

The Motherhood Trap: How the First Child Shapes Couples' Labor Trajectories^{*}

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Abstract

The existence of child penalties on the labor trajectories of mothers and the absence of effects for fathers are already stylized facts in both developed and developing countries. However, the understanding of labor market dynamics around childbirth relies in couples' decisions. This paper applies an event study method to matched administrative data on birth certificates and formal labor registries to investigate the effect of the first child on couples' labor trajectories in Uruguay. The results indicate a significant decrease in the probability of dual-earner couples by around 10%, fully explained by an increase in the probability of the male-breadwinner model. Consistently, there are no effects on couple's income but a decrease in the mother's share of total income that fails to recover and remains 6.4% below the pre-child percentage 5 years after the event. Moreover, this paper considers two measures of within-couple heterogeneity to analyze the results in light of the specialization theory based on comparative advantages. The drop in dual-earner probability is more pronounced for couples where the father has a higher educational level than the mother or out-earned the mother pre-child, driven by a transition to male-breadwinner. However, results show a decrease in female breadwinner probability even in couples where the mother has a higher level of education or out-earned the father. Taken together, these results provide robust evidence of a motherhood trap: child penalties are evident for all groups of women regardless of their relative labor market productivity and persist at least up to five years of childbirth. Overall, the evidence provided in this paper gives little support to the specialization theory and showcases important potential efficiency gains if couples were to behave according to their comparative advantages.

JEL Classification: J13, J16, J21.

Keywords: Labor gender gap, couple specialization, efficiency gains, developing countries.

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1. Introduction

The significant reduction of gender employment gaps is one of the most important trends in recent history (Goldin, 2006). Latin America was the region that experienced the greatest reduction in employment gender gaps in the last three decades (ILO, 2019). However, structural gender differences still persist, and since the 2000s there has been a deceleration in the closing of gaps (Gasparini and Marchionni, 2015; Marchionni et al., 2018). At the same time, family organization has changed dramatically in recent decades. With the decline of the male breadwinner model giving way to a new model in which both parents are employed (Garcia Roman and Cortina, 2016).

Pioneering studies in economic literature focused their explanations on the existence of gender labor inequalities based on theories of human capital or discrimination. Since the seminal work by Mincer and Polachek (1974), several papers have studied wage gaps taking male characteristics -typically education and experience- as a counterfactual, in an attempt to answer what would happen if women had equal human capital to men. Decades later, in light of the reduction in experience gaps and the reversal of educational gaps (Goldin, 2006; Blau and Kahn, 2017), these factors have ceased to be relevant. Emerging literature has focused on motherhood and family responsibilities as one of the most relevant quantifiable factors in explaining persistent gender labor gaps.

International literature finds negative effects of motherhood on the labor trajectories of mothers, but absence of substantive effects for fathers. These findings are already a stylized fact due to the vast empirical evidence in both developed (Angrist and Evans, 1998; Waldfogel, 1998; Bertrand et al., 2010; Kleven et al., 2019; Kunze, 2020; Berniell et al., 2020) and developing countries (Berniell et al., 2021, 2023; Querejeta and Bucheli, 2023). Most of this literature has focused on comparing changes in the labor trajectories of male and female workers separately. However, to understand the explanatory causes of labor market decisions around childbirth and what drives transitions from and to the dual-earner model, couples play a key role. In this context, what is the effect of the first child on the labor decisions of the couple is still an open question.

The objective of this paper is to provide empirical evidence that contributes to understanding the labor trajectory of the couple as a response to the birth of the first child for the Uruguayan case. To do this, I combine two novel sources of administrative records and obtain a longitudinal database with monthly records of formal employment for mother-father pairs from two years prior up to five years after childbirth. Applying the quasi-experimental approach of event study I provide causal evidence of a significant and persistent reduction in the probability of dual-earner couples driven by a transition to a male-breadwinner model. The probability of being a male-breadwinner couple remains 21% above the pre-child level 5 years after the event. Consistently, results further indicate almost no effect on couples' total labor income but a change in its gender composition. The percentage of couple's labor income contributed by the

mother remains 6.4% below the pre-child level 5 years after childbirth.

To analyze the parenthood effects in light of the comparative advantages theoretical framework, I explore behaviors considering two measures of within-couple heterogeneity: the partner's relative educational level, and the pre-child mother's share of couple's income.¹ First, this paper provides robust evidence of the motherhood trap: parenthood negative effects on the probability of dual-earner and transitioning to a male-breadwinner are evident for all type of couples considered and persist after five years of childbirth. Second, there are strong heterogeneities in place. The decline in the dual-earner model is higher among couples where the fathers is more educated or out-earned the mother before childbirth. However, there is evidence of a decline in the female-breadwinner model even in cases where the mother had higher relative labor market productivity. That is, we observe mothers opting-out the labor market irrespective of their relative advantages. Third, the comparison of both measures shows high but not perfect correspondence. Higher decrease in dual-earner probability is evident among couples in which the father is more educated than the mother even for mothers that out-earned fathers. Fourth, I provide evidence of important potential efficiency gains if couples were to behave based on their comparative advantages. Couple's income would have been 54% higher if transitioning to female instead of male-breadwinner in couples where the mother out-earned. Overall, the evidence provided in this paper gives little support to the specialization theory. Even in couples expected to divide household tasks in a gender-neutral way, parents do not specialize according to their comparative advantage and negative effects on formal employment are evident for all women considered. The comparative advantage theory fails to fully account for why women continue to shoulder a disproportionate burden of childcare.

This paper contributes to the literature on gender inequalities in the labor market. First, this work advances on the extensive evidence of the impact of parenthood on the labor outcomes of mothers and fathers. Recent studies estimate the impact of the first child on mothers' and fathers' employment finding relevant differences between countries. Motherhood penalties in employment range from 7% to 13% in Scandinavian countries and 43-44% in the United Kingdom and the United States (Kleven et al., 2019), while fatherhood penalties are insignificant. For Denmark, Kleven et al. (2019) also perform a decomposition analysis and find that the component of the gender wage gap attributable to the first child's has increased considerably, from explaining 40% in 1980 to 80% in 2013. Meanwhile, Berniell et al. (2021) is one of the first studies to account for this phenomenon in developing countries.² The authors study the Chilean case, finding a significant penalty for motherhood in employment (17%) as well as an increase in the informality rate (25%) that does not recover in the long term. Again, there are no evident effects for fatherhood. For Uruguay, Querejeta and Bucheli (2023) find that ten years after the first childbirth only 44% of mothers are still employed and low-wage women face

¹I assume there are no differences in childcare productivity and so differences in labor market productivity are referred here as comparative advantages. More discussion on this in Section 3.

²Other studies for Latin American countries include Aguilar-Gomez et al. (2020) and Berniell et al. (2023).

higher penalties.³ However, what is the effect of the first child on the couple’s labor decisions is still an open question. This paper will contribute to this literature based on a developing country case study.

Second, this work will provide novel empirical evidence by taking the couple as the unit of analysis. This presents several advantages by allowing to control for characteristics of couples that simultaneously affect labor and fertility decisions. Likewise, the couple is a key unit of analysis for understanding changes in labor trajectories after parenthood ([Angelov et al., 2016](#)). However, the literature on couple dynamics around parenthood has been scarcely addressed, with some contributions from the economic literature ([Lundberg and Rose, 2000](#); [Angelov et al., 2016](#); [Andresen and Nix, 2022](#); [de la Vega, 2022](#)) and also from the sociology literature ([Dotti Sani, 2015](#); [Bergsvik et al., 2019](#); [Musick et al., 2020](#); [Nylin et al., 2021](#); [Dunatchik, 2022](#)). [Angelov et al. \(2016\)](#) compare the labor trajectories of Swedish couples and find that the earnings’ gender gap increases by 32 percentage points (pp) 15 years after child-birth. The effects are smaller for couples in which the woman achieved a higher educational level than the man. [Musick et al. \(2020\)](#) find a sharp decrease in the contribution of mothers to the couple’s income after the first child that ranges from 28 pp in Germany to 8-12 pp in the United States and the United Kingdom. This study based on the Uruguayan case would be the first for a developing country. Results are expected to differ from that of high-income countries for several reasons. It is worth considering the role played by more modest family policies, weaker labor market institutions, higher labor informality, and more conservative gender norms. These are expected to push mothers out of the formal labor market, thus experiencing higher penalties in developing countries compared to those of developed ones. The data source is novel for a developing country’s context as the evidence is generally based on survey data.

Moreover, this paper will advance in the literature analyzing the importance of household specialization based on comparative advantages. Most of the literature focuses on within-couple earnings gap as a measure of relative advantage ([Chung et al., 2017](#); [Angelov et al., 2016](#)). In a related work, [Artmann et al. \(2022\)](#) explores the child penalty in the Netherlands using three separate measures of within-household earning potential. The authors find that the higher the relative earning potential the lower the motherhood penalties. In this paper we further explore heterogeneous responses to motherhood combining two measures of market relative productivity, and conclude that both the relative education and income share combined provide useful insights to understand the dynamics behind the parenthood effects. The comprehensive analysis of child-related labor penalties and the heterogeneities according to within-couple productivity characteristics is a novel aspect I bring to the literature on child penalties in the developing world. My results build over previous evidence suggesting that the gender roles women and men take after entering parenthood seem unrelated to their relative earnings potential ([Andrew et al., 2021](#)).

³Other influential work includes [Angrist and Evans \(1998\)](#); [Budig and England \(2001\)](#); [Bertrand et al. \(2010\)](#); [Killewald \(2013\)](#); [Kunze \(2020\)](#); [Berniell et al. \(2020\)](#)

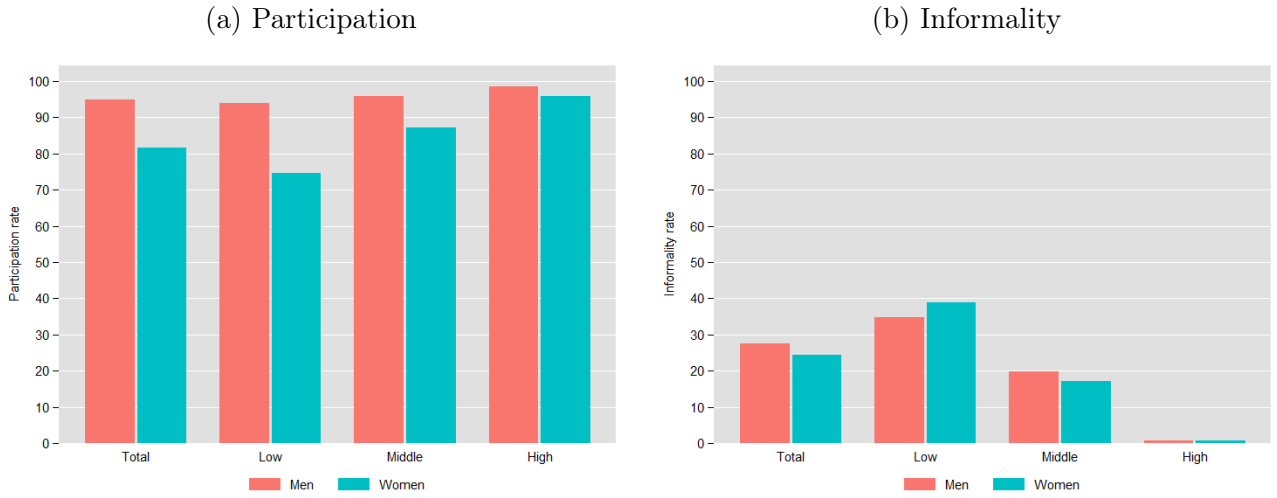
The rest of the paper proceeds as follows. The next section describes some background characteristics of the empirical setting. Section 3 presents the theoretical framework on the parenthood effects. Then, Section 4 describes the source of information, the estimation sample, the within-couple productivity measures, and the empirical strategy to identify the parenthood impact on couple's labor trajectories. Following, Section 5 shows the parenthood effects on couple's labor decisions considering the within-couple measures of comparative advantages. Finally, Section 6 concludes.

2. Background: children and couples' labor outcomes in Uruguay

Uruguay is one of the countries with the highest female labor force participation in the region. However, only 55% of Uruguayan women aged 14 and older participates in the labor market and employed women still earn 25% less than men (CEPAL, 2020).

Gender gaps have been narrowing since the 1980s mostly driven by an increase in the female labor force participation. However, as shown in Panel (a) of Figure 1, the gender gap in participation remains high favoring men in 13 pp when considering individuals aged between 25 and 54 (GenLAC-CEDLAS). Moreover, the gender gap widens among low educated people. Figure 1 also reports the informality rate by educational level (Panel b). While on average labor informality is slightly higher among men than women for the considered ages (27 vs 24%), this varies by educational level. Again, the gender gap widens among low educated people favoring men in 4 pp.

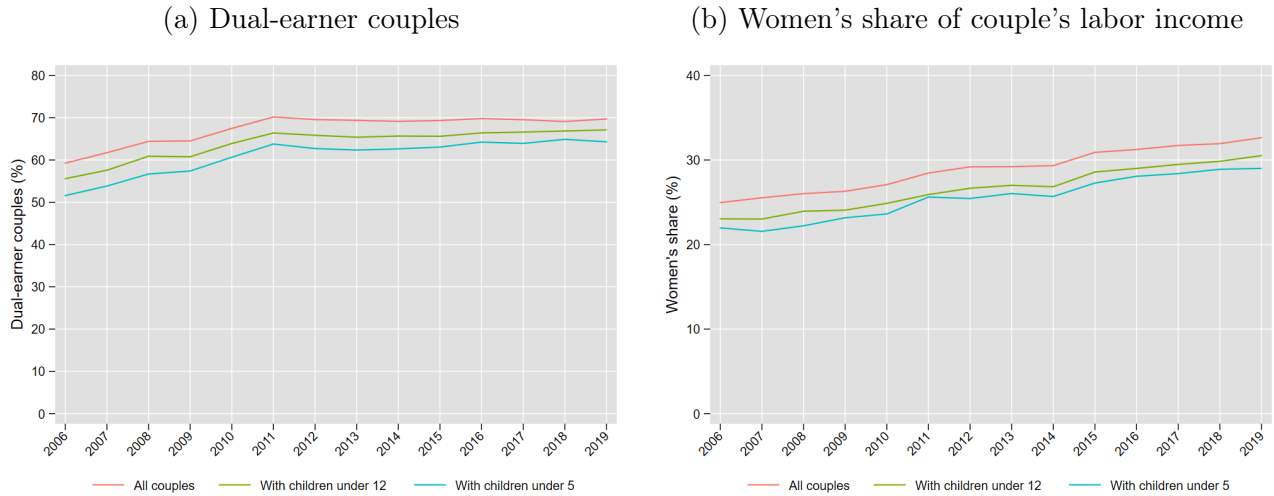
Figure 1: Labor force participation and labor informality rates, by sex and level of education



Notes: Figures represent the proportion men and women aged between 25 and 54 that are economically active (a), and the proportion of workers aged between 25 and 54, in wage-earning jobs with no access to social security, self-employed workers who have not completed higher education, and zero income workers (b) according to the attained level of education. Low level of education comprehends high school dropouts, Middle all high school graduates or some college, and High all individuals who completed higher education. Own elaboration based on [GenLAC-CEDLAS \(2022\)](#) data for the year 2019.

Moreover, motherhood is a significant determinant of gender labor gaps. There is evidence of substantial penalties in formal employment and wages following the birth of the first child, that persist after several years ([Querejeta and Bucheli, 2023](#)). The proportion of dual-earner couples has slightly increased reaching 70% of all couples in Uruguay. However, this proportion is consistently lower among couples with children (Panel a of Figure 2). This is explained by the increase in female employment rates in the last decades, as male's remained relatively constant. Correspondingly, the contribution of women to the couple's total labor income has also increased (Panel b). However, women's income only accounts for 33%, and their contribution is lower in households with children under 12 years of age and even lower in the presence of children under 5.

Figure 2: Proportion of dual-earner couples and women's share of couple's labor income, by presence of children in the household



Notes: The Figures represent the proportion of dual-earner couples (a), and the contribution of women's labor income to the couple's total labor income (b) according to the presence of children under 12 and 5 years old in the household. Sample includes household head and spouse, between 20 y 49 years old, living in nuclear households. Own elaboration based on ECH-INE microdata.

Family leaves in Uruguay are quite generous compared to the region, but modest compared to high-income countries (Galván et al., 2022). Mothers are entitled to a 14-weeks maternity leave following ILO recommendation No. 183, and fathers entitled to a 10-days paternity leave. Different from what happens for high-income countries, the payment rate is 100% and covered by the Social Security Institute. Since 2013 family leaves in Uruguay also consist of a parental leave covering from the end of the maternity leave until baby's six months and allowing parents to work part-time while receiving full-paid. Interestingly, the design allows fathers and mothers to alternate the use of the parental benefit with the objective of increase father's involvement in childcare and close the gender labor gaps. However, only 2% of total parental leave beneficiaries are men. Moreover, family leaves only covers formal workers contributing to the Social Security Institute, thus leaving informal workers uncovered.

Finally, Uruguay is one of the countries with more progressive gender norms in the region (Galván et al., 2022). However, social norms regarding gender roles are still widespread. 40% of mothers and fathers aged between 25 and 64 years old agrees or strongly agrees with the statement that 'Pre-school child suffers with working mother', 20% with 'If a woman earns more money than her husband, it's almost certain to cause problems', and 13% with the statement that 'When jobs are scarce, men should have more right to a job than women'.

3. Theoretical framework

Upon arrival of the first child parents experience a sudden increase in time constraints. The new time requirements due to care activities and other domestic chores alter the work-family balance and may create incentives to change couple's labor decisions from what was optimal before. How couples behave after the arrival of the first child will depend on the assumptions regarding the household model and the relative productivity.

Labor dynamics around childbirth have been widely studied and evidence is conclusive on the negative effects for mothers and the absence of effects for fathers in both developed and developing countries. Since the work of [Becker \(1981\)](#) literature has argued that couple's specialization based on comparative advantage is an important channel behind the sexual division of labor and the motherhood penalties. The specialization theory poses that an efficient allocation of household resources requires that the member of the couple with the highest market productivity relative to the productivity in home production remains in the labor market while the other stays at home. This idea of comparative advantages is central in family economics. Provided there are no differences in childcare productivity and given that men receive on average higher wages, the sexual division of labor will follow a process of specialization such that domestic production will be assigned to the mother and paid work to the father. Under this model, the motherhood penalty is mostly explained by men's higher average wages. This is also compatible with intra-household bargaining theoretical frameworks that suggests the partner with greater control over the couple's resources will be in a better position to impose his(her) preferences on the division of labor ([Lundberg and Pollak, 1996](#)). Again, due to men higher control over couple's resources, new care and domestic responsibilities will be primarily allocated to the female partner.

I assume that there are no differences in childcare productivity and so in this paper refers to the notion of comparative advantages based solely on differences in labor market productivity. This assumption is based on previous research on the topic. [Kleven et al. \(2021\)](#) find that biological and adoptive mothers face similar labor effects, suggesting that the explanations associated with biological factors and breastfeeding are not a key factor behind the motherhood penalty. [Andresen and Nix \(2022\)](#) also concludes that biological factors cannot explain the persistence of long-run child penalties. By comparing heterosexual and same-sex couples the authors conclude that biology plays a small role and the most of the child penalties differential is explained by preferences and gender norms.⁴ Moreover, even if any biological advantage exists, it is expected to vanish after the first year with the end of the recommended period of exclusive breastfeeding. It could also be argued that differences in childcare productivity are not innate but nurtured. However, these would have to be quite large to account for the motherhood effects reported in

⁴[Giddings \(2003\)](#) reviews the empirical work showing that lesbian couples distribute household chores more equally than heterosexual ones. The absence of traditional gender relations and social norms, and the rejection of gender differentiation appears as key explaining factors of why same-sex couples adopt more egalitarian roles regarding the division of labor.

the literature ([Berniell et al., 2020](#); [Cortes and Pan, 2020](#)).

Critiques to the specialization theory bring to the discussion the role of culturally constructed social norms that shape mothers and fathers' behaviors. [Akerlof and Kranton \(2000\)](#) incorporate the notion of identity into the utility function thus altering economic behavior. Given that identity formation is affected by the prevalence of social norms, under their theoretical model, both mothers and fathers would face a non-financial cost for deviating from the gender norm that identifies women as the main caregivers and fathers as breadwinners ([Bertrand, 2020](#)). This challenges the economic rationality and the efficiency assumption derived from the comparative advantages theory. The existence of social norms that impose patterns of behavior could generate an inefficient allocation of resources, in this case, couple's time ([Browning et al., 2014](#); [Couprie et al., 2020](#)). Traditional social norms on what it means to be a mother and a father are expected to increase time devoted to home(market) production by women(men) after parenthood.

4. Empirical strategy

4.1. Data and sample descriptives

The paper relies on two sources of administrative data for Uruguay. First, on birth registries from the Ministry of Health. This comprehends certificates of all births occurred in the country, and includes identification of the mother and the father, date and birth place, and parents' characteristics at childbirth (age, educational level, cohabiting status). Second, monthly labor records of workers registered in the social security institute of Uruguay, including formal employment and wages. The combination of both data sources yields a longitudinal database with monthly records of formal employment between January 2012 and October 2021, for all mother-father pairs who had their first biological child between January 2014 and December 2018.⁵

The final sample for estimation is composed of 43,807 heterosexual couples, who transitioned to first-time parenthood together between January 2014 and December 2018, were living together at the time of birth⁶, and were between 16 and 49 years of age at childbirth.

The treatment variable is the birth of the first child. For this, I consider the first appearance of both parents in the birth registries. Data is available since the year 2002 for mothers, and since

⁵As labor records are available from January 2012, only births after January 2014 will be considered in order to have information on formal employment for two years prior to the event.

⁶As I only observe if parents are living together at childbirth it might be a concern whether the couple separated or divorced under the study period. I argue this is not an issue given the objectives of the paper. First, 77.1% of children under 4 years of age live with both parents ([Cabella et al., 2015](#)), and this is likely to be higher among those that lived with both parents at childbirth. Second, I'm using the couple to compute a measure of relative productivity of the father and the mother before childbirth and this is useful even in the case of the couple dissolving.

2009 for fathers. As mentioned, the estimation sample is composed of all mother-father pairs who had their first biological child from January 2014 onward. Thus, the correct identification of the treatment relies on the non-existence of births prior to 2002 for women, and 2009 for men. That is, the assumption is that parents did not have any children 12 years before 2014 in the case of mothers and 5 years in the case of fathers.

The main outcome variables are the couple’s typology, couple’s total labor income, and mother’s share of total income. The couple’s typology are a series of three dummy variables indicating whether the couple is dual-earner, male-breadwinner, or female-breadwinner based on parent’s employment status. The parents’ employment is a binary variable taking value 1 when the individual is employed and 0 otherwise. The individual is considered to have a formal job if having positive income that month. Couple’s labor income corresponds to the sum of monthly labor earning of all occupations of the mother and the father, assigning a value equal to zero if not registered as working.⁷ The mother’s share of couples’ total labor income corresponds to the percentage of couple’s labor income contributed by the mother. Because the database is composed of registered workers, all outcome variables refer only to formal employment and wages. That is, we are not able to disentangling whether a decrease in employment is explained by transitions from formality to informality or out of the labor market.⁸

Table A.1 in the Appendix shows some demographic and socioeconomic characteristics at childbirth. 39% of childbirths in the estimation sample occurred in the capital city —Montevideo—, and 12% in public health institutions —*proxy* of low socioeconomic background—. Mother’s age at first child is 28.6, and fathers are almost 3 years older on average. Finally, mothers are on average more educated than fathers, as 40% reached tertiary education compared to only 26% among fathers.⁹

4.2. Within-couple heterogeneity measures

For the heterogeneity analysis I rely on two variables. First, couple’s relative educational level considering the level of education of both parents declared at childbirth. I compute three groups of couples, those in which the father is more educated, those in which the mother is more educated, and those equally educated. Second, the mother’s share of couples’ total labor income prior to childbirth, measured as the percentage of couple’s labor income contributed by

⁷Monthly income are indexed to the CPI of October 2021.

⁸As I only observe if parents are formally employed it might be a concern whether the observed transitions from dual-earner couples to single-breadwinner couples are explained by informality or non-employment. I argue this is not an issue for two main reasons. First, based on data from the Longitudinal Social Protection Survey for Uruguay, only 6.2% of people between 16 and 54 years of age who were employed at Wave I (2012) transitioned from formality to informality at Wave II (2016). Second, both the shift towards informality and out of the labor market are conceptualized as negative effects. Therefore, the lack of data from the informal sector is not a concern given the objectives of the paper.

⁹These proportions are 32% and 20% respectively using nationally representative survey data from 2019.

the mother.¹⁰ To this end, incomes for the period between the 24th month and the 13th month prior to childbirth is considered, since the 12th month before the birth is the omitted period in the regressions. I compute two groups of couples depending on the mother contributing with more or less than 50% of couple's total income. These variables can be interpreted in various ways. As a *proxy* of the prevalence of gender norms in the home, as women's bargaining power, or as relative productivity of the mother in the labor market in relation to the father.

Table 1 shows the distribution of couples by relative level of education and relative income.

Table 1: Within-couple measures

	Mean	SD	Obs.
<i>Couple's relative education</i>			
Father more educ.	0,11	0,32	40476
Same educ.	0,52	0,50	40476
Mother more educ.	0,36	0,48	40476
<i>Mother's share</i>			
Below 50%	0,57	0,49	40821
50% or more	0,43	0,49	40821

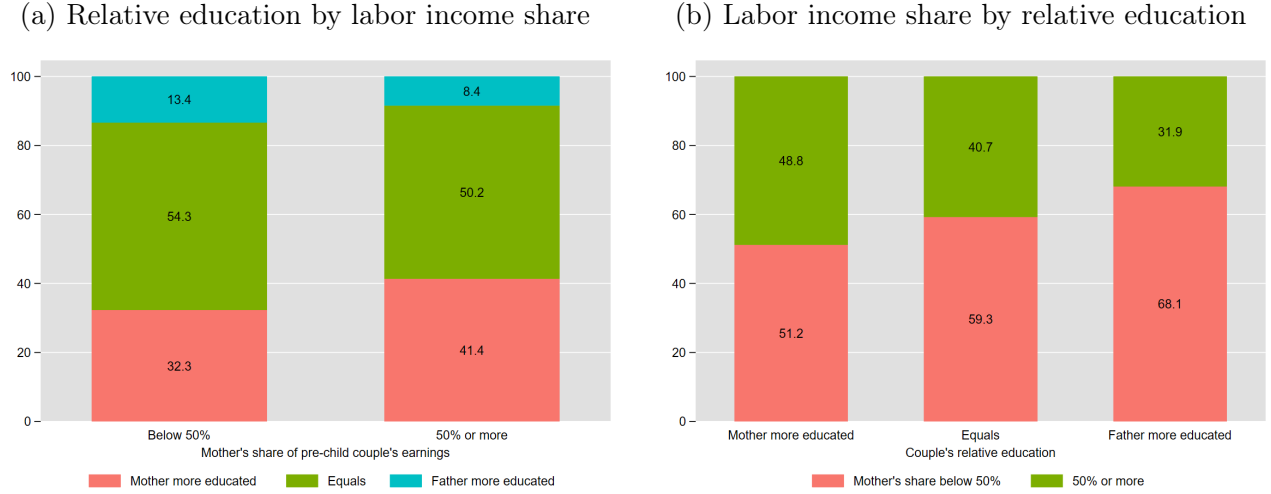
Notes: The table shows the mean, standard deviation, and number of observations for the two within-couple heterogeneity measures. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

Figure 3 explores the similarities and differences of each measure of within-couple relative market productivity.¹¹ Panel (a) plots the distribution of couples by relative level of education separately for couples in which the mother contributes with less than 50% of couple's total income and those in which contributes with 50% or more, and Panel (b) the distribution by mother's share separately for couples according to their relative education. Gradients are clear, with mothers being more educated in couples where mothers out-earn fathers, and mothers out-earning fathers in higher proportion in couples where mothers are more educated. However, correspondence between both measures is not perfect. Figure A.1 in the Appendix shows the estimated kernel densities of the mother's share pre-child by couples' relative education. Consistently, the distributions are essentially symmetric, but skewed to the left the less educated the mother. That is, the less(more) educated the mother compared to the father, the lower(higher) her share of couple's income.

¹⁰Note that if no parent is working this variable will take missing value. This represent 6.8% of the estimation sample.

¹¹There is missing information both in couple's relative education and income for 13.8% of cases.

Figure 3: Distribution of couples by the two within-couple heterogeneity measures



Notes: The Figures show the distribution of couples by mother's share of couple's total labor income prior to childbirth and relative level of education. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

4.3. Methodology

The causal identification of parenthood effects is challenging because of potential endogeneity due to unobservable characteristics that simultaneously affect both the decision of entering childbirth and the labor trajectories. The first empirical papers in dealing with this issue relied on fixed-effects models (Waldfoegel, 1997, 1998; Lundberg and Rose, 2000; Budig and England, 2001; Bertrand et al., 2010; Wilde et al., 2010) and instrumental variables (Angrist and Evans, 1998; Cruces and Galiani, 2007; Tortarolo, 2014; Lundborg et al., 2017). In recent years, empirical studies have increasingly turned to the event study approach to establish a causal relationship between the birth of a first child and its impact on labor market outcomes (Angelov et al., 2016; Kleven et al., 2019; Berniell et al., 2021).

This paper relies on the quasi-experimental event study approach to estimate the impact of the first child on couple's formal labor trajectories in Uruguay. The event is the birth of the couple's first child identified through national birth registries. The methodology consist in analyzing the evolution of the outcome variable before and after the event, exploiting the variation in the time in which each couple experienced the event. This allows for the separate identification of time-cycle trends, couple/individual trends, and the treatment effects by comparing results between parents and not-yet-parents.

The empirical strategy consists of estimating the following equation at the couple level:

$$y_{ct} = \sum_{\tau \neq -12} \beta_{\tau} I(e_{ct} = \tau) + \sum_x \alpha_x I(x = t) + \gamma_c + \varepsilon_{ct} \quad (1)$$

where c stands for each couple in period t . y_{ct} is the outcome variable (couple’s type, couple’s total labor income, and mother’s share). e_{ct} is the number of months prior or from the event and τ is a normalized variable taking value 0 the month of the event. The analysis consider the period between two years prior up to five years after childbirth. Thus, β_τ are the dynamic effects of entering parenthood relative to 12 months before the event. The model also includes period fixed effects (α_t) to control for time-cycle trends, and couple fixed effects (γ_c) to control for constant characteristics of the couple (e.g., age difference, educational level).

The main identification assumptions are that the event is not correlated with labor trajectories, conditional on being parents in the period and the other set of controls, and the absence of anticipatory behavior before the event.¹² Another potential threat for the identification strategy is the use of an unbalanced panel. For couples transitioning to parenthood after October 2016 we will not observe a full 60 months period because our data ends in October 2021. That is, we can only follow up couples for over 60 months if the event occurred before October 2016 so we work with an unbalanced panel. Indeed, the sample reduced by 37% at $\tau = 60$. Figure A.2 in the Appendix pictures the coefficients of regressing parent’s predetermined characteristics on the relative time variable. The results suggest the sample remains quite balanced over time.

5. Parenthood effects on labor outcomes

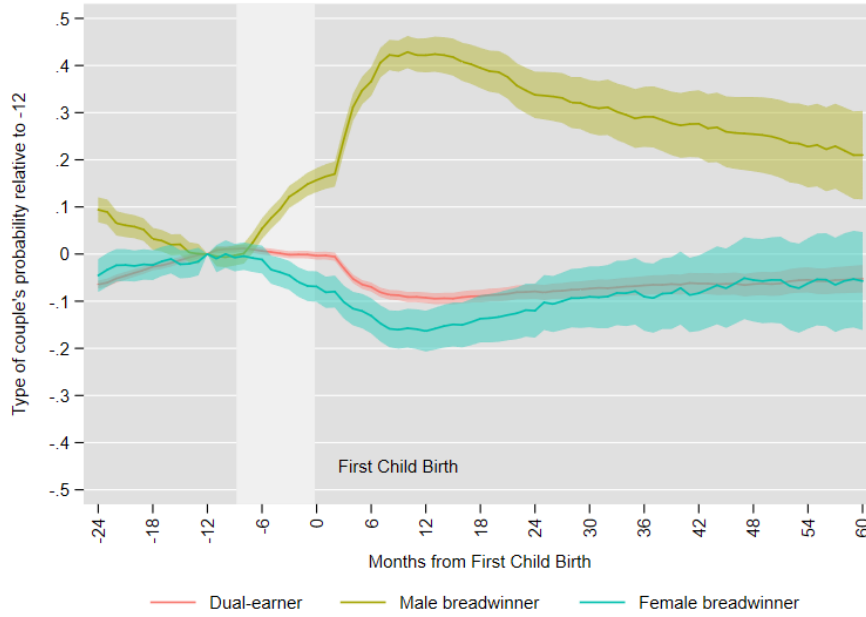
5.1. Couple’s typology

I start by documenting the parenthood effect on the probability of being a dual-earner couple or a single -male or female- breadwinner couple obtained from regressions of equation 1. Figure 4 shows the parenthood effect on couple’s typology. Results indicate an immediate decrease of around 10% in the probability of being a dual-earner couple following childbirth. This drop fails to recover up to 5 years after the birth of the first child, remaining 5% above the pre-child percentage. Moreover, there is a significant decrease in the probability of being a female-breadwinner couple. As a result, the birth of the first child leads to a notable increase in the probability of being a male-breadwinner couple that remains 21% above the pre-child percentage 5 years after the event.¹³

¹²According to the Perinatal Information System, in 2021 37% of births result from unplanned pregnancies.

¹³Figure A.3 in the Appendix presents the short-term parenthood effect on the probability of dual earner couple using alternative dynamic differences-in-differences methods (Borusyak et al., 2024; Sun and Abraham, 2021). The main results are robust to the choice of a particular method.

Figure 4: Parenthood effects on the type of couples



Notes: The Figures show the parenthood effect relative to the year before childbirth as a percentage of the counterfactual outcome of couples without children. Couple and period (month and year) fixed effects included as control variables. Ninety-five per cent confidence intervals are based on robust standard errors. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

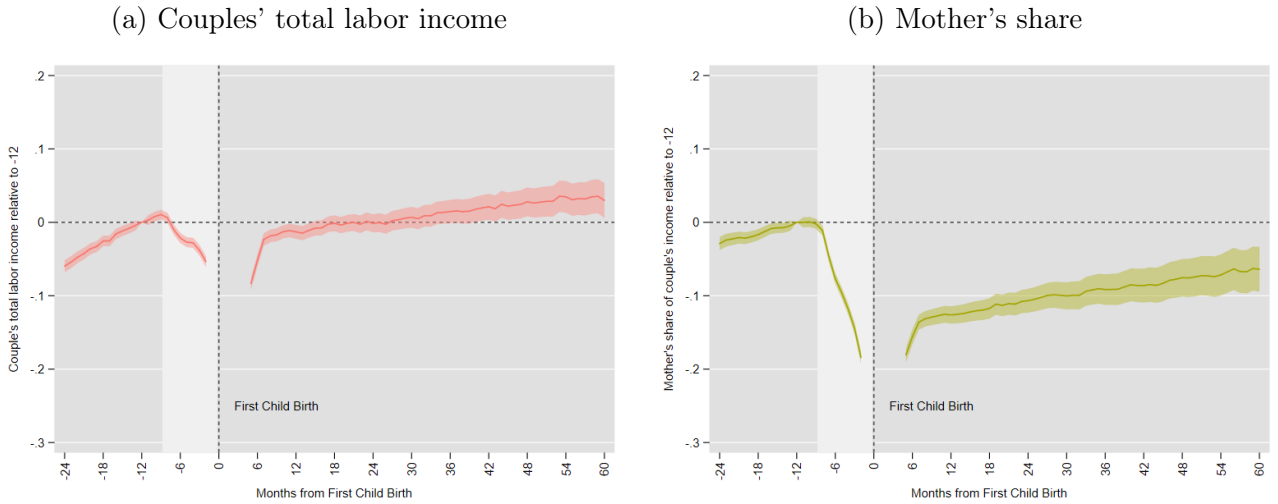
These effects are basically explained by a decrease in mother's formal employment. As shown in Figure A.4, while parent's formal employment evolve similarly before childbirth, trends diverge significantly soon after leading to a motherhood penalty of 20% that persist after 5 years, consistent with previous evidence showing significant negative motherhood effects in Uruguay (Querejeta and Bucheli, 2023). Interestingly, different from what is shown for other countries (Killewald, 2013), there is no evidence of a fatherhood premium in this setting. Recall that the outcome variable here refers to formal employment, thus including both non-employment and moving to informal jobs. However, it is important to stress that moving to informality is also considered a negative effect as leaving workers out of the social security benefits. Berniell et al. (2023) find an increase of 5% in fathers employment five years after child-birth along with an immediate increase in labor informality that vanishes over time. Although their estimates are not precise due to the small sample size, their results point to the same direction.

Overall, these couple's labor trajectories are consistent with previous evidence showing that the single breadwinner model may be the only realistic option for some couples in key stages of the life-cycle such as following childbirth (Kowalewska and Vitali, 2021).

5.2. Effects on couple's income and mother's contribution

Figure 5 shows the parenthood effect on couple's total labor income (Panel a) and on the mother's share of couple's income (Panel b). Results indicate almost no effect on couple's income. The immediate short-term reduction could be explained by the couple perceiving family leave benefits that are not considered when computing the labor incomes. Results further show that while there is almost no effect on couples' total formal labor income, there is a significant change in the composition of that income. Panel (b) evidences a significant drop in the percentage of couple's income contributed by the mother. This drop recovers over time, but remains 6.4% below the pre-child percentage 5 years after the event. That is, following parenthood couples would redistribute their roles but seeking to maintain total labor income.

Figure 5: Parenthood effects on couple's income and shares



Notes: The Figures show the parenthood effect relative to the year before childbirth as a percentage of the counterfactual outcome of couples without children. Period (month and year) and couple fixed effects were included as control variables. Ninety-five per cent confidence intervals are based on robust standard errors. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

5.3. Parenthood effects by within-couple characteristics

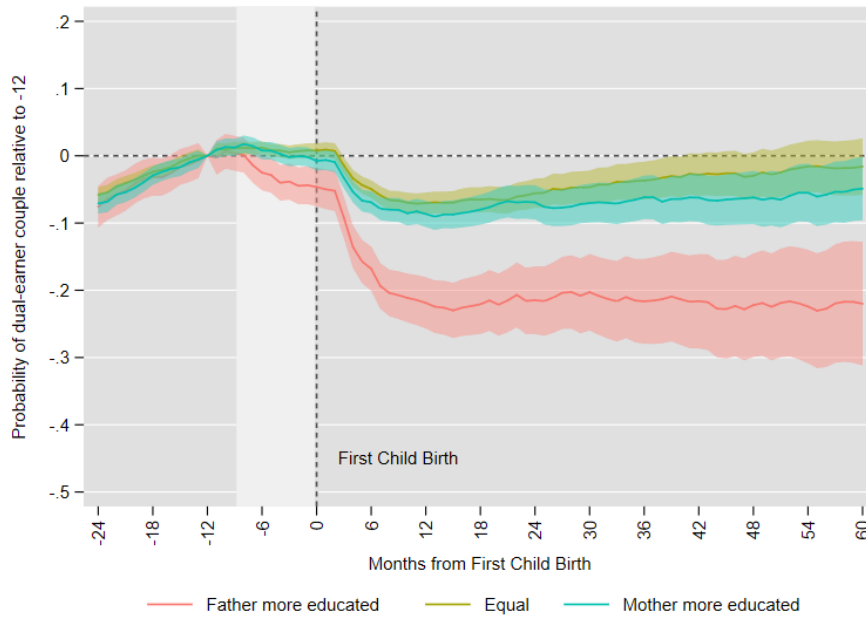
In what follow, I analyze the parenthood effects considering within-couple human capital characteristics as a proxy of comparative advantages, bargaining power or labor market productivity. This analysis better help to contrast the results in light of the comparative advantages theoretical framework. To this end, I compute two measures of within-couple heterogeneity: relative educational level, and share of couple's income contributed by the mother.

5.3.1. Couple's relative educational level

To start exploring the results in light of the comparative advantages theory, I first show the parenthood effect on the probability of being a dual-earner couple by couple's relative education. Three groups of couples are computed considering the level of education of both parents: those in which the father is more educated, both parents are equally educated, and those in which the mother is more educated. These represent 12%, 52%, and 36% of the estimation sample respectively as reported in Table 1, indicating high levels of educational homogamy.¹⁴ The educational level is usually available both in survey data and administrative data, but it is only a crude proxy of labor productivity.

Three main findings arise as depicted in Figure 6. First, negative parenthood effects in the probability of being a dual-earner couple are evident for all types of couples. Second, the drop is largest for couples where the father has a higher level of education than the mother. Third, no significant differences are observed for couples where the mother is more educated or they are equally educated, and the drop in the probability of dual-earner among these couples recovers 5 years after the event.

Figure 6: Parenthood effects on the probability of dual-earner by couple's relative education



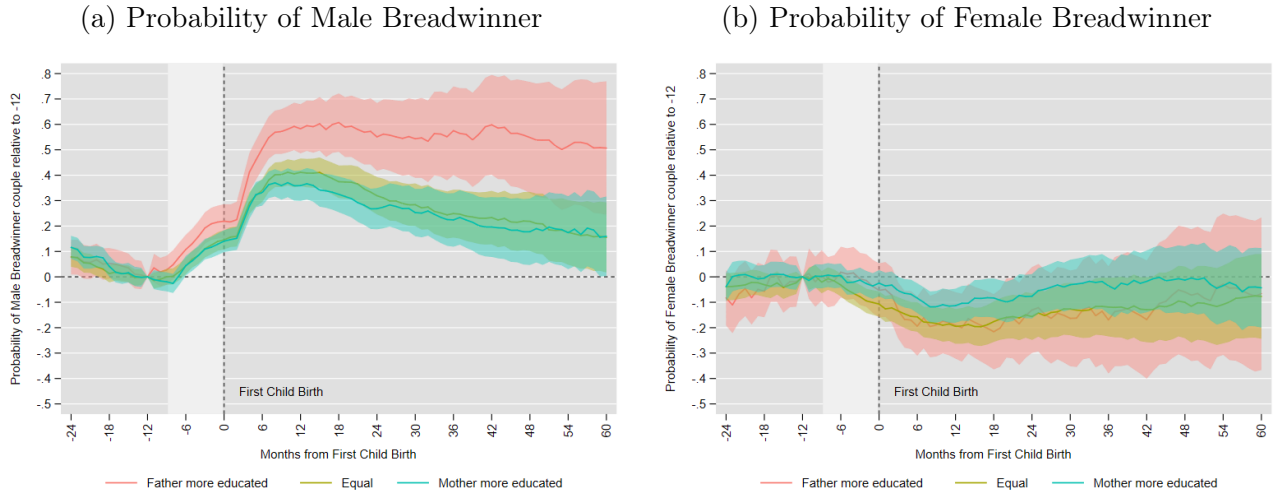
Notes: The Figure shows the parenthood effect relative to the year before childbirth as a percentage of the counterfactual outcome of couples without children. Couple and period (month and year) fixed effects included as control variables. Ninety-five per cent confidence intervals are based on robust standard errors. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

Figure 7 shows the corresponding parenthood effects on the probability of single male or female-

¹⁴There is missing information in couple's relative education for 7.5% of cases.

breadwinner couple. The higher decrease in the probability of dual-earner couples among those in which the father has a higher level of education is explained by a transition to a male-breadwinner model (Panel a), as there are no significant heterogeneous effects on the probability of female-breadwinner model (Panel b) for all types of couples. Interestingly, we observe an increase in the male-breadwinner typology and a decrease in the female-breadwinner even in couples where the mother is more educated than the father.

Figure 7: Parenthood effects by couple's relative education



Notes: The Figures show the parenthood effect relative to the year before childbirth as a percentage of the counterfactual outcome of couples without children. Fixed effects by age and period (month and year) were included as control variables. Ninety-five per cent confidence intervals are based on robust standard errors. Relative education computed using the declared level at childbirth. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

Taken together, results from Figures 6 and 7 are consistent with previous evidence showing that the effect of parenthood on the within-couple earnings gap is higher among couples in which the father is more educated than the mother (Angelov et al., 2016; Chung et al., 2017). These results further build over previous evidence showing that child penalties are observed for all women even those more educated than their partners (Cortes and Pan, 2020).

5.3.2. Mother's share of couple's income

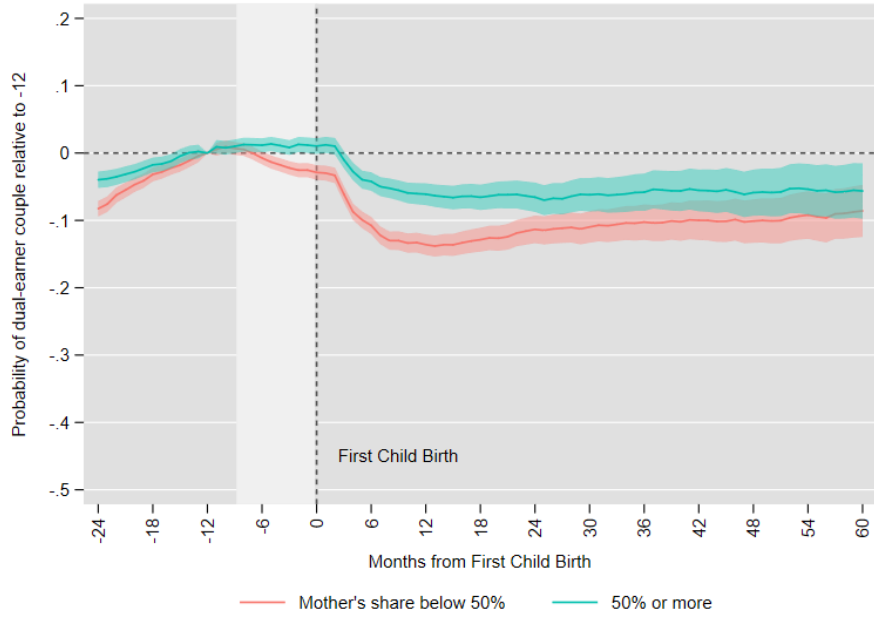
Second, I explore heterogeneities according to the mother's share of couple's formal income prior to childbirth. Two groups of couples are computed considering the mother's pre-child income, those in which the mother contribute with less than 50% of couple's total income and those in which the mother contributes with 50% or more. These represent 57% and 43% of the estimation sample respectively as reported in Table 1.¹⁵ This measure better accounts for

¹⁵There is missing information in mother's share for 6.8% of cases.

within-couple market productivity than the relative level of education.

Figure 8 shows the existence of negative parenthood effects for all couples in the probability of dual-earner but significant short-term heterogeneities depending on women's position in the household. The immediate drop is higher the lower the mother's share of total income. It reaches 16% one year after the event for couples in which the mother contributed less than 50% of couple's total income, and 6% among those that contributed with 50% or more. Nevertheless, this gap turns non-significant 5 years after entering parenthood.

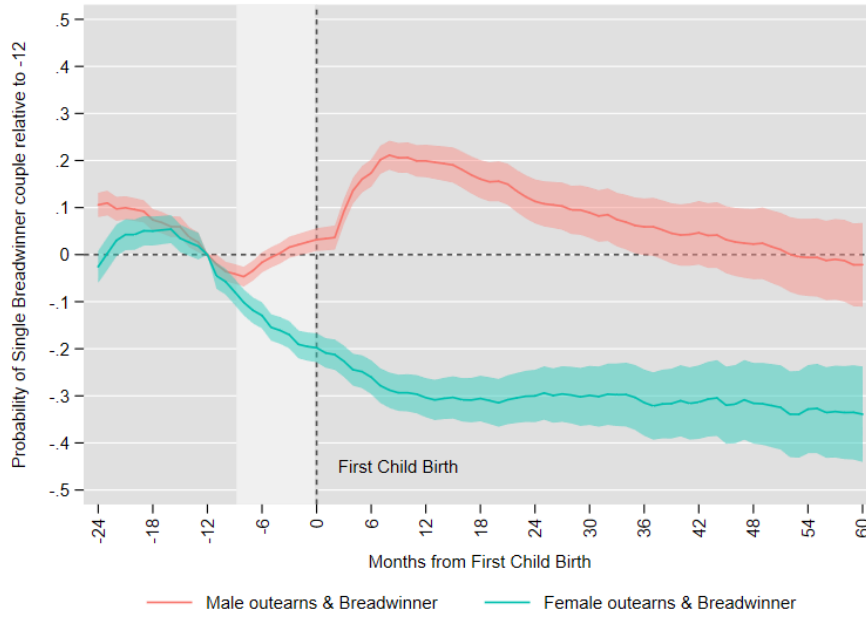
Figure 8: Parenthood effects on the probability of dual-earner by couple's relative income



Notes: The Figure shows the parenthood effect relative to the year before childbirth as a percentage of the counterfactual outcome of couples without children. Couple and period (month and year) fixed effects included as control variables. Ninety-five per cent confidence intervals are based on robust standard errors. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

To better explore what is behind these effects, Figure 9 considers the two efficient transitions to a single-breadwinner model. That is, transitioning to a male-breadwinner couple when the father out-earned the mother pre-child, or to a female-breadwinner one when the mother out-earned. As expected, we observe an increase in the probability of male-breadwinner in couples there the father out-earned the mother (i.e., is likely to face higher income losses). Interestingly, we also observe a decrease in the female-breadwinner typology even in couples where the mother out-earned the father.

Figure 9: Parenthood effects on the probability of single-breadwinner by couple's relative income



Notes: The Figure shows the parenthood effect relative to the year before childbirth as a percentage of the counterfactual outcome of couples without children. Couple and period (month and year) fixed effects included as control variables. Ninety-five per cent confidence intervals are based on robust standard errors. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

Overall, these results are consistent with previous evidence showing that mothers with higher relative incomes experience smaller income losses after childbirth (Angelov et al., 2016).¹⁶ This further builds on previous evidence showing that women's higher wages (and egalitarian attitudes) prior to childbirth led to a less traditional division of labor among couples following parenthood (Schober, 2013).

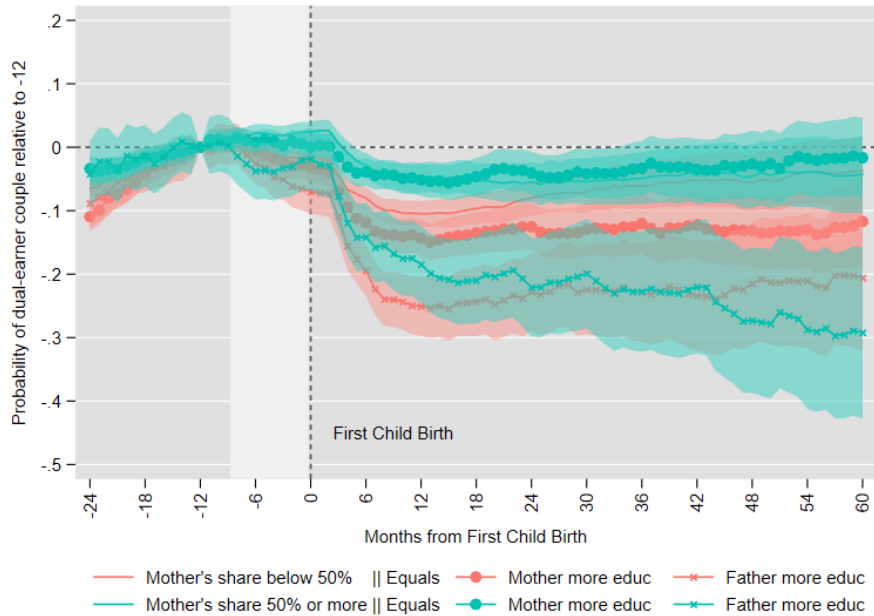
5.3.3. Parenthood effects by within-couple heterogeneity measure

All in all, both measures of within-couple heterogeneity provide little support to the household specialization based on comparative advantages. Finally, Figure 10 pictures the heterogeneities effects by both the mother's share of couples' total labor income and the couple's relative education. This is the results of estimating equation 1 separately for the six groups of couples. Three main findings arise. First, the higher drop in dual-earner typology are experienced among couples where the mother is less educated than the father regardless of their contribution to couple's income. Second, for the other educational groups, the decrease in dual-earner is higher

¹⁶Other related works find no significant heterogeneities by women's potential earnings before childbirth (de la Vega, 2022), or even the opposite: that mothers with higher relative incomes experience higher income losses after childbirth compared to fathers (Chung et al., 2017).

among couples there the father out-earned the mother before childbirth. Third, significant and negative effects that persistent over time are evident for all couples, with couple's relative education and income providing quite different information.

Figure 10: Parenthood effects on the probability of dual-earner by couple's relative education and income



Notes: The Figure shows the parenthood effect relative to the year before childbirth as a percentage of the counterfactual outcome of couples without children. Couple and period (month and year) fixed effects included as control variables. Ninety-five per cent confidence intervals are based on robust standard errors. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

The comparative advantages theory indicates that the member of the couple with the highest labor income should remain in the labor market while the other stays at home. That is, if the mother has a higher productivity in the labor market (proxied by being more educated or contributing a higher share of couple's pre-child income), then the male partner should take the most of the household work after childbirth. While higher transitions from dual-earner to male-breadwinner couples when the father is more productive in the labor market is consistent with the comparative advantages theory, the existence of parenthood effects for all types of couples challenges this rationale. My results points to a motherhood trap, as women exit the labor market presumably to assume a dominant role in caregiving even when they provide the highest income to the couple. Specialization theory is likely underestimating the gender differences that arise upon arrival of the first child.

5.4. Income loss for dual-earner couples

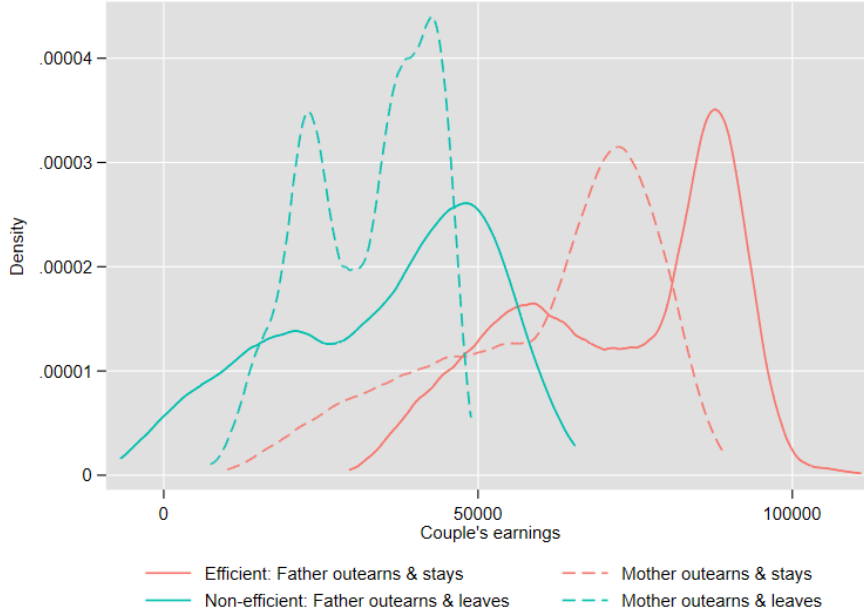
Finally, this section presents the results of a counterfactual exercise of considering dual-earner couples before childbirth and analyzing the changes in couple's income for transitioning to a single-breadwinner model after childbirth. Figure 11 depicts the estimated kernel densities of the couple's total labor income one year after childbirth by couples' relative income and efficiency in the transition to a single-breadwinner model.¹⁷

I conceptualize as efficient transitions (pink lines) those in which the father out-earned the mother pre-child (continuous lines) and the couple moves to a male-breadwinner model, and also those in which the mother out-earned (dashed lines) and the couple moves to a female-breadwinner model. Non-efficient transitions (depicted in green) are those in which the father out-earned and the couple moves to a female-breadwinner model, and those in which the mother out-earned and the couple moves to a male-breadwinner model.

Moving from a dual-earner to a single-breadwinner model results in an income loss that is higher when the couple's allocation to employment is non-efficient based on pre-child characteristics. Couple's income would have been 54% higher if transitioning to female instead of male-breadwinner in couples where the mother had higher labor income before childbirth (i.e., moving from the green to the pink dashed line). On the other hand, couple's income would have been 48% higher if transitioning to male instead of female-breadwinner in couples where the father out-earned (i.e., moving from the green to the pink continuous line).

¹⁷These are the predicted values of couple's labor income at $t = 12$ from estimating equation 1 separately for the four group of couples (by mother's share groups and by single-breadwinner model).

Figure 11: Couple's income by efficiency in transition after childbirth



Notes: The Figure shows the estimated kernel densities of the couple's total labor income one year after childbirth by couples' relative income and transition to single-breadwinner. Sample is composed of dual-earner couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

Additionally, of the total couples transitioning to a non-efficient single-breadwinner model 73% are explained by the mother opting-out of the labor market even when she had higher labor income than the father. The remaining 17% of non-efficient couples are explained by transitions to female-breadwinner couples even when the father had higher labor income.

6. Conclusion

Labor dynamics around childbirth have been widely studied and evidence is conclusive on the negative effects for mothers and the absence of effects for fathers in both developed and developing countries. While most of this literature has focused on individual labor trajectories, couples play a key role to understand the labor market decisions around childbirth. This paper relies on matched administrative data of birth certificates and formal labor trajectories and applies an event-study approach to investigate the parenthood effects on couples' labor trajectories.

The results indicate a significant decrease in the probability of being a dual-earner couple explained by an increase in the probability of male-breadwinner model. Consistently, there are almost no effects on couple's total labor income but a significant decrease in the mother's contribution to total income. This paper further provides empirical evidence aiming at rationalize

the different theoretical models on family economics. I consider two measures of within-couple heterogeneity. Couple's relative education and the mother's share of couple's income are used as proxy of labor market productivity. Results provide robust evidence of a motherhood trap: persistent negative effects on the probability of dual-earner couples are evident for all groups of couples, mostly explained by a transition to a male-breadwinner typology. There is evidence on the decrease in female-breadwinner model even in couples where the mother is more productive in the labor market than the father. This further result in important potential efficiency gains if couples were to behave based on their comparative advantages. For instance, couple's income would have been 54% higher if transitioning to female instead of male-breadwinner in couples where the mother out-earned.

The empirical evidence provided in this paper gives little support to the specialization theory. The comparative advantage theory fails to fully account for why women continue to shoulder a disproportionate burden of childcare. Even in couples expected to divide household tasks in a gender-neutral way, parents do not specialize according to their comparative advantage and negative effects on formal employment are evident for all group of couples mostly explained by women exiting the formal labor market. Identity theory and social norms on gender roles provide an interesting framework to understand the motherhood trap. Identifying and tackling those factors appears as a key issue to reduce gender labor gaps and unlock the society's full potential by allocating talents more efficiently.

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7. Appendix

Table A.1: Descriptives at first childbirth

	Mean	SD	Obs.
<i>Birth' characteristics</i>			
Capital city	0,39	0,49	43802
Public health	0,12	0,33	43800
<i>Mothers' characteristics</i>			
Mothers' age	28,6	6,0	43807
Attending educ	0,06	0,24	40868
Primary level	0,07	0,25	43096
Lower Secondary level	0,20	0,40	43096
Upper Secondary level	0,35	0,48	43096
Tertiary level	0,4	0,5	43096
<i>Fathers' characteristics</i>			
Fathers' age	31,28	6,58	43807
Attending educ	0,04	0,20	39797
Primary level	0,14	0,34	40598
Lower Secondary level	0,26	0,44	40598
Upper Secondary level	0,34	0,47	40598
Tertiary level	0,26	0,44	40598

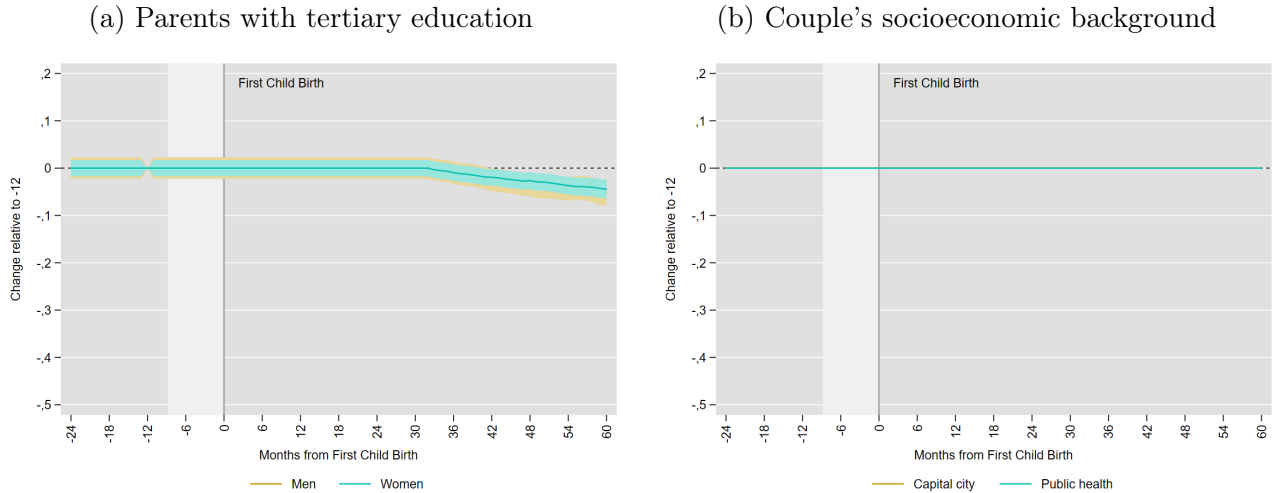
Notes: The Table shows the mean, standard deviation, and number of observations for the main characteristics at childbirth. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

Figure A.1: Distribution of mother's share by couple's relative education



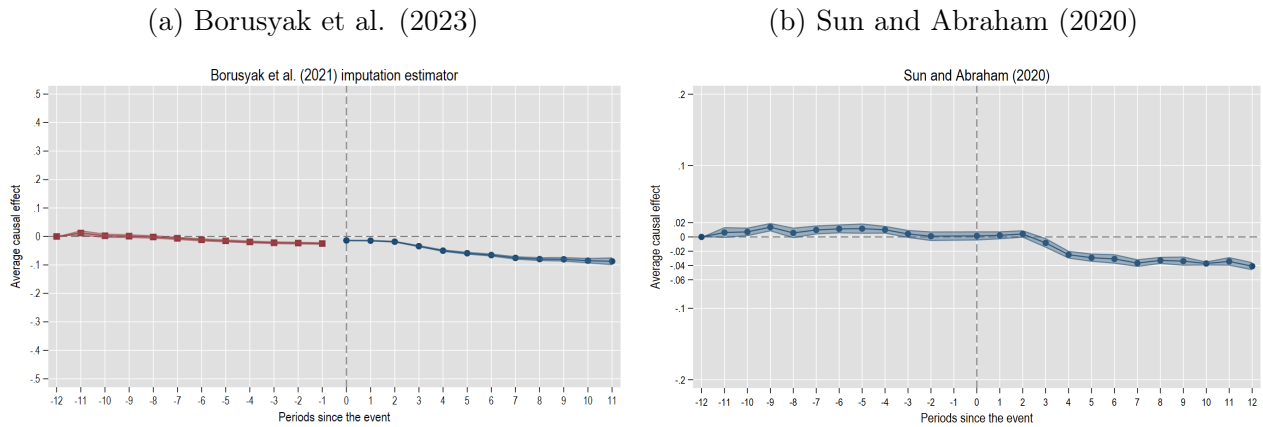
Notes: The Figure shows the estimated kernel densities of the mother's share of couple's total labor income prior to childbirth by couples' relative level of education. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

Figure A.2: Sample composition. Effect on predetermined characteristics.



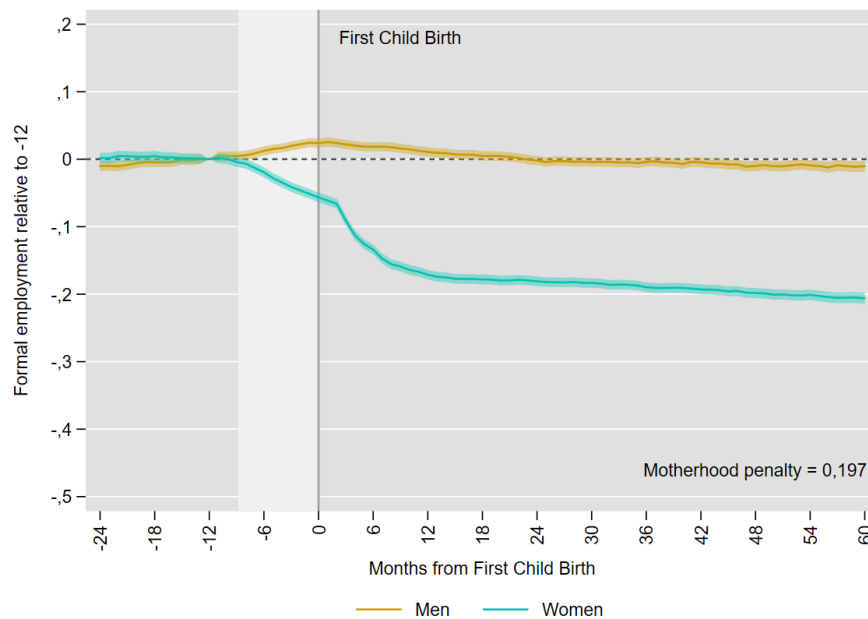
Notes: The Figures show the β_τ coefficients resulting from regressing each predetermined characteristic on the relative time variable $y_{it} = \sum_{\tau \neq -12} \beta_\tau I(e_{it} = \tau) + \varepsilon_{it}$ where the omitted variable is the year before childbirth. Ninety-five per cent confidence intervals are based on robust standard errors. Selected variables indicates whether the parents reached at least tertiary level, whether the childbirth occurred in the capital city -Montevideo-, and in a public hospital (proxy of low socioeconomic background). All outcomes correspond to characteristics at childbirth. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

Figure A.3: Alternative TWFE specifications: Parenthood short-term effects on dual earner couples



Notes: The Figure shows the monthly parenthood effect relative to the year before childbirth. Ninety-five per cent confidence intervals are based on robust standard errors. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.

Figure A.4: Parenthood effects on individual formal employment



Notes: The Figure shows the parenthood effect relative to the year before childbirth as a percentage of the counterfactual outcome of individuals without children. Age and period (month and year) fixed effects included as control variables. Ninety-five per cent confidence intervals are based on robust standard errors. Sample is composed of couples who had their first biological child between January 2014 and December 2018, were living together and were between 16 and 49 years of age at childbirth. Data from birth certificates of the Ministry of Health and formal labor registries of the social security institute.