.236*** (0.005)	0.197*** (0.004)	0.137*** (0.004)	0.094*** (0.003)
Wife's Birth Year	Yes	Yes	Yes	Yes	Yes
Birth Year of First Child		Yes	Yes	Yes	Yes
Wife's Degree			Yes	Yes	Yes
Husband's Degree			Yes	Yes	Yes
Wife's Origin				Yes	Yes
Husband's Origin				Yes	Yes
Wife Religious					Yes
Husband Religious					Yes
Observations	256,247	256,247	250,843	248,183	245,360

Notes: Each column represents a separate OLS regression with the wife's number of siblings as the dependent variable. Standard errors are in parentheses. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes women from the administrative dataset (see Panel A of Table 1 for descriptive statistics).

Table 5—Mother's Earnings and Wage Penalties by Sibling Size

	(1)	(2)	(3)	(4)	(5)	(6)
	Mother's Earnings (NIS)			Mother's Log Wage		
Post First Birth	-22,225***	-22,449***	-12,527***	-0.309***	-0.312***	-0.161***
	(1,641)	(1,781)	(2,571)	(0.009)	(0.009)	(0.026)
Mother's Sibling Size		-2,529***	-626**		-0.029***	-0.001
		(358)	(275)		(0.005)	(0.005)
Post First Birth * Mother's Sibling Size			-2,761***			-0.042***
			(372)			(0.005)
Age	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,241,488	3,940,272	3,940,272	4,241,488	3,940,272	3,940,272

Notes: Each column represents a separate OLS regression with the dependent variable for the mother indicated at the top (mother's earnings or log wage). Standard errors are in parentheses. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes women from the administrative dataset (see Panel A of Table 1 for descriptive statistics).

Table 6—Mother's Child Penalties by Sibling Size (Firm and Industry Characteristics)

	(1)	(2)	(3)	(4)	(5)	(6)
	Firm AKM	Commuting Distance	Firm Share Female	Industry Share Female	Industry Part-Time Workers Share	Public Sector
Post First Birth	0.004	0.578	0.016***	0.005*	0.006*	0.050***
	(0.008)	(0.693)	(0.002)	(0.003)	(0.003)	(0.008)
Mother's Sibling Size	-0.005***	0.732***	0.001***	0.001	0.004***	0.004***
	(0.001)	(0.159)	(0.000)	(0.000)	(0.001)	(0.001)
Post First Birth * Mother's Sibling Size	-0.010***	-0.838***	0.001*	0.001**	0.000	0.002
	(0.001)	(0.179)	(0.000)	(0.000)	(0.001)	(0.001)
Age	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	No	Yes	Yes	No	Yes
Observations	3,275,355	45,877	3,278,350	3,049,126	47,402	2,846,161

Notes : Each column represents a separate OLS regression with the dependent variable for the mother's outcome indicated at the top. Standard errors are in parentheses. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample for columns (1), (3), (4), and (6) includes women from the administrative dataset (see Panel A of Table 1 for descriptive statistics); the sample for columns (2) and (5) includes women from the Census dataset (see Panel A of Table 2 for descriptive statistics).

Table 7—Mother's Child Penalty by Husband's Sibling Size

	(1)	(2)	(3)	(4)	(5)	(6)
	Earnings	Log Wage	Firm AKM	Commuting Distance	Firm Share Female	Industry Share Female
Post First Birth	-11,829***	-0.163***	0.006	-0.255	0.014***	0.005***
	(2,514)	(0.024)	(0.008)	(0.715)	(0.001)	(0.002)
Husband's Sibling Size	-762***	-0.006	-0.004***	0.351*	0.001***	0.000
	(255)	(0.004)	(0.001)	(0.174)	(0.000)	(0.000)
Post First Birth * Husband's Sibling Size	-2,589***	-0.038***	-0.010***	-0.557***	0.001***	0.001***
	(372)	(0.004)	(0.001)	(0.182)	(0.000)	(0.000)
Age	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	No	Yes	Yes
Observations	3,780,640	3,275,286	3,143,690	44,177	3,146,583	2,927,351

Notes : Each column represents a separate OLS regression with the dependent variable for the mother's outcome indicated at the top. Standard errors are in parentheses. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample for columns (1), (2), (3), (5), and (6) includes women from the administrative dataset (see Panel A of Table 1 for descriptive statistics); the sample for column (4) include women from the Census dataset (see Panel A of Table 2 for descriptive statistics).

Table 8—Mother's Earnings and Wage Penalties by Origin

	(1)	(2)	(3)	(4)	(5)	(6)
	Mother's Earnings (NIS)			Mother's Log Wage		
Post First Birth	-22,225***	-22,659***	-16,488***	-0.309***	-0.316***	-0.208***
	(1,641)	(1,758)	(2,384)	(0.009)	(0.008)	(0.023)
Asia-Africa		-8,769***	-551		-0.068***	0.074**
		(1,445)	(1,287)		(0.023)	(0.030)
Post First Birth * Asia-Africa			-11,925***			-0.207***
			(1,445)			(0.029)
Age	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,241,488	3,896,448	3,896,448	3,642,363	3,377,454	3,377,454

Notes: Each column represents a separate OLS regression with the dependent variable for the mother's outcome indicated at the top (earnings or log wage). Standard errors are in parentheses. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes women from the administrative dataset (see Panel A of Table 1 for descriptive statistics).

Table 9—Descriptive Statistics (First-born Children Sample)

	(1)	(2)	(3)
	Mean	Median	SD
Birth Year	1995	1995	2.8
Mother's Birth Year	1968	1968	4.7
Mother's Earning Penalty	0.23	0.26	0.44
High School Graduate Year	2013	2013	2.9
Matriculation Exam Passed	0.85	1.00	0.36
Matriculation Grade (avg.)	93.0	94.0	10.9
Matriculation grade > 90	0.51	1.00	0.50
Matriculation grade > 100	0.25	0.00	0.43
Matriculation Math Grade (avg.)	88.1	91.5	24.2
Sibling Size	2.8	3.0	1.1
Mother's Highest Diploma	4.3	5.0	1.7
Father's Highest Diploma	4.6	5.0	1.7
School Quality	-4.31	-4.17	1.88
Observations		120,151	

Notes : The sample includes firstborn children who where born between 1990 and 1999 with non-missing values in the main variables (see Section 3.1.2 for more details). Highest diploma categories are: 1 - advanced degree; 2 - master's degree; 3 - bachelor's degree; 4 - post-secondery non-academic degree; 5 high school diploma with a matriculation certificate; 6 - high school diploma without a matriculation certificate; 7 - eight-year middle; 8 - less than eight years of school.

Table 10—Mother's Earning Penalty and Child Matriculation Outcomes (First-Born Children)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earning Penalty	-0.037***	-0.382***	-0.031***	-0.012***	-2.824***
	(0.002)	(0.076)	(0.003)	(0.003)	(0.163)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	120,151	100,136	118,310	118,310	119,953
	B. Controlling for Parental Income				
Mother Earning Penalty	0.023***	1.501***	0.059***	0.050***	2.226***
	(0.004)	(0.123)	(0.005)	(0.005)	(0.259)
log(Mother's Post-Birth Earnings + 1)	0.036***	1.167***	0.053***	0.037***	3.002***
	(0.002)	(0.065)	(0.003)	(0.002)	(0.139)
log(Father's Post-Birth Earnings + 1)	0.010***	0.307***	0.015***	0.010***	0.916***
	(0.001)	(0.026)	(0.001)	(0.001)	(0.058)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	120,151	100,136	118,310	118,310	119,953

Notes : Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes firstborn children who where born between 1990 and 1999 with non-missing value in the main variables (see Table 9 for descriptive statistics). Fixed-effects include child's birth year, sex, sibling size, and ethnicity, as well as highest diploma of the father and mother (separately).

Table 11—Mother's Earnings Penalty and Fertility

	(1)	(2)	(3)
	Mother's Number of Children		
Mother's Earning Penalty	0.131***	0.121***	0.120***
	(0.009)	(0.008)	(0.008)
Mother's Earnings (before + after)			0.000
			(0.001)
Fixed Effects	Yes	Yes	Yes
Sibling Size		Yes	Yes
Observations	253,332	250,886	250,886

Notes: Each column represents a separate OLS regression with the mother's number of children as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes mothers from the administrative dataset. Fixed-effects include mother's birth year, ethnicity, highest diploma, and year of first child.

Table 12—Mother's Earning Penalty and Child Matriculation Outcomes: Not Controlling for Child's Sibling Size

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earning Penalty	-0.039***	-0.374***	-0.031***	-0.011***	-2.891***
	(0.002)	(0.076)	(0.003)	(0.003)	(0.163)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	120,151	100,136	118,310	118,310	119,953
	B. Controlling for Parental Income				
Mother's Earning Penalty	0.023***	1.474***	0.058***	0.049***	2.149***
	(0.004)	(0.123)	(0.005)	(0.005)	(0.258)
log(Mother's Post-Birth Earnings + 1)	0.037***	1.139***	0.053***	0.036***	2.964***
	(0.002)	(0.064)	(0.003)	(0.002)	(0.138)
log(Father's Post-Birth Earnings + 1)	0.012***	0.300***	0.016***	0.010***	1.015***
	(0.001)	(0.026)	(0.001)	(0.001)	(0.058)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	120,151	100,136	118,310	118,310	119,953

Notes: Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. The sample includes first-born children only. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. Fixed-effects include child's birth year, sex, sibling size, and ethnicity, as well as highest diploma of the father and mother (separately).

Table 13—Child Sibling Size and Child Matriculation Outcomes (First-born Children)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	Not Controlling for Parental Income				
Child's Sibling Size	0.007***	0.464***	0.017***	0.017***	0.823***
	(0.001)	(0.021)	(0.001)	(0.001)	(0.045)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	205,291	164,617	202,344	202,344	204,896

Notes: Each column represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. Fixed effects include child's birth year, sex, and ethnicity.

Table A.1—Mother's Child Penalty by Mother's Sibling Size (Earnings Components)

	(1)	(2)	(3)	(4)
	Log Hourly Wage	Month Worked	Hours Worked	Employment Status
Post First Birth	0.044	-1.619***	-3.711***	-0.084***
	(0.027)	(0.152)	(0.710)	(0.007)
Mother's Sibling Size	-0.010**	-0.019	-0.436***	-0.011***
	(0.005)	(0.015)	(0.107)	(0.001)
Post First Birth * Mother's Sibling Size	-0.022***	-0.018	0.044	0.003
	(0.006)	(0.020)	(0.131)	(0.002)
Age	Yes	Yes	Yes	Yes
Year	No	No	No	No
Observations	42,378	55,778	44,133	55,778

Notes : Each column represents a separate OLS regression with the dependent variable for the mother's outcome indicated at the top. Standard errors are in parentheses. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes women from the Census dataset (see Panel A of Table 2 for descriptive statistics).

Table A.2—Mother's Child Penalty by Ethnic Origin (Earnings Components)

	(1)	(2)	(3)	(4)
	Log Hourly Wage	Month Worked	Hours Worked	Employment Status
Post First Birth	0.002	-1.623***	-3.637***	-0.078***
	(0.018)	(0.111)	(0.506)	(0.005)
Asia-Africa	-0.040**	0.304***	0.863*	-0.024***
	(0.019)	(0.074)	(0.451)	(0.003)
Post First Birth * Asia-Africa	-0.075***	-0.179**	-0.358	0.002
	(0.022)	(0.087)	(0.458)	(0.005)
Age	Yes	Yes	Yes	Yes
Year	No	No	No	No
Observations	41,324	54,356	43,055	54,356

Notes : Each column represents a separate OLS regression with the dependent variable for the mother's outcome indicated at the top. Standard errors are in parentheses. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes women from the Census dataset (see Panel A of Table 2 for descriptive statistics).

Table A.3—Mother's Child Penalty by Origin (Firm and Industry Charataristics)

	(1)	(2)	(3)	(4)	(5)	(6)
	Firm AKM	Commuting Distance	Firm Share Female	Industry Share Female	Industry Part-Time Workers Share	Public Sector
Post First Birth	-0.011	-1.932***	0.019***	0.010***	0.005**	0.063***
	(0.007)	(0.358)	(0.001)	(0.002)	(0.002)	(0.006)
Asia-Africa	0.018***	-0.920*	-0.009***	-0.012***	-0.016***	-0.024***
	(0.006)	(0.469)	(0.001)	(0.001)	(0.002)	(0.001)
Post First Birth * Asia-Africa	-0.046***	-0.467	0.001	0.001	0.009***	-0.004
	(0.006)	(0.456)	(0.001)	(0.001)	(0.003)	(0.003)
Age	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	No	Yes	Yes	No	Yes
Observations	3,242,463	45,877	3,245,528	3,015,799	46,254	2,814,185

Notes : Each column represents a separate OLS regression with the dependent variable for the mother's outcome indicated at the top. Standard errors are in parentheses. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample for Columns (1), (3), (4), and (6) includes women from the administrative dataset (see Panel A of Table 1 for descriptive statistics); the sample for columns (2) and (5) includes women from the Census dataset (see Panel A of Table 2 for descriptive statistics).

Table A.4—Mother's Earnings Penalty and Child Matriculation Outcomes (Mothers With a College Degree)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earnings Penalty	-0.021***	-0.240**	-0.025***	-0.015***	-1.957***
	(0.003)	(0.099)	(0.005)	(0.005)	(0.217)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	51,695	46,498	50,831	50,831	51,656
Adj. R2	0.031	0.107	0.085	0.076	0.069
	B. Controlling for Parental Income				
Mother's Earnings Penalty	0.006	1.187***	0.040***	0.056***	1.691***
	(0.004)	(0.152)	(0.007)	(0.008)	(0.327)
log(Mother's Post-Birth Earnings + 1)	0.020***	1.093***	0.049***	0.054***	2.728***
	(0.003)	(0.094)	(0.004)	(0.005)	(0.210)
log(Father's Post-Birth Earnings + 1)	0.008***	0.363***	0.017***	0.016***	1.105***
	(0.001)	(0.036)	(0.002)	(0.002)	(0.082)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	51,695	46,498	50,831	50,831	51,656

Notes : Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes first-born children whose mother holds a college degree and were born between 1990 and 1999 with non-missing value in the main variables (see Table 9 for descriptive statistics). Fixed-effects include child's birth year, sex, sibling size, and ethnicity, as well as highest diploma of the father and mother (separately).

Table A.5—Mother's Earnings Penalty and Child Matriculation Outcomes (Mothers Without College Degree)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earnings Penalty	-0.053***	-0.563***	-0.037***	-0.010***	-3.761***
	(0.004)	(0.118)	(0.005)	(0.004)	(0.244)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	68,456	53,638	67,479	67,479	68,297
Adj. R2	0.056	0.102	0.089	0.052	0.068
	B. Controlling for Parental Income				
Mother's Earnings Penalty	0.038***	2.101***	0.092***	0.058***	2.931***
	(0.007)	(0.212)	(0.009)	(0.007)	(0.431)
log(Mother's Post-Birth Earnings + 1)	0.045***	1.360***	0.064***	0.034***	3.298***
	(0.003)	(0.094)	(0.004)	(0.003)	(0.196)
log(Father's Post-Birth Earnings + 1)	0.012***	0.249***	0.014***	0.005***	0.763***
	(0.001)	(0.038)	(0.001)	(0.001)	(0.080)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	68,456	53,638	67,479	67,479	68,297

Notes : Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes first-born children whose mother does not hold a college degree and were born between 1990 and 1999 with non-missing value in the main variables (see Table 9 for descriptive statistics). Fixed-effects include child's birth year, sex, sibling size, and ethnicity, as well as highest diploma of the father and mother (separately).

Table A.6—Mother's Earnings Penalty and Child Matriculation Outcomes (Girls)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earnings Penalty	-0.038***	-0.306***	-0.025***	-0.012***	-2.752***
	(0.004)	(0.114)	(0.005)	(0.004)	(0.244)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	59,646	47,335	58,554	58,554	59,518
Adj. R2	0.071	0.192	0.157	0.119	0.142
	B. Controlling for Parental Income				
Mother's Earnings Penalty	0.030***	1.733***	0.065***	0.049***	2.683***
	(0.006)	(0.183)	(0.008)	(0.007)	(0.390)
log(Mother's Post-Birth Earnings + 1)	0.040***	1.282***	0.054***	0.036***	3.251***
	(0.003)	(0.096)	(0.004)	(0.003)	(0.209)
log(Father's Post-Birth Earnings + 1)	0.014***	0.410***	0.019***	0.013***	1.179***
	(0.001)	(0.042)	(0.002)	(0.001)	(0.090)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	59,646	47,335	58,554	58,554	59,518

Notes : Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes first-born girls who were born between 1990 and 1999 with non-missing value in the main variables (see Table 9 for descriptive statistics). Fixed-effects include child's birth year, sibling size, and ethnicity, as well as highest diploma of the father and mother (separately).

Table A.7—Mother's Earnings Penalty and Child Matriculation Outcomes (Boys)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earnings Penalty	-0.037***	-0.453***	-0.036***	-0.012**	-2.890***
	(0.003)	(0.101)	(0.005)	(0.005)	(0.214)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	60,505	52,801	59,756	59,756	60,435
Adj. R2	0.057	0.186	0.146	0.129	0.130
	B. Controlling for Parental Income				
Mother's Earnings Penalty	0.016***	1.286***	0.054***	0.051***	1.786***
	(0.005)	(0.163)	(0.007)	(0.008)	(0.336)
log(Mother's Post-Birth Earnings + 1)	0.032***	1.066***	0.053***	0.037***	2.767***
	(0.003)	(0.086)	(0.004)	(0.004)	(0.180)
log(Father's Post-Birth Earnings + 1)	0.006***	0.229***	0.012***	0.007***	0.686***
	(0.001)	(0.033)	(0.001)	(0.001)	(0.073)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	60,505	52,801	59,756	59,756	60,435

Notes : Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes first-born boys who were born between 1990 and 1999 with non-missing value in the main variables (see Table 9 for descriptive statistics). Fixed-effects include child's birth year, sibling size, and ethnicity, as well as highest diploma of the father and mother (separately).

Table A.8—Mother's Earnings Penalty and Child Matriculation Outcomes (Secular)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earnings Penalty	-0.037***	-0.381***	-0.029***	-0.010***	-2.794***
	(0.003)	(0.082)	(0.004)	(0.003)	(0.176)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	102,551	85,657	100,980	100,980	102,386
Adj. R2	0.072	0.198	0.167	0.130	0.137
	B. Controlling for Parental Income				
Mother's Earnings Penalty	0.024***	1.670***	0.066***	0.056***	2.611***
	(0.004)	(0.132)	(0.006)	(0.006)	(0.279)
log(Mother's Post-Birth Earnings + 1)	0.037***	1.279***	0.057***	0.039***	3.238***
	(0.002)	(0.070)	(0.003)	(0.003)	(0.151)
log(Father's Post-Birth Earnings + 1)	0.011***	0.364***	0.017***	0.012***	0.988***
	(0.001)	(0.029)	(0.001)	(0.001)	(0.063)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	102,551	85,657	100,980	100,980	102,386

Notes : Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes first-born secular children who were born between 1990 and 1999 with non-missing value in the main variables (see Table 9 for descriptive statistics). Fixed-effects include child's birth year, sex, sibling size, and ethnicity, as well as highest diploma of the father and mother (separately).

Table A.9—Mother's Earnings Penalty and Child Matriculation Outcomes (Religous)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earnings Penalty	-0.039***	-0.661***	-0.048***	-0.030***	-3.229***
	(0.007)	(0.208)	(0.009)	(0.009)	(0.440)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	17,471	14,363	17,201	17,201	17,438
Adj. R2	0.080	0.220	0.182	0.145	0.139
	B. Controlling for Parental Income				
Mother's Earnings Penalty	0.017	0.521	0.020	0.015	-0.039
	(0.010)	(0.338)	(0.014)	(0.015)	(0.703)
log(Mother's Post-Birth Earnings + 1)	0.032***	0.706***	0.039***	0.026***	1.822***
	(0.006)	(0.168)	(0.007)	(0.007)	(0.356)
log(Father's Post-Birth Earnings + 1)	0.006***	0.165**	0.010***	0.005*	0.618***
	(0.002)	(0.066)	(0.003)	(0.003)	(0.142)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	17,471	14,363	17,201	17,201	17,438

Notes : Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes first-born religious children who were born between 1990 and 1999 with non-missing value in the main variables (see Table 9 for descriptive statistics). Fixed-effects include child's birth year, sex, sibling size, and ethnicity, as well as highest diploma of the father and mother (separately).

Table A.10—Mother's Earnings Penalty and Child Matriculation Outcomes (Asia-Africa)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earnings Penalty	-0.044***	-0.596***	-0.035***	-0.009**	-3.211***
	(0.004)	(0.118)	(0.005)	(0.004)	(0.245)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	62,555	50,305	61,657	61,657	62,453
Adj. R2	0.073	0.164	0.144	0.101	0.113
	B. Controlling for Parental Income				
Mother's Earnings Penalty	0.026***	1.767***	0.069***	0.060***	2.642***
	(0.006)	(0.193)	(0.008)	(0.007)	(0.401)
log(Mother's Post-Birth Earnings + 1)	0.039***	1.383***	0.058***	0.039***	3.272***
	(0.003)	(0.096)	(0.004)	(0.003)	(0.202)
log(Father's Post-Birth Earnings + 1)	0.010***	0.265***	0.013***	0.007***	0.776***
	(0.001)	(0.039)	(0.002)	(0.001)	(0.085)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	62,555	50,305	61,657	61,657	62,453

Notes : Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes first-born Sephardic children who were born between 1990 and 1999 with non-missing value in the main variables (see Table 9 for descriptive statistics). Fixed-effects include child's birth year, sex, and sibling size, as well as highest diploma of the father and mother (separately).

Table A.11—Mother's Earnings Penalty and Child Matriculation Outcomes (Europe-America)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earnings Penalty	-0.032***	-0.228*	-0.030***	-0.015***	-2.679***
	(0.004)	(0.124)	(0.006)	(0.006)	(0.271)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	37,763	32,778	37,190	37,190	37,710
Adj. R2	0.050	0.166	0.132	0.115	0.115
	B. Controlling for Parental Income				
Mother's Earnings Penalty	0.019***	1.388***	0.056***	0.048***	1.835***
	(0.006)	(0.195)	(0.009)	(0.009)	(0.417)
log(Mother's Post-Birth Earnings + 1)	0.032***	1.049***	0.054***	0.040***	2.829***
	(0.003)	(0.106)	(0.005)	(0.005)	(0.232)
log(Father's Post-Birth Earnings + 1)	0.011***	0.389***	0.018***	0.014***	1.125***
	(0.001)	(0.043)	(0.002)	(0.002)	(0.096)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	37,763	32,778	37,190	37,190	37,710

Notes : Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes first-born Ashkenazi children who were born between 1990 and 1999 with non-missing value in the main variables (see Table 9 for descriptive statistics). Fixed-effects include child's birth year, sex, and sibling size, as well as highest diploma of the father and mother (separately).

Table A.12—Mother's Earnings Penalty and Child Matriculation Outcomes (Control Pre+Post Parental Income)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earnings Penalty	-0.037***	-0.382***	-0.031***	-0.012***	-2.824***
	(0.002)	(0.076)	(0.003)	(0.003)	(0.163)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	120,151	100,136	118,310	118,310	119,953
Adj. R2	0.073	0.199	0.168	0.131	0.136
	B. Controlling for Parental Income				
Mother's Earnings Penalty	0.017***	1.807***	0.067***	0.059***	2.280***
	(0.003)	(0.102)	(0.005)	(0.004)	(0.216)
log(Mother's Pre+Post-Birth Earnings + 1)	0.047***	1.966***	0.083***	0.061***	4.353***
	(0.002)	(0.065)	(0.003)	(0.003)	(0.140)
log(Father's Pre+Post-Birth Earnings + 1)	0.014***	0.451***	0.022***	0.015***	1.356***
	(0.001)	(0.034)	(0.001)	(0.001)	(0.077)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	120,151	100,136	118,310	118,310	119,953

Notes : Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes first-born children who where born between 1990 and 1999 with non-missing value in the main variables (see Table 9 for descriptive statistics). Fixed-effects include child's birth year, sex, sibling size, and ethnicity, as well as highest diploma of the father and mother (separately).

Table A.13—Mother's Earnings Penalty and Child Matriculation Outcomes (All Children)

	(1)	(2)	(3)	(4)	(5)
	Eligible	Grade	Grade > 90	Grade > 100	Math Grade
	A. Not Controlling for Parental Income				
Mother's Earnings Penalty	-0.035***	-0.396***	-0.030***	-0.012***	-2.661***
	(0.002)	(0.067)	(0.003)	(0.003)	(0.138)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	206,406	171,281	202,129	202,129	205,889
Adj. R2	0.069	0.200	0.169	0.126	0.136
	B. Controlling for Parental Income				
Mother's Earnings Penalty	0.022***	1.346***	0.054***	0.042***	2.196***
	(0.003)	(0.110)	(0.005)	(0.005)	(0.223)
log(Mother's Post-Birth Earnings + 1)	0.033***	1.043***	0.048***	0.031***	2.810***
	(0.002)	(0.057)	(0.002)	(0.002)	(0.116)
log(Father's Post-Birth Earnings + 1)	0.009***	0.328***	0.015***	0.011***	0.877***
	(0.001)	(0.023)	(0.001)	(0.001)	(0.047)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	206,406	171,281	202,129	202,129	205,889

Notes : Each column and panel represents a separate OLS regression with the first-born child's matriculation outcome indicated at the top as the dependent variable. Significance levels are indicated by: *** for the 1% level, ** for the 5% level, and * for the 10% level. The sample includes children who where born between 1990 and 1999 with non-missing value in the main variables (see Table 9 for descriptive statistics). Fixed-effects include child's birth year, birth order, sex, sibling size, and ethnicity, as well as highest diploma of the father and mother (separately) and the mother's year of her first-birth.