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Carole Bonnet, Léa Dubreuil, Bertrand Garbinti, Pierre Pora

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CREST
Center for Research in Economics and Statistics
UMR 9194

5 Avenue Henry Le Chatelier
TSA 96642
91764 Palaiseau Cedex
FRANCE

Phone: +33 (0)1 70 26 67 00
Email: info@crest.science
https://crest.science/

Child Penalty & The Rise in Within-Couple Income Inequality *

Carole Bonnet Léa Dubreuil Bertrand Garbinti Pierre Pora

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Abstract

Using a rich administrative dataset representative of the French population, we study the causal impact of the first childbirth on the within-couple inequality in France. We find that women's contribution to total household income 5 years after the birth of their first child is 16% lower than what it would have been absent children. Both partners experience an income loss after childbirth, driven by a decline in working hours. However, the drop is much larger for women: 23% for women and 4% for men five years after childbirth. The drop in woman's contribution to total household income after childbirth is more pronounced for women with a higher contribution to couple's income before childbirth. This is both because the child penalty is higher for these women compared to others, and because their partners experience the largest increase in income following childbirth compared to other partners. Moreover, heterogeneous responses across couples reshape the entire distribution of within-couple inequality, notably through a sharp decline in the share of egalitarian couples, while the share of female-breadwinner couples slightly decreases but remains closed to its already low level.

JEL Codes: J12, J13, J16, J22, J71

Keywords: *child penalty*, *gender inequality*, *within-couple inequality*, *gender norms*, *marital specialization*

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1 Introduction

The gender earnings gap has decreased over the last decades but it is still persistent (Blau and Kahn (2017)). Meanwhile, the contribution of children to the gender earnings gap has increased in the developed countries (Kleven et al. (2024)), attracting a a lot of attention in the literature (Kleven et al. (2019a,b); Sieppi and Pehkonen (2019); Rabaté and Rellstab (2022); Pora and Wilner (2025)). Children have been found to have a much greater impact on women's career trajectories than on those of men (Cortes and Pan (2023)), with a persistent effect over time. Five to ten years following childbirth, child earnings penalties for women reach 21% in Sweden, 44% in the UK and even 61% in Germany (Kleven et al. (2019a)).

While most of the literature on child penalties focuses on estimating the effects of childbirth separately for mothers and fathers, much less attention has been paid to its consequences at the couple level. Yet, within-couple income inequality matters greatly. It shapes family decision-making by influencing each partner's bargaining power, often proxied by their share of household income. These decisions include labor supply, savings, and portfolio choices (Bertocchi et al., 2014), and even the decision to divorce (Foster and Stratton, 2021). Moreover, within-couple inequality has direct implications for economic security, as it determines how vulnerable each partner is in the event of a breakup (Bonnet et al., 2021).

Moving from estimating child penalties to understanding their impact on within-couple inequality is not straightforward. Simply comparing the average child penalty for men and for women does not suffice to infer how parenthood affects income inequality within couples.

Within-couple inequality is first shaped by partner matching. At the beginning of the union, differences in partners' relative incomes often already exist. As couples age, these inequalities evolve, reflecting changes in each partner's labour supply. Childbirth is a major turning point, as it has a stronger effect on mothers' labour supply than on fathers' (Ponthieux and Meurs (2015)), but the extent to which it increases within-couple income inequality remains poorly documented. There are indeed few studies examining how childbirth affects women's share of household income. In Sweden, Angelov et al. (2016) find that women's share is halved right after childbirth and remains substantially lower 15

years later. Musick et al. (2020) find also declines in Germany, the UK, and the US.[1] Yet, despite suggestive evidence of heterogeneity by education, the extent to which these effects differ across other couple characteristics remains underexplored. How much within-couple inequality increases may depend on each partner's characteristics and their interaction, as labour supply decisions are influenced by the partner's attributes (Bredemeier and Juessen, 2013; Turon, 2022). This is especially true for couples in which women outearn their husbands. Two competing theories apply. According to specialization theory, women who outearn their husbands before childbirth should maintain their labour market position afterwards. In these couples, within-couple inequality should remain the same or even increase in favour of women. However, the literature suggests otherwise: women who were main breadwinners before childbirth do not maintain this advantage (Artmann et al. (2022); Galván and García-Peñalosa (2024)). Recent research highlights the role of gender norms in shaping labour division and reinforcing traditional roles, especially after childbirth (Akerlof and Kranton (2000); Bertrand et al. (2015); Andresen and Nix (2022)). Women who outearn their husbands may reduce their labour supply following childbirth more than other women to compensate for violating traditional norms.

This article aims to quantify how the birth of the first child shapes within-couple income inequality and whether this effect varies across couples. By examining couples according to their relative income positions before childbirth — with a particular focus on those in which the woman was the main earner — we also investigate wether these effects may reflect and reinforce prevailing gender norms.

Our contribution to the growing literature on within-couple income inequality is threefold. First, we evaluate the causal impact of first childbirth on within-couple income inequality, measured as the woman's share of total household income, in France. To clarify the effect of childbirth on within-couple inequality, we first examine how childbirth affects the income trajectories of both partners. While most studies on the child penalty have thus far focused on women, it is equally important to consider changes in men's labour supply. We then adopt a gender norms perspective to study how child penalty and the resulting within-couple inequality may vary across couples. Specifically, we investigate the discontinuity around the 0.5 income share threshold, which may reflect prevailing gender norms (Bertrand et al., 2015; Doumbia and Goussé, 2021), driven by an aversion to

[1] In the year following childbirth, women's share of household income falls by by 28% in Germany, 12% in the UK, and 8% in the US.

situations where women earn more than their husbands. Finally, we show how heterogeneity in the effect of childbirth on within-couple inequality across couples reshapes the whole distribution of women's contribution to total household income.

Based on an event-study approach with individual and time fixed effects, we find that the evolution of the woman's contribution to total household income falls by 16% six years after their first child, compared to what would have happened had they not had a child. This decline results from income losses for partners, but is much more pronounced for women: five years after childbirth, mothers' incomes decrease by 23%, compared to a 4% decrease for fathers. These income declines are driven by reductions in working hours, for both mothers and fathers. The impact on within-couple inequality is larger among couples where women contributed more to household income before birth, contradicting specialization theory but aligning with explanations based on gender norms. Leveraging our ability to track both partners, we show that the decline among couples in which women held a more favorable relative position is driven not only by a higher child penalty for women, but also by a greater increase in men's income. This different effect of childbirth following divorce across couples reshapes the whole distribution of within-couple inequality by sharply reducing the proportion of egalitarian couples, defined as couples where women contribute between 45% and 55% of the total resources. The already low proportion of women contributing more than 55% to the couple's total income also decreases, although to a lesser extent. Women who earned substantially more than their partners before childbirth tend to remain the primary earners.

The remainder of the paper is organized as follows. Section 2 describes our data and our identification strategy. We then present our main results on the effect of the first childbirth on within-couple income inequality in Section 3 and the results linked to gender norms in Section 4. Section 5 concludes.

2 Data and methodology definitions

2.1 Data and sample definitions

Data

Our analysis is based on a representative longitudinal dataset of the French population, the Echantillon Démographique Permanent (EDP). It contains information on individuals born on January, 2nd to 5th, April, 1st to 4th, July, 1st to 4th and October, 1st to 4th. They are qualified as EDP-individuals. As such, the EDP includes approximately 4.4% of the French population. This rich administrative database combines matched employer-employee data, demographic data and income tax returns. The matched employer-employee data basis, the *Déclarations Annuelles de Données Sociales* (DADS), collects information about jobs and employee characteristics, such as the number of hours worked, wages, activity sector, professional social categories. The demographic data gathers information on the civil status of EDP-individuals, and of particular interest for us, the year of birth, number and date of birth of children.

The income and housing tax returns are available from 2010 onwards. They include information declared by individuals to the French tax authorities: marital status, place of residence, gender, information on taxable income and its composition (wages and self-employment earnings, unemployment benefits, taxable capital income). Through the housing tax returns, we also have fiscal information for all the other members of the same EDP-individual's household (living in the same dwelling). It is particularly useful as if married people, or people in a civil union relationship (called *Pacs*) fill in their tax return jointly (all the information on the EDP individual's partner is available on the same income tax file), it is not the case for cohabiting partners. In that case, the EDP-individuals and their partner fill in two different income tax files but as they are living in the same dwelling, we are able to collect information on both of them.[2]

Samples definition

To build our sample, we restrict the analysis to individuals aged 20 to 45, in different-sex couples, and who all have a first child between 2013 and 2019 (See Section 2.2). We

[2]See Appendix A for more details on identifying cohabiting couples.

consider individuals who are observed at least 2 years before and up to childbirth[3]. The main rationale for this choice is that, for children born in the beginning of a calendar year, the maternity leave is likely to have begun the calendar year just before, thereby impacting some couples the year before childbirth. We also exclude women or men with no income before childbirth. Empirically, about 17% of couples were observed with either one or the other partner, usually the woman, with no income at some point before birth.[4] We winsorize the top 1% of women's and men's income each year. The main sample then includes all active parents before childbirth, aged between 20 to 45 years old, for whom we have information at least two years before childbirth. In the end, this sample allows us to follow 68,533 couples over time.

When we run analysis stratifying by the situation in $t-2$, for instance by their position in the within-couple inequality distribution, we apply additional restrictions to avoid usual issues of reversion to the mean. We compute the variation of the share between $t-3$ and $t-2$ and drop couples with the extreme 10% variation (at the top and at the bottom). We qualify this sample as the stable sample. This sample allows us to follow 32,615 couples whose income we track over time.

Our analysis covers parents with a first child born between 2013 and 2019, i.e., 7 cohorts. Figure 1 shows the years for which each cohort is observed both before and after childbirth. Our study period starts 8 years before childbirth and ends 6 years after, from 2011 to 2019.

Descriptive Statistics

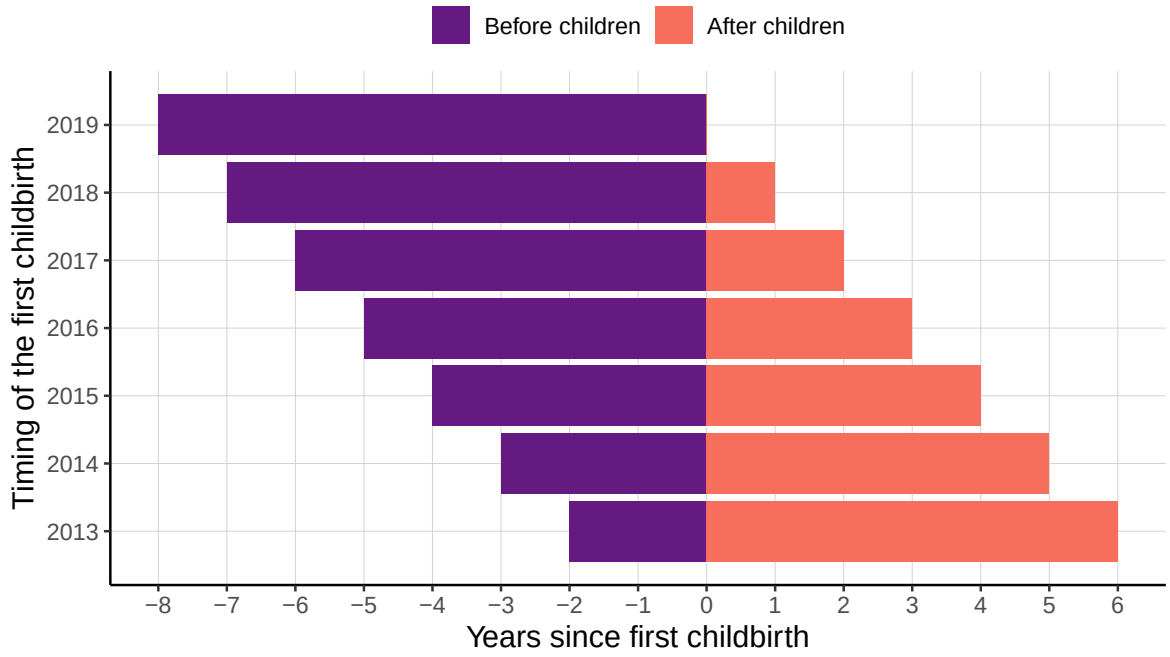
Our variable of interest is within-couple income inequality. Income includes wages, self-employment earnings, and unemployment benefits. In particular, it includes maternity and paternity leave allowances that are tied to wages and self-employment earnings, but it excludes parental leave benefits.

Table 1 characterizes each cohort defined by the timing of the first child's birth. It contrasts two different approaches to these cohorts. The first one describes them as they

[3]The panel is not balanced. When the income of one of the partners is missing, we do not keep the observation for the couple since we cannot compute its total income. When the partners separate, we also exclude the observation for the couple since our population of interest is partners in couples.

[4]In Figure 13 in Appendix C, we compare our baseline results to those obtained on the entire population of couples, without excluding those of which one partner is without income before childbirth. The resulting estimates appear very consistent with our baseline approach.

Figure 1 – Time-period of observation for each cohort, relative to the first childbirth



are observed in the population, using sampling weights. The second one uses a different weighting scheme. As Subsection 2.2 clarifies, identification of the child penalty rests on comparisons across these cohorts, within parents' birth cohorts. To implement this, we reweight the data using inverse probability weights based on an estimated propensity score that quantifies the probability that each couple belongs to one of the different cohorts defined by the timing of the first child's birth, given the parents' birth cohort.

The most striking difference between these two approaches is that while there is very little variation across cohorts in parents' age at first birth as observed in the population, when we condition on parents' birth cohort those whose first child was born in 2019 were clearly older at that point than those whose first child was born in 2013 were in 2013. Specifically, while on average the age at first birth was about 30 years for women and 32 for men, once we condition on parents' birth cohort, this age varies from 28 years for women and 30 years for men in the earliest cohort of couples whose first child was born in 2013, to over 33 years old for women and over 35 years old for men in the last cohort of couples whose first child was born in 2019.

As a result, when comparing labour outcomes as observed in 2011, without conditioning on parents' birth cohort, those whose first child was born later were less likely to be employed (for women) and had lower earnings (for both genders). This is mostly due to them belonging to younger cohorts, as the sign of the difference reverses when we condition

on parents' birth cohorts. With inverse probability weights, and thus within birth cohort, parents whose first child was born later had a higher employment rate (for women) and higher earnings (for both genders).

However, both these selection and composition effects appear common to both genders. As a result, they matter very little for our main outcome which is the ratio of women's individual income to the sum of both partners' individual incomes. Indeed, this outcome appears remarkably similar across cohorts, regardless of the weighting scheme: before having children, this share amounted to 0.44 on average across all cohorts.

Table 1 – Summary statistics: by timing of the first child's birth

			2013	2014	2015	2016	2017	2018	2019
Observed		Woman's share of income	0.44	0.44	0.44	0.44	0.44	0.44	0.44
	Women	Age at first birth	30.1	30.2	30.2	30.3	30.4	30.4	30.5
		Yearly salaried employment	0.80	0.79	0.78	0.72	0.69	0.67	0.68
		Weekly employment	0.73	0.72	0.71	0.64	0.60	0.60	0.58
		FTU employment	0.70	0.69	0.68	0.60	0.57	0.57	0.56
		Individual income	20,600	20,600	19,800	19,000	18,400	17,900	17,800
	Men	Age at first birth	32.2	32.1	32	32.1	32.1	32.2	32.2
		Yearly salaried employment	0.89	0.89	0.91	0.90	0.90	0.91	0.91
		Weekly employment	0.82	0.82	0.85	0.83	0.83	0.82	0.82
		FTU employment	0.81	0.82	0.84	0.82	0.81	0.81	0.80
		Individual income	26,100	26,500	25,100	23,900	23,200	23,100	22,500
Reweighted		Woman's share of income	0.44	0.44	0.44	0.44	0.44	0.44	0.45
	Women	Age at first birth	28	28.9	29.6	30.50	31.4	32.4	33.5
		Yearly salaried employment	0.66	0.70	0.74	0.73	0.76	0.79	0.82
		Weekly employment	0.60	0.63	0.67	0.66	0.66	0.71	0.72
		FTU employment	0.57	0.60	0.64	0.62	0.62	0.68	0.70
		Individual income	18,400	19,200	19,300	19,400	19,400	19,500	20,200
	Men	Age at first birth	29.9	30.7	31.3	32.3	33.2	34.2	35.3
		Yearly salaried employment	0.90	0.90	0.92	0.90	0.89	0.90	0.90
		Weekly employment	0.82	0.82	0.85	0.83	0.82	0.82	0.82
		FTU employment	0.81	0.82	0.84	0.82	0.80	0.81	0.80
		Individual income	23,500	24,900	24,700	24,400	24,300	25,200	24,900

Individual labor outcomes and women's share of income are measured in 2011. *Population.* Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

2.2 Empirical strategy

Our empirical strategy follows the event-study approach to the child penalty inaugurated by Angelov et al. (2016) and Kleven et al. (2019a). This approach leverages variation in the timing of the first child's birth across couples and individuals to identify the causal effect of parenthood on parents' labor outcomes and within-couple income inequality. Specifically, we rely on heterogeneity in the timing of the first childbirth conditional on the birth cohort of both spouses. In other words, the identifying variation occurs across couples of which all men (women) are the same age. Couples who remain without children are thus excluded from this comparison.

This approach relies on both a conditional parallel trends assumption, that states that, absent children and conditional on the birth-cohort of both spouses, all couples would follow similar trends in labor outcomes and within-couple inequality, and a limited anticipation assumption, that assumes that children cannot impact their parents' labor outcomes before they are born. Specifically, we assume that children cannot impact their parents' behavior before the last calendar year preceding the birth of the first child. The reason for this is that for children born in the beginning of a calendar year, the relevant maternity leave period is likely to have started the calendar year just before.

Because our approach assumes that the anticipated impact of children on their parents' labour outcome is 0, it discards the fact that women could self-select into different occupations based on their anticipated fertility long before they have children (Adda et al., 2017), which contributes to them earning less than men. However, before they have children, such self-selection tends to result in lower hourly wages rather than lower labour market participation. Because labour supply decisions contribute much more to the effect of motherhood on women's labor earnings, this slight violation of our limited anticipation assumption may only lead to a small underestimation of the impact of children on within-couple inequality.

Another concern is that because the timing of the first child's birth is not randomly assigned, for instance due to exogenous success in IVF implementation (Lundborg et al., 2017). Couples may choose to have children based on both partners' unobserved expected labour market trajectories. This would be the case if, for instance, couples are more likely to become parents when they anticipate some kind of career stagnation for the woman. Recent evidence based on IVF suggests that this is a reasonable assumption (Lundborg et

al., 2024). However, the IV approach based on IVF focuses on quantities that may differ from those upon which the child penalty literature focuses, and a careful comparison of both approaches concludes that their conclusions match when it comes to within-couple gender gaps, which are of particular interest for our paper (Bensnes et al., 2023).

As de Chaisemartin and D'Haultfoeuille (2020); Sun and Abraham (2021); Callaway and Sant'Anna (2021) show, together the parallel trends assumption and the limited anticipation assumption are sufficient to identify the dynamic average causal effects of parenthood on parents. Such average causal effects may however, differ markedly from the coefficients of the usual event-study two-way fixed effects linear regression if the causal effects are heterogeneous across cohorts defined by the timing of the first childbirth. The reason for this is that the identification of such coefficients entails two types of comparisons: first, comparisons between treated cohorts and cohorts that have not yet been treated, and second, comparisons across cohorts that have already been treated. The latter are only valid if average causal effects are the same across cohorts: violations of this assumption can lead to substantial bias. However, when this assumption holds, relying on both types of comparisons is likely to yield additional statistical efficiency with respect to estimators that only rely on the former. An additional benefit of this homogeneity assumption, when it holds, is that it allows the identification of additional quantities, namely dynamic effects at longer horizons, both before and after the start of the treatment. A tradeoff therefore exists between estimators that are robust to heterogeneous effects, but less efficient when effects are homogeneous, and estimators that are biased under heterogeneous effects, but offer efficiency gains when effects can be considered as homogeneous.

In this paper, we rely on the additional homogeneous effect assumption to back our decision to rely on an estimator that belongs to the latter category. Our robustness checks include comparisons between our preferred estimator and an estimator robust to heterogeneous effects, borrowed from the recent difference-in-differences literature. The lesson from this comparison is that the estimates obtained from both types of estimators are compatible. This suggests that the homogeneity assumption is not rejected by the data, which allows us to benefit from the efficiency gains of our estimator.

In the end, our approach relies on a two-step estimator:

1. We estimate $\mathbb{P}(C_h = c \mid B_h^M, B_h^F)$, the probability for couples to have their first child born during year C_h equals to $c \in [\![2013, 2019]\!]$, given the birth cohort of both

spouses. This (multidimensionnal) propensity score is estimated using an ordered logit model that takes as covariates the year of birth of each spouse, as well as their interaction.

2. Using inverse probability weights that rely on the estimated propensity score, we estimate:

$$Y_{ht} = \sum_{s \notin \{-7,-2\}} \beta_s \mathbb{1}\{t = C_h + s\} + \lambda_h + \mu_t + \epsilon_{ht} \tag{1}$$

where Y_{ht} represents the relevant outcome for household h during calendar year t, C_h is the year of birth of the couple's first child, λ_h corresponds to a couple-level fixed effect and μ_t is a non-parametric time trend that will capture any trend related to either calendar time or the age of both spouses. To do so, we rely on ordinary least squares using the within estimator. Due to multicolinearity issues, two coefficients have to be omitted in the pre-treatment period (see Borusyak et al., 2024, Proposition 1).[5]

The inverse probability weighting ensures that all the comparisons we make are conditional on the birth cohort of both spouses. The β_s coefficients in 1 identify the dynamic average causal effects of parenthood under the conditional parallel trends assumption, the limited anticipation assumption and the homogeneous causal effects assumption.

Finally, standard errors are estimated using a random weighting bootstrap approach (Shao and Tu, 1995) with 200 replicates.

3 Main results

3.1 How does childbirth affect income inequality within the couple?

The estimated coefficients of the regression (Equation 1, Section 2.2) are plotted in Figure 2. The share of the woman's income in the total household income, expressed in percentage points, decreases after the birth of the first child. 2 years before childbirth, woman owns 46% of the total household income. During the birth year, the ratio decreases to 43%, corresponding to a decrease of 3 percentage points. 5 years after the event, the woman contributes to 38% of the household income (which corresponds to a decrease of 8

[5] More precisely, we set to zero the coefficient for the period $t-2$ and $t-7$.

percentage points from pre-child level). There is no pre-trend before $t-2$, but an effect is visible one year before childbirth. This is mostly driven by households who have their child early in the year: women spent a majority of their maternity leave in year $t-1$.[6]

In order to know how much percentage this evolution represents, we use the conversion proposed by Kleven et al. (2019a). We first compute the counterfactual outcome.

$$Y^c = \hat{Y}_{ht} - \hat{\beta}_s$$

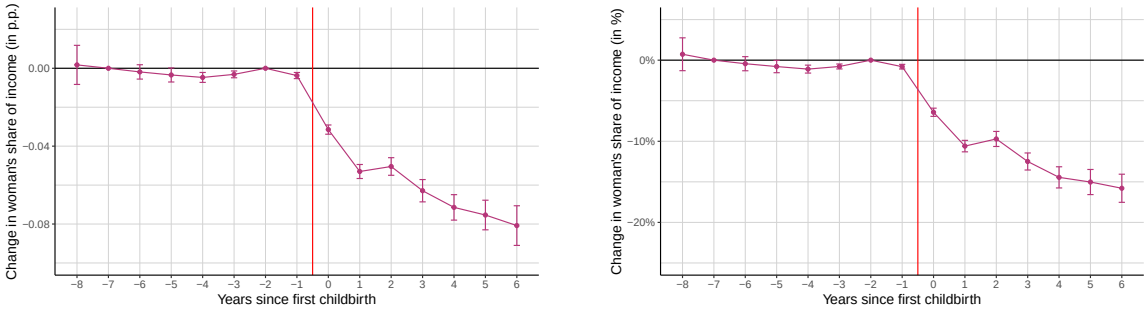
Where $\hat{Y}_{ht}$ is the predicted outcome from equation 1. β_s corresponds to the estimated coefficient associated to the timing to the event. We then are able to compute the change between the predicted and the counterfactual outcome:

$$Change = \frac{\hat{Y}_{ht} - Y^c_{ht}}{Y^c_{ht}}$$

The evolution of the woman's contribution to total household income decreases by approximately 15% five years after childbirth, compared to what would have happened absent of child (Figure 2b).

Figure 2 – Evolution of the female's share within total household income

(a) in percentage points **(b)** in percentage



NOTE. Share 2 years before childbirth: 45%. Average counterfactual share after childbirth: 47%. *Population.* Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

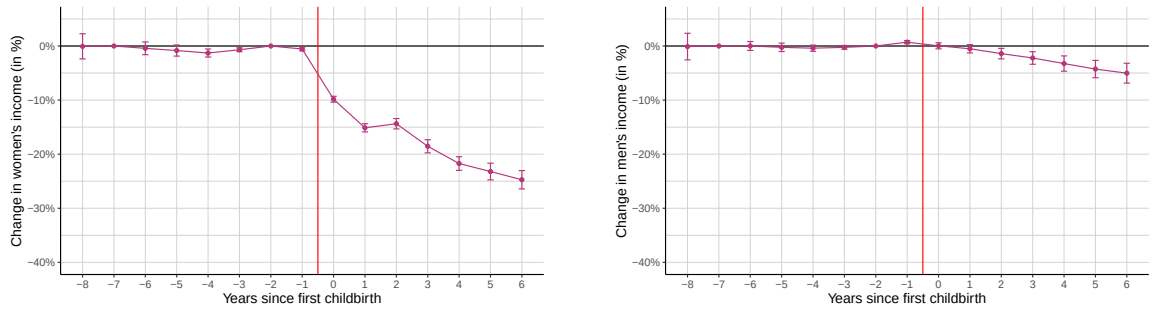
Childbirth increases within-couple income inequality (Figure 2). However, since this measure reflects the ratio of the woman's contribution to the couple's total income, it is essential to identify the main driver of this evolution. Is it driven by changes in the woman's income, the man's income, or both?

[6]We also distinguish women according to having a child at the beginning or at the end of the year (from July to December). Results are very similar.

Figure 3 represents the results for female and male income using the same TWFE approach as before. Five years after childbirth, female income decreases by 23% as compared to pre-birth levels. The income loss of women is of the same order of magnitude as previous findings in the literature (Pora and Wilner (2025); Meurs and Pora (2019)). Figure 3 also shows the evolution of male income after childbirth. We find no impact the year of birth. However, the trend is decreasing: males also lose income several years after the birth of the child. Five years after childbirth, we observe a decrease in men's income of 4% compared to pre-birth levels. Previous research has shown a stable income trajectory or a slight increase for men, while we find here a small decrease. One explanation for this difference could be that income trends are not exactly the same for men who have their first child early in their career compared to those who have it later. Men who have a first child early in their career may have a return to experience a bit higher than those who become fathers later. Once this difference is accounted for through our fixed effect approach, male income appears to follow a slightly decreasing trend. In conclusion, the fact that the income loss is much more pronounced for women drives the increase in within-couple inequality.

Figure 3 – Evolution of female and male income

(a) Female income (in percentage) **(b)** Male income (in percentage)



NOTE: These figures plot the evolution of income in percentage for women (Panel A) and men (Panel B). For females, the average income 2 years before childbirth is €21,700. For males, it is €26,200. The corresponding average counterfactual post-birth values are €26,300 and €30,800.
Population. Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

This drop in income for both women and men is explained by a significant decrease in working hours. Figure 4 plots the results of a TWFE regression for females and males with working hours as a dependent variable. [7] Women work approximately 20% fewer

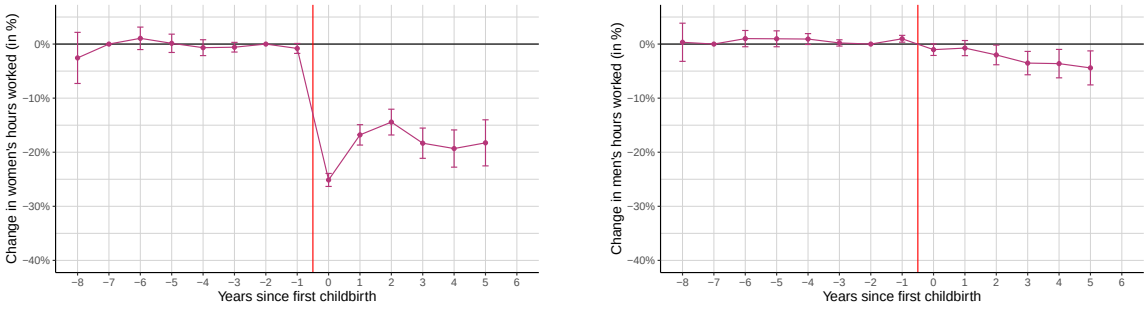
[7] Information on working hours is only available for the EDP-individual. Unfortunately, we do not have this information for his or her partner (see Section 2.1 for details)

hours (Figure 4)[8]. Men also gradually reduce their working hours, but the magnitude is considerably different: it amounts to a decrease of approximately 5% (Figure 4). Therefore, the loss in income is driven by a reduction in working hours for both women and men, but, as with income, the effect is much more pronounced for women.[9]

These results are robust to different estimators that allow for heterogeneous effects across cohorts (see Subsection 2.2): see Figure 15 in Appendix C that compares our baseline results to estimates obtained using (i) the doubly-robust estimator suggested by Callaway and Sant'Anna (2021) and (ii) the two-stage imputation estimator suggested by Gardner et al. (2024), that is numerically equivalent to that of Borusyak et al. (2024) with inference based on a conventional GMM asymptotic framework.

Figure 4 – Evolution of female and male annual working hours

(a) Female hours worked (in percentage) **(b)** Male hours worked (in percentage)



NOTE: These figures plot the evolution of working hours in percentage for women (Panel A) and men (Panel B). For females, average working hours 2 years before childbirth amount to 0.52 full-time units. For males, they amount to 0.81 full-time units. The corresponding average counterfactual post-birth values are 0.58 and 0.84.
Population. Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

4 Heterogeneity of childbirth effect and gender norms

4.1 Heterogeneity of childbirth effect by marital status

So far, we have considered the entire population of couples without distinguishing by marital status. Yet, only 29% of these couples are married two years before the birth of

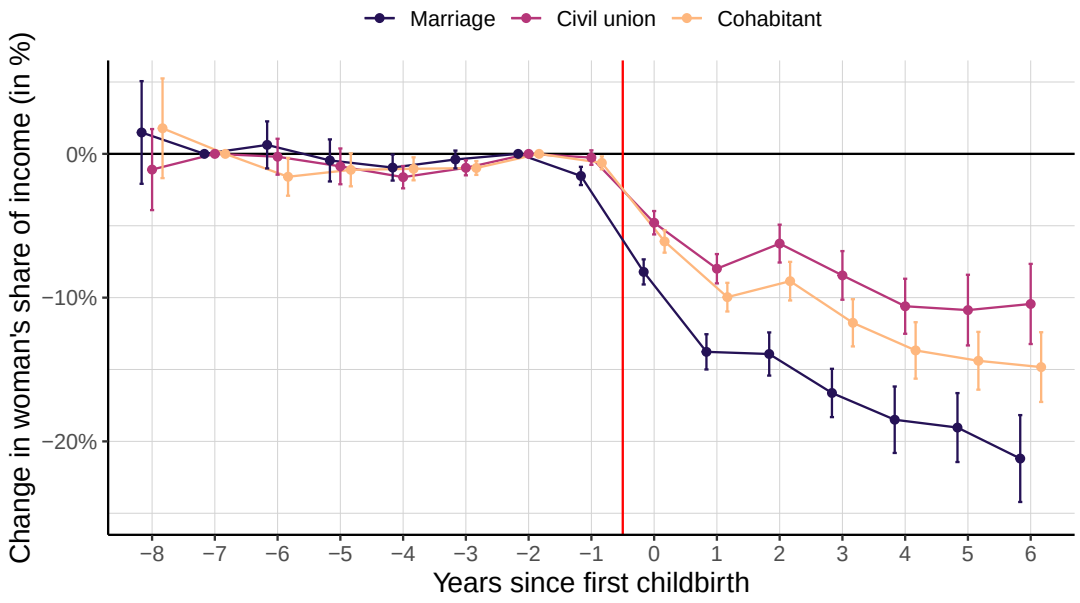
[8]We do not have information on working hours for t+6, as it takes one additional year for the administrative database containing hours to be matched with the rest of the data.

[9]This decrease in working hours does not result from a decrease in overtime hours (Figure 14 in Appendix C).

their first child. According to commitment theory (Cigno (2012)), the more protective legal framework that is offered by marriage may encourage greater specialization in mothers' labour supply, as income pooling or sharing (both during marriage and in case of divorce) is more ensured. In particular, spousal alimony in the case of divorce provides additional protection to the lower-earning partner, potentially inducing new mothers to reduce their labour supply.

To test this mechanism, we divide couples into three categories based on their marital status two years before childbirth: married, in a civil union, or cohabiting (see Section 2.1 for details). We find that five years after childbirth women's income share decreases most among married couples (by 20% relative to no-child counterfactual), compared to 15% for cohabiting couples and 10% for civil unions (Figure 5). While income losses are slightly larger for married women (Figure 6), men's income losses are similar across union types (Figure 6).

Figure 5 – Evolution of the female's share within total household income by marital status

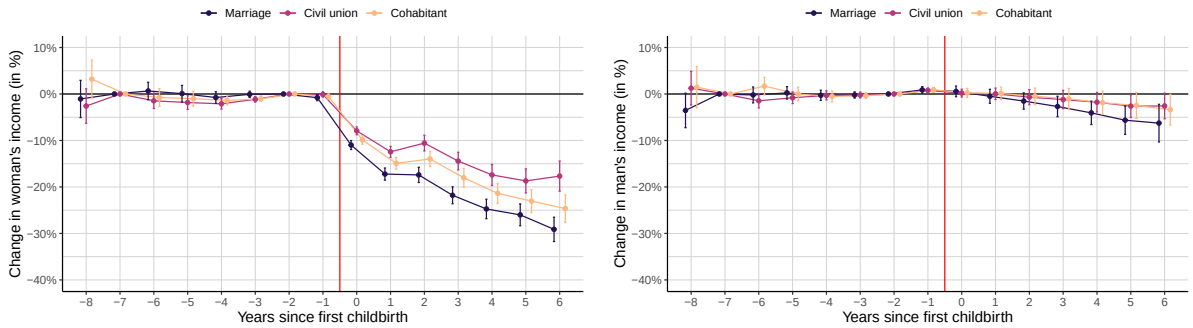


NOTE. Average share 2 years before childbirth: 45% (married), 45% (partnered) and 46% (cohabiting). Average counterfactual share after childbirth: 47% (Q1), 45% (partnered) and 47% (cohabiting). *Population.* Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

These results suggest that while the protective legal framework of marriage may reinforce specialization, significant increases in within-couple inequality also occur among

non-married couples. This indicates that institutional incentives alone do not drive the child penalty; rather, pervasive gender norms around motherhood and paid work likely play a key role.

Figure 6 – Evolution of female and male income following childbirth, according to marital status



NOTE: These figures plot the evolution of income in percentage for women (Panel A) and men (Panel B). For females, the average income 2 years before childbirth is: €22.300 (married), €23,200 (partnered), €20,700 (Q3) and €30,300 (Q4). The corresponding average counterfactual post-birth values are €27,400 (Q1], €27,200 (partnered) and €25,100 (cohabiting). For males, the average income 2 years before childbirth is: €27,700 (married) €28,500 (partnered) and €24,300 (cohabiting). The corresponding average counterfactual post-birth values are €32,700 (married), €33,000 (partnered) and €28,400 (cohabiting). *Population.* Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

4.2 Heterogeneity of childbirth effect by initial level of within-couple inequality

We may expect different evolutions following childbirth according to the initial level of within-couple inequality, especially for women who outearn their husbands. First, in line with the specialization hypothesis, these women who are the main breadwinners should maintain their position in the labour market even after childbirth. Other authors claim the opposite, in line with Bertrand et al. (2015). Women who outearn their husbands could also reduce their labour supply to compensate for breaking the norms by being the main breadwinner. The literature provides some indications for this behaviour. De la Vega (2022) observes that women's earning trajectories following childbirth are roughly the same, regardless of whether they were the main breadwinner or not. More recently, Galván and García-Peñalosa (2024) concludes that while the labour supply response of women who are main breadwinners is smaller immediately after childbirth compared to

women who are secondary earners, the two groups converge after 10 years. Artmann et al. (2022) reach a similar conclusion.

To analyze potential heterogeneous responses across couples, we compute quartiles of women's contribution to total household income in $t-2$ and $t-3$[10]. The levels of these quartiles are respectively: 41% (Q1), 47% (Q2), 53% (Q3). In the last quartile, women outearn their husbands.

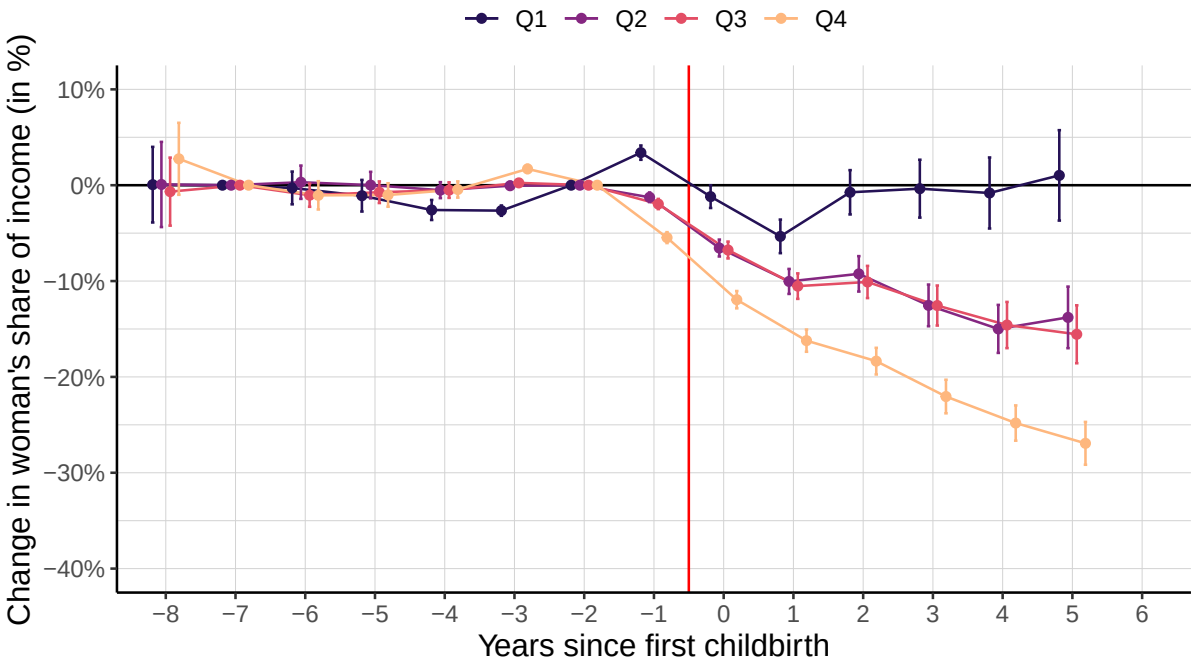
We observe that the effect of childbirth is more pronounced among couples in which women contributed more to total household income prior to childbirth (Figure 7). Specifically, the share of women's income in total household income decreases by 27% five years after childbirth, compared to a decrease of only 15% when the woman was the secondary earner. Because we are able to track both partners, we observe that the decline among couples in which women previously held a more favourable relative position is driven by changes in both women's and men's labour supply. While men's income decreases by 4% on average following childbirth, this decrease is much more dispersed than for women, ranging from -12% for men in highly specialized couple before childbirth (where women's contribution to total resources is low) to +20% when men were the second provider of resources (Figure 8). De la Vega (2022) obtain similar results for secondary earners males.[11] The evolution of women's income following childbirth is less different according to their relative contribution to the household income before childbirth. The decrease is more pronounced (30%) for women who outearn their husbands before childbirth, compared to 18% for those whose contribution was the lowest (Figure 8). In line with Galván and García-Peñalosa (2024), two explanations are possible. First, men may increase their labour supply to compensate for the decrease in total household income when women provided the highest income in the couple pre-birth. Second, men may increase their labour supply to re-establish a more traditional division of labour. Couples thus appear to conform to gender norms by reducing women's relatively more favourable income position prior to childbirth, through adjustments in both male and female labour market behaviours. For couples with the highest within-couple inequality before childbirth (first quartile of within-couple inequality), the level of inequality remains roughly the same. Both women and men in these couples

[10] Quartiles are computed for each birth cohort. They are very similar across years. We compute the quartiles in $t-2$ and $t-3$ to avoid some mean reversion issues.

[11] "Men who outearn their wives before childbirth tend to maintain stable labour-market trajectories, whereas men whose potential earnings are lower than their wives' before childbirth tend to increase their earnings and employment after childbirth, both at the intensive and extensive margins".

suffer a child penalty of the same magnitude (Figure 8).[12]

Figure 7 – Evolution of woman's contribution to total household income, according to the initial level of within-couple inequality



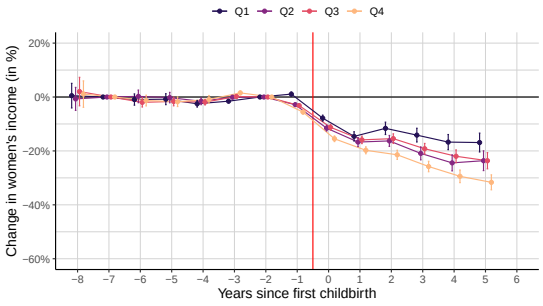
NOTE. Average share 2 years before childbirth: 35% (Q1), 44% (Q2), 50% (Q3) and 61% (Q4). Average counterfactual share after childbirth: 32% (Q1), 46% (Q2), 52% (Q3) and 67% (Q4).

Population. Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth, after excluding the 20% with the largest changes in woman's share of income between $t-3$ and $t-2$. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

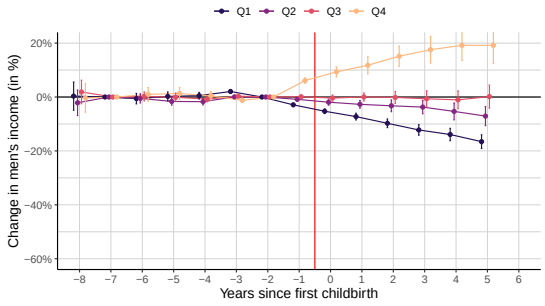
[12]We also document in Appendix B the evolution of within-couple inequality following childbirth by the initial position in the household income distribution. We observe that the within-couple inequality increases more after the birth of the first child among the richest couples (couples in the fourth quartile of the household income distribution), compared to the poorest ones. This effect is driven both by a lower child penalty for women and an increase in men's income in the first household income quartile compared to the others.

Figure 8 – Evolution of female and male income following childbirth, according to the initial level of within-couple inequality

(a) Female income (in percentage)



(b) Male income (in percentage)



NOTE: These figures plot the evolution of income in percentage for women (Panel A) and men (Panel B). For females, the average income 2 years before childbirth is: €18,500 (Q1), €22,900 (Q2), €25,200 (Q3) and €30,300 (Q4). The corresponding average counterfactual post-birth values are €20,800 (Q1], €27,200 (Q2), €29,900 (Q3) and €38,500 (Q4). For males, the average income 2 years before childbirth is: €35,400 (Q1) €28,800 (Q2), €25,400 (Q3) and €20,000 (Q4). The corresponding average counterfactual post-birth values are €42,900 (Q1], €33,000 (Q2), €28,800 (Q3) and €21,400 (Q4).
Population. Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth, after excluding the 20% with the largest changes in woman's share of income between $t-3$ and $t-2$. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

4.3 How does childbirth reshape the distribution of within-couple inequality ?

As previously shown, the effect of childbirth on within-couple inequality is not uniform across couples; it is more pronounced when the woman contributes more to total income prior to childbirth. To better understand how the distribution of within-couple inequality evolves following childbirth, it is necessary to further characterize couples in which the woman is the main breadwinner. Indeed, a woman earning more than her partner before childbirth may reflect a range of situations: her income might be only slightly higher than his, or the gap could be substantial. Therefore, a simple dummy variable indicating whether a woman outearns her spouse is not sufficient to capture the full variation in income dynamics.

We then first look at the potential discontinuity in the distribution of woman's contribution to total income at 0.5. As Bertrand et al. (2015) suggest, this discontinuity observed at 0.5 may reflect gender norms. Women who would outearn their husbands (women who contribute more than 50% to the household income) reduce their labour supply not to break the norm of being the secondary earners.

To investigate whether this discontinuity is related to the child penalty, we compare the observed distribution of within-couple income inequality after childbirth with a counterfactual distribution using an approach much akin to our baseline specification. Specifically, we split the $[0, 1]$ line into 40 bins of equal length, and estimate the predicted probability of falling within each of these bins by: (i) reweighting the data so that all estimates are based on within-parent's birth cohorts comparisons, as detailed in Subsection 2.2; and (ii) using a logit model that takes as covariates the same ones as in Equation 1, except that the couple-level fixed effects are replaced with cohort fixed effects defined by the timing of childbirth.[13] Finally, we average these probabilities over all years from the birth of the first child to quantify the impact of parenthood on the distribution of within-couple inequality.

We observe such a discontinuity at 0.5 in the distribution of relative earnings that would have been observed in the absence of children[14] (Figure 9). A first result is that gender norms already exist in the absence of childbirth. It seems that even before childbirth couples already care about gender norms and some of them avoid the situation where the woman earns more than the man.

The slight discontinuity at 0.5 persists after childbirth but is less pronounced (Figure 9) than what we would have observed in the absence of children. The entire distribution within a narrow range around 0.5 changes after childbirth. We define egalitarian couples as those where both partners contribute roughly the same amount of income, with the woman's share of the total couple's income ranging between 45% and 55%.[15]. We observe that the proportion of these egalitarian couples decreases sharply after childbirth.[16] Figure 10[17] illustrates how women move depending on their position in the within-couple inequality

[13] In the linear case with balanced panel data, this substitution is innocuous as the resulting estimator is numerically equivalent to that upon which our approach relies. In the nonlinear case, couples being tracked over a limited number of time-periods gives rise to an incidental parameter bias when relying on maximum likelihood estimation (Neyman and Scott, 1948). Here, given that the empirical strategy relies on comparisons across cohorts defined by the timing of the first childbirth, this substitution appears to be a reasonable way to mitigate this issue.

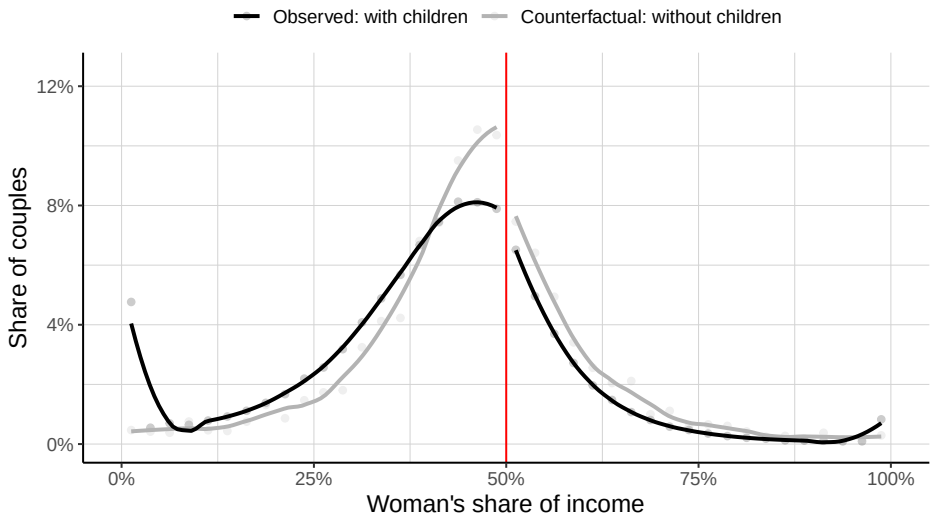
[14] We exclude equal earnings couples. Indeed, respectively on Swedish and American data Hederos and Stenberg (2022) and Binder and Lam (2020) show that excluding these couples eliminates the discontinuity. On our data, the discontinuity still holds even when we exclude equal earnings couples. We also check that the discontinuity still holds if we exclude self-employed couples. Zinovyeva and Tverdostup (2021) indicate that the observed discontinuity at 0.5 may also result from self-employed equalizing their earnings with a result of bunching at 0.5.

[15] Couples where women contribute between 50% and 55% of the total household income correspond to cases where women outearn their spouse by less than 22%.

[16] The distribution of relative earnings of women before and after childbirth including non-working women can be found in Appendix, Figure 16.

[17] We built Figure 10 using the same approach as for Figure 9: it relies on the predicted and counterfactual

Figure 9 – Distribution of within-couple inequality after childbirth: observed and counterfactual



NOTE: Distribution of woman's share of income averaged over the first six years following the birth of the first child.
Population. Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

distribution before childbirth[18]. Before childbirth, 41% of women contribute less than 45% to the couple's income. Around 40% are in egalitarian couples, with 23% contributing between 45% and 50%, and 17% between 55% and 60%. Finally, 18% of women contribute more than 55% to the couple's income, thus earning at least 22% more than their husbands. The biggest change is observed for the egalitarian couples, whose proportion decreases by 11 pp, to reach 30% after childbirth (Figure 10). The proportion of women significantly outearning their husbands (contributing more than 55% to the total household income before childbirth) decreases after childbirth compared to what would have been observed without childbirth, but with a smaller magnitude compared to other women. Moreover, some of these women experience a decrease in their relatively more favourable income position, but still remain the main earners following childbirth. Among women contributing between 0.55 and 0.6 (respectively between 0.6 and 0.75) to the total pre-birth household income, roughly two-thirds (respectively three out of four) maintain their first earner position within the couple. The proportion of women contributing more than 75% of the

probabilities of falling within each bracket of the within-couple inequality distribution in a two-way fixed effects logit model, but this time conditional on the initial position (in $t-2$ and $t-3$).

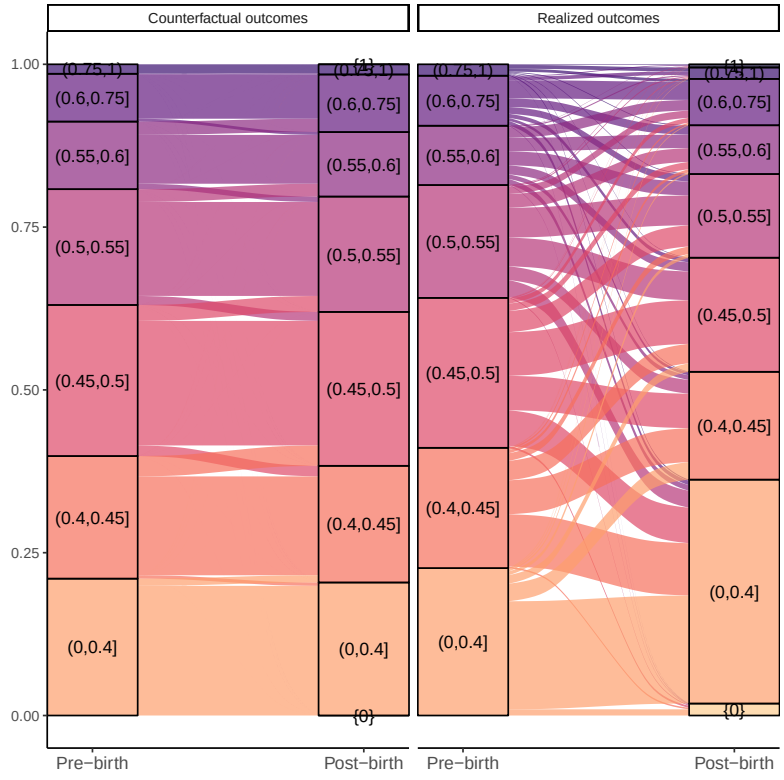
[18]We define the corresponding brackets according to the woman's share in total household income (Figure 10) : 0 ; (0-0,4] ; (0,4-0,45] ; (0,45-0,5] ; (0,5-0,55] ; (0,55-0,6] ; (0,6-0,75] ; (0,75-1].

total couple's income remains unchanged following childbirth.

These results may suggest that women who were in an egalitarian couple before childbirth, more specifically among them women who were in a more favourable relative income position could be more induced to follow this gender norm following childbirth. Whether this results from changing norms when becoming a mother or from it being easier to comply with gender norms when one is not too far from them, remains an unsolved issue.

As a result, the heterogeneous response to childbirth across couples reshapes the entire distribution of within-couple income inequality, notably leading to a marked drop in the share of egalitarian couples.

Figure 10 – Distribution of relative earnings of women before and after childbirth



NOTE: Distribution of woman's share of income averaged over the first six years following the birth of the first child, by initial level of within-couple inequality two to three years before childbirth.
Population. Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth, after excluding the 20% with the largest changes in woman's share of income between $t-3$ and $t-2$. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

5 Conclusion

This paper examines how the birth of the first child affects within-couple income inequality in France, a country of particular interest given its relatively similar fertility rates across socio-professional categories (Daguet, 2019) and a maternal employment rate close to the European average.[19] Using rich French administrative data and an event-study design, we compare couples who have children early versus later in life.

Our first finding is that childbirth increases within-couple income inequality, as measured by the woman's share of household income. While both partners experience income declines following childbirth, the drop is substantially larger for women: five years after birth, women's earnings fall by 23%, compared to 4% for men. This disparity is primarily driven by a reduction in working hours.

Second, we adopt a gender norms perspective. Specifically, when examining the top quartile of the within-couple inequality distribution - where women outearn their spouses, we observe that the decline in women's income share is especially pronounced when the woman was the main earner prior to childbirth, consistent with gender norms explanations. As we are able to track the labour market trajectories of both spouses, we can disentangle the effect of the labour supply changes of both spouses. We observe that within these couples, the deterioration of the relative income position of women results from changes in both spouses' labour supply. If women experience a child penalty, men who were secondary earners strongly increase their labour supply following childbirth. Conforming to gender norms results from behaviors of the two spouses. We go a bit further using this gender norms approach, and we look at the discontinuity at the 0.5 threshold in the distribution of income shares, often used to proxy the observed aversion to women outearning their partners. We observe such a discontinuity at the 0.5 threshold before childbirth, but it becomes less salient afterwards. Empirically, childbirth modifies the entire distribution of within-couple income shares. We observe a sharp decline in the proportion of egalitarian couples, while the already low share of female-breadwinner couples decreases only moderately.

This result has important implications for gender equality. Beyond confirming the average child penalty for women, we observe that the effect of childbirth is heterogeneous

[19] OECD Family Database, 2020.

across couples. More specifically, the child penalty is more pronounced for couples in the middle of the within-couple distribution where couples were egalitarian before childbirth. This implies that child penalty causes an increase in the number of couples in which women are financially dependent on their spouses. If the share of income provided by each spouse is a proxy for their bargaining power regarding household decisions, this implies that more women lose their favourable relative position.

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Appendix

A Identification of Cohabiting Couples

As outlined in Section 2.1, we have access to fiscal information for all other members of an EDP individual's household (i.e., individuals residing in the same dwelling). Identifying married or civil union couples within a household is straightforward, as they file joint tax returns. However, detecting cohabiting couples is more complex, since such individuals are reported as single in tax declarations. Two single individuals sharing a household are not necessarily partners—they may be roommates, a parent and child, or siblings. To address this, the French statistical office, INSEE (Institut National de la Statistique et des Études Économiques), provides a variable that classifies household composition, distinguishing between categories such as single individuals, single-parent families, and couples with or without children. This variable enables us to identify cohabiting couples more accurately. One might argue that cohabiting individuals could still be unrelated roommates. To mitigate this ambiguity, we restrict our analysis to households in which a child is born in year t, and where the same two adults are present in the household during years $t-2$, $t-1$, and t. We further require that these two individuals are of different sexes and share the same year of birth throughout this three-year period. These restrictions help ensure the stability of the couple and reduce the likelihood of including unrelated individuals such as roommates or other household members.

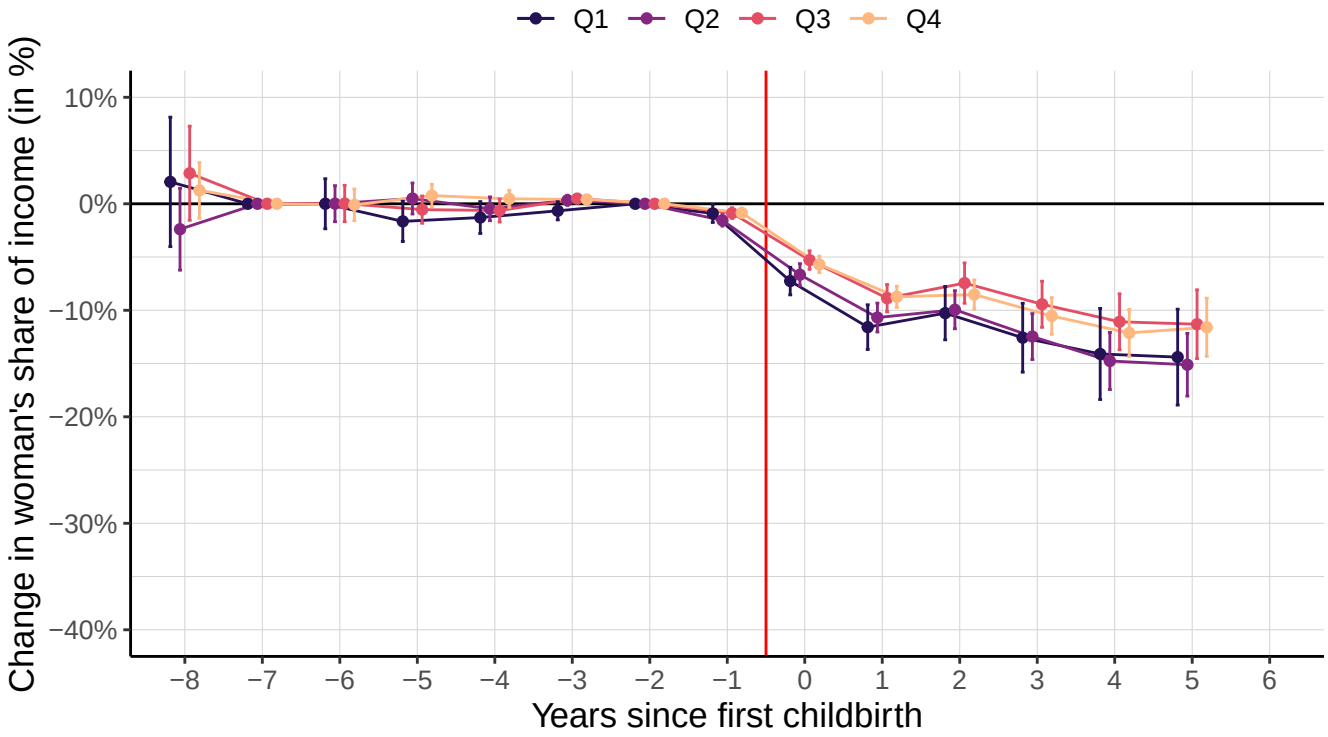
B Heterogeneity according to the initial position in the household income distribution

In this section we select couples with stable evolution of income between $t-3$ and $t-2$. To select these individuals, we compute the distribution of the evolution of income respectively for men and women. We define as stable an evolution between the first decile and the last decile of the distribution of the income evolution. We keep couples in which the evolution of income of both spouses is stable, *ie* we exclude individuals with an income evolution below the first decile or above the ninth decile. We then compute household income quartiles in (t-2) using this population.

We observe that the within-couple inequality increases more after the birth of the first child among the poorest couples (couples in the first quartile of the household income distribution), compared to the richest ones (see figure 11) (even if differences are not significant).

How does the evolution of the individual income of the two spouses contributes to this increased within-couple inequality ? We do not observe any significant differences of the child penalty for women along the household income distribution (see Figure 12). On the contrary, while on average, men also experience a slight decrease in their income following childbirth, this only holds for men in the second to fourth quartile of the income distribution. For men in the first quartile (the poorest ones), on the other hand, we observe a child premium.

Figure 11 – Evolution of woman's contribution to total income, according to household income quartile

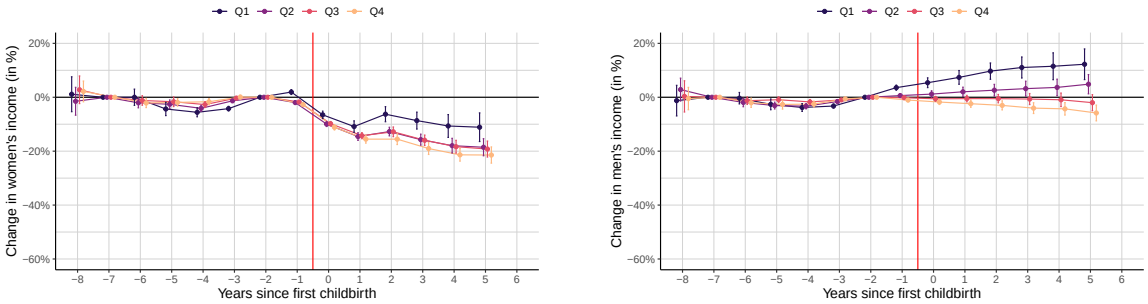


NOTE. Share 2 years before childbirth: 45% (Q1), 47% (Q2), 46% (Q3) and 45% (Q4). Average counterfactual share after childbirth: 46% (Q1), 49% (Q2), 47% (Q3) and 49% (Q4).
Population. Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth, after excluding the 20% with the largest changes in household income between $t-3$ and $t-3$. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

C Figures

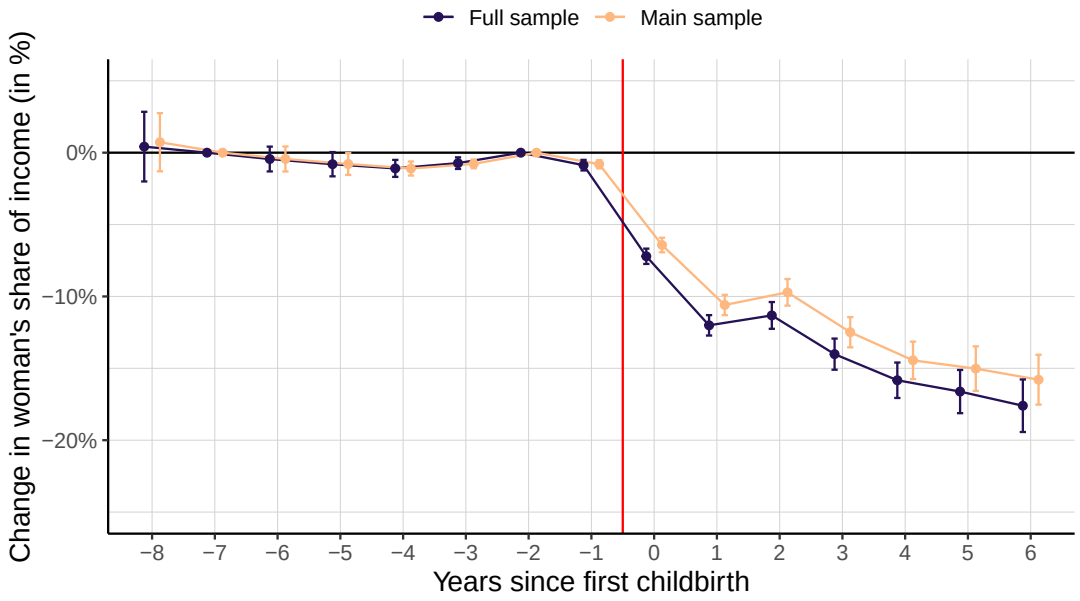
Figure 12 – Evolution of female and male income following childbirth, according to household income quartile

(a) Female income (in percentage) **(b)** Male income (in percentage)



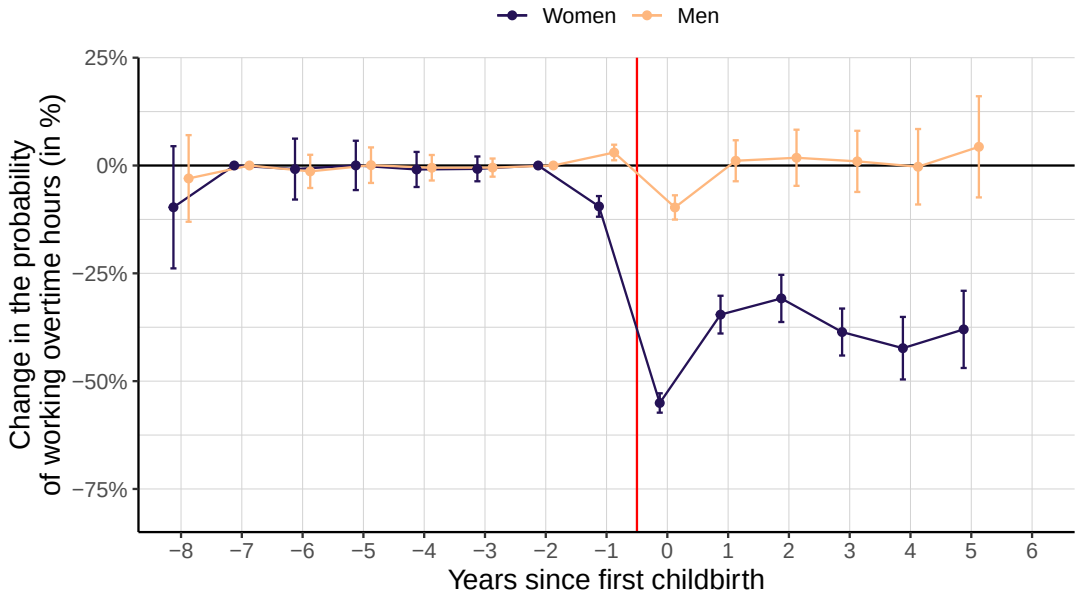
NOTE: These figures plot the evolution of income in percentage for women (Panel A) and men (Panel B). For females, the average income 2 years before childbirth is: €15,000 (Q1), €20,000 (Q2), €24,200 (Q3) and €34,600 (Q4). The corresponding average counterfactual post-birth values are €16,500 (Q1], €23,100 (Q2), €28,200 and €42,100 (Q4). For males, the average income 2 years before childbirth is: €17,800 (Q1) €22,700 (Q2), €28,200 (Q3) and €43,000 (Q4). The corresponding average counterfactual post-birth values are €19,200 (Q1], €24,900 (Q2), €32,400 and €50,700 (Q4).
Population. Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth, after excluding the 20% with the largest changes in household income between $t-3$ and $t-3$. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

Figure 13 – Evolution of the female's share within total household income, full and main samples



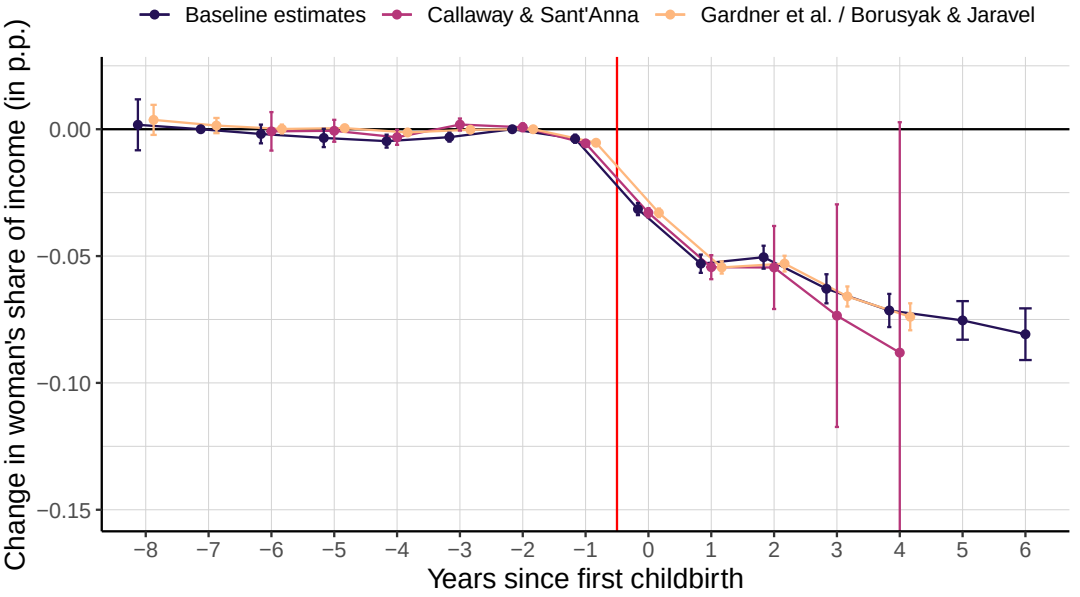
Population. Population of different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

Figure 14 – Changes in the probability of working overtime hours



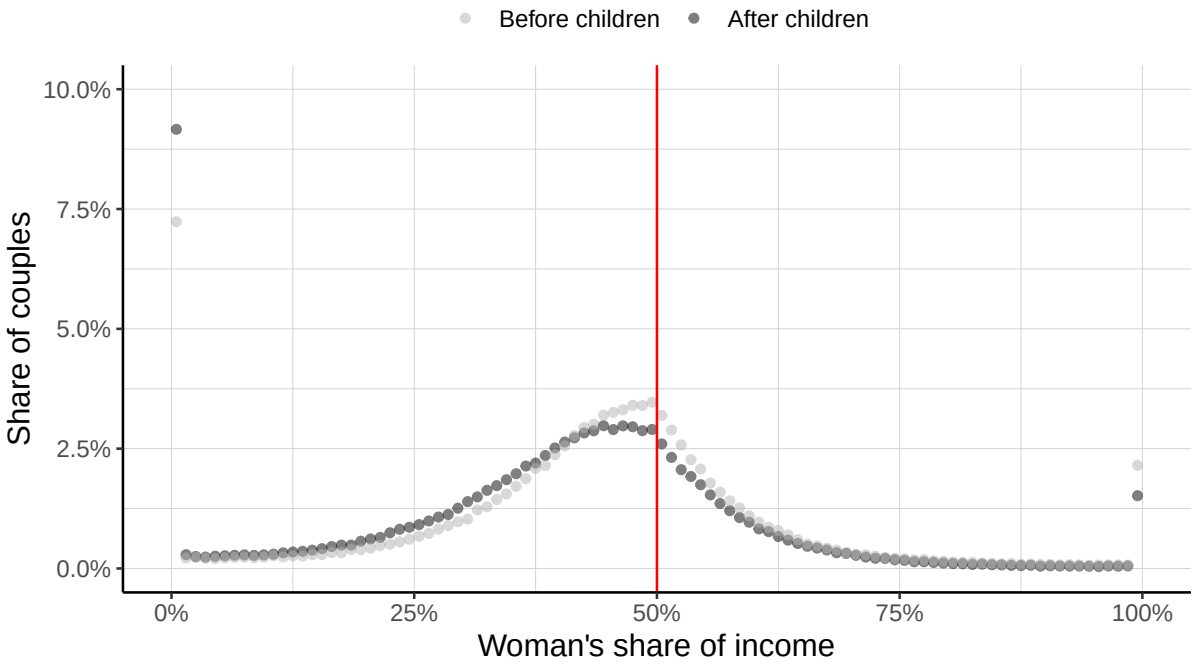
Population. Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

Figure 15 – Evolution of the female's share within total household income



Population. Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019 and with both partners having positive income before birth. *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee, permanent demographic sample (EDP), authors' calculation.

Figure 16 – Distribution of relative earnings of women before and after childbirth



Population. Different-sex couples living in mainland France who experienced their first child's birth between 2013 and 2019,including non-working women before chidlbirth *Source.* CCMSA, Cnaf, Cnav, DGFiP and Insee

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CENTER FOR RESEARCH
IN ECONOMICS AND STATISTICS

CREST
Center for Research in Economics and Statistics
UMR 9194

5 Avenue Henry Le Chatelier
TSA 96642
91764 Palaiseau Cedex
FRANCE

Phone: +33 (0)1 70 26 67 00
Email: info@crest.science
https://crest.science/

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