The Effects of Institutional Gaps between Cohabitation and Marriage

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Abstract

This paper examines the effects of institutional differences between marriage and non-marital cohabitation on household formation, individual's welfare, and child human capital. I first show that, conditional on observable characteristics, cohabiting couples have, on average, higher separation rates, higher female labor supply, and worse cognitive outcomes among their children, relative to married couples. To explain these empirical findings, I model the individuals' life-cycle problem within an equilibrium marriage market framework that features the choice between marriage and cohabitation. I estimate the model using U.S. household data. The results indicate that non-college educated cohabiting women receive a lower share of the household's resources than low-educated married women. Moreover, consistent with the empirical findings, their children accumulate less human capital compared to those born to low-educated married women, explained by lower maternal time investments and higher separation rates between cohabiting couples. In counterfactual analysis, I equalize child custody laws for unmarried and married parents upon separation. I find that this policy would improve the welfare of low-educated cohabiting women and the outcomes of their children. Accounting for marriage market equilibrium effects is critical for this result: Under the baseline equilibrium, this policy change would reduce the welfare of low-educated cohabiting women (by reducing their parental rights upon separation). However, in the new marriage market equilibrium, these women would be compensated with a higher share of the household's resources, which induces them to form cohabiting relationships. This policy also contributes to closing the human capital gap between children born to low-educated cohabiting and married women.

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1 Introduction

Non-marital cohabitation and non-marital fertility are prevalent in the U.S., mainly among the less-educated (Lundberg, Pollak, and Stearns, 2016).[1] At the same time, cohabiting and married couples are treated differently under U.S. laws, in dimensions such as property division upon separation and child custody laws. As marriage has been associated with higher family stability, higher parental investments, and better child outcomes, an open policy question is whether these legal differences should narrow, at the expense of reducing the set of individuals' choices.

While institutional differences between marriage and cohabitation are widespread, some countries and U.S. states have passed laws closing these gaps. As an example, most Canadian provinces now allow a cohabiting partner to claim alimony upon separation. Beginning in January 2020, cohabiting couples in California can register their partnerships and get many of the rights and obligations of marriage. However, the effectiveness of these policies to improve welfare of couples and their children remains unclear. In order to design effective policies, we need to advance our understanding of what affects the choice between cohabitation and marriage, and of the effects that such policies would have on intra-household inequality, child outcomes, and the type of households that form in equilibrium.

In this paper, I address two main questions. First, I investigate what drives the choice between marriage, cohabitation, and staying single, and how this choice impacts intra-household inequality and child human capital. Second, I examine the equilibrium effects of reducing the institutional differences between marriage and cohabitation on household formation, child outcomes, and individuals' welfare. I focus on two types of policies: changes in child custody laws, and policies that equalize the financial obligations of married and cohabiting couples (e.g., property division).

To answer these questions, I first document the dimensions in which married and cohabiting couples differ. Second, to explain these differences, I build and estimate an equilibrium model of household formation, in which couples choose between marriage and cohabitation. After making this choice in the marriage market, couples and single individuals solve their life-cycle problem. Finally, using the estimated model, I simulate the equilibrium effects of reducing the legal differences between cohabitation and marriage.

In the first part of the paper, I use rich data on U.S. households from the National Longitudinal Survey of Youth (NLSY-97) and the Fragile Families and Child Wellbeing Study

[1] By 2017, about one-third of the women born in the U.S. in the early 1980s with at most a high school degree had their first child under cohabitation (National Longitudinal Survey of Youth 1997). By the same year, five million children in the U.S. lived with cohabiting partners and about 19 million children lived with single parents (Pew Research Center, 2018).

(FFCW). I document that married and cohabiting couples differ in observable characteristics and in the choices they make, even conditional on these observables. In particular, I show that cohabiting couples, relative to married couples, have higher separation rates, higher female labor supply after having a child, and worse cognitive and behavioral outcomes among their children.

Moreover, I show that the cohabitation decision responds to changes in the institutional differences between marriage and cohabitation. To do so, I exploit the staggered policy changes across states in the U.S. in three areas: a) the transition from a presumption of sole maternal custody to joint parental custody upon divorce; b) the transition from mutual consent to unilateral divorce; and c) the simplification of the process through which unmarried fathers claim legal paternity. I find that all these policy reforms caused significant changes to marital choices, including the cohabitation choice. For example, the transition from maternal sole custody to parental joint custody upon divorce reduced the two-year transition from cohabitation to marriage by 54%. The adoption of unilateral divorce increased by 21% the likelihood that an unmarried women would be in a cohabiting relationship 2 years later.

In the second part of the paper, I develop an equilibrium model of household formation that incorporates, for the first time, both the choice between marriage and cohabitation, and subsequent life-cycle decisions. This model allows me to analyze sorting into marriage or cohabitation and the effects of this choice for intra-household inequality and child welfare. In the model, the marriage market equilibrium determines the matching patterns (who marries and who cohabits with whom) and the partners' initial relative bargaining power. After matching in the marriage market, households solve a life-cycle problem with limited commitment. In each period, they make choices about separation, female labor supply, and savings. These decisions endogenously determine the child human capital accumulation and the evolution of the partners' relative bargaining power. The latter determines the weight given to each partner's preferences when the household makes choices.

A critical feature of my model is that it incorporates the main institutional differences between marriage and cohabitation, reflecting the U.S. legal system. These differences are: 1) the presumption of parental joint custody upon divorce versus the presumption of maternal sole custody after cohabitation 2) the higher probability that the father pays child support after marriage than after cohabitation; and 3) the common property of assets for married couples versus individual ownership for cohabiting partners. By modeling this comprehensive set of distinctions between marriage and cohabitation, I can assess how each of them shapes household formation and child development. As I show below, differences in child custody laws will prove to be a key driver of selection into cohabitation in my model, and changing these laws will have large impacts on household formation.

Central to my model and analysis is the marriage market equilibrium. This feature allows me to quantify the relative gains for men and women of entering each type of relationship, contributing to our understanding of what drives marital choices. Moreover, since the relative bargaining power of partners is determined in equilibrium, I can assess, for the first time, differences in intra-household inequality between married and cohabiting couples.

This equilibrium framework is suitable to examine not only the short-term effects of policy changes on existing households, but also the long-term impact of policies that operate by changing the marriage market equilibrium. I use this framework to assess the effect of narrowing the legal differences between cohabitation and marriage. My findings show that considering the long-run effects is critical for assessing the effectiveness of policies, because changes in household formation and in the equilibrium bargaining position of partners can undo the initial effects of policy changes.

Using U.S. data, I estimate the model in two stages. First, I estimate in the data the parameters of the wage processes and the production function of child human capital. Then, I use the method of simulated moments to estimate internally the remaining parameters, targeting the matching patterns and the life-cycle behavior of couples and single individuals.

The results indicate that the marriage market exhibits positive assortative matching in education, driven by parental complementarities in the production function of child human capital. Compared to cohabitation, legal marriage is relatively more attractive for men, who gain from higher stability and higher access to their children upon divorce. These benefits offset the costs associated with a higher probability of paying child support and equal split of assets between spouses. For women, the main advantage of cohabitation is that it allows them to retain full custody over children upon separation, while married couples are more likely to obtain shared custody upon divorce. This reduces their relative value of marriage, particularly for women matched to low-educated men. For these women, marriage provides less benefits in terms of asset division and child support, since their partners have low wages. In equilibrium, men attract women into marriage by providing them with a larger share of household resources relative to cohabitation arrangements, conditional on education. These differences are larger for low-educated women.

Consistent with my empirical findings, I show in the model that children born to low-educated cohabiting women accumulate less human capital than those born to low-educated married mothers. This is driven by higher separation rates among cohabiting couples. Anticipating separation, cohabiting women increase their labor supply, which in turn decreases their maternal time investments. Moreover, their children are more likely to grow up in a single-parent household, which negatively impacts the accumulation of human capital.

In the last part of my paper, I use the estimated model to assess the welfare effects of

closing the institutional differences between cohabitation and marriage. I find that a policy that equalizes child custody for married and cohabiting parents upon separation—by increasing joint parental custody after cohabitation—improves the welfare of low-educated women. The equilibrium effects are critical for this result: Under the baseline marriage market equilibrium, this policy *decreases* the welfare of cohabiting women (by reducing their access to children upon separation). However, in the new equilibrium, their welfare increases as they are compensated with a higher share of the household's private consumption, as a way to induce them to cohabit. In this scenario, cohabitation increases by 36%, mainly explained by changes in family arrangements among the less-educated. After this policy change, the gap in human capital between children born to low-educated cohabiting and low-educated married mothers closes, driven by the increased stability of cohabiting relationships in the counterfactual scenario.

Two other policies—equal division of assets at separation from cohabitation and full child support enforcement upon divorce and separation—have negligible welfare effects. Still, these exercises highlight the importance of considering the marriage market equilibrium effects when evaluating the impact of policies. For example, I find that the marriage market equilibrium reverses most of the gains for low-educated women from an increase in child support enforcement. This is driven by men demanding a higher share of the household's resources to form partnerships with them under this counterfactual scenario.

These findings can inform policy-makers about the implications of treating married and cohabiting couples more equally under the law. Moreover, my results highlight the importance of considering the long-run consequences of such policies. In particular, I provide evidence on the long-term effects of altering parental rights and obligations upon separation and divorce, an area previously underexplored in the literature.

1.1 Related Literature

This paper relates to four strands of literature: First, it speaks to the literature studying the changing structure of the U.S. family, and the causes and consequences of non-marital cohabitation. Second, it contributes to the study of the impact of family structure on parental investments and child outcomes. Third, it relates to research examining how family policy affects household formation, couple's choices and welfare. Finally, it builds on and extends the work studying the marriage market equilibrium and the forces that shape it.

Changes in the U.S. family structure and the role of cohabitation: A growing body of literature has documented the changes in the U.S. family structure in the last decades, such as the retreat from marriage and the increase in non-marital fertility (Browning, Chiappori, and Weiss, 2014; Aiyagari, Greenwood, and Guner, 2000). These

papers propose different mechanisms behind the decline in marriage rates, such as the reduction in job opportunities for men (Autor, Dorn, and Hanson, 2019), the increase in male wage inequality (Gould and Paserman, 2003), changes in the wage structure (Ciscato, 2021; Regalia, Rios-Rull, and Short, 2001), changes in cultural norms (Bau and Fernández, 2021), and technological change in home production (Greenwood, Guner, Kocharkov, and Santos, 2016).

A related phenomena—that received significantly less attention—is the increase in non-marital cohabitation. Lundberg, Pollak, and Stearns (2016) document the uneven retreat from marriage and the increase in cohabitation across education groups in the U.S. They suggest that, for low-educated couples, cohabitation has became an alternative arrangement under which to have children. Other studies address specific factors explaining the choice of cohabitation from a more theoretical perspective, such as learning about the quality of new partners (Brien, Lillard, and Stern, 2006) and differences in marital preferences and commitment (Iyigun, 2009).

I contribute to this literature by providing new evidence on how changes to the institutional differences between marriage and cohabitation affected marital choices, and in particular, the cohabitation margin. Moreover, I document novel empirical facts about the differences in the behaviors and outcomes of cohabiting and married couples. This contributes to our understanding of what is cohabitation in the U.S., characterizing it as a different family arrangement than legal marriage.

Family structure, parental investments and children outcomes: My paper relates to a second strand of literature that studies the link between family structure and child development, usually documenting a strong association between marriage and better child outcomes (McLanahan and Sandefur, 1994; Brown, 2004).

Focusing on marriage versus cohabitation, Lundberg, Pollak, and Stearns (2016) suggest that marriage has become a commitment device to support high couple-specific parental investments among the highly-educated. As less-educated parents have on average a lower investment strategy, presumably requiring less commitment, they are more likely to have children under non-marital cohabitation. In line with this hypothesis, Lafortune and Low (2020) examine how wealth becomes a commitment device within the marriage, sustaining intra-household specialization and higher parental investments. My research is closer to Adamopoulou, Hannusch, Kopecky, and Obermeier (2021) who show that cohabitation is associated with worse child outcomes relative to marriage, due to differential parental investments. They show that lower costs and higher returns from specialization for highly-educated couples explain the lesser increase in cohabitation among this group.

While some of the mechanisms in these papers are also present in mine, my work dif-

fers in important dimensions: First, I build the production function of child human capital within a marriage market equilibrium framework. In this setting, the marriage market equilibrium affects child human capital accumulation, but also, the nature of this production function endogenously shapes the equilibrium. Second, I model a broader set of differences between marriage and cohabitation only partially taken into account in Adamopoulou, Hannusch, Kopecky, and Obermeier (2021) and Lafortune and Low (2020). This allows me to investigate the impact of different policies on child human capital accumulation.

The impact of family policy on household choices and outcomes: My paper relates to a third body of research that investigates the impacts of a wide variety of family policies on household formation and dissolution, and other household's choices, such as female labor supply or savings. The policies studied include divorce laws (Voena, 2015; Fernández and Wong, 2017; Reynoso, 2019), welfare benefits (Low, Meghir, Pistaferri, and Voena, 2018), child support and alimony (Foerster, 2020, Chiappori, Iyigun, Lafortune, and Weiss, 2017), the structure of the tax system (Gayle and Shephard, 2019), paternity establishment rules (Rossin-Slater, 2017), and survivor benefits (Persson, 2020), among others. Some of this work explicitly considers the effects of policy changes on household formation. This allows them to study how policies may have different effects for existing couples versus newly-formed households (Fernández and Wong, 2017; Reynoso, 2019; Chiappori, Iyigun, Lafortune, and Weiss, 2017). This stresses the importance of taking into account the equilibrium effects when assessing the impact of policies.

Within this literature, a set of papers explicitly examines how extending the rights and obligations of married couples to cohabiting partners impacts the choice of cohabitation or the decisions made by cohabiting couples. This work has focused on dimensions such as alimony rights (Goussé and Leturcq, 2018; Rangel, 2006), equitable property division rights (Chigavazira, Fisher, Robinson, and Zhu, 2019) or the tax system (Chade and Ventura, 2005). My paper most closely relates to Blasutto and Kozlov (2020) and Laufer and Gemici (2009), who allow for cohabitation within a life-cycle model of the household. The first finds that the transition from mutual consent to unilateral divorce increased cohabitation, by reducing the commitment involved in the marriage contract. The latter finds that a higher cost of divorce increases cohabitation.

While my model has common elements with both papers, I additionally model the marriage market in equilibrium. This allows me to assess how policy changes affect household formation in the longer-run, and the welfare implications of such policies. Moreover, I model a broader set of differences between marriage and cohabitation, and use data from a younger cohort (born between 1980-84), for whom cohabitation and non-marital fertility are more prevalent.

Marriage Market Equilibrium and the Gains from Marriage: Finally, my

paper builds on work characterizing the marriage market equilibrium and examining how economic and institutional changes affect household formation, life-cycle choices, and welfare. I build on the literature quantifying the gains from marriage, after to the seminal contribution by Choo and Siow (2006), and extensions by Chiappori, Salanié, and Weiss (2017) and Mourifié and Siow (2021).

Within this literature, recent papers have embedded a collective model of the household into an equilibrium framework of the marriage market. The advantage of these models is that they allow us to study the impact of changes in the economic or institutional environment on already formed couples, but also on future household formation. Among these papers, Goussé, Jacquemet, and Robin (2017) use a search and matching framework to study marital sorting and the life-cycle behavior of couples. Calvo, Lindenlaub, and Reynoso (2021) construct a framework with equilibrium both in the marriage and the labor market, to study how sorting in both markets affect gender gaps and within- and between-household inequality.

Chiappori, Costa-Dias, and Meghir (2018) combine a household life-cycle model with an equilibrium frictionless matching framework, with pre-marital investments and full-commitment to the marriage allocations over the life-cycle. Gayle and Shephard (2019) and Reynoso (2019) extend this framework to an imperfect transferable utility (ITU) environment with limited commitment. In this setting, the total marital surplus cannot be determined independently from the intra-household allocation of resources, and couple dissolution is endogenous. This makes it possible to study the equilibrium effect of policies that change the individuals' outside option, such as changes in divorce laws.

I extend the equilibrium life-cycle models with imperfect transferable utility (ITU) to allow couples to choose between contracts with different characteristics—namely, marriage and cohabitation. This allows me to assess the drivers behind the marriage versus cohabitation choice, and the intra-household allocation of resources implied by each type of contract. Moreover, I build into the model the accumulation of child human capital. In this setting, the marriage market equilibrium endogenously determines child outcomes. At the same time, the nature of the child human capital production function shapes the marriage market equilibrium.

The rest of the paper is organized as follows. I describe the institutional setting in Section 2. In Section 3, I document empirical facts on the differences between marriage and cohabitation. I also show how changes in family policy affect the cohabitation choice. Section 4 introduces the model. Section 5 describes the estimation procedure, identification and results. I present the policy experiments in Section 6. Section 7 concludes.

2 The Institutional Setting

In the U.S., legal marriage grants spouses specific rights and obligations, different from those faced by unmarried couples, independently of the length of the relationship or the presence of common children. Civil unions between unmarried partners are not recognized by the U.S. federal government or the vast majority of states.[2]

In Table 1, I provide an overview of the main dimensions in which the law treats married and cohabiting couples differently. I include these distinctions in my model below.

Table 1: Differences in Institutions Affecting Married and Cohabiting Couples

	Marriage	**Cohabitation**
Children	Paternity established by default	Paternity needs to be established
	Joint custody more likely	Joint custody less likely
	Child support settled at divorce	Child support needs to be claimed
Dissolution	Common property of assets	Individual property of assets
	Requires state intervention	No state intervention

Regarding children, unmarried fathers in the U.S. are treated differently than married fathers. While married fathers are automatically granted legal paternity at birth, unmarried fathers have to follow additional steps in order to establish legal paternity.[3] Moreover, several state courts still distinguish between married and unmarried parents when determining how assign custody rights over children, either favoring unmarried mothers over unmarried fathers, or requiring legal paternity establishment before treating married and unmarried parents equally (Cuadra, 2010). Additionally, married couples finalize the divorce process having a custody and child support order in place, usually accompanied by a parenting plan to help them solve conflicts and avoid discretionary decisions (Huntington, 2015). However, for unmarried parents there is no formal process to end their unions, and while in principle fathers could go to court to request custody, they are more likely to have no formal custody or visitation agreements (as discussed in Section 3.2). Moreover, the vast

[2] A handful of U.S. states passed laws recognizing registered domestic partnerships, which provide partners with some rights against each other and third parties. However, in most cases these rights are limited in scope or available only to couples in which one partner is above a certain age threshold (typically 62). Additionally, 9 states and the District of Columbia still recognize common law marriages (Bowman, 2010). However, common law marriage requires the two partners to agree to be married and to hold themselves out as a married couple to the community, which is typically not the case for cohabiting couples.

[3] During the 1990s, states aimed to facilitate the paternity establishment process, by allowing parents to sign an affidavit in the hospital at childbirth. However, data suggests that by the end of the 1990s this procedure was not commonly used: more than 75% of the mothers and 87% of the fathers in the Fragile Families and Child Wellbeing Study (described in Online Appendix OB), who were cohabiting at childbirth, reported that nobody at the hospital talked to them about establishing paternity.

majority of states grant child support orders through state agencies, without a co-requisite of custody of visitation settlement (Huntington, 2015).

Second, married couples are covered by state divorce laws—which determine who can start the divorce, on which grounds, and how property is divided— but unmarried couples are not. Therefore, there is no formal procedure for cohabiting couples to dissolve their unions. Each partner is legally entitled to keep their own assets upon separation.

There are many other differences in the U.S. between marriage and cohabitation, that I do not include directly into my model. These include federal tax treatment, welfare eligibility, inheritances, social security benefits, and more. An extensive discussion of these differences can be found in Appendix OA.

3 Descriptive Evidence

3.1 Data

I use three different data sources. First, the National Longitudinal Survey of Youth 1997 (NLSY-97), that follows a cohort of men and women, born in the U.S. between 1980 and 1984. These data include rich fertility and marital histories, including cohabitation, which is critical for my analysis. It also contains rich demographic information, labor market outcomes, and characteristics about the respondent's partner. Second, the Fragile Families and Child Wellbeing Survey (FFCW) follows a cohort of children born between 1998 and 2000 in the U.S., and their parents. The first round of data was collected at birth, and the last available wave was collected at age 15. This data have rich information on children outcomes and parent's characteristics, such as marital status and labor supply. Finally, the Panel Study of Income Dynamics (PSID) started in 1968 following a representative sample of 5,000 families and their descendants. These data contain the marital status of individuals—including cohabitation since 1977—and their state of residency, which is key for my analysis. Additional details can be found in Online Appendix OB.

3.2 Empirical Evidence

In this section I first document the role of cohabitation as a new defining feature of U.S. society. Then, I show that married and cohabiting couples are observationally different, but that even conditional on these characteristics, they behave differently. Finally, I document differences in the outcomes of children born under different marital contracts.

The role of cohabitation in the structure of the U.S. family: Cohabitation

tripled over the last 40 years, becoming a defining feature of the U.S. family structure (see Figure A.1 in Appendix A.1). About two-thirds of women born in the early 1980s (who would complete their fertility choices in the late 2010s/early 2020s) had at least one cohabitation experience. Moreover, about one-fourth of them had their first child under cohabitation, as I show in Table 2.

Many couples consider cohabitation as a prelude to marriage: 86% of the women in the FFCW who had a child under cohabitation report intentions to marry their child's father.[4] However, as I show in Figure A.4 in Appendix A, only about 20% of these couples transitioned to marriage and 60% separate by the time their child turns 9 years old.

Table 2: Marital Status of Women at First Birth

Marital status	**Share (%)**
Married	52%
Cohabiting	23%
No Partner Present	25%

Notes: National Longitudinal Survey of Youth 1997, Bureau of Labor Statistics. I restrict the sample to women who had their first child between 1997 and 2017.

Observable differences between married and cohabiting women: Cohabitation is widespread across demographic groups (Table A.1 in Appendix A.1). However, there are marked observable differences between women who had children under marriage and under cohabitation. Women who have children under cohabitation are relatively younger, more likely to belong to racial minorities, and have lower education, as I show in Tables A.2 and A.3 in Appendix A.1.[5] Married women are also more positively sorted in the marriage market, with a higher correlation between partner's education in marriage than in cohabiting relationships (0.44 vs 0.36).[6]

Differences in choices between married and cohabiting couples: Even after conditioning on observable characteristics, married and cohabiting couples make dif-

[4]When asked about the reasons for not being married, the most common answers included financial reasons (32%), timing reasons (36%), and relationship reasons (25%).

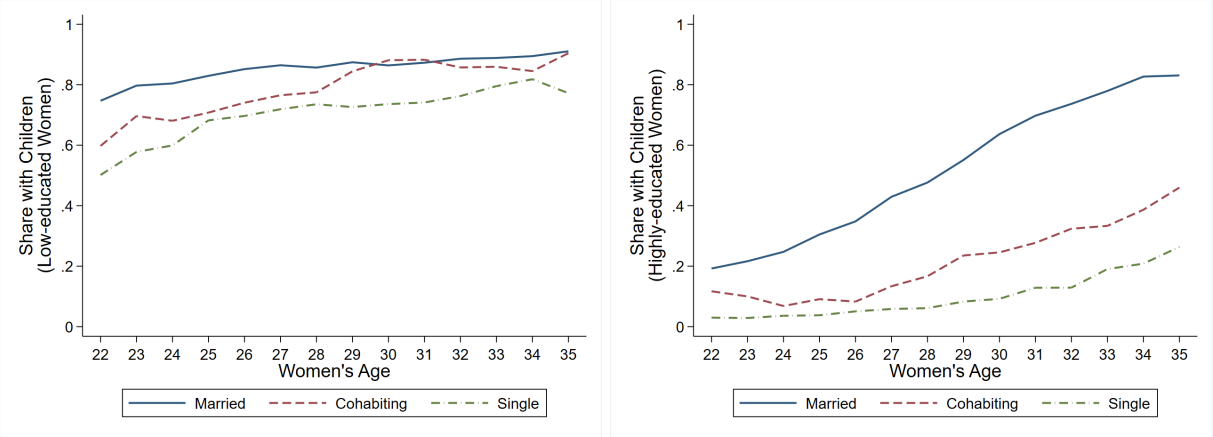
[5]Using the FFCW data, I also find that cohabiting couples are more "progressive" than married couples, using as proxy of "progressiveness" the answers to two questions asking whether same religion and female stable employment are important for a successful relationship. Women in cohabiting couples are less likely to report that religion is important for a successful relationship, compared to their married counterparts (26.4% versus 39.8%, t-stat=7.7). They are also comparatively more likely to report that female stable employment is important (71.9% versus 47.5%, t=-13.8). This suggests potential selection into cohabitation, not explained by the observable characteristics of the individuals.

[6]Women who have their first children under cohabitation are also different from single-mothers. In particular, cohabiting women are slightly older at first birth, and have on average higher education, compared to single-mothers. Differences in other dimensions are mainly not significant (Table A.2).

ferent choices in dimensions that can affect their long term outcomes (such as female human capital accumulation) and the outcomes of their children.

First, cohabiting women are less likely to have children, conditional on education. These differences are more marked among highly-educated women, as shown in Figure 1.

Figure 1: Share of Women with Children by Marital Status: a) Low-Educated (left), b) High-Educated (right)



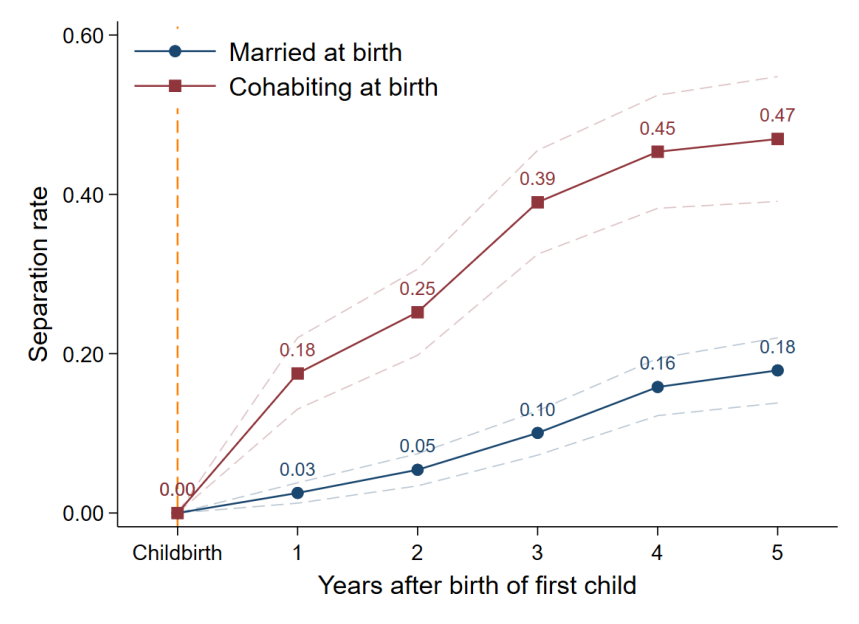
Notes: National Longitudinal Survey of Youth 1997, Bureau of Labor Statistics. The sample includes women between 22 and 35 years old from the who are married, cohabiting or living without a partner at each age. The share with children is computed based on whether they had at least one child by the time they are a certain age, independently of whether the child is living in the household. *Low Educated* includes women with high school degree or less by the time they are 27 years old, and *High Educated* includes women with a 4 years college degree or more.

Second, conditional on observable characteristics, couples that have a child under cohabitation are significantly less stable than married couples. 2 shows that about half of the women who had their first child under cohabitation have separated from their child's father by the child's 5-year birthday. This is true for only 18% of the couples that were married at childbirth.[7] Then, children born to unmarried parents are more likely to grow up with only one of their parents (the mother, in the vast majority of cases).[8]

[7]Using FFCW data, I show in Figure A.4 of Appendix A.1 that about 20% of couples that have a child under cohabitation eventually get married, but most transitions occur relatively soon after childbirth. Figure A.5 shows that among the women who were single at childbirth, less than 10% eventually marry and 20% eventually cohabit with the father of their biological child.

[8]These children are more likely to be exposed to non-biological parental figures. Differences in exposure to new parental figures between children born to married or cohabiting mothers are explained by differences in dissolution rates, but not by differences in exposure conditional on dissolution, as shown in Figure A.6.

Figure 2: Couple Stability by Marital Status at First Birth



Notes: National Longitudinal Survey of Youth 1997, Bureau of Labor Statistics. Notes: the figure plot the coefficients of a regression of whether the couple is separated on dummy variables indicating the time since childbirth. Other demographic controls in the regression include women's education, age, race, age at first birth, length of the relationship before childbirth, and year and region fixed effect, and periods together before childbirth. The vertical orange line indicates the period of child arrival. The dashed lines represent the 95% CI of the estimates.

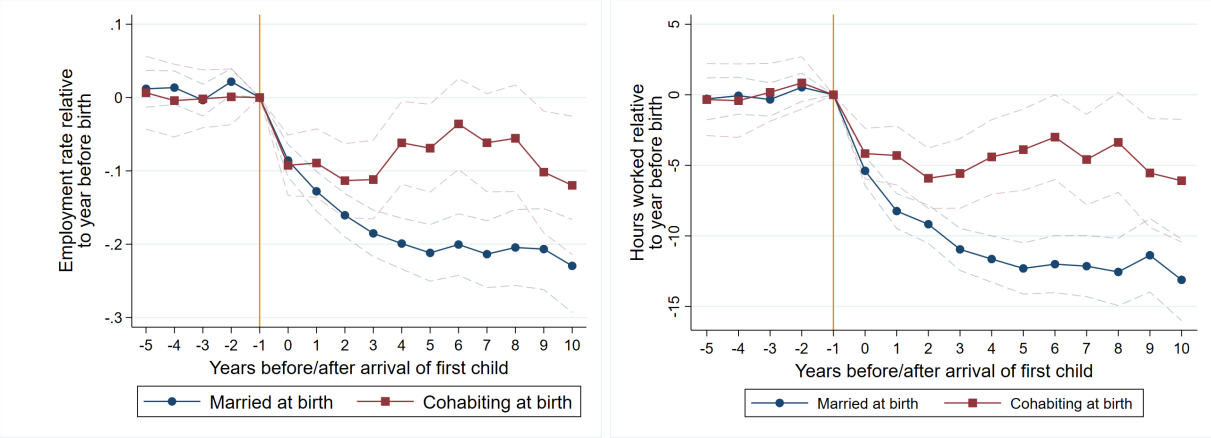
Third, while there is plenty of evidence on the negative impacts of childbirth on female labor market outcomes (Angelov, Johansson, and Lindahl, 2016; Kleven, Landais, and Søgaard, 2019; Adda, Dustmann, and Stevens, 2017; Berniell, Berniell, de la Mata, Edo, and Marchionni, 2021), I find that these effects are less pronounced for cohabiting women. Using an event study approach, I show in Figure 3 that, conditional on maternal age and education, the negative impacts of childbirth on both maternal labor force participation (panel a) and hours worked (panel b) are stronger and more persistent for married than for cohabiting women.[9] These findings are consistent with Adamopoulou, Hannusch, Kopecky, and Obermeier (2021), who show that cohabiting women have lower motherhood penalties than married women, relative to men.[10] If maternal time is an input in the production

[9]The coefficients in Figure 3 are relative to the levels on the year before the arrival of the first child ($\tau = -1$). For labor force participation, the baseline levels are 93% and 90% for married and cohabiting women, respectively (p-value = 0.11). However, married women worked significantly more hours in the baseline (34 versus 32, p-value = 0.008), but the magnitudes of the hours' reduction reverse the baseline differences. In Figure A.7 in Appendix A.2 I show that the behavior of single moms is similar to that of cohabiting women. In Figure A.8 I show that the difference in labor force participation responses are attenuated when I include individual fixed effects in the regressions, while the effect on hours worked are robust in this specification. I provide details about the event study specifications in Appendix A.2.

[10]I find consistent patterns using the FFCW data, as shown in Figure A.2 in Appendix A.1.

function of child human capital, and higher labor supply reduces the time available to invest in children, different labor market behaviors between married and cohabiting women may lead to gaps in child outcomes.[11] This story is consistent with Lafortune and Low (2020) and Laufer and Gemici (2009), who suggest that the marriage contract supports specialization within the household, and hence higher investments in children.

Figure 3: Effect of First Child's Birth on Maternal (a) LFP and (b) Hours Worked



Notes: National Longitudinal Survey of Youth 1997, Bureau of Labor Statistics. The sample includes women from the NLSY-97 who had their first child between 2000 and 2017 and who were between 20 and 35 years old at the time of childbirth, under marriage or cohabitation. The figures display the coefficients of indicator variables capturing the distance between child's birth ($\tau = 0$) and year t. The magnitudes of the coefficients are relative to the year before the child's birth ($\tau = -1$). I estimate separate models for the sample of women who were married and cohabiting at first birth. All models control for women's age and education, and include year fixed effects. The dashed lines represent the 95% CI of the model estimates. Standard errors are clustered at the individual level.

Finally, married and cohabiting couples also make different choices in other dimensions.[12] In Table A.4 in Appendix A.1, I show that, conditional on observable characteristics, couples that have children under cohabitation are less likely to report pooling their money and savings together, compared to married couples. This is consistent with a policy environment that treats married couples as an "unit" in terms of property ownership, taxes, etc., but cohabiting partners as individual units.[13] Other elements of the institutional set-

[11] Figure A.3 in Appendix A shows that the time women allocate to childcare activities decreases as they increase their labor supply, conditional on education and partner's presence. This is consistent with Agostinelli and Sorrenti (2021) and Bastian and Lochner (Forthcoming) who find that the increase in labor supply induced by the EITC reduces maternal time investments. They show that these reductions are not compensated with an increase in the quality of the time investment.

[12] Married and cohabiting couples differ in dimensions not described above. For example, cohabiting women are more likely to make choices with potential negative consequences on children, in dimensions such as prenatal check-ups, healthy habits during pregnancy, or breastfeeding, as shown in Table A.5.

[13] This differential treatment can affect other financial choices, that usually require joint investments. For example, cohabiting partners are 17% less likely than married couples to own a house at childbirth (column 3 of Table A.4), in line with the findings in Lafortune and Low (2020).

ting (described in Section 2) may also determine the couple's choices, potentially affecting parental involvement in the children's life. For example, by the child's first birthday, 22% of the fathers who were cohabiting at childbirth have not established legal paternity.[14] Additionally, only one-third of the fathers separated from cohabitation in the NLSY-97 have formal custody arrangements, compared to two-thirds of divorced fathers. Cohabiting couples are 50% more likely than married couples to receive welfare benefits, conditional on observable characteristics, as shown in Table A.6.

Differences in outcomes between children born to married and cohabiting couples: Table A.7 in Appendix A.1 shows evidence suggesting that children born to cohabiting parents have worse cognitive and behavioral outcomes than those born to married couples, conditional on a broad set of demographic characteristics.[15] Children born to cohabiting parents perform worse in standardized tests at 9 years old (columns 2 and 3), and are significantly more likely to have failed a class (9 percentage points) or to have been suspended from school (5 percentage points) by age 15 (columns 4 and 5).[16] Differences in outcomes might reflect both lower parental investments and lower household stability, usually associated with worse outcomes. These differences may also respond to composition effects. The estimates of the model presented below will allow me to quantify the importance of each mechanism.

3.3 The Impact of Policies on the Choice of the Marital Contract

I documented that married and cohabiting couples have different behaviors and outcomes. But even when I control for a large number of observable characteristics, these differences may be driven by differences in unobservable characteristics that affect *both* the marital choice and the behavior of couples (e.g., preferences). To rule out concerns that marital choices reflect only preferences, I present evidence supporting the fact that marital choices—including the cohabitation choice—are responsive to policies widening or narrowing the institutional differences between the marital contracts.

In order to do so, I exploit the staggered implementation across states in the U.S. and over time of three policies that changed the differences between the marriage and cohabi-

[14] My findings suggest that not establishing paternity leads to less parental involvement in the child's life upon separation. For example, separated fathers who did not establish legal paternity are significantly less likely to see their child or to have their child to stay overnight, by the time a child turns 9 years old, compared both to divorcees and to fathers who were cohabiting at birth and established legal paternity.

[15] I find no significant differences in outcomes between children born to cohabiting mothers and children born to single mothers (results not reported but available upon request).

[16] Additionally, children born to cohabiting mothers are significantly more likely to have low birth weight—defined as less than 2,500 grams—than those born to married parents, which can reflect differences in parental investments during pregnancy, as suggested by the results in Table A.5 discussed above.

tation: a) the transition from a presumption of sole maternal child custody at divorce to a presumption of joint parental custody, b) the simplification of the paternity establishment process for unmarried fathers, and c) the transition from mutual consent to unilateral divorce. This allows me to estimate the causal effect of these policies on the marital contract choice, and in particular, on the cohabitation margin. I discuss here in detail the results from analyzing the first of these policies. I provide details about the econometric model and the results for the other two policies in Appendix A.3.

Presumption of Joint Custody: I first study the impact on marital choices of changing state custody laws from a presumption of sole maternal custody to a presumption of joint parental custody at divorce. This increases the likelihood that child custody would be allocated jointly to both parents at divorce, if it is considered to be in the best interest of the child. However, a presumption of sole maternal custody remains for unmarried parents.

Table 3: The impact of a presumption of joint custody on marital status

	Married(t+1)	Married(t+1)	Married(t+2)	Married(t+2)
Transition to Presumption of Joint Custody	-0.088*	-0.078	-0.181**	-0.238**
	(0.050)	(0.106)	(0.072)	(0.134)
State and Year FE	Yes	Yes	Yes	Yes
State Linear Trends	No	Yes	No	Yes
Demographic Controls	Yes	Yes	Yes	Yes
Mean Dep. Var	0.231	0.231	0.339	0.339
Observations	796	796	772	772
R-squared	0.117	0.178	0.145	0.217

Notes: I use policy variation from Brinig and Buckley (1997), presented in column 2 of Table A.10. Data comes from the PSID (1977-1994). The sample is restricted to women between 20 and 40 years old who are in a cohabitation relationship in year t. Married$_{t+1}$ and Married$_{t+2}$ are indicator variables that take value 1 when the woman is married in period $t+1$ or period $t+2$. The demographic controls include the age and education level of women, the number of children in the household, and whether there is a newborn at home. Robust standard errors clustered at the state level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

In Table 3, I estimate the model in Equation 16. I restrict my attention to the sample of cohabiting women. My dependent variable takes value 1 when a woman is married in year $t+1$ or year $t+2$. The results show that the transition to a presumption of joint parental custody upon divorce reduces the transition from cohabitation to marriage. In particular, after the policy change, the likelihood that a woman who is cohabiting in period t would become married by $t+1$ or $t+2$ falls by 8.8 (38%) and 18.1 (54%) percentage points, respectively.[17] This suggests that as custody laws change to favor joint custody at divorce, the marriage contract becomes less attractive for women, as the value of the outside option (divorce) decreases, reducing the transition from cohabitation to marriage.

[17]Conditional on the sample of women who were unmarried at baseline, I find that this transition reduced the likelihood that a woman will marry by $t+1$ and $t+2$, and increase the likelihood that she will stay single. This policy change had no effect in the likelihood of starting a new cohabiting relationship.

These results are qualitatively aligned with the policy counterfactuals I discuss in Section 6, where I show that a presumption of joint parental custody for cohabiting couples upon separation, reduces the attractiveness of the cohabitation contract for women. However, an advantage of my counterfactual analysis is that it additionally allows me to explain the mechanisms underlying the change in the marriage market equilibrium.

Simplification of Paternity Establishment: As discussed in Appendix OA, during the 1990s the U.S. Federal government mandated that states implement hospital-based policies to simplify the process of establishing paternity for unmarried parents. I show in Table A.8 that the adoption of such policies increased by 9 percentage points (34%) the likelihood that an unmarried woman would be in a cohabiting relationship, decreasing the likelihood that they remain single. I find no significant effects on marriage rates of young women. These results suggest that facilitating legal paternity increases the attractiveness of cohabitation for those in the margin between forming a partnership or not.

Unilateral Divorce Laws: In Appendix A.3 I discuss in detail the results of examining a third policy: the transition from mutual consent to unilateral divorce. My results in Table A.9 show that this transition reduces the likelihood that an unmarried woman will enter legal marriage by 3.7 percentage points (23%) after two years. Moreover, it increases the likelihood that an unmarried woman will be in a cohabiting relationship by 2.9 percentage points (21%), consistent with the findings by Blasutto and Kozlov (2020). This reflects a weakening of the commitment involved in the marriage contract, after the adoption of unilateral divorce.

The three cases studied show that the cohabitation choice responds to the legal environment. This suggests that policies can affect the type of households that form, and indirectly the choices that individuals and couples make. In the next section, I develop a model of household formation with life-cycle choices. This model will allow me to study the effects of legal differences between marriage and cohabitation on household formation and welfare, considering the equilibrium effects of policy changes.

4 The Model

Motivated by the evidence presented in Sections 3, I build an equilibrium model of the marriage market that features the choice between marriage, cohabitation, and staying single. I use this model to investigate what drives marital choices, and how this decision affects a variety of outcomes, including intra-household allocation of resources and child human capital. This model captures the main differences in the institutional setting affecting marriage and cohabitation, including differences in property division and child custody laws.

This framework will allow me to disentangle how legal differences between marriage and cohabitation shape the marriage market equilibrium and children outcomes.

4.1 Model Overview

There is an equal measure of men and women (denoted by subscripts m and f respectively). Individuals $i \in \{f, m\}$ are characterized by their exogenous education level s that could be of two types: Low (L) or High (H).

The life of the individuals is divided in two stages, as illustrated in Figure 4. The first stage is the matching stage, in which individuals meet in a one-shot frictionless heterosexual marriage market. In this stage, agents choose the type of household they want to form, given by a combination of contract-type (g)— Marriage (M), Cohabitation (C) or Singlehood (S)—and a partner's type (s). This choice is made based both on the expected utility from forming each type of household, and on idiosyncratic preferences for a partner-contract combination (Chiappori, Salanié, and Weiss, 2017; Chiappori, Costa-Dias, and Meghir, 2018; Reynoso, 2019; Gayle and Shephard, 2019). There are 12 types of potential households: 4 types of married couples and 4 type of cohabiting couples (given by the combinations (L_f, L_m), (L_f, H_m), (H_f, L_m), (H_f, H_m) under each type of contract), and 2 types of single-female and single-male households. The marriage market equilibrium determines who matches with whom and under which contract, and the initial allocation of intra-household consumption for each couple type (i.e.: the market clearing Pareto weights).

Note that in my model, the initial market-clearing Pareto weights are common to all couples of the same type. Moreover, due to the non-cooperative nature of the household problem after a couple splits, my model exhibits imperfect transferable utility. This implies that in equilibrium, the Pareto weights are determined by anticipating the life-cycle expected utilities. At the same time, the life-cycle surplus produced by a couple depends on the intra-household resource allocation (i.e., the Pareto weights).

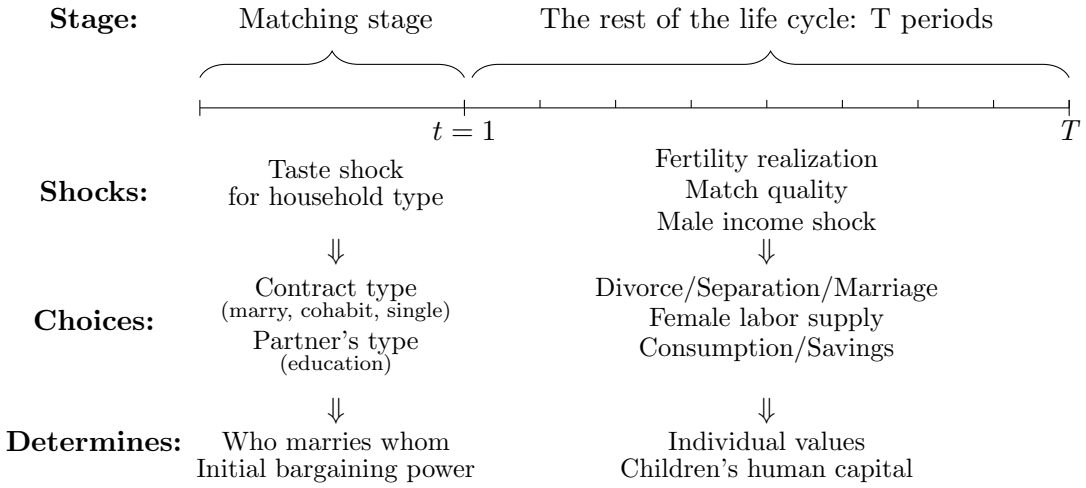
The second stage is the rest of the individual's life cycle, in which couples solve a collective household problem with limited commitment. This stage is divided in T periods (each accounting for 4 years of the individual's life). In each period, the existing households observe the realization of shocks (match quality and male income shock) and the fertility realization, and make choices on couple dissolution, female labor supply and savings. In each period, these decisions endogenously determine the intra-household allocation of private consumption—the partners' updated Pareto weights—and child human capital.

A critical feature of the model is that during the matching stage individuals can choose between three marital status: marriage, cohabitation or staying single. During the life

cycle, married couples can choose to *divorce* and cohabiting couples can choose to *separate* or to transition to marriage (with the same partner).[18] My model does not allow for rematching. Hence, divorce, separation, and staying single at the time of the marriage market are absorbing states.

Next, I describe these two stages of the individual's life cycle in detail. I proceed backwards: I show the second stage of the life cycle in Section 4.2. In Section 4.3, I describe the first stage, in which individuals match in the marriage market anticipating the solution to the life-cycle problem of the second stage.

Figure 4: Model Overview: The individuals' life cycle



4.2 Second Stage of the Life Cycle

Flow Utilities: In every period $t \in \{1, .., T\}$, the flow utilities of women (f) and men (m) in couples (married or cohabiting) are given by:

$$u_t^f = \log(c_t^f Q_t) - \psi^{s_f, \text{K arrival}, PP} P_t + \xi_t \tag{1}$$

$$u_t^m = \log(c_t^m Q_t) + \xi_t. \tag{2}$$

Individuals in couples derive utility from the consumption of a private good, c_t. When children are present in the household they also derive utility from child human capital, Q_t,

[18] Throughout the paper, I use the term *divorce* to refer to couples that were previously married, and *separation* to refer to couples that were formerly cohabiting.

a public good produced in the maternal household, as explained below.[19] Women have disutility from labor supply, $P_t \in \{0, 0.5, 1\}$, captured by ψ. I allow this parameter to depend on the education of women (s_f), the arrival of a child to the household (captured by 'K arrival' = 1), and the presence of the male partner in the household ($PP = 1$). Additionally, both partners derive utility from their match quality, ξ_t. This is a couple specific shock that follows a random walk process, $\xi_t = \xi_{t-1} + \epsilon_t$, with $\epsilon_t \sim N(0, \sigma^2_\xi)$.

In the first period of cohabitation, the male partner receives an extra utility $\theta_C^{s_f}$, that depends on his partner's type. This is intended to capture the non-economic value of cohabitation, which can be associated with a benefit of delaying commitment.

After a couple dissolves, the partners stop perceiving utility from the match quality. Moreover, when individuals live alone the utility derived from the consumption of the private good is scaled by a constant $\pi^j < 1$ for $j \in \{f, m\}$.[20] However, they both keep deriving utility from child human capital. The flow utilities of ex-partners are given by:

$$u_t^f = \log(\pi^{f,\text{age}^k} c_t^f Q_t^{\boldsymbol{\alpha^{g,f}}}) - \psi^{s_f, age^K, PP} P_t \tag{3}$$

$$u_t^m = \log(\pi^m c_t^m Q_t^{\boldsymbol{\alpha^{g,m}}}). \tag{4}$$

A key distinction between marriage and cohabitation is given by the marginal utility that individuals derive from the child human capital when a couple breaks up. This is captured by the parameters $\alpha^{g,j}$, which vary by gender $j \in \{f, m\}$ and contract g. For clarity of the exposition, I denote the contracts as D for Divorce and S for Separation (for example, $\alpha^{D,f}$ denotes the marginal utility over the public good for a divorced women).

The extent to which children enter the utility function of parents after divorce and separation is an open question, which my model allows me to investigate empirically. However, to estimate these parameters I impose restrictions that reflect institutional differences in terms of custody laws and parental rights (discussed in Section 2). First, I assume that unmarried women retain sole custody and that their marginal utility over the public good does not change upon separation ($\alpha^{S,f} = 1$). Second, divorcees are more likely to obtain shared custody, reducing the marginal utility over child human capital for divorced women ($\alpha^{D,f} \leq 1$). Third, divorced women have higher access to their children, relative to divorced fathers ($\alpha^{D,m} \leq \alpha^{f,\text{Divorced}}$). Finally, cohabiting fathers are less likely to have formal custody or parental rights upon separation, compared to divorced men (which leads to $\alpha^{S,m} \leq \alpha^{D,m}$). These parameters, and particularly $\alpha^{D,f}$, will prove to be critical to shape

[19] Couples only derive utility from the public good if there is a child in the household. Including the period of birth (denoted as 'K arrival' = 1), a child is present in the household for four periods ($age^K = 4$). When a child is not present in the household, individuals only consume a private good, and $Q_t = 1$.

[20] If there is no child in the household, $\pi^{f,\text{no child}} = \pi^{m,\text{no child}}$. Women finance the child's consumption, which implies $\pi^{f,\text{child}} < \pi^{f,\text{no child}}$. This parameter varies with child's age.

the marriage market equilibrium and couples' choices, as I will discuss in Section 6.

Regarding singles, the flow utilities are analogous to those for separated/divorced couples, with the following exceptions: single men do not have children and hence cannot derive utility from the public good ($\alpha^{m,\text{single}} = 0$). Single women with children have sole custody over them ($\alpha^{f,\text{single}} = 1$). In each period, singles derive extra flow utility, θ^{s_j}, for $j \in \{f, m\}$, $s \in \{L, H\}$. These extra utility terms capture the non-economic preferences for singlehood. I allow these parameters to vary by gender and education-type.[21]

Resources: In each period, the resources available for household's consumption, x_t, depend on earnings, $w_t^j P_t^j$ for $j \in \{f, m\}$, and assets, $(1+r)A_t - A_{t+1}$, with $A_t > 0$, reflecting borrowing constraints. The household's budget constraint is given by:

$$x_t = w_t^f P_t^f + w_t^m P_t^m + (1+r)A_t - A_{t+1}.$$

The total expenditure in private consumption, x_t, finance the consumption of all household members, including children (which implies that $c_t^f + c_t^m = C_t \leq x_t$).

When individuals do not live with a partner, their resources depend on their own earnings and savings. As explained before, I assume that women who do not live with a partner and have children keep financing the child's consumption, but men do not.

Labor earnings depend on the wage rate and the labor supply of men and women, P_t. Women decide in every period whether to work full time ($P_t = 1$), part time ($P_t = 0.5$), or not work ($P_t = 0$). Labor supply choices determine the cumulative experience at time t, Exp_t, and in turn, their wage rate, $w_{i,t}^f$:

$$\log(w_{i,t}^f) = \beta_0^{s_f} + \beta_1^{s_f} Exp_{i,t} + \beta_2^{s_f} Exp_{i,t}^2,$$

where I allow the parameters β to depend on women's education s_f.

Men always work ($P_t = 1$) and their wages are only a function of age (t):

$$\log(w_{i,t}^m) = \beta_0^{s_m} + \beta_1^{s_m} t + \beta_2^{s_m} t^2.$$

However, men can suffer an income shock $\mu_t^{s_m}$, that halves their period earnings. This

[21] The flow utilities of singles are given by:

$$u_t^f = \log(\pi^{f,\text{age}^k} c_t^f Q_t) - \psi P_t + \theta^{f,s_f}$$
$$u_t^m = \log(\pi^m c_t^m) + \theta^{m,s_m}.$$

shock follows a Markov process:

$$E(\mu_t^{s_m}|\mu_{t-1}^{s_m}) = \begin{bmatrix} \phi_{t,00}^{s_m} & \phi_{t,01}^{s_m} \\ \phi_{t,10}^{s_m} & \phi_{t,11}^{s_m} \end{bmatrix}$$

Divorced and separated men with children will pay child support to their ex-partner with a probability that depends on the previous marital contract g (marriage or cohabitation). Their payment status is realized after the couple breaks up.[22] Child support becomes an extra source of income in the female household.

Other differences in resources between marriage and cohabitation materialize in the period the couple splits. At divorce ($t = t^D$) ex-spouses pay a divorce cost (DC), divided evenly between them. They also allocate half of the couple's assets (A_{t^D}) to each of the ex-spouses, with $A_{t^D}^f = A_{t^D}^m = A_{t^D}/2$. However, in the first period of separation ($t = t^S$) ex-partners walk away without paying a separation cost and keeping their own assets, allocated as a share of their potential earnings ($A_{t^S}^f = A_{t^S}(\frac{w_f}{w_t^f + w_t^m})$, $A_{t^S}^m = A_{t^S} - A_{t^S}^f$).

Fertility: Women are fertile during the first 4 periods of the life cycle and have at most one child. The fertility process is stochastic, and the probability of a child's arrival depends on the woman's age, her education, and her marital status (marriage, cohabitation or singlehood). I assume that the marital contract chosen in the marriage market is also the marital status under which women have a child. Hence, by choosing a marital contract, they also choose the fertility process that will govern the child's arrival.[23] Childless women who divorced or separate cannot have children.

Production Function of Child Human Capital: After the arrival of a child, child human capital is produced in the maternal household during the first 3 periods of the child's life (equivalent to 12 years). The inputs in producing child human capital are maternal time ($I_{i,t}$), previous child human capital ($Q_{i,t}$), and a set of indicators that capture the interaction between parent's education fixed effects ($\gamma^{s_f} \times \gamma^{s_m}$).

$$\log(Q_{i,t+1}) = \rho_0^{PP,\text{age}^K} + \underbrace{\rho_1^{PP,\text{age}^K} \log(I_{i,t})}_{\text{Maternal Time}} + \underbrace{\rho_2^{PP,\text{age}^K} \log(Q_{i,t})}_{\substack{\text{Past Child} \\ \text{Human Capital}}} + \underbrace{\gamma^{s_f} \times \gamma^{s_m}}_{\text{Parental Education}} \tag{5}$$

I allow the parameters ρ to depend on the age of the child, and particularly, on whether $age^K = 1$ or $age^K > 1$, where $age^K = 1$ is the period of the child's arrival. This captures differences in the productivity of time investments at different ages. The ρ parameters also

[22] I assume that men who stay single in the marriage market will never pay child support, and women who stay single in the marriage market will never receive it.

[23] In the model, this implies that childless couples cannot transition from cohabitation to marriage. I make this assumption for consistency between how I treat individuals in the data and the model.

depend on the presence of the father in the household, but not on the specific marital contract (e.g., marriage and cohabitation, or single, divorce, and separated). Then, differences in child development between marriage and cohabitation will only depend on endogenous investments and differences in partners' sorting across marital status, but not on structural differences in the production function.

Two things are worth mentioning: First, parental education types (s_f and s_m) enter the production function *directly*, through the interaction between γ^{s_f} and γ^{s_m}, but do not affect the productivity of the investments (ρ_0, ρ_1 and ρ_2 are independent of s_f and s_m). When the father is not present in the household, only the mother's education, captured by γ^{s_f}, matters for the production of child human capital.[24] Second, the maternal time investment is a function of the labor supply of women, given by $I_t = \kappa^{s_f, PP, age_K}(P_t)$. I allow κ to depend on the education of the woman (s_f), the presence of the father in the household (PP), and the age of the child (age^K), but not on the specific marital status.

Summary of the differences between marriage and cohabitation in the model: Before describing the household problem and the model solution, I summarize the main differences between marriage and cohabitation. Importantly, these differences will affect the relative values of marriage and cohabitation to a different extent for different types of couples. Married and cohabiting couples have different fertility processes, and cohabiting couples have the extra choice of transitioning to marriage. Most differences materialize when the couple breaks up. First, divorced and separated men and women have different marginal utilities over the public good. I impose restrictions over these parameters to capture differences in child custody laws for married and cohabiting parents. Second, divorcees split marital assets evenly, while cohabiting partners keep their own assets. Finally, the probability that the fathers pays child support varies upon divorce or separation.

4.2.1 The problem of the household during the life cycle

I introduce now the problem of the household. To simplify the exposition, I focus on the problem of a married couple. I only briefly mention the main differences with the problem of a cohabiting couple and provide details in Appendix B.1.[25]

A couple that starts period t married (AM) will compare their values under marriage

[24] Since I do not observe child expenditures, I capture them indirectly, through the parental education. This is consistent with Del Boca, Flinn, and Wiswall (2014) who use the PSID Child Development Supplement, but do not consider expenditures in children when constructing the estimator of the child human capital production function, as they suggest that individuals may not adequately attribute household public good expenditures to children.

[25] In the same Appendix, I describe the problems solved by other type of households.

and divorce, after observing the realization of the shocks (match quality and male income shock) and their fertility realization. Based on these, they will decide whether to stay married ($D_t = 0$) or divorce ($D_t = 1$), their savings (A_{t+1}), and female labor supply (P_t), to maximize the household's value, given by (6):

$$V_t^{AM}(\Omega_t^M) = \max_{P_t^f, A_{t+1}, D_t} \Big[\lambda_t^M \underbrace{V_t^{fM}(\Omega_t^M)}_{\substack{\text{Female Partner's} \\ \text{Value}}} + (1-\lambda_t^M) \underbrace{V_t^{mM}(\Omega_t^M)}_{\substack{\text{Male Partner's} \\ \text{Value}}} \Big] \tag{6}$$

$$s.t \begin{cases} \text{Budget Constraint in Marriage if } D_t = 0 \\ \text{Budget Constraint in Divorce if } D_t = 1 \end{cases}$$

The value of the household $V_t^{AM}(\Omega_t^M)$ is the weighted value of the spouses' individual values, $V_t^{fM}(\Omega_t^M)$ and $V_t^{mM}(\Omega_t^M)$, where Ω_t^M is the state space of the couple in period t, given by $\Omega_t^M = \{Exp_t^f, \xi_t, A_t, k, age^K, Q_t, \mu_t, \lambda_t^f\}$. For each partner, the value V_t^{jM} will be given by their value under marriage, when they decide to stay married ($D_t = 0$), and the value in divorce otherwise (if $D_t = 1$). For example, for the female partner, V_t^{fM} is given by:

$$V_t^{fM}(\Omega_t^M) = (1-D_t) \underbrace{\big(u_t^{fM} + \beta E_t V_{t+1}^{fAM}(\Omega_{t+1}^M)\big)}_{\text{Value in Marriage}} + D_t \underbrace{\big(u_t^{fD} + \beta E_t V_{t+1}^{fD}(\Omega_{t+1}^{fD})\big)}_{\text{Value in Divorce}}. \tag{7}$$

The value for the male partner, V_t^{mM}, is analogous. The values under marriage and under divorce are computed considering the expected future realizations of shocks and the optimal choices that, conditional on those shocks, they would make as a couple if they stay married or individually if they divorce.[26]

I assume limited commitment. In each period, the partners' weights in the household problem are given by their relative bargaining power (or Pareto weight), λ_t. The Pareto weights at the beginning of the life cycle ($t = 1$) are those determined by the marriage market equilibrium, and are the same for all couples of the same type. For period $t > 1$, these Pareto weights will be couple-specific, as they can be updated to ensure that the participation constraints of the spouses hold, as I explain below.

The choice of female labor supply (P_t) determines female experience, and hence, her wages. Together with the savings choice (A_{t+1}), it affects the total resources x_t available for consumption of all household members. The intra-household allocation of resources

[26] To compute the corresponding expected values, the individuals will solve the problem backwards, starting from the last period of the life cycle, T, and integrating over all possible realization of the shocks, given their current state space (Ω_t^M under marriage, and Ω_t^{mD} and Ω_t^{fD} for men and women under divorce).

to private consumption of each partner will depend on the relative Pareto weights, λ_t.[27] The female labor supply—together with the divorce decision—also determine child human capital, Q_{t+1}, as in Equation (5). When divorce is optimal, the choice of savings and labor supply (in the case women) will be made by each divorced household, individually.

Different features of my model lead to the Transferable Utility (TU) structure to break up. First, a TU framework requires that the partners cooperate both during the relationship, and after divorce or separation. However, in my model, ex-partners act non-cooperatively. Upon separation or divorce, resources are allocated among the partners based on pre-specified rules. These rules are independent from the relative Pareto weights that the partners had during the relationship. Second, in my model, female labor supply affects not only women's current earnings, but also their time investments in children and the accumulation of female experience, which in turn affects their future wage rate. As the couples behave non-cooperatively after they split, the partners do not have a mechanisms to compensate each other for the investments made during the relationship. This might lead to inefficient levels of maternal time investments. Third, the nature of the utility function changes after the couple breaks up, affecting the extent under which men and women enjoy the public good. This can lead to inefficient investments in children, as individuals may not be able to reap the benefits of those investments in the future. Together, these features of my model impose a departure from the TU setting. Therefore, in my Imperfect Transferable Utility (ITU) framework, the allocation of bargaining power within the household—that determines the allocation of private consumption between the partners and the way that the household weights each partner's preferences—will affect the choices that the couple will make over the life cycle, and hence, the surplus generated by a match.

Couple dissolution and renegotiation of the Pareto weights: Couples that arrive married or cohabiting to period t optimally decide whether they stay together or break up. Cohabiting couples have the additional option of transitioning to marriage.[28] For brevity, here I explain the decision process for a couple that starts period t married. I summarize the decision process of a cohabiting couple in Appendix B.1. For a married couple, there are three potential scenarios:

1. If for both spouses the value under marriage is *higher* than the value under divorce, $u_t^{jM} + V_{t+1}^{jM}(\Omega_t^M) < V_t^{jD}(\Omega_t^{jD})$ for $j \in \{f, m\}$, the couple will continue married at the

[27] In particular, if the couples decides to stay married the household problem will be given by problem (6), with $D_t = 0$. When solving this problem, the couple will first decide how to allocate the total resources between total consumption and savings. Conditional on that decision, the intra-household allocation of consumption will be such that the marginal utilities of both partners equalize. Given λ_t, this implies: $\frac{\partial V_t^{fM}}{\partial c_t^f} = \lambda_t \frac{1}{c_t^f} = (1-\lambda_t)\frac{1}{c_t^m} = \frac{\partial V_t^{mM}}{\partial c_t^m}$. Given that $c_t^f + c_t^m = C_t$, then $\lambda_t \frac{1}{C_t - c_t^m} = (1-\lambda_t)\frac{1}{c_t^m}$, which implies $c_m = (1-\lambda_t)C_t$ and $c_f = \lambda_t C_t$.

[28] For childless cohabiting couples, the problem's structure is analogous to that of the married couples.

same Pareto weights, λ_t^f, with which they arrived to period t.

2. If for both spouses the value under marriage, $u_t^{jM} + V_{t+1}^{jM}(\Omega_t^M)$, is *lower* than the value under divorce, $V_t^{jD}(\Omega_t^{jD})$, the couple will divorce (and the Pareto weights are not relevant anymore).

3. If for one of the spouses $j \in \{f, m\}$ the value of divorce is larger than the value of marriage, but the opposite holds for the other spouse, the couple will engage in a renegotiation. This is, they will update the Pareto weight in favor of the party that wants to leave so that they become indifferent between leaving and staying.[29] Divorce will occur when there is no allocation of resources within marriage that satisfies the individual participation constraints of both spouses, and the intertemporal budget constraint. In this setting, divorce is efficient.[30]

4.3 The Matching Stage

The marriage market is frictionless and opens only once, at the beginning of the life cycle. At this stage, individuals decide the type of household they want to form, given by a combination of a partner-type (based on education) and a marital contract (marriage or cohabitation). Individuals can also remain single.

Before choosing their matches, each individual i of sex $j \in \{f, m\}$ draws a vector of marital preferences, ω_i^j, over partners of the opposite sex, as in Choo and Siow (2006):

$$\boldsymbol{\omega}_i^j = (\omega_i^{\emptyset}, \omega_i^{s_{-j},M}, \omega_i^{s_{-j},C};\ \ s \in L, H);\ \ \omega^{s_{-j},g} \sim \text{Type I}(0, \sigma_\omega). \tag{8}$$

I assume these taste shocks are drawn from an Extreme Value Type-I distribution, with location 0 and scale parameter σ_ω. These shocks $\omega_i^{s_{-j},g}$ represent the subjective taste of individual i of sex j of entering a contract g with a partner of type s_{-j}.[31] This implies that individuals care about the type of contract they set and their partner's education, but not about their partner's identity.

[29] In principle, there might be a continuum of Pareto weights under which both partners might decide to stay in the relationship. However, as in Voena (2015), Low, Meghir, Pistaferri, and Voena (2018) and Reynoso (2019), I assume that they will only change the Pareto weights by the minimum amount required to make the partner for whom the participation constraint is binding to choose to stay in the marriage.

[30] In this model, divorce is unilateral, which implies that any spouse can walk away from the relationship without the consent of the other party.

[31] Specifically, $\omega_i^{s_{-j},M}$ is the idiosyncratic value for an individual i of type s_j of marrying a spouse of type s_{-j}, $\omega_i^{s_{-j},C}$ is the subjective taste for a cohabiting partner of type s_{-j}, and $\omega_i^{\emptyset}$ is the subjective taste of staying single.

At the matching stage, each individual takes as given the solution of the life-cycle problem (described in Section 4.2.1) in each type of household. They compute the expected lifetime value, $\bar{V}^{(s_j,s_{-j},g)}(\lambda^{(s_j,s_{-j})})$, of entering each type of contract g with a partner of type s_{-j}. These are the expected values, from the perspective of the marriage market, of starting period $t=1$ in each potential household, before any shocks are realized.[32] These values are determined in equilibrium since, as explained above, in the imperfect transferable utility setting the total surplus produced by a couple is not independent of the equilibrium Pareto weights, $\lambda^{(s_j,s_{-j})}$.

Then, given the systematic utility values, $\bar{V}^{(s_j,s_{-j},g)}(\lambda(s_j,s_{-j}))$, and their idiosyncratic preferences, $\omega_i^{(s_j,s_{-j},g)}$, individuals choose the type of household that maximizes their utility, given by a combination of $s_{-j} \in \{H,L\} \cup \emptyset$ and $g \in \{M,C,S\}$:

$$V_i^{(s_j,s_{-j},g)} = \max_{s_{-j},g} \left(\underbrace{\bar{V}^{(s_j,\emptyset)} + \omega_i^{s_j,\emptyset}}_{\text{Value of singlehood}} ; \underbrace{\bar{V}^{(s_j,\boldsymbol{s_{-j}},\boldsymbol{g})}(\lambda^{(s_j,s_{-j})}) + \omega_i^{(s_j,\boldsymbol{s_{-j}},\boldsymbol{g})}}_{\substack{\text{Value of matching to partner} \\ \text{of type } s_{-j} \text{ under contract } g}} \right) \tag{9}$$

Note that, following Choo and Siow (2006), the idiosyncratic taste shocks $\omega_i^{s_j,s_{-j}}$, are additively separable in the total value of forming each type of household, V_i (as in Chiappori, Salanié, and Weiss, 2017; Chiappori, Costa-Dias, and Meghir, 2018; Reynoso, 2019; Gayle and Shephard, 2019). This implies that, conditional on the marriage market equilibrium, these idiosyncratic taste shocks have no impact on the life-cycle choices and individuals' lifetime values. This separability assumption and the distributional assumptions made in (8) allow me to obtain in close form the proportion of individuals of type s_j that will demand a contract g with a partner of type s_{-j}, given the matrix of $s_m \times s_f \times 2$ initial Pareto weights, Λ. These are given by the conditional choice probabilities, defined in Appendix B.2.

The solution to the matching problem defined by (9) determines the marriage market equilibrium. This equilibrium is defined by the matching patterns (who matches with whom) and the initial matrix of Pareto weights Λ (how the marital surplus is split between the partners). At the equilibrium Pareto weights, the measure of men who demand each type of household will coincide with the measure of women who supply the same type of household, and the marriage market clears. Formally, the equilibrium is defined as:

Definition 1: A competitive equilibrium at the matching stage is given by:

1. A matrix of $(s_f \times s_m \times 2)$ Pareto weights Λ,

[32] For example, the expected lifetime value for an individual of type s_j of marrying a partner s_{-j} is given by $E_{t=0}[V_{t=1}^{AM}(\Omega_{t=1}^{M}(s_j,s_{-j}))]$, where the expectation is taken from the perspective of the marriage market ($t=0$) over all the potential shock realizations. $V_{t=1}^{AM}(\Omega_{t=1}^{M}(s_j,s_{-j}))$ is the value of problem (6), for $t=1$.

2. An assignment of male types to female types (i.e., defined by the choice probabilities as in Equation (18)), $\nu^m_{s_m,s_f,g} \to \nu^f_{s_f,s_m,g}$, $\forall s_m \in \{L,H\}$, $\forall s_f \in \{L,H\}$ and $\forall g \in \{M,C\}$,

such that,

1. The measure of type-s_m men demanding a type-s_f woman under a contract g equals the measure of type-s_f female supplied to the type-s_m male under contract g:

$$\nu^f_{(s_f,s_m,g)}(\Lambda) = \nu^m_{(s_m,s_f,g)}(\Lambda) \;\; \forall s_m \in \{L,H\}, \forall s_f \in \{L,H\}, \forall g \in \{M,C\},$$

2. At the the Pareto weights Λ, the mass of single men and women, $\nu^m_{(s_m,\emptyset)}(\Lambda)$ and $\nu^f_{(\emptyset,s_f)}(\Lambda)$, is such that the sum of men and women in each type of household (couples and singles) equals the measure of men and women in the economy:

$$\nu^f = \nu^f_{(s_f,\emptyset)}(\Lambda) + \sum_{s_m,g} \nu^f_{(s_f,s_m,g)}(\Lambda) \;\; \forall s_f \in \{L,H\}$$
$$\nu^m = \nu^m_{(\emptyset,s_m)}(\Lambda) + \sum_{s_f,g} \nu^m_{(s_f,s_m,g)}(\Lambda) \;\; \forall s_m \in \{L,H\}.$$

As explained earlier, the equilibrium Pareto weights are common to all couples of the same type that form in the marriage market. These are endogenously determined anticipating the allocations and choices that individuals (singles and in couples) will make over the life cycle. At the same time, in the ITU setting, those allocations and choices will be affected by the Pareto weights of the partners.

To solve for the matrix of equilibrium Pareto weights, Λ, I adapt to my setting the fixed point algorithm proposed by Gayle and Shephard (2019) and Reynoso (2019). The details are presented in Appendix B.3.

5 Model Estimation

In this section, I discuss the identification of the model parameters and the methods used in the model estimation. The estimation of the structural model proceeds in two steps. First, I identify the wage processes for men and women, the production function of child human capital, and the fertility and male income shock processes directly from the data. Another set of structural parameters is drawn from previous research. In a second stage, I estimate the remaining parameters within the model, using the Method of Simulated Moments (McFadden, 1989; Pakes and Pollard, 1989).

5.1 Parameters Estimated Outside the Model

Preset Parameters: The parameters presented in Table A.11 in Appendix C.1 are taken directly from the literature or determined based on external data sources. I set the length of the life cycle to seven periods, of four years each. Women are fertile during the first four periods of the life cycle (equivalent to age 37). Child's human capital accumulates for three periods. Households derive utility from their children for four periods.

Wage Process for Men: I estimate the wage process for men using the NLSY-97. In my model, male wages for education type s_m are deterministic and depend on age. I estimate the following model, for a man of type i, of age t, in state s:

$$\log(w_{its}) = \beta_0^{s_m} + \beta_1^{s_m} Age_{its} + \beta_2^{s_m} Age_{its}^2 + \delta_y^{s_m} + \delta_s^{s_m} + \epsilon_{its}. \tag{10}$$

I allow the coefficients in (10) to depend on male education, s_m. Time and state fixed effects are captured by δ_y and δ_s. I present the results in Table A.12 in Appendix C.1. The estimates are consistent with Reynoso (2019), and show that male returns to experience (equivalent to age for men in my model) are higher for highly-educated men. Wages exhibit a concave profile, with the returns to age being positive but decreasing over time.

Wage Process for Women: Using the NLSY-97, I specify the earnings process for a woman j, in state s and at time t as follows:

$$\log(w_{jts}) = \beta_0^{s_f} + \beta_1^{s_f} Exp_{jts} + \beta_2^{s_f} Exp_{jts}^2 + \Gamma^{s_f} X_{jst} + \delta_y^{s_f} + \delta_s^{s_f} + \epsilon_{jts}, \tag{11}$$

where, as in the case of men, I allow the parameters to depend on female education. In this model, Exp captures the cumulative experience of women from the beginning of the life cycle (age 23). I assume part-time work adds 1/2 year of experience, in line with how I treat experience in the model.[33] The vector X controls for the marital status of the individual, and δ_y and δ_s capture year and state fixed effects.

I use a standard two-step control function approach as in Reynoso (2019) and Low, Meghir, Pistaferri, and Voena (2018) to address two main challenges in the estimation of the female wage process: First, female experience is endogenous, and second, I only observe wage offers for women who select into the labor market (an issue addressed by Heckman, 1979). I further describe these endogeneity concerns and the two-step estimation approach I implement to deal with them in Appendix C.1.

The main results from estimating model (11) are shown in Table A.14. As in the case

[33] Since one period in my model consists of four years, in the data I treat one year of experience as one-fourth of a period.

of men, female wages exhibit a concave profile on experience. The returns to experience are larger for highly-educated women.

PRODUCTION FUNCTION OF CHILD HUMAN CAPITAL: I estimate the production function of child human capital based on Equation (5) in the model:

$$\begin{aligned}\log(Q_{i,t+1}) = \rho_0^{PP} + \rho_1^{PP} \times \text{Small}_{i,t} + \rho_2^{PP} \log(I_{i,t}) + \rho_3^{PP} \log(I_{i,t}) \times \text{Small}_{i,t} \\ + \rho_4^{PP} \log(Q_{i,t}) + \rho_5^{PP,\text{age}^K} \log(Q_{i,t}) \times \text{Small}_{i,t} + \gamma^{s_f} \times \gamma^{s_m} + \epsilon_{i,t}\end{aligned} \tag{12}$$

I estimate Equation (12) using data from the FFCW Study. As I explained in Section 4.2, the parameters of the production function of child human capital depend on the presence of the father in the household, and the age of the children. To account for the first, I estimate the model separately for households in which the two parents are present, and for households in which only the mother is present. To account for differences in the child's age, I interact maternal time investments (I_t) and past human capital (Q_t) with the variable Small_t, an indicator that takes value 1 when the child is 5 years old or younger (mapped to the first period of the child's life in the model). The indicator variables γ^{s_f} and γ^{s_m} capture the education level of the parents in couples. For single-parent household, only the indicator for maternal education, γ^{s_f}, enters in the production function.

Since I do not observe maternal time investments (I_t), I develop a strategy to map the female labor supply to maternal time investments in children by combining data from the FFCW Study and the American Time Use Survey (ATUS). The latter contain detailed information on time use, including childcare activities. I allow the mapping to depend on maternal education, the presence of the male partner, and the child's age.[34] I explain this in detail in Appendix C.1.

In order to construct the child's human capital measures, Q_t, I take advantage of the rich information on child cognitive and behavioral outcomes available in the FFCW data at different ages. I provide details in Appendix C.1.

The results are reported in Table A.17. The returns of maternal time investments are larger for young children, consistent with previous findings in the literature (Del Boca, Flinn, and Wiswall, 2014; Attanasio, Meghir, and Nix, 2020; Bolt, French, Maccuish, and O'Dea, 2021). Self-productivity increases with the child's age, and it is higher when both parents are present in the household. This may capture the role of the father's time investments or the household's resources that might be higher in two-parents households and that

[34] This allows me to introduce variation in maternal time investments that are not only driven by the maternal labor supply, as illustrated in Figure A.3. For example, it allows for the possibility that a highly-educated women works full time in the labor market, but still invests a significant share of her time in developing their children human capital.

are omitted from my model. Finally, there are large complementarities in parental education, captured by the large and significant coefficient of having two highly-educated parents. This complementarity will prove to be important in driving sorting in the marriage market.

To map the data estimates to the model, I make the following assumptions: First, I map the first period of the model to data of when the child is 'small' (ages 1 to 3). Second, while in the data I use a latent variable to map the maternal labor supply from the FFCW to maternal childcare time from the ATUS data, such a latent variable is missing in the model. Therefore, in the model I assign to each woman the average time spend on childcare of her corresponding cell in the ATUS (defined by maternal education $\times$ presence of a partner $\times$ age of the child $\times$ labor supply).

Other elements estimated outside the model: I estimate the Markov process $(\mu_t^{s_m})$ of the male income shock and the fertility process using the NLSY-97. I use the FFCW data to estimate the probability that the father will pay child support upon divorce or separation. Details and results are provided in Appendix C.1.

5.2 Internally Estimated Parameters

I internally estimate the remaining 17 structural parameters (denoted by the vector $\boldsymbol{\Upsilon}$): a) the disutility of work of women in different type of households $(\psi^{s_f,\text{K arrival},PP})$; b) the variance of the shock to the match quality (σ_ξ); c) the marginal utility over child human capital for divorced women $(\alpha^{D,f})$, divorced men $(\alpha^{D,m})$, and separated men $(\alpha^{S,m})$; d) the scale parameter for the marriage market taste shocks (σ_ω); and e) and the extra utility values for single men and women $(\theta_S^{s_f}$ and $\theta_S^{s_m})$ and for cohabiting men (θ_C^{m,s_f}). The full list of parameters is in Table A.21.

5.2.1 Data and Sample

The internal estimation uses data from the NLSY-97, described in Online Appendix OB. I summarize the complex marital histories of individuals by combining data on marital and fertility histories. For consistency with my model, I assign to each individual a unique marital status and partner, to characterize in the data their marriage market choices. As a relevant criteria for this assignment, I consider the marital status under which they had their first child.[35] For women who are childless by the last survey, I consider them as singles if they never had a partner, as cohabiting if they have ever cohabited but have never been married, and as married if they were ever married. My final sample consists

[35] I assume that women already completed their fertility choices by the last survey round in which they appear in the survey. I discuss this assumption in the Appendix.

of 1,837 women, 48% of which are assigned to 'marriage', 24% to 'cohabitation' and 28% to 'singlehood', from the perspective of the marriage market. I provide details about the sample selection and the assignment of individuals to unique marital status and partners in Online Appendix OC.1.

5.2.2 The Method of Simulated Moments

To estimate the vector of structural parameters $\boldsymbol{\Upsilon}$, I use the Method of Simulated Moments. I construct in the data a set of 33 moments, denoted by M_D, related to the labor supply of women in different type of households, marital transitions, and marriage-market matching frequencies. For every given vector of structural parameters $\boldsymbol{\Upsilon}$, I solve the model and construct the same set of moments, denoted by M_M, on simulated data. I describe these moments in Online Appendix OC.2. Overall, I do not target heterogeneity by couple-type or between marriage and cohabitation in the estimation, except in behaviors directly associated with differences in the institutional setting, such as separation versus divorce rates.

Following Gayle and Shephard (2019) and Reynoso (2019), I use an equilibrium constraint approach in the estimation (Su and Judd, 2012). Under this approach, I augment the vector of parameters $\boldsymbol{\Upsilon}$ to include the vector Λ, containing the set of eight equilibrium Pareto weights, one for each type of couple. I use a global search algorithm to obtain the estimated parameters $\hat{\boldsymbol{\Upsilon}}$ and the equilibrium Pareto weights Λ that minimize the distance between the data and the model moments. This implies minimizing the criterion function (13), subject to market-clearing constraints (14), defined as in Appendix B.2:

$$(\hat{\boldsymbol{\Upsilon}}, \Lambda(\hat{\boldsymbol{\Upsilon}})) = \underset{\boldsymbol{\Upsilon},\Lambda}{argmin} \big[M_M(\boldsymbol{\Upsilon}, \Lambda) - M_D\big]^T W \big[M_M(\boldsymbol{\Upsilon}, \Lambda) - M_D\big] \tag{13}$$

$$s.t \;\; \nu^f_{(s_f,s_m,g)}(\Lambda) = \nu^m_{(s_m,s_f,g)}(\Lambda) \quad \forall (s_m, s_f) \forall \, g \in \{M, C\}, \tag{14}$$

where W is the optimal weighting matrix, given by the inverse of the diagonal of the variance-covariance matrix of the data moments. As discussed by Gayle and Shephard (2019) this approach is more efficient than solving a nested fixed point problem in which, for each proposed vector of parameters $\boldsymbol{\Upsilon}$, one needs to solve for the Pareto weights using the equilibrium algorithm discussed in Appendix B.3.[36]

[36] Due to the discreteness of the numerical solution of the model, the vector Λ obtained using the method of simulated moments is not identical to the vector of Pareto weights obtained with algorithm described in Appendix B.3. Therefore, for consistency between the procedure used to obtain the baseline equilibrium Pareto weights and those in counterfactual exercises, I use the vector of structural estimates, $\hat{\Upsilon}$, and solve for the initial Pareto weights again using the equilibrium algorithm. I report these Pareto weights in Table 4. While there are differences in the magnitudes between the Pareto weights obtained using each procedure,

5.2.3 Identification

The structural parameters in $\boldsymbol{\Upsilon}$ are identified from the close link between each parameter and the aggregate behavior of individuals in the model. These behaviors are captured by the 33 moments described in Online Appendix OC.2. I here provide heuristic identification arguments.

Most parameters in my model are associated to the mean lifetime expected values of forming each type of household ($\bar{V}^{s_j,\emptyset}$ and $\bar{V}^{s_j,s_{-j},g}$ for $j \in \{f,m\}$ and $g \in \{M,C\}$). As changes in parameters generate variation in the simulated matching frequencies, the matching patterns observed in the data contribute to the identification of the model parameters. Moreover, the structural parameters are disciplined by the individuals life-cycle behaviors.

The parameters of the disutility of work for women, $\Psi^{s_f,\text{K arrival},PP}$, are linked to female labor supply choices. Given the wages and productivity of the maternal time in the production of child human capital, an increase in the parameters associated with the disutility of work makes it more costly for women to work in the labor market.

The variance of the shock to the match quality, σ_ξ, is associated with the divorce and separation rates of the married and cohabiting couples. Given the mean of the shock (normalized to zero), a higher variance of the match quality shock will increase the share of couples that get a shock below a certain threshold, fueling separation. Marital transitions over the life cycle contribute to pin down the parameters of the marginal utility over the public good. In particular, married and cohabiting partners have different outside options. Therefore, differences between divorce and separation rates, conditional on σ_ξ, will contribute to pin down the marginal utilities over child human capital for divorcees, $\alpha^{D,f}$ and $\alpha^{D,m}$. For example, given σ_ξ, a lower marginal utility over the public good for divorced women, $\alpha^{D,f}$, will decrease the value of divorce relative to separation, widening the gap between divorce and separation rates. The relative marginal utility over the public good for separated men relative to divorced men (which determines $\alpha^{S,m}$) can be pinned down from the transitions from cohabitation to marriage. A lower gap between $\alpha^{D,m}$ and $\alpha^{S,m}$ reduces the incentives for cohabiting men of transitioning to marriage, conditional on the other parameters.

The scale parameter of the taste-shock distribution in the marriage market, σ_ω, is pinned down by the overall sorting patterns in the marriage market. The observed fraction of singles informs the parameters of the extra flow utility of singles, $\theta_S^{s_f}$ and $\theta_S^{s_m}$. The first period values of cohabitation for men, $\theta_C^{s_f}$, are pinned down both from the aggregate share of cohabiting couples, and by the transition from cohabitation to marriage. For example, a higher $\theta_C^{s_f}$ increases male incentives to choose cohabitation in the marriage market and

the patterns are the same in both cases.

to later transition to marriage.

Finally, all the structural parameters are constrained by the marriage market-clearing conditions. For a proposed set of parameters $\boldsymbol{\Upsilon}$, the model matching frequencies computed from female and from male choices may differ. Then, the equilibrium Pareto weights and the structural parameters will adjust until there is no excess demand in any couple-type, and the model matching frequencies coincide with the corresponding data moments.

5.2.4 Results and Fit

Parameters estimates and fit: I report the structural parameters from the internal estimation and its standard errors in Table A.21.[37] In the last column of Table A.21 I present the result of sensitivity analysis (Andrews, Gentzkow, and Shapiro, 2017).[38] I report the three moments that explain most of the variation of the parameters in the estimation, and the share of this variation explained by those three moments.

My estimates of the marginal utility over the child's human capital show an intuitive ranking, with $\alpha^{S,m} < \alpha^{D,m} < \alpha^{D,f} < \alpha^{S,f} = 1$.[39] This reflects the current institutional environment (discussed in Section 2), in which married and cohabiting parents are treated differently by state courts, favoring joint parental custody after divorce and sole maternal custody upon separation. I investigate the effects of changing these policies in Section 6.

The estimates of the utility function parameters, $\psi^{s_f,\text{K arrival},PP}$, suggest that most women lose utility when supplying positive market hours. However, women in couples with a small child derive utility from labor market participation. This induces them into work even when their time increases child human capital. The estimate of the variance of the match quality shock (σ_ξ) equals to 7.71. The extra flow utility from singlehood, θ^s_S, is positive for men and women, and increasing on education. Conditional on education, men require a higher taste value to reproduce the observed fraction of singles, as the value of singlehood is lower for men due to the fact that single men cannot have children. The extra utility value for men in the first period of cohabitation is positive, and increasing on the partner's education. Finally, the estimate of the scale parameter of marriage market preferences, σ_ω is 3.47, rationalizing the observed marriage market mismatch.

Figure 5 shows that my model fits the set of moments targeted in the estimation very

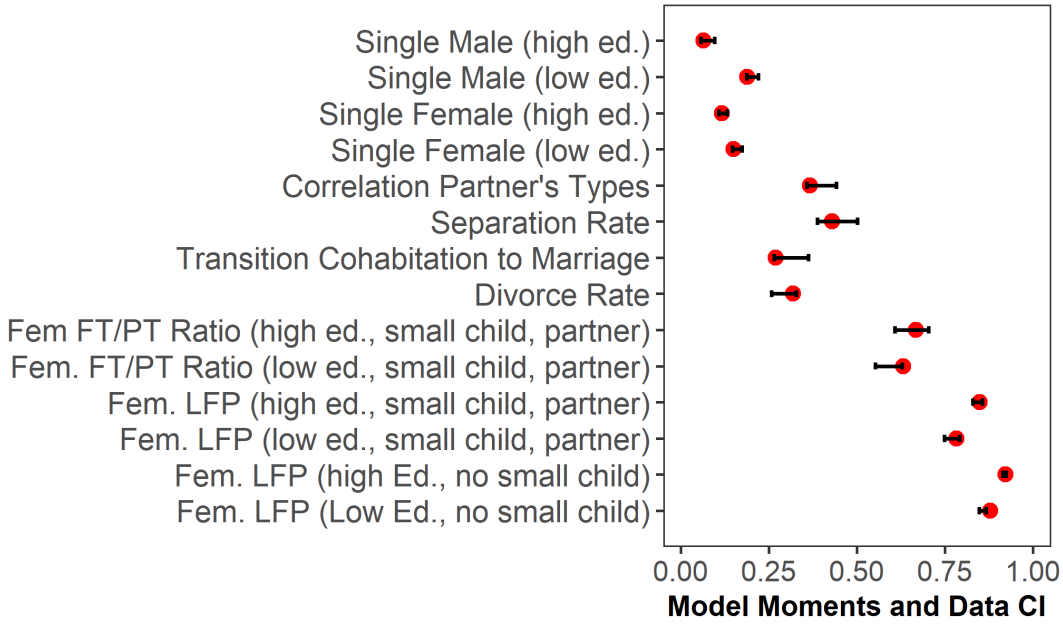
[37] The variance matrix of the estimated parameters $\hat{\boldsymbol{\Upsilon}}$ is computed as $\text{Var} = [\Delta'_m W \Delta_m]^{-1} \Delta'_m W C W \Delta_m [\Delta'_m W \Delta_m]^{-1}$, where Δ_m is the 17×33 matrix of partial derivatives of the moment condition with respect to each parameter. C is the covariance matrix of the data moments.

[38] I compute the sensitivity of each parameter to the moments in the estimation as $|\text{Sensitivity}| = |-[\Delta'_m W \Delta_m]^{-1} \Delta'_m W|$, as defined by Andrews, Gentzkow, and Shapiro (2017). See footnote 37 for notation.

[39] Instead of estimating $\alpha^{S,m}$ directly, I estimate it relative to $\alpha^{D,m}$, with $\alpha^{S,m} = K \times \alpha^{D,m}$, with $0 < K \leq 1$. My estimates imply $\alpha^{S,m} = 0.555 \times 0.205 = 0.113$.

well, with most of them lying within the 95% confidence intervals of the data moments.[40]

Figure 5: Model Moments (red dots) and Data Confidence Intervals (black bars)



Notes: The red dots display the model moments, at the estimated values of the parameters and the equilibrium Pareto weights. The error bars show the 95% confidence interval of the data moments. The construction of the data and the model moments is explained in detail in Online Appendix OC.2.

The marriage market equilibrium: I display the model matching frequencies in Figure 6, an additional set of moments targeted in the estimation. Under the estimated structural parameters and the equilibrium Pareto weights, the matching frequencies computed from female choices (light blue dots in Figure 6) coincide with those computed from male choices (dark blue triangles in Figure 6), consistent with the marriage market equilibrium.[41] Moreover, both male and female marital choices reproduce the targeted marriage market patterns, as most of these model moments lie within the 95% confidence intervals of the data matching frequencies.

The marriage market exhibits positive assortative matching (PAM) in education, measured by a positive correlation between the education of the male and the female partner in couples (0.367). A key mechanism driving this result is the complementarity between partners education in the production function of child human capital, given by the estimation

[40] Detailed model fit is provided in Tables A.22.

[41] Minor differences of at most 1.9 percentage points between the male and the female choices remain due to the discreteness of the numerical solution of the model.

of Equation 12 (reported in Table A.17).

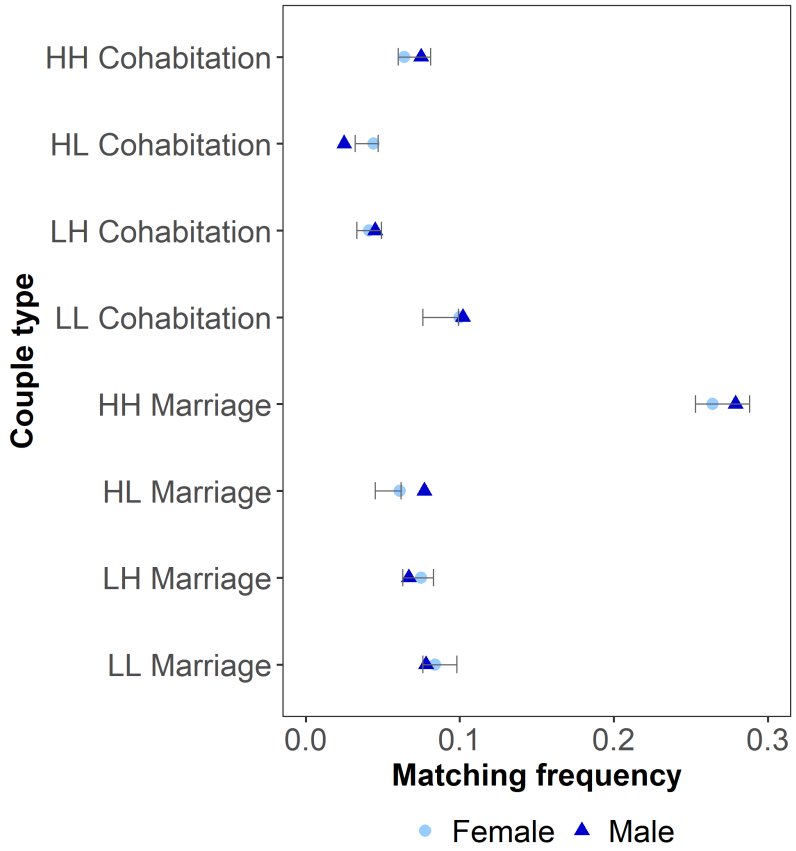
The Pareto weights Λ that clear the marriage market—the initial female partner's weight in the household problem in each type of household—are displayed in Table 4. Within contracts, the initial female Pareto weight is increasing on female education, and decreasing on male education. Moreover, cohabiting women have lower initial Pareto weights in all type of households, conditional on both partner's education.

Compared to cohabitation, legal marriage is relatively more attractive for men, who gain from higher stability (which allows them to enjoy their children for longer) and higher access to their children upon divorce. These benefits offset the costs associated with a higher probability of paying child support and even split of assets between spouses (as the male partner is usually the main earner).[42] For women, the main advantage of cohabitation is that it allows them to retain full custody over children upon separation (captured by $\alpha^{S,f} = 1$), while married couples are more likely to obtain shared custody upon divorce ($\alpha^{D,f} < 1$). This reduces relative value of marriage for women, particularly for those matched to low-educated men, for whom legal marriage provides less benefits in terms of asset division and child support (since their partners have relatively low wages).

As men have a relative higher value of marriage, they attract women into marriage by providing them with a larger share of household resources relative to cohabitation. This is particularly true among the highly-educated, who benefit relatively more from marrying highly-educated women. Therefore, these men are more willing to give up private consumption to disproportionately convince highly-educated women to marry. For the low-educated, the relative gains from marriage are lower for both men and women (and women are better-off in cohabitation, conditional on Pareto weights). Then, low-educated men are less willing to give up consumption to attract women into marriage, while low-educated women are willing to resign private consumption to enter cohabiting relationships. This makes low-educated partners relatively more likely to sort into cohabitation. As shown in Figure 6 and Table A.23, there are no large differences in the share of low-educated (or mixed-educated) couples that choose either contract. For these couples, preferences play a larger role in driving the marital choices.

[42] The relative value of marriage is higher for highly-educated men, due to higher fertility probability under marriage.

Figure 6: Matching Frequencies: Model Moments and Data Confidence Intervals (black)



Notes: Each set of dots and bar represents a different type of couple in the marriage market. 'L' denotes low education and 'H' denotes high education. For each pair, the first letter denotes the female partner's education and the second the male partner's education. For example 'HL Cohabitation' refers to cohabiting couples in which the female partner is high educated and the male partner is low educated. The light-blue dots correspond to the female choices in the model, and the blue triangles to the male marital choices. Since in the data the matching partners are unique, there is only one data confidence interval, denoted by the black bars. An overlapping between the light-blue and the coral dots imply that the model female and the male choices coincide.

All in all, two-thirds of the couples that form choose legal marriage, and married couples are more positively sorted than cohabiting couples.[43] The equilibrium share of singles is large, with 27% of men and women staying single in the marriage market. However, the educational composition of singles varies by gender: 78% of single men and 58% of single women are low-educated.

[43]In the model, the correlation between partner's education for married couples is 0.350 while for cohabiting couples is 0.304

Table 4: Equilibrium Pareto Weights (Female)

	Marriage		**Cohabitation**	
	Male Low Ed.	Male High Ed.	Male Low Ed.	Male High Ed.
Female Low Ed.	0.582	0.317	0.240	0.030
Female High Ed.	0.939	0.910	0.855	0.480

Notes: This table displays the female Pareto weights that clear the marriage market—this is, the female relative weight in the household problem, that also determines her relative share of the household's resources. The computational procedure to obtain the Pareto weights is described in Section 5.2. Women and men are classified between Low and High-educated as described in Online Appendix OC.1.

Untargeted Patterns: The estimates also reproduce the untargeted patterns from the data that I discussed in Section 3.2. First, low- and highly-educated women who have children in marriage accumulate 32% and 7% less labor market experience than cohabiting women, respectively (see Table A.24). In particular, low-educated cohabiting women are more likely to work in the labor market when they have small children, as shown in Figure A.10)—which leads to lower parental investments, as discussed below—and conditional on participation, are more likely to work full time (92% vs. 86% for married women).[44] Moreover, women in cohabiting relationships anticipate a higher separation rate, which provides an additional incentive to increase their labor supply.

Consistent with the data, my model shows that, conditional on the child's age, cohabiting couples separate more often than married couples, as shown in Figure A.11. This is mainly driven by cohabiting women retaining full access to children upon separation.[45]

Child Human Capital: Consistently with my empirical evidence, children born under cohabitation accumulate less human capital than those born to married mothers. By the end of the child's developmental stage, this difference is on average 7.6%. This is explained by highly-educated couples—that have higher complementarity in the production of child human capital—disproportionately sorting into marriage, as explained above. However, among low-educated women, differences in child human capital between cohabitation and marriage persist after conditioning on parental education, as I show in Table A.25. These differences are explained by lower maternal time investments and higher separation rates among low-educated women.

To assess the importance of the mechanisms, I close one channel at a time in the production function of child human capital.[46] I report the results in Table A.26. First,

[44] As shown in the right panel of Figure A.10 the reverse is true for high educated women, but my model overestimates this difference compared to the data.

[45] Still, my model underestimates the difference in divorce versus separation rates, particularly when there are young children in the household.

[46] To close each channel, I proceed as follows: First, I set to zero the coefficients capturing the direct

ignoring the direct effect of parental education closes 88% of the overall gap in child human capital between children born to married and cohabiting women, and 56% of the gap between children born to low-educated women. Second, ignoring differences in maternal time investment choices closes the overall gap in child human capital by only 4%. However, it closes the human capital gap by 28% among children born to low-educated women.[47] Finally, I eliminate differences explained by higher separation rates of cohabiting couples (that make children born to cohabiting mothers more likely to end up living only with their mothers). This closes 50% of the child human capital gap between marriage and cohabitation among low-educated women, and 15% of the overall human capital gap.

Finally, among low-educated women, children born to cohabiting mothers accumulate on average 5.8% more human capital than those born to single-mothers.

5.2.5 The Importance of Equilibrium Effects: an Illustration

Before moving to the counterfactual analysis, I perform a comparative statics exercise to illustrate the relevance of considering equilibrium effects. Not taking into account the marriage market adjustments might lead to erroneous conclusions of the impact of policies. I focus on a key model parameter—the marginal utility over child human capital for divorced women ($\alpha^{D,f}$)—and I explore two outcomes: couple stability and marital contract choice.

I first take the marriage market equilibrium as given (i.e., matching frequencies and initial Pareto weights). I show in the left panel of Figure 7 that decreasing the female marginal utility over child human capital upon divorce leads to a reduction in divorce rates, as the value of the female outside option falls. It also leads to a decline in the share of women who would choose to marry and an increase in the share of women who would choose to cohabit, at the given equilibrium Pareto weights. This is aligned with the empirical results in Section 3.3, where I show that the transition from a presumption of sole maternal custody to a presumption of joint parental custody at divorce—captured by a decrease in $\alpha^{D,f}$ and an increase in $\alpha^{D,m}$—reduces marriage rates in the short run.

However, Figure 7 (right panel) and Figure A.12 in Appendix D show that accounting

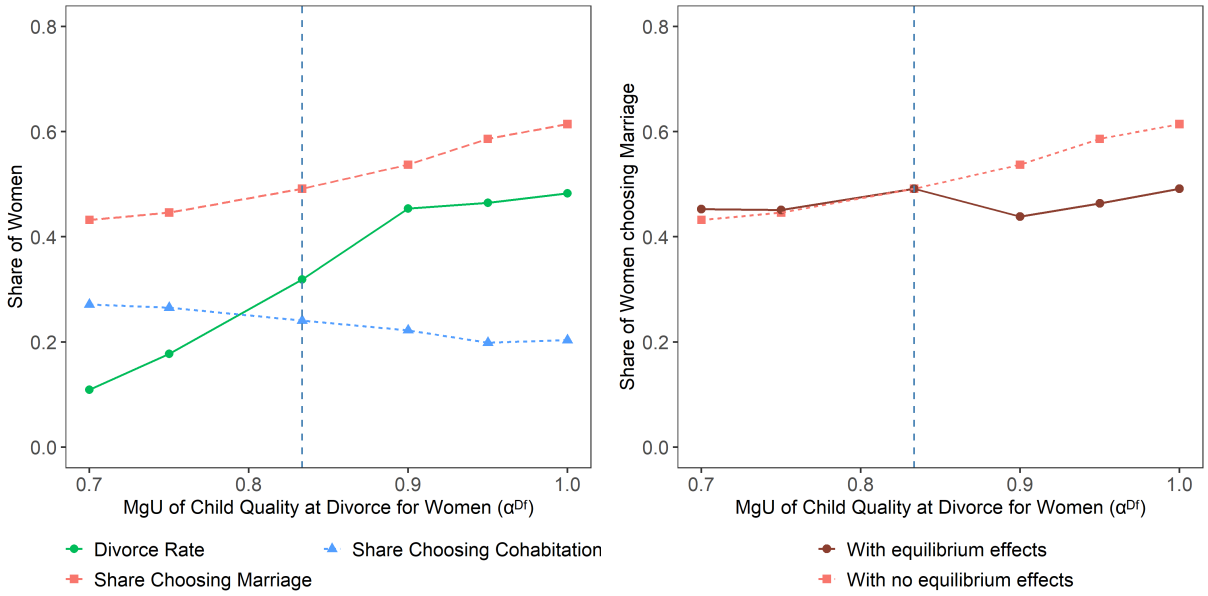
effect of parental education in the production function of child's human capital (captured by the indicator variables δ^{s_f} and δ^{s_m} in Equation 5). Second, I ignore differences in maternal time investments by maintaining the baseline parameters in the production function of child human capital, but assigning to all women the maternal time investment I_t they would make if they had choose not to work in the labor market. To eliminate differences driven by separation rates, I equalize the coefficients in the production function of child's human capital for couples and no couples (corresponding to ρ_0, ρ_1, ρ_2, ρ_3, ρ_4 and ρ_5 in equation 5).

[47] This difference is explained by the fact that low educated cohabiting women with a small child have on average higher labor supply (see figure A.10) and hence, lower time investments, while the opposite is true among highly-educated women (for whom the gap in child's human capital increases by 10%).

for equilibrium effects mitigates the impact of changes in $\alpha^{D,f}$ on women contract choices. As $\alpha^{D,f}$ increases, the share of resources that women receive within marriage falls, as I show in Figure A.13. In equilibrium, this offsets the positive impact of higher $\alpha^{D,f}$ on the choice of marriage and the negative impact on the decision to cohabit.[48] The equilibrium marital patterns do not change significantly when $\alpha^{D,f}$ increases from 0.83 (the baseline) to 1 (maternal sole custody), but the women's position within marriage worsens considerably.

This exercise illustrates the importance of considering the equilibrium effects—both changes in the relative bargaining power of partners in different type of couples, Λ, and changes in household formation—when assessing the impact of policies. Moreover, this exercise highlights the role custody laws—captured by the α parameters—play in shaping the marriage market equilibrium. I will return to this in the next section.

Figure 7: Comparative statics: The effect of $\alpha^{D,f}$ on marital contract and divorce choices



Notes: The left panel shows the effects of changing $\alpha^{D,f}$ on the share of women that would choose marriage and cohabitation, and in divorce rates, taking the baseline equilibrium as given. The dashed line with square markets in the right panel reproduces the same line from the left panel. The solid line with circle markers shows the effects on the share of women who would choose marriage once I take into account the equilibrium effects. The vertical dashed blue line represents the baseline value of $\alpha^{D,f}$.

[48] Taking into account the equilibrium effects has almost no impact on divorce rates, as shown in Figure A.12 (right panel).

6 Policy Counterfactuals

The estimated model above shows two key results. First, the benefits of cohabitation for low-educated women—given by the fact that they retain sole maternal custody over children upon separation—are offset by the lower share they receive of the household's resources, relative to married women. Second, children born to low-educated cohabiting women have worse outcomes than those born to married couples.

In this section, I simulate a reduction in the institutional differences between marriage and cohabitation and investigate the welfare implication of these policies. Particularly, I examine whether these policies could be effective to improve the position of low-educated women within the household and the outcomes of their children, as they are in the relative weakest position in cohabiting arrangements.

I simulate three different policies. First, I equalize access to children at divorce and separation, which increases the prevalence of joint parental custody upon separation. Second, I simulate full child support enforcement both for divorced and separated fathers. Finally, I simulate equal property division at separation from cohabitation.

Equal Child Custody and Legal Access to Children: As discussed in Section 2, married and unmarried fathers are treated differently under the current institutional setting. While most states have a presumption of joint parental custody upon divorce, mothers are more likely to retain sole custody if the parents are unmarried. Unmarried fathers need to take further steps to obtain custody or visitation rights (Cuadra, 2010). In Section 3, I showed evidence suggesting that cohabiting couples are actually affected by these policies. This leads to a lower probability of setting a formal custody agreement or establishing legal paternity among cohabiting fathers, relative to married men.

As explained in Sections 4.2 and 5.2.4, I investigate the effects of this aspect of the institutional setting empirically, by allowing in the model for differences in the marginal utility over child human capital at divorce and at separation (the α parameters in the utility functions (3) and (4)). I reproduce the baseline estimates of these parameters in the first row of Table 5.[49] The ranking of the α estimates—given by $\alpha^{S,m} < \alpha^{D,m} < \alpha^{D,f} < \alpha^{S,f} = 1$—is consistent with a policy environment that favors maternal custody (higher α for women than for men, conditional on marital status), and in which divorcees are more likely to get joint parental custody ($\alpha^{D,f} < \alpha^{S,f}$ and $\alpha^{D,m} > \alpha^{S,m}$).

I then subject cohabiting couples to the same custody laws than married couples, by equalizing the marginal utility over child human capital upon divorce and separation, within

[49] As explained above, I assume that cohabiting mothers (and single-moms) retain full access to their child upon separation (with $\alpha^{S,f}$ =1). Relative to it, I estimate this marginal utility for divorced women, divorce men and separated men.

gender. The counterfactual parameters are displayed in the second row of Table 5.[50]

Table 5: Marginal Utility over Child Human Capital: Baseline and Counterfactual

Parameters	$\alpha^{D,f}$	$\alpha^{S,f}$	$\alpha^{D,m}$	$\alpha^{S,m}$
Baseline Model	0.83	1.00	0.21	0.11
Counterfactual	0.83	0.83	0.21	0.21

Notes: The parameters $\alpha^{D,f}$, $\alpha^{S,f}$, $\alpha^{D,m}$, $\alpha^{S,m}$ capture the marginal utility over child human capital for divorce women, separated women, divorce men and separated men, respectively (see Equations (3) and (4) in Section 4.2). The row 'Baseline Model' reproduces the baseline estimates from Table A.21. The row 'Counterfactual' equalizes $\alpha^{S,f}$ and $\alpha^{S,m}$ to the baseline values of $\alpha^{D,f}$ and $\alpha^{D,m}$, respectively.

I first investigate the effects of implementing this counterfactual policy on the choice of the marital contract. In partial equilibrium (i.e., under the baseline Pareto weights), Figure 8 shows that cohabitation becomes less attractive for women, while the opposite it true for men.[51] For women, this reflects the reduction in access to children at separation (lower $\alpha^{S,f}$), which makes cohabitation less valuable, while men gain from the increase in access to children at separation (higher $\alpha^{S,m}$).

In Panel (b) of Figure 8, I show that as the value of the outside option for women goes down, separation rates fall.[52] The share of couples transitioning from cohabitation to marriage increases by 30%, driven by couples in which the male partner is highly-educated. Overall, there is a reversal in the average length of relationships, with cohabiting relationships becoming longer than marriages. The increased stability benefits men, who now enjoy their children for longer.

However, in equilibrium, the initial Pareto weights adjust to guarantee market-clearing. The counterfactual equilibrium Pareto weights are reported in Table 6. In the new equilibrium, women receive a higher share of the household's private consumption, relative to the baseline, which induces them to cohabit. The relative change in the initial Pareto weights is larger for low-educated women. The relative gains from marriage relative to cohabitation fall for women in most type of couples, as shown in Figure 9. Overall, cohabitation rates increase by 36% (as shown in panel (a) of Figure 8), mainly driven by changes in family arrangements among the less-educated. This is compensated by changes in both the marriage and the singlehood margins. The disaggregated changes in matching frequencies are

[50] A caveat of this analysis is that I keep the baseline fertility processes fixed in the counterfactual scenario. In principle, fertility could also respond to the policy change, but the direction of this change is not obvious.

[51] This is compensated by marriage and singlehood becoming more attractive for women, and less attractive for men, as shown in Figure A.14 in Appendix E.

[52] As the main advantage of cohabitation for women disappears, the lower probability of receiving child support and the lack of property division for cohabiting couples contribute to make separation rates lower than divorce rates in counterfactual.

displayed in Table A.27 in Appendix E.

Table 6: Counterfactual Equilibrium Pareto Weights after Equalizing α

	Marriage		**Cohabitation**	
	Male Low Ed.	Male High Ed	Male Low Ed.	Male High Ed
Female Low Ed.	0.63 (0.08)	0.27 (-0.15)	0.59 (1.46)	0.26 (7.66)
Female High Ed.	0.94 (0.00)	0.87 (-0.04)	0.86 (0.01)	0.78 (0.62)

Notes: Percentage changes in counterfactual versus baseline Pareto weights (from Table 4) are in parentheses.

To summarize these effects, I construct an aggregate measure of *social welfare*, and assess how it changes in the counterfactual scenario relative to the baseline. This measure, defined by (15), is given by the weighted sum of the expected lifetime utility, $\bar{V}^{s_j,s_{-j},g}$, of both men and women in every type of households (including singles) at the time of the marriage market.[53]

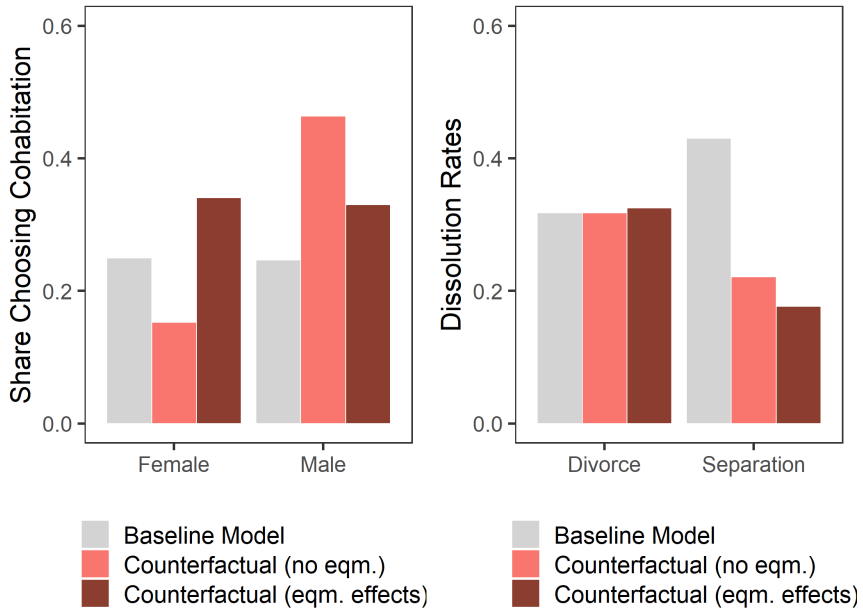
$$SW = \underbrace{\sum_{s_f}\sum_{s_m}\sum_{g}\frac{\nu^{f}_{(s_f,s_m,g)}(\mathcal{V})}{\mu_f}\times\bar{V}^{s_f,s_m,g}}_{\text{Female Welfare}} + \underbrace{\sum_{s_m}\sum_{s_f}\sum_{g}\frac{\nu^{m}_{(s_m,s_f,g)}(\mathcal{V})}{\mu_m}\times\bar{V}^{s_m,s_f,g}}_{\text{Male Welfare}} \tag{15}$$

I show the results in Table 7. My findings suggest that social welfare increases by 1.26% in the counterfactual equilibrium (first row of column 2). Both men and women benefit from the policy change (with welfare gains of 2% and 0.49%, respectively). However, the results are heterogeneous by education, with most gains concentrated among low-educated women and highly-educated men.

Taking into account the equilibrium effects is critical for these conclusions. While low-educated women lose from the policy change (column 1 of Table 7), the increase in the Pareto weights reverses the initial welfare losses. In equilibrium, the gains from cohabitation (versus marriage) for low-educated women increase in the counterfactual, as shown in Figure 9. For most men, increased stability and higher access to children in cohabitation offset their losses driven by the lower consumption share. As cohabitation increases in equilibrium, a larger share of highly-educated men benefit from the policy change, explaining the welfare gains for these men in equilibrium.

[53]The weights are given by the measure of men and women, $\nu^{m}_{(s_m,s_f,g)}$ and $\nu^{f}_{(s_f,s_m,g)}$, choosing each type of contract, as defined in Equation (18). The expected lifetime values $\bar{V}^{s_j,s_{-j},g}$ are defined in Section 4.3.

Figure 8: Equal marginal utility over child human capital at divorce and separation: (a) Share choosing cohabitation, (b) Dissolution rates



Notes: The baseline model reproduces the results from Section 5.2.4. The counterfactual model with no equilibrium effects considers the change in parameters from Table 5, taken as given the baseline Pareto weights from Table 4. The counterfactual model with equilibrium effects, considers changes in parameters, matching frequencies and equilibrium Pareto weights (shown in Tables A.27 and 6). The left panel reports the share of men and women who would choose cohabitation, under each of these settings. The baseline and the equilibrium counterfactual (first and third set of bars) reflect realized choices. However, the partial equilibrium counterfactual (middle bars) show non-equilibrium choices by men and women, given the baseline Pareto weights (for that reason, the middle bars for men and women do not coincide). The right panel reports divorce and the separation (directly from cohabitation) rates, under each scenario.

Finally, I look at the effects of this policy on child development. Overall child human capital increases by 1%, relative to the baseline, after taking into account the equilibrium effects. This is mainly explained by changes in household formation, and in particular, by the decrease in the share of children born to single mothers.[54]

Among low-educated women, the differences in child human capital between children born to married and cohabiting women close. This is driven by the lower separation rates of cohabiting couples in the counterfactual. This has two effects. The *direct* effect is given by the increase in the time children spend living with both parents. It also has an *indirect* effect, as low-educated cohabiting women anticipate higher stability and decrease their labor supply, increasing their maternal time investments, relative to the baseline.

[54]However, the increase in cohabitation among low-educated women leads to a 12% increase in the overall gap between children born to married and cohabiting women, in the new equilibrium.

Table 7: The Effects of Equalizing Child Custody Laws on Social Welfare

		(1) **Counterfactual (no eqm) vs. Baseline** (partial effects)	(2) **Counterfactual (eqm) vs. Baseline** (total effects)
All		0.06%	**1.26%**
Female		**-0.47%**	**0.49%**
	Low Ed.	-0.71%	1.24%
	High Ed.	-0.30%	-0.05%
Male		**0.58%**	**2.00%**
	Low Ed.	0.39%	-2.87%
	High Ed.	0.74%	6.31%

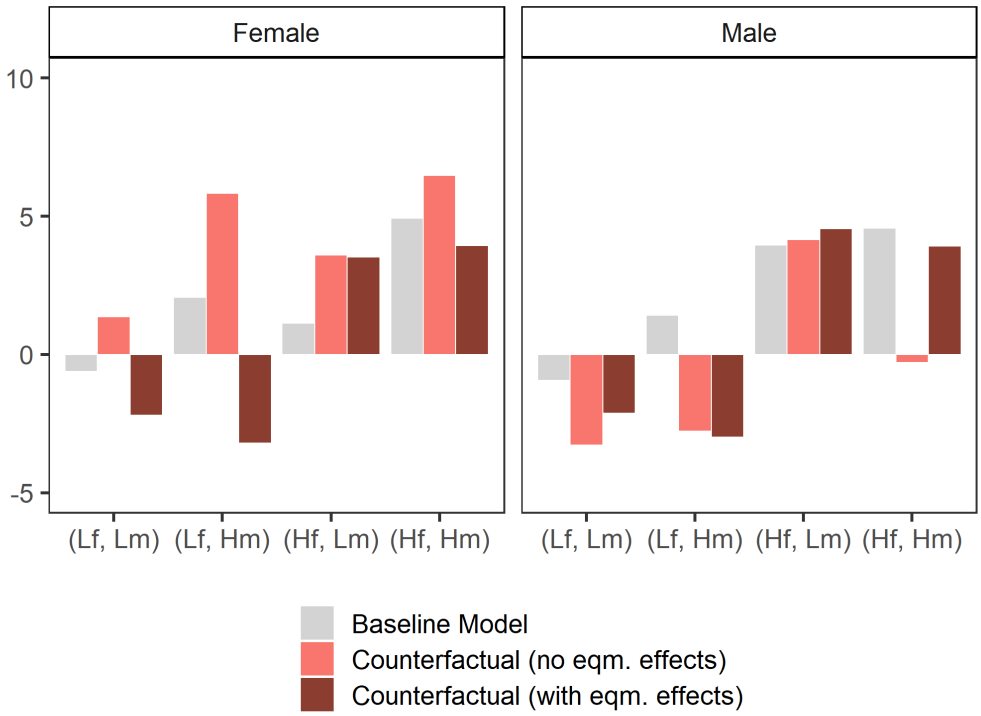
Notes: This table reports the welfare effects (as defined in Equation 15) of equalizing the marginal utility over child human capital (given by the parameters α) at divorce and separation, for men and women. In column (1) I only consider the partial effects, without taking into account changes in household formation and in the equilibrium Pareto weights. In column (2) I allow for changes in the marriage market equilibrium. The row 'All' considers men and women in every type of household. The row 'Female' computes changes in Equation (15) only for women. Rows 3 and 4 consider low-educated and highly-educated women, separately. The row 'Male' computes changes in Equation (15) only for men, while rows 6 and 7 consider low- and highly-educated men, separately.

OTHER POLICIES: I then implement two other policies: full child support enforcement after divorce and separation and equal division of assets for cohabiting couples upon separation.

The share of parents that pay child support is actually low—particularly among fathers who separate from cohabitation—which reflects weak child support enforcement, as discussed in Sections 2 and 5.1. Moreover, cohabiting couples are not subject to divorce laws, and then, they have no common property over the assets accumulated during the relationship (in principle, each partner can keep their own assets). The evidence showed in Table A.4 and discussed in Section 3.2 suggests that cohabiting couples respond by reducing resource pooling within the household and by saving in separate accounts.

The implementation of each of these policies leads to smaller changes in household formation, compared to the previous counterfactual, as reported in rows (3) to (8) of Table A.28 in Appendix E). Common property over assets at separation has a larger impact in household formation, increasing the equilibrium share of cohabiting couples by 6.8%, relative to the baseline. In equilibrium, both policies increase the stability of cohabiting relationships, as the outside option for men becomes less attractive.

Figure 9: Equalizing custody laws: Gains from marriage relative to cohabitation by couple-type and gender (baseline and counterfactual)



Notes: This figure shows the expected lifetime gains from marriage relative to cohabitation from the perspective of the marriage market, for women and for men, in every type of couple, defined based on partner's education. 'L' denotes low-education, and 'H' denotes high education. The subscripts 'f' and 'm' denote female and male, respectively. The gray bars refer to the results of the baseline model (described in Section 5.2.4). The coral bars refer to the counterfactual in which I equalize the access through children at divorce and separation by equalizing the α parameters, but taking as given the matching frequencies and the Pareto weights from the baseline (Figure 6 and Table 4). The brown bars refer to the same counterfactual, but after allowing for equilibrium effects that change the matching frequencies and the Pareto weights (to those in Table A.27 and Table 6.

The overall welfare gains of these policies are small in magnitude, especially for women, as I report in Table A.30. When men have to pay more child support, entering a relationship becomes less attractive for them. Then, in equilibrium, higher child support enforcement leads to a decrease in the bargaining position of low-educated women in couples, as shown by the reduction in Pareto weights in panel (a) of Table A.29 in Appendix E. This offsets the gains for these women of the increase in child support enforcement at divorce and separation. I also show that cohabiting highly-educated women lose in equilibrium after the implementation of equal division of assets at separation. These results are in line with Chiappori, Iyigun, Lafortune, and Weiss (2017). They show that when cohabiting partners become eligible to claim alimony upon separation, a lower intra-household allocation offsets the intended effects of the policy, for newly-formed couples. Finally, I find that the effects of these policies on child human capital are negligible.

While these two exercises lead to minor changes in welfare, they highlight the importance of considering equilibrium effects when assessing the impact of policies aiming to benefit certain groups. For example, child support has the goal of providing resources to women living with their children. However, my results suggest that as a consequence of the increase in child support enforcement, low-educated women start new relationships with a relative weaker bargaining position within the household. In this case, the marriage market equilibrium effects partially undo the intended effects of the policy.

7 Conclusion

The U.S. society is characterized by high rates of non-marital cohabitation and fertility, mainly among the less-educated. At the same time, laws in the U.S. treat married and cohabiting families differently. However, we have limited evidence to inform policy regarding the effects of narrowing these differences.

In this paper, I first show empirically that cohabiting couples and married couples make different choices. In particular, cohabiting women have higher labor supply after having children and higher separation rates. Moreover, their children have on average worse cognitive and behavioral outcomes. To explain these facts and understand the effects of institutional differences between marriage and cohabitation, I build a framework of household formation, in which individuals decide between marriage, cohabitation, and singlehood, in equilibrium. After choosing a contract and a partner-type in the marriage market, agents solve a life-cycle problem, making decisions about separation, female labor supply, and savings. These choices endogenously determine their child human capital and the allocation of private consumption between the partners. I model the key institutional distinctions between marriage and cohabitation—namely, property division laws, child custody laws, and differences in child support enforcement.

I estimate the model using data from the NLSY-97 and the Fragile Families and Child Wellbeing Study. My findings show that the lower estimated female marginal utility over child human capital at divorce versus separation—which captures differences in child custody laws—plays a key role to determine sorting into cohabitation, mainly among low-educated women. However, women's gains from cohabitation relative to marriage, driven by higher access to children upon separation, are offset by the lower share of private consumption they receive in cohabiting arrangements. Additionally, the model shows that, consistent with the empirical evidence, children born to low-educated cohabiting women accumulate less human capital than those born to low-educated married women, explained by lower maternal time investments and higher separation rates among cohabiting couples.

I simulate the effects of closing the institutional differences between marriage and cohabitation. I find that subjecting cohabiting couples to the same child custody rules of married couples upon separation—by reducing the prevalence of sole maternal custody after cohabitation—has positive welfare effects for low-educated cohabiting women in the long-run. The marriage market equilibrium effects are critical for this result: Under the baseline equilibrium, the welfare of cohabiting women decreases after the policy change (as it lowers their access to children upon separation). However, in the new equilibrium, these women are compensated with a higher share of the household's private consumption, which induces women to enter cohabiting relationships. This policy change also contributes to closing the gap in human capital accumulation between children born to low-educated cohabiting and married women. Other simulated policies, such as increasing child support enforcement and equal property division upon separation, have lower welfare implications.

A main contribution of my paper is the investigation of both the short-term and the long-term equilibrium impact of policy changes. My results from the policy simulations highlight the importance of considering these equilibrium effects, as changes in household formation and in the relative bargaining position of partners, can reverse the initial effects of policies. This paper also stresses the importance of taking into account the evolving structure of families when investigating the impact of policies, since different living arrangements may affect individuals' choices and their responses to policy changes.

This paper fits into a broader research agenda on the implications of family arrangements on individuals' welfare and child development. In future research, I aim to extend this framework to allow for re-matching after divorce/separation. This would allow me to investigate how being exposed to unstable family structures while growing up (for example, by living in assembled families, or co-residing with a non-biological parental figure) has consequences on child development. This can also affect the marital choices of men and women, and have welfare implications.

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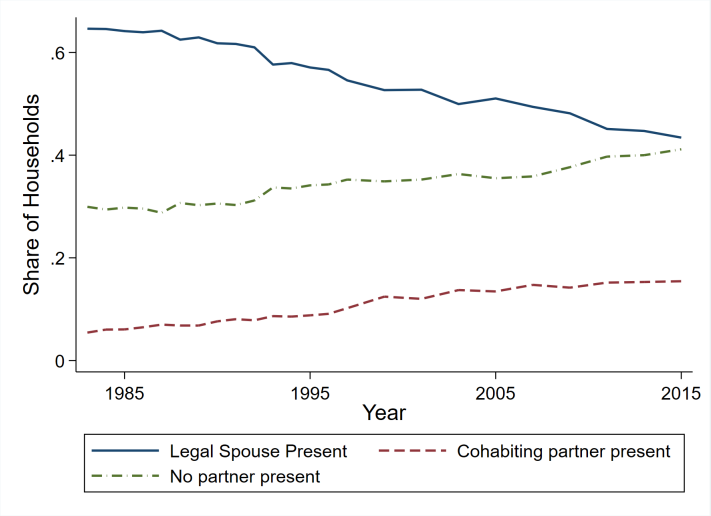
A Empirical Evidence

A.1 Additional Tables and Figures

Figure A.1: Share of Households by Marital Status



Notes: PSID data (1983-2015). The sample includes all household heads between 1983 and 2015, who are between 18 and 40 years old. 'No partner present' includes divorced or separated individuals.

Table A.1: Share of Women who ever Cohabit by Demographic Group

	Has Ever Cohabited (%)
White	67
Black	54
Hispanic	66
High School Graduate	73
College +	60

Notes: NLSY-97. *Has Ever Cohabited* takes value 1 when women are observed in a cohabiting relationship in at least one of the years they appear in the sample. Women are classified as high school graduates if they got a high school degree but not further education but the time they are 27 years old. College + includes women that received at least a 4 years college degree.

Table A.2: Differences in Demographic Characteristics by Marital Status at First Birth (NLSY-97)

	Married	**Cohabiting**	**Single**	**M-C**	**C-S**
Age at first birth	26.57	23.10	21.59	3.47***	1.51***
Multi-partner fertility (by 2017)	1.12	1.38	1.65	−0.27***	−0.27***
White	0.81	0.67	0.43	0.14***	0.24***
Black	0.07	0.14	0.39	−0.08***	−0.25***
Hispanic	0.12	0.18	0.17	−0.06***	0.01
HS dropout	0.05	0.18	0.16	−0.12***	0.01
HS graduate	0.16	0.30	0.30	−0.14***	0.01
Some college	0.35	0.38	0.45	−0.03	−0.07**
College plus	0.44	0.14	0.09	0.30***	0.05**
Correlation in partner's education	0.44	0.36			

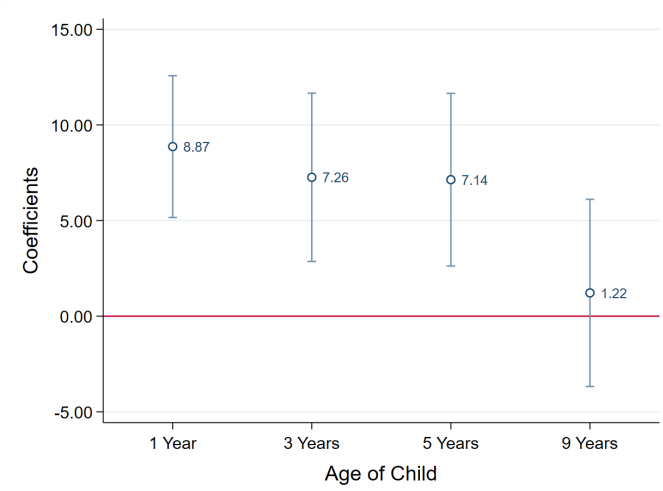
Notes: the sample includes women from the NLSY-97 who had their first child between 1997 and 2017, under marriage, cohabitation or as single mothers (not living with a partner). The column labeled as **M-C** shows the difference between the Married and Cohabiting women, while **C-S** shows the difference between Cohabiting and Single women. (***p<0.01).

Table A.3: Demographic Characteristics by Marital Status of Biological Parents at Birth (FFWC)

	(1) Married (M)	(2) Cohabit (C)	(3) Single (S)	(4) Diff (M-C)	(5) Diff (C-S)
Age of mother	29.34	24.22	23.69	5.11***	0.53***
Log HH income (mother)	10.64	9.85	9.58	0.79***	0.27***
White (%)	0.42	0.19	0.11	0.23***	0.08***
Black (%)	0.25	0.44	0.65	-0.19***	-0.20***
Hispanic (%)	0.25	0.34	0.21	-0.09***	0.12***
HS dropout	0.16	0.40	0.41	-0.23***	-0.01
High School	0.20	0.33	0.34	-0.13***	-0.00
Some College	0.29	0.23	0.23	0.05***	0.01
College +	0.35	0.03	0.03	0.31***	0.00
# of Children in HH	1.09	1.18	1.44	-0.09*	-0.26***
Other children together (%)	0.65	0.64	0.57	0.01	0.07***
Time known before birth (focal child)	7.53	4.04	3.51	3.49***	0.52***
Correlation in Education	0.56	0.35	0.35		

Notes: Data from the Fragile Families and Child Wellbeing Study (Wave 1). "Other children together" is a dummy variable that takes value 1 if the mother has another child with the biological father of the survey focal child. "Time known before birth" measures the number of years the child's mother has known the child's biological father before giving birth (to the focal child). Column 4 displays the differences between married mothers and cohabiting mothers. Column 5 shows the differences between cohabiting mothers and single moms, defined as not living the child's biological father. *** p<0.01, ** p<0.05, * p<0.1

Figure A.2: Impact of Marital Status at Birth on Maternal Labor Supply

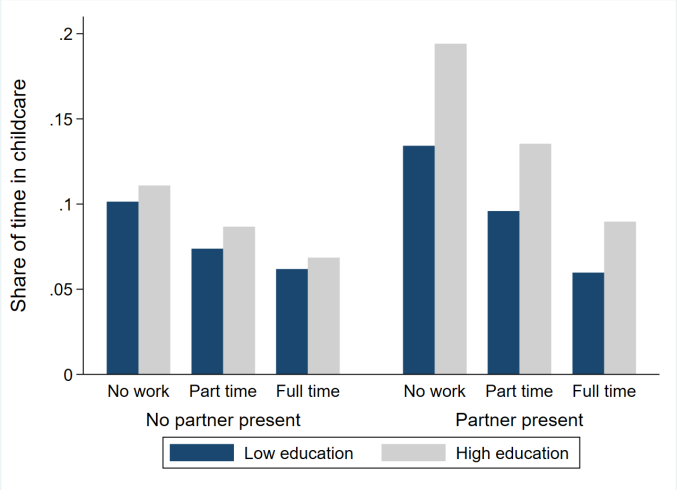


Notes: Data from the Fragile Families and Child Wellbeing Study (Waves 2 to 5). The sample include women who were married or cohabiting when the focal child was born. In this figure I report the OLS β_1 coefficients from the following model:

$$\text{Mother's LFP}_i = \beta_0 + \beta_1 \text{Cohabitation at birth}_i + \boldsymbol{\gamma} Z_i + \epsilon_i$$

where Mother's LFP_i takes value 1 when the child's mother participates in the labor market. $\text{Cohabitation at birth}_i$ takes value 1 if women were cohabiting when the child was born, with married at childbirth as the omitted category. Z_i is a vector of demographic controls that includes mother's age, race and education, the income of the maternal household, the gender of the focal child, the time the biological parents have known each other, whether they have other biological children together, and the number of children in the household. All regressions include state fixed effects. I run the model at 4 different periods, and I report each coefficient separately. The blue bars denote the 95% confidence intervals of the β_1 estimates.

Figure A.3: Share of maternal time in childcare activities, by education, labor supply and partner presence



Notes: Data from the American Time Use Survey 2003-2016. The sample includes women between the age of 20 and 55, who have a child younger than 4 years old in the household. I split the sample in 4 groups, depending on the education level of the woman (between those with some college with no degree or less, and those with a 2 years or 4 years associate or college degree and more) and the presence of a partner in the household. The share of time in childcare is computed as the share of a the day, assuming a total of 16 hours available, that women spend in a comprehensive set of childcare activities (passive and active childcare). I drop from the sample those women who report more than 16 hours between labor market work and childcare, and those that report both working full time and spending more than 57% of their time in childcare, and those that work part time and report spending more than 75% of their time in childcare.

Table A.4: Resource Pooling in Married and Cohabiting Couples

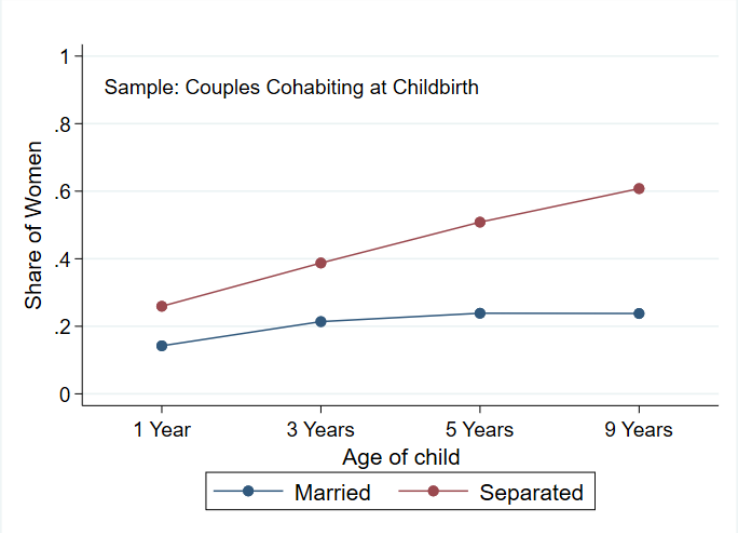
	(1) Joint Bank Account	(2) Pool Money Together	(3) Own house at childbirth
Cohabitation at birth	**−0.31*** **	**−0.24*** **	**−0.06*** **
	(0.03)	(0.02)	(0.02)
Demographic variables	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Mean Dependent Variable	0.57	0.57	0.35
Observations	1 497	2 444	2 763
R-squared	0.29	0.21	0.20

Notes: Data from the Fragile Families and Child Wellbeing Study (Wave 2). This table report the OLS β_1 coefficients from the following model:

$$\text{pooling}_{is} = \beta_0 + \beta_1 \text{Cohabitation at birth}_{is} + \boldsymbol{\gamma} Z_i s + \delta_s + \epsilon_{is}$$

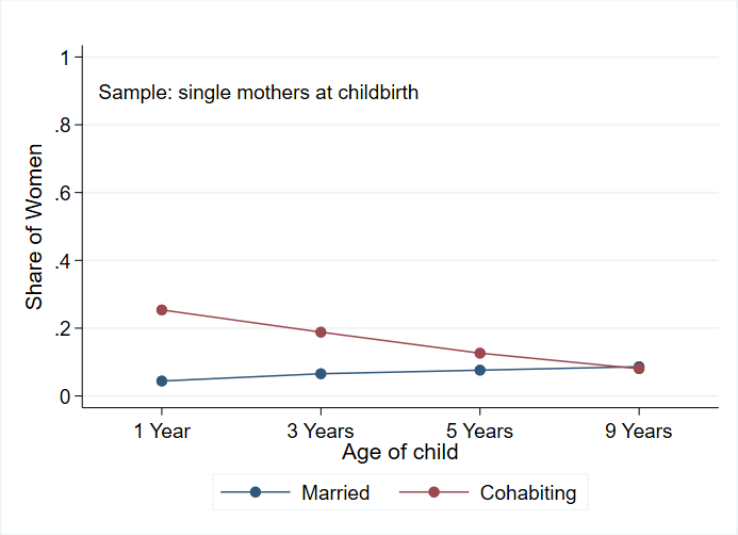
where $pooling_i$ is a dummy variable that takes value 1 when the couple reports having a joint bank account (column 1) or pooling their money together (at least partially). In column 3, the dependent variable "Own house" takes value 1 when the parents report owning a house at the time of childbirth. Cohabitation at birth_i takes value 1 if women were cohabiting when the child was born, with married at childbirth as the omitted category. Z_i is a vector of demographic controls including mother's age, race and education, the income of the maternal household, the gender of the focal child, the time the biological parents have known each other, whether they have other biological children together, and the number of children in the household. δ_s captures state fixed effects. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Figure A.4: Transitions to Marriage and Separation for Cohabiting Women at Birth



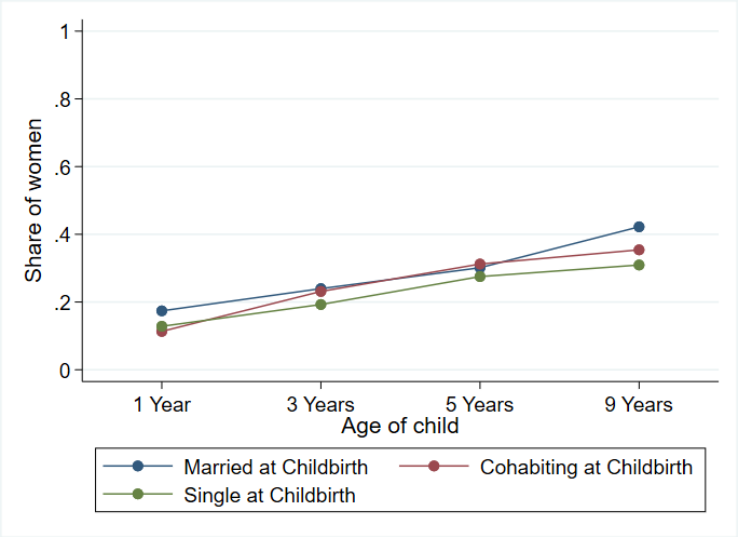
Notes: Data from the FFCW Study (waves 2 to 5). The sample includes women who were cohabiting with the biological father of the focal child at childbirth. "Married" and "Separated" represents the marital status between the children biological parents, independently of whether the mother started a relationship with a new partner. "Separated" includes cases in which the couple transitioned from cohabitation to marriage and divorced afterwards.

Figure A.5: Cumulative Transitions to Marriage and Cohabitation for Single Moms at Birth



Notes: Data from the FFCW Study (waves 2 to 5). The sample includes women who were not living with the biological father of the focal child at childbirth. "Married" and "Cohabiting" refers to the marital status with the child's biological father.

Figure A.6: Share of Women Living with a New Partner by Child's Age and Marital Status at Birth



Notes: Data from the FFCW Study (waves 2 to 5). Women are classified based on their marital status at the time of childbirth, but the sample includes women who were not living with the biological father of the focal child at a certain wave.

Table A.5: Marital Status at Birth and Proxies of Parental Investments

	(1) Vices during pregnancy	(2) Prenatal Check 1st trimester	(3) Ever Breastfed
Cohabitation at birth	**0.10*** **	**−0.06*** **	**−0.12*** **
	(0.02)	(0.02)	(0.02)
Demographic variables	Yes	Yes	Yes
State FE	Yes	Yes	Yes
Mean Dependent Variable	0.23	0.82	0.60
Observations	2 774	2 778	2 675
R-squared	0.12	0.07	0.12

Notes: Data from the Fragile Families and Child Wellbeing Study (Waves 1 and 2). This table report the OLS coefficients of a set of regressions with the structure of those described in the footnote of Table A.4, where the outcome variables are maternal behaviors. "Vices" takes value 1 when the mother reports smoking or drinking alcohol during the pregnancy. "Prenatal 1st trim" takes value 1 if the child's mother report attending a prenatal check-up during the first trimester. "Breastfed" takes value 1 if the mother reports that she ever breastfed the child, independently of the length. The main independent variable is an indicator of whether the mother was cohabiting at childbirth, with being married as the omitted category. Demographic controls include mother's age, race and education, the income of the maternal household, the gender of the focal child, the time the biological parents have known each other, whether they have other biological children together, and the number of children in the household. All regressions include fixed effects of the maternal state of residency. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.6: Welfare Claims by Marital Status at Childbirth

	(1) TANF	(2) Food Stamps
Cohabitation at birth	**0.09*** **	**0.15*** **
	(0.02)	(0.02)
Demographic variables	Yes	Yes
State FE	Yes	Yes
Mean Dependent Variable	0.18	0.32
Observations	2 688	2 685
R-squared	0.19	0.29

Notes: Data from the Fragile Families and Child Wellbeing Study (Waves 1 and 2). This table report the OLS coefficients of a set of regressions with the structure of those described in the footnote of Table A.4. The variables "TANF" and "Food Stamps" take value 1 when the mother reports receiving TANF or Food Stamps welfare benefits by the time the child is 1 year old, respectively. Demographic controls include mother's age, race and education, the income of the maternal household, the gender of the focal child, the time the biological parents have known each other, whether they have other biological children together, and the number of children in the household. All regressions include fixed effects of the maternal state of residency. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.7: Children Outcomes by Parental Marital Status at Birth

	(1) Low Birth Weight	(2) Math Score (percentiles)	(3) PPVT (percentiles)	(4) Ever failed a class	(5) Suspended from school
Cohabitation at birth	**0.04*** **	**−2.61***	**−3.24****	**0.09*** **	**0.05****
	(0.01)	(1.50)	(1.46)	(0.03)	(0.02)
Demographic variables	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Mean Dependent Variable	0.09	48.85	37.89	0.46	0.24
Observations	2 755	1 917	1 917	1 782	1 787
R-squared	0.03	0.17	0.27	0.11	0.13

Notes: Data from the Fragile Families and Child Wellbeing Study (Waves 1-6). This table report the OLS coefficients of a set of regressions with the structure of those described in the footnote of Table A.4, where the dependent variables are children outcomes at different ages. "Low Birth Weight" is a dummy variable that takes value 1 when birth weight is below 2,500 grams. "Math Score" is the score in percentiles in the Woodcock Johnson Test 10, administered at 9 years old. "PPVT" is the score in percentiles in the Peabody Picture Vocabulary Test at age 9. "Ever failed a class" is an indicator variable that takes value 1 if a child has ever failed a class at school by the time they are 15 years old. "Suspended from school" is an indicator that takes value 1 if the child was ever suspended by the time they are 15. Demographic controls include mother's age, race and education, the income of the maternal household, the gender of the focal child, the time the biological parents have known each other, whether they have other biological children together, and the number of children in the household. All regressions include fixed effects of the maternal state of residency. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

A.2 Event Studies

For the event studies presented in Figure 3 I follow the approach Cortés and Pan (2020) and estimate the following model:[55]

$$Y_{it}^{g} = \sum_{\tau=-5}^{\tau=10} \beta_{\tau}^{g} \mathbb{1}[\tau = t - e^{i}] + \sum_{a} \gamma_{a}^{g} \mathbb{1}[a = \text{age}_{it}] + \sum_{e} \gamma_{e}^{g} \mathbb{1}[e = \text{ed}_{i}] + \delta_{t}^{g} + \epsilon_{it}^{g},$$

where Y_{it} captures the outcome of interest (either labor force participation or hours worked) of individual i on year t. The coefficients of interest—displayed in Figure 3—are the β_{τ}, where τ captures the distance between year t and the birth of the first child. I add controls for women's age and education. I also include year fixed effects in the regressions, captured by δ_t.

My sample includes all women who had a first child between 2000 and 2017, and who

[55] I focus only on the sample of women, and classify them according to their marital status at the time of the first birth, while Cortés and Pan (2020) compared men and women responses to childbirth, but do not take into account their marital status.

were between 20 and 35 years old when the first child was born. I estimate the model separately for women who had their children under different marital status, g. Since I use the marital status at first birth to classify the women in my sample into groups, I am not able to include in my regressions a control group of childless women.

Figure A.7: Effect of First Child's Birth on Maternal (a) LFP and (b) Hours Worked (including single women at childbirth)

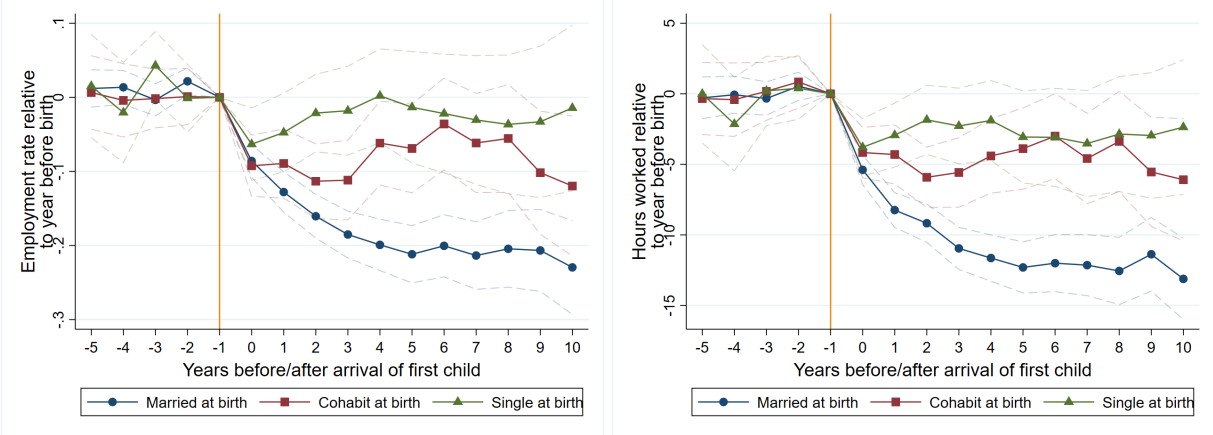
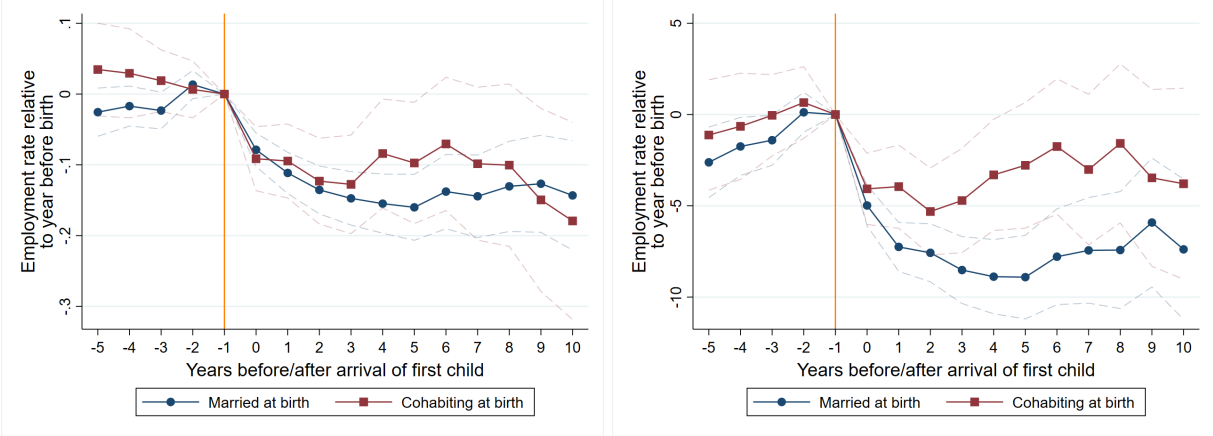


Figure A.8: Effect of First Child's Birth on Maternal (a) LFP and (b) Hours Worked (with individual fixed effects)



A.3 The Effect of Policies on the Choice of the Marital Contract

In this Appendix I provide more details about the estimation of the causal effect of family policy changes on the choice of the marital contract. As discussed in Section 3.3, I consider three policies: a) the transition from a presumption of sole maternal child custody at

divorce to a presumption of joint parental custody, b) the simplification of the paternity establishment process for unmarried fathers, and c) the transition from mutual consent to unilateral divorce.

In particular, for each of the policies, I estimate the effect of the policy change on the marital status choice, for an individual i living in state s in year t:

$$\text{Marital Status}_{ist} = \beta_0 + \beta_1 \mathbf{Policy}_{st} + \boldsymbol{\gamma} Z_{ist} + \delta_t + \delta_s + \epsilon_{ist}, \tag{16}$$

where $\text{Marital Status}_{ist}$ is an indicator of the individual's marital status. $\mathbf{Policy}_{st}$ is an indicator variable that takes value 1 after the policy under consideration was implemented, and zero otherwise. The vector Z_{ist} includes a set of demographic controls, and δ_t and δ_s capture time and state fixed effects.

To estimate these effects, I use data from the PSID, described in section 3.1, that contains information on cohabitation for a time period aligned with the policy changes (between the 1970s and the 1990s).

In Section 3.3, I discussed in details the results for the estimation of model 16 for the first policy. I present here the results for the other two policies: the simplification of the paternity establishment process and the transition from mutual consent to unilateral consent divorce.

Simplification of Paternity Establishment: As discussed in Appendix OA, during the 1990s the U.S. Federal government mandated that states implement hospital-based policies to simplify the process of establishing paternity for unmarried parents. As I mentioned in Section 3.3 the adoption of such policies increased by 9 percentage points (34%) the likelihood that a woman would be in a cohabiting relationship, decreasing the likelihood they will remain single. I find no significant effects on marriage rates of young women.

I discuss here potential mechanisms for this result: First, from the man's perspective, being legally involved in the life of a child might increase his willingness to become involved in the family life of the mother and the child. Moreover, as legal paternity makes it easier for the child's mother to claim child support from the father, singlehood becomes more costly for men, who might instead choose to live with the child's mother. From a woman's perspective, legal paternity allows fathers to claim custody in courts if the parents do not live together. Then, this policy may increase women's incentives to cohabit (in line with the results of the previous policy).

Table A.8: Paternity establishment simplification and the choice of the marital status

	Cohabit (t)	Married (t)	No Partner (t)
Simplified Paternity Establishment	0.090**	0.025	-0.115**
	(0.043)	(0.039)	(0.045)
State and Year FE	Yes	Yes	Yes
State Linear Trends	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes
Mean Dep. Var	0.265	0.218	0.517
Observations	2,068	2,068	2,068
R-squared	0.104	0.108	0.115

Notes: I use policy variation from Rossin-Slater (2017), presented in column 3 of Table A.10. Data for the regression models comes from the PSID (1985-2003). The sample is restricted to women between 17 and 25 years old who were not married in period $t-1$ (or period $t-2$ after 1997, when the data becomes bi-annual). Cohabit_t, Married_t and No Partner_t are indicator variables that take value 1 when the woman reports that marital status in year t. Demographic controls include the age and education attainment of women, the number of children in the household, and whether there is a newborn at home. Robust standard errors clustered at the state level in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Unilateral Divorce: Finally, I study the effects on the cohabitation choice of transition from mutual consent to unilateral divorce, that simplified divorce by allowing one party to start the process without spousal consent.[56] I report the results in Table A.9.[57] Considering the sample of women who were unmarried at period t, I find that the introduction of unilateral divorced increased by 4.5 percentage points (29%) the likelihood that they would be cohabiting in $t+1$. This was offset by a similar reduction in marriage rates. My findings are consistent with recent results by (Blasutto and Kozlov, 2020), who use data from the National Survey of Family and the Household and are able to exploit variation in divorce laws starting at an earlier period.

These results suggest that weakening the commitment involved in the marriage contract makes marriage less attractive. For men, who are more likely to be the primary earners, divorce implies dividing their assets with their ex-spouses and/or paying alimony. For women, divorce may imply reduced access to children, as states transition to a presumption of joint custody, and lower household income.[58]

[56]Several papers have studied the effect of this transition on different outcomes, such as female labor supply and household's savings (Voena, 2015), household formation (Reynoso, 2019), children outcomes (Gruber, 2004) and divorce rates (Wolfers, 2006).

[57]A caveat of my analysis is that most of the states transitioned from mutual consent to unilateral divorce in the 1970s, but cohabitation data starts in 1977. Therefore, identification is based on a handful of states changing divorce laws after 1977, which makes results sensitive to excluding some of them from the sample.

[58]In principle, the opposite could be true: as divorce becomes easier, marriage could become more attractive if it offers protections at divorce, while making it easier to leave low quality marriages.

Table A.9: The impact of Unilateral Divorce on Marital Status

	Cohabit (t+1)	Cohabit (t+2)	Married (t+1)	Married (t+2)
Unilateral Divorce	0.045***	0.029**	-0.047	-0.037**
	(0.011)	(0.011)	(0.033)	(0.018)
State and Year FE	Yes	Yes	Yes	Yes
Demographic Controls	Yes	Yes	Yes	Yes
Mean Dep. Var	0.156	0.136	0.091	0.158
Observations	6,075	5,936	6,075	5,936
R-squared	0.074	0.071	0.024	0.045

Notes: I use policy variation from the transition from mutual consent to unilateral divorce from Voena (2015) and Gruber (2004) presented in column 1 of Table A.10. Data for the regression models comes from the PSID (1983-1997). The sample is restricted to women between 18 and 45 years old who were not married in period t. Cohabit_{t+x} and Married_{t+1} are indicator variables that take value 1 when a woman is either cohabiting or married in period $t+x$, with $x \in \{1, 2\}$. The demographic controls include the age and the education level of women, the number of children in the household, and whether there is a newborn at home. Regressions include state and year fixed effects. Robust standard errors clustered at the state level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.10: The Timing of the Policy Changes

State	Unilateral Divorce	Presumption of Joint Custody	Paternity Establishment Simplification	State	Unilateral Divorce	Presumption of Joint Custody	Paternity Establishment Simplification
Alabama	1971		1994	Montana	1973	1981	
Alaska		1982	1997	Nebraska	1972	1983	1995
Arizona	1973	1991	1997	Nevada	1967	1981	1995
Arkansas			1994	New Hampshire	1971	1974	
California	1970	1979	1995	New Jersey		1981	1997
Colorado	1972	1983	1996	New Mexico		1982	
Connecticut	1973	1981	1995	New York		1981	1995
Delaware	1968	1981	1995	North Carolina		1979	1997
District of Columbia			1998	North Dakota	1971	1993	1996
Florida	1971	1979	1998	Ohio		1981	1999
Georgia	1973	1990	1999	Oklahoma		1990	
Hawaii	1972	1980	1999	Oregon	1971	1987	1996
Idaho	1971	1982	1998	Pennsylvania		1981	1998
Illinois		1986	1997	Rhode Island	1975	1992	1995
Indiana	1973	1973	1997	South Carolina			1994
Iowa	1970	1977		South Dakota	1985	1989	1994
Kansas	1969	1979	1997	Tennessee		1986	1994
Kentucky	1972	1979	1997	Texas	1970	1987	1999
Louisiana		1981	1999	Utah	1987	1988	1995
Maine	1973		1996	Vermont		1992	1997
Maryland		1984	1997	Virginia		1987	1995
Massachusetts	1975	1983	1994	Washington	1973		1990
Michigan	1972	1981	1993	West Virginia			
Minnesota	1974	1981	1995	Wisconsin	1978	1979	1999
Mississippi		1983	1995	Wyoming	1977	1993	
Missouri		1983	1995				

Notes: The column *Unilateral Divorce* refers to the year in which a state transitioned from mutual consent to unilateral divorce. The classification is based on Voena (2015) and Gruber (2004). States with blank entries correspond to states that did not transition to unilateral divorce. The column *Presumption of Joint Custody* follows the timing coded by Brinig and Buckley (1997). It corresponds to the year in which a state enacted joint custody statutes. States with blank entries correspond to those that did not enacted such statutes by 1993. The column *Paternity Establishment Simplification* shows the year of the implementation of a policy that simplified the process of establishing legal paternity for unmarried parents, by signing an affidavit in the hospital at childbirth. The timing of the policy follows Rossin-Slater (2017).

B Model Solution

B.1 The Life-Cycle

The Problem of the Cohabiting Couple: A couple that arrives cohabiting (subscript AC) at period t will observe the realization of the shocks (fertility shock, male income shock, shock to the match quality), and will make endogenous choices on savings (A_{t+1}), female labor supply (P_t) and couple marital status (whether separate, $S_t = 1$, transition to marriage, $M_t = 1$ or continue cohabiting, $S_t = M_t = 0$), to maximize the value of the household:[59]

$$V_t^{AC}(\Omega_t^C) = \max_{P_t^f, A_{t+1}, M_t, S_t} \lambda_t^C \underbrace{V_t^{fC}(\Omega_t^C)}_{\substack{\text{Female Partner's} \\ \text{Value}}} + (1-\lambda_t^C) \underbrace{V_t^{mC}(\Omega_t^C)}_{\substack{\text{Male Partner's} \\ \text{Value}}} \tag{17}$$

$$s.t \begin{cases} \text{Budget Constraint in Marriage if } M_t = 1 \\ \text{Budget Constraint in Separation if } S_t = 1 \\ \text{Budget Constraint in Cohabitation if } M_t = 0 \text{ and } S_t = 0 \end{cases}$$

where:

$$V_t^{fC}(\Omega_t^C) = (1 - S_t - M_t) \underbrace{\left(u_t^{fC} + \beta E_t V_{t+1}^{fC}(\Omega_{t+1}^C) \right)}_{\text{Value in Cohabitation}} + M_t \underbrace{\left(u_t^{fM} + \beta E_t V_{t+1}^{fM}(\Omega_{t+1}^M) \right)}_{\text{Value in Marriage}}$$
$$+ S_t \underbrace{\left(u_t^{fS} + \beta E_t V_{t+1}^{fS}(\Omega_{t+1}^{fS}) \right)}_{\text{Value in Separation}}$$

The value of the household $V_t^{AC}(\Omega_t^C)$ is the weighted value of the partner's individual values $V_t^{fC}(\Omega_t^C)$ and $V_t^{mC}(\Omega_t^C)$, where Ω_t^C is the state space of the cohabiting couple in period t.[60] The value of each partner j, V_t^{jC} will be given by the value under cohabitation, when the couple decides to stay cohabiting ($S_t = M_t = 0$), the value under marriage if the

[59] As discussed in Section 4.2, only couples with children can choose to transition from cohabitation to marriage. Then, for couples with no children, the structure of the problem is analogous to 6, but where the value of marriage is replaced by the value of cohabitation and the value of divorce by the value under separation.

[60] The state space of the cohabiting couple is analogous to the one for the married couple, described in Section 4.2.

couple decides to transition to marriage ($M_t = 1$) and the value in separation otherwise ($S_t = 1$).

The marital status' choice will determine whether the problem is solved under the intertemporal budget constraint of the cohabiting couple, the married couple or the separated couple. As in the case of the married couple, each partner's weight in the household problem is given by their relative bargaining power, summarized by λ_t^f. The other aspects of the problem are analogous to the problem of the married couple, described in Section 4.2.

TRANSITION ACROSS MARITAL STATES AND RENEGOTIATION: I now explain in detail how a couple that starts period t cohabiting decides their marital status for the next period and renegotiate their Pareto weights. The structure of the problem is analogous to the one for the couple that starts period t married, described in Section 4.2. However, as mentioned before, since cohabiting couples with children have the additional option to transition to marriage, this adds complexity to their renegotiation problem.

For each couple that starts period t cohabiting, each partner ranks their values under cohabitation, under marriage, and under separation. To simplify notation, I denote values by V and the suprascripts M, C, and S refer to marriage, cohabitation or separation, respectively. There are 6 potential alternative ways in which they can rank their options:

$$V^C > V^M > V^S$$
$$V^C > V^S > V^M$$
$$V^M > V^S > V^C$$
$$V^M > V^C > V^S$$
$$V^S > V^C > V^M$$
$$V^S > V^M > V^C$$

Combined with the same 6 potential alternatives for the other partners, it leads to 36 potential scenarios in which the couple can be.

In order to solve for the transitions and to determine under which marital status and which Pareto weights the couple will continue their life-cycle, I classify these 36 cases in different cases:

1. CASE 1: BOTH PARTNERS AGREE IN THEIR TOP CHOICE (12 CASES). under this

scenario, both partners agree on the first ranked alternative, even if they disagree on how they rank the other two alternatives. As previously described for the case of marriage, when partners agree on their first rank option, there will be no renegotiation of the Pareto weights. There are three possibilities:

(a) If for both partners the first ranked option is cohabitation, they will continue cohabiting, with $\lambda_{t+1} = \lambda_t$

(b) If for both partners the first ranked option is marriage, they will transition to marriage, with $\lambda_{t+1} = \lambda_t$.

(c) If for both partners the first ranked option is separation, separation will be efficient and they will not engage in renegotiation.

2. Case 2: Both partners agree on their lowest ranked choice, but they disagree on how they rank their two top choices (6 cases). In this case, the lowest ranked option becomes irrelevant, but the scenario depends on which is this lowest rank choice.

   (a) If for both parents marriage is the lowest ranked choice, the problem will be analogous to the one of the married couple described in Section 4.2, but the decision with the choices would be to stay cohabiting or to separate.

   (b) If the lowest ranked option is separation, the couple will decide whether they continue cohabiting or transition to marriage. Since they disagree in the first choice, the partner who prefers marriage will decrease his/her bargaining power to try to convince the other party to get married. If they find a Pareto weight at which both partners want to get marry, they will transition to marriage. If they do not, they will continue cohabiting at λ_t.

   (c) If the lowest ranked option is cohabitation, they will decide whether to transition to marriage or separate. If there is a Pareto weight such that the partner who prefers to get married can convince the other partner to stay in the relationship and transition to marriage, they will get married at that Pareto weight. Otherwise, they will separate.

3. Case 3: Partners do not agree neither in the highest-ranked or the lowest-ranked alternative (18 cases). This gives rise to different cases, depending on how partners rank their choices. For brevity, I will not discuss all the

cases here since the logic involved in all the cases is similar. I provide an example for illustration purposes.

Example: For partner j, the ranking is given by $V_j^C > V_j^S > V_j^M$ and for partner $-j$ the ranking is given by $V_{-j}^M > V_{-j}^S > V_{-j}^C$. In this case, separation is the middle-ranked for both of them, but they disagree in how they rank marriage and cohabitation. To solve for this case the couple proceed in steps: First, they search for a Pareto weight ($\tilde{\lambda}'$) that decreases the bargaining power of partner j such that both partners now prefer cohabitation over separation (irrespective of marriage). Second, they search for a Pareto weight ($\tilde{\lambda}''$) such that partner j will prefer marriage over separation.

If neither $\tilde{\lambda}'$ nor $\tilde{\lambda}''$ exist, the couple will separate, with no renegotiation. If $\tilde{\lambda}'$ exists but $\tilde{\lambda}''$ does not, the couple will continue cohabiting at $\tilde{\lambda}'$. If $\tilde{\lambda}''$ exists but $\tilde{\lambda}'$ does not, the couple will transition to marriage at $\tilde{\lambda}''$.

If both $\tilde{\lambda}'$ and $\tilde{\lambda}''$ exist, the partners will compare the values of cohabitation and marriage under $\tilde{\lambda}'$ and $\tilde{\lambda}''$. If marriage at $\tilde{\lambda}''$ has higher value for both partners, they will marry at $\tilde{\lambda}''$. If cohabitation at $\tilde{\lambda}'$ is better for both partners than marriage at $\tilde{\lambda}''$, they will continue cohabiting at $\tilde{\lambda}'$. But, if they do not agree in their ranking, they will continue cohabiting at $\tilde{\lambda}'$, since the transition to marriage requires mutual consent (but they are both better off cohabiting than under separation at $\tilde{\lambda}'$).

The problems of other types of households: The problem of the single, divorced and separated men and women have a simpler structure, since these marital status are absorbing states. Then, once an individual is in one of these household's types, there are no further choices regarding marital status transitions. To simplify the notation, I will use the subscript NP (No Partner) to refer to any of these scenarios (divorced, separated or single). I will describe the differences between them below.

I start by the problem of the man who arrives single, separated or divorced to period t. He will solve a standard problem of choosing how to allocate their resources between private consumption and savings, after observing the realization of the labor income shock.

$$V_t^{m,NP}(\Omega_t^{NP}) = \underset{A_{t+1}}{max}\big(u_t^{m,NP} + \beta E_t V_{t+1}^{m,NP}(\Omega_{t+1}^{m,NP}|\Omega_t^{m,NP})\big)$$

Men (and women) who do not live in couples lose economies of scale in consumption. Then, the male consumption c_t^m that enters the utility function, will be only a share π^m of the total household expenditures, $x_t = A_t^m(1+r) - A_{t+1}^m + w_t^m P_t^m$.

If a divorced or separated man did not have a child while he was married or cohabiting, then the problem is the same under the three scenarios (single, divorce or separated), since after divorce and separation I assume no ongoing relationship with the ex-partner.[61]

On the other hand, if a man had a child under marriage or cohabitation, there are two main differences between the household problems of these men compared to the single men: First, child's human capital will still enter the utility function for a total of 4 periods (including any periods in which the man lived with the child in the same household). As discussed in section 4.2, the marginal utility over children human capital, captured by α^m, will be different for separated and divorced men. For singles, however, $\alpha^m = 0$, which is equivalent to consider that they never have children.

Second, after divorce or separation it will be revealed whether the father will pay child support. This probability will be different depending on whether he was married or cohabiting with the child's mother. If he turns out to be a 'payer', this will reduce the total resources available for private consumption (until period 4 of the life of the child). If he turns out to be 'no-payer', there will be no changes to their resource's availability, since this is the only way in which divorced/separated fathers contribute to finance the consumption of their non-resident child.

Analogously, the problem of single, divorced or separated women is given by:

$$V_t^{f,NP}(\Omega_t^{NP}) = \underset{A_{t+1}^f, P_t^f}{max} \left(u_t^{f,NP} + \beta E_t V f_{t+1}^{f,NP}(\Omega_{t+1}^{f,NP} | \Omega_t^{f,NP}) \right)$$

For women with no children, the problem is similar in structure to the one for men. There are two differences: women will endogenously choose their labor supply, and single women (but not those separated and divorced) with no children, may still have children in the future (during the first four periods of their life).

When there are children in the household, similar points to those described for men apply: first, the utility function will depend on the previous marital status, that affects the marginal utility over child human capital, through α^f. Second, if the father of the child

[61] The only difference will be in the period in which they arrive married or cohabiting and make the choice to divorce or separate. In that period, each partner of a recently divorced couple will pay half of the divorce cost CD. In this period, the partners will also split the total couple's assets between A_t^m and A_t^f, with which the divorced/separated partners will start their new lives as individual households. The specific allocation rules depend on their previous marital status (marriage or cohabitation), as described in Section 4.2. However, conditional on the level of assets, the structure of the problem is the same for the divorced or separated men.

turns out to be a child support payer (which is revealed after the couple dissolves), separated and divorce women will receive an extra source of income in period t, proportional to the potential income of their ex-partners in $t-1$. Finally (and different from men), women will finance the consumption of children in the household. Then, the female consumption will be only a share π^{f,age^K} of the total expenditures of the household, $x_t = A_t^f(1+r) - A_{t+1}^f + w_t^f P_t^f$, with $\pi^{f,age^K=1} > \pi^{f,age^K>1}$.[62]

B.2 Choice Probabilities

The problem of a male of type s_m of choosing the type of household (contract-partner combination) they want to form is defined by (9), which implies:

$$p_{s_m \to s_f,g} = Pr\Bigg[\bar{V}_m^{(s_m,s_f,g)}(\lambda^{(s_f,s_m,g)}) + \omega_m^{(s_m,s_f,g)} > max(\bar{V}_m^{(s_m,\emptyset)} + \omega_m^{(s_m,\emptyset)}; \bar{V}_m^{(s_m,s_{f'},g)}(\lambda^{(s'_f,s_m,g')}) + \omega_m^{(s_m,s_{f'},g')} \quad \forall (f',g') \neq (f,g))\Bigg]$$

Following Choo and Siow (2006), and recent contributions by Gayle and Shephard (2019), Chiappori, Costa-Dias, and Meghir (2018) and Reynoso (2019), I make the assumption that the idiosyncratic marriage market taste shocks ω follow a Type-I extreme value distribution, with location parameter 0 and scale parameter σ_ω.

Assumption 1:

$$\omega^{s_{-j},g} \sim \text{Type I}(0, \sigma_\omega)$$

Assumption 1 implies that the proportion of men of type s_m that would like to match with a woman of type s_f under a contract g (or stay single) are given by the conditional choice probabilities, defined in equation 18:

$$p_{s_m \to s_f,g} = \frac{\nu^m_{(s_m,s_f,g)}(\boldsymbol{\lambda^{s_m}})}{m_{s_m}} = \frac{exp(\bar{V}_m^{(s_m,s_f,g)}(\lambda^{(s_f,s_m,g)})/\sigma_\omega)}{exp(\bar{V}_m^{(s_m,\emptyset)}/\sigma_\omega) + \sum_{s=s_f,g=\{M,C\}} exp(\bar{V}_m^{(s,s_m,g)}(\lambda^{(s_f,s_m,g)})/\sigma_\omega)} \quad (18)$$

where $(\boldsymbol{\lambda^{s_m}})$ is the vector of $g \times s_f = 2 \times 2$ Pareto weights associated with the different household's types a man of type s_m can form. Given those Pareto weights, $\nu^m_{(s_m,s_f,g)}(\boldsymbol{\lambda^{s_m}})$

[62] When there are no children in the household, $\pi^f = \pi^m$.

defines the measure of men of type s_m that demand to enter a contract of type g with a woman of type s_f. We can write the analogous expressions for women, which define the supply of women to men in each sub-market. I omit these expressions here for brevity.

B.3 Numerical Algorithm to Solve the Equilibrium

I closely follow Gayle and Shephard (2019) and Reynoso (2019) to construct the algorithm to solve for the equilibrium Pareto weights Λ in the marriage market.

First, using the conditional choice probabilities from Equation (18) we can write the quasi-demand of a type s_m man for a type s_f partner, under a contract g:

$$\sigma_\omega \times [\ln(\nu^m_{(s_m,s_f,g)}(\lambda^{s_f,s_m,g})) - \ln(\nu^m_{(s_m,\emptyset)})] = \bar{V}^m_{(s_m,s_f,g)} - \bar{V}^m_{(s_m,\emptyset)}. \tag{19}$$

Analogous, we can write the quasi-demand of a type s_f woman for type s_m men under contract g:

$$\sigma_\omega \times [\ln(\nu^f_{(s_f,s_m,g)}(\lambda^{s_f,s_m,g})) - \ln(\nu^f_{(s_f,\emptyset)})] = \bar{V}^f_{(s_f,s_m,g)} - \bar{V}^f_{(s_f,\emptyset)}. \tag{20}$$

Description of the Algorithm. The numerical algorithm to solve for the equilibrium proceeds as follows:

1. Propose an initial guess for the measure of men of type s_m and women of type s_f that choose to stay single, $\nu^m_{(s_m,\emptyset)}$ and $\nu^f_{(s_f,\emptyset)}$.

2. Take differences between (19) and (20), and impose market clearing conditions, $\nu^m_{(s_m,s_f,g)}(\lambda^{s_f,s_m,g}) = \nu^f_{(s_f,s_m,g)}(\lambda^{s_f,s_m,g})$, to obtain

$$\sigma_\omega \times [\ln(\nu^f_{(s_f,\emptyset)}) - \ln(\nu^m_{(s_m,\emptyset)})] = [\bar{V}^m_{(s_m,s_f,g)}(\lambda^{s_f,s_m,g}) - \bar{V}^m_{(s_m,\emptyset)}] - [\bar{V}^f_{(s_f,s_m,g)}(\lambda^{s_f,s_m,g}) - \bar{V}^f_{(s_f,\emptyset)}], \tag{21}$$

   which leads to a system of $s_f \times s_m \times 2$ equations, to solve for $s_f \times s_m \times 2$ Pareto weights.

3. Find the matrix of Pareto weights Λ that is the root of the system of $s_f \times s_m \times 2$ univariate equations.

4. Use the choice probabilities defined in (18), and the analogous for women, to compute

the measures of single men and women consistent with the matrix of Pareto weights Λ obtained in Step 3.

5. Repeat Step 2 and Step 3 until the measure of singles converges. The equilibrium Pareto weights consistent with market clearing will be given by the matrix Λ at which the algorithm stops.

When solving the model in counterfactual exercises I follow Gayle and Shephard (2019) and implement the algorithm by first evaluating for each type of men and women, the expected values of forming the different type of households (partner and contract type combination) on a grid of 50 Pareto weights. In this way, I avoid computing the expected values as part of the fixed-point algorithm, as this is the most computationally expensive part of it.

C Estimation

C.1 Estimation outside the Model

Preset Parameters:

Table A.11: Preset Parameters

Parameter		Value	Source
Discount factor	β	0.98	Attanasio, Low, and Sánchez-Marcos (2008)
Interest rate	r	0.015	Attanasio, Low, and Sánchez-Marcos (2008)
Consumption scale (singles)	π^S	0.61	Reynoso (2019)
Consumption scale (small kid)	$\pi^{age^K=1}$	0.88	Muellbauer (1979)
Consumption scale (older kid)	$\pi^{age^K=2}$	0.81	Muellbauer (1979)
Divorce costs	DC	\$10,000	Rosen's Law Firm calculation *
Child support rate	CS	20%	Child Support Guideline Models: Percentage of Obligor's Income (Texas) **
Length of life-cycle ***	T	7	-
Decision period	t	4	-

Notes: * I use the Rosen's Law Firm attorney fee calculator (www.rosen.com/feecalculator) to determine the approximate cost of divorce. ** In order to simplify the child support guidelines in the model, I use the *Percentage of Obligor's Income* rule, in which the child support payments are determined as a share of the income of the non-resident parent. I take the Texas rate, since it's the largest state in terms of population that follows this rule. *** Women can only have children in the first 4 periods.

Male wage process:

Table A.12: Dependent Variable: ln of Hourly Wages

	(1) Low Education	(2) High Education
Age	0.107***	0.202***
	(0.027)	(0.039)
Age^2	-0.009*	-0.016**
	(0.005)	(0.006)
Constant	2.420***	2.446***
	(0.033)	(0.064)
Observations	10,525	6,134
R-squared	0.089	0.191
State and Year FE	Yes	Yes

Notes: The dependent variable is the natural logarithm of hourly wages in real terms (2015 prices). I trimmed the bottom and top 1% of the distribution of hourly wages. The sample pools data of men aged 23 to 37 years old in the NLSY-97, who I observe working full time (between 37.5 and 70 hours), and with no missing information on wages. In line with the model, *Age* is a categorical variable capturing different intervals of individual's life cycle: 23-25, 26-29, 30-33 and 34-37. Individuals are split between the two education groups considering their main education attainment, using less than 14 years of education and 14 years of education or more as the two groups. Standard errors clustered at the state level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Female Wage Pocess: Here I provide additional details on the estimation of the female wage process of Equation (11) in Section 5.1.

The identification of the effect of experience on female wages presents two main challenges. First, female experience depends on endogenous choices. Second, the distribution of wages that I observe in the data is censored by the endogenous selection of women into participation (Heckman, 1979). In order to address these concerns, I follow a two-step control function approach, as in Reynoso (2019) and Low, Meghir, Pistaferri, and Voena (2018).

First Step: In a first step, I estimate two different models. First, I estimate a model for experience (Exp), using age and the presence of children in the household as excluded instruments, and controlling for the marital status of the women, as in (22):

$$Exp_{jts} = \alpha_0^{s_f} + \alpha_1^{s_f} Age_{jts} + \alpha_2^{s_f} Age_{jts}^2 + \Gamma^{s_f} X_{jst} + \delta_t^{s_f} + \delta_s^{s_f} + \epsilon_{jts}, \tag{22}$$

where X is a vector including the total number of children and the woman's marital status. Year and state fixed effects are captured by δ_t and δ_s, respectively.

The results from estimating model (22) by OLS are shown in columns (1) and (2) of Table A.13. As expected, while experience increases with age, the presence of the children in the household is negatively associated with cumulative experience, particularly for low educated women.

I also estimate a model of labor market participation, using variation across states and over time in the generosity of the welfare system interacted with the presence of young children as an additional excluded instrument (additionally to female age and total number of children in the household), as in (23):

$$Part_{jts} = \psi_0^{s_f} + \psi_1^{s_f} Age_{jts} + \psi_2^{s_f} Age_{jts}^2 + \psi_3^{s_f} \text{Welfare}_{ts} + \psi_4^{s_f} \text{Welfare}_{ts} \times \text{Small}_{jts} + \Gamma^{s_f} X_{jst} + \delta_t^{s_f} + \delta_s^{s_f} + \epsilon_{jts}, \quad (23)$$

where $Part$ is an indicator variable that takes value 1 when a women supplies strictly positive hours in the labor market. Welfare_{ts} captures the maximum welfare benefits for a household with two children in state s in year t, and Small_{jst} is a dummy variable that takes value 1 when there is a child aged 4 or younger in the household.[63] [64] X is a vector including the total number of children and the woman's marital status. Year and state fixed effects are captured by δ_t and δ_s.

I use a probit model to estimate model (23). The results are presented in columns (3) and (4) of Table A.13. The results suggest that when small children are present in the household, a more generous welfare system has negative effects on female labor force participation, both for low and high educated women.

[63] I am grateful to Luigi Pistaferri who generously provided the welfare data.

[64] The state identifier of the NLSY-97 respondents are not include in the publicly available data. I use the restricted-use Geocoded NLSY-97 data from the Bureau of Labor Statistics in order to match respondents to their state of residency in period t. This allows me to first control for state-level fixed effects in the regressions, but also exploit the variation across states and over time in the generosity of the welfare system, which is key for the estimation of the participation model.

Table A.13: Regression Models of Female Experience and Participation

	Experience		**Participation**	
	(1)	(2)	(3)	(4)
	Low Education	High Education	Low Education	High Education
Age	0.394***	0.405***	0.115	0.235
	(0.040)	(0.029)	(0.100)	(0.155)
Age^2	0.001	0.002	-0.026	-0.018
	(0.010)	(0.008)	(0.017)	(0.025)
Number of Children	-0.108***	-0.016	-0.211***	-0.293***
	(0.015)	(0.018)	(0.021)	(0.033)
Welfare (1,000s)			0.098	0.105
			(0.343)	(0.732)
Welfare (1,000s) × Small			-0.249**	-0.239*
			(0.099)	(0.128)
Constant	0.460***	0.253***	0.946***	1.164***
	(0.038)	(0.038)	(0.136)	(0.213)
State and Year FE	Yes	Yes	Yes	Yes
Marital Status	Yes	Yes	Yes	Yes
Observations	15,727	15,726	15,624	15,526
R-squared	0.373	0.542		

Notes: The dependent variable in columns (1) and (2) is *Exp*, which adds the total years a woman participated in the labor market and divides it by 4, to account for the fact that 1 year corresponds to 1/4 of a period in the model. Part-time work is considered as half a year. The dependent variable in columns (3) and (4) is *Part*, an indicator that takes value 1 when women provide strictly positive hours in the labor market. For consistency with the structural model *Age* is a categorical variable that captures different periods of the life of the individuals, as explained in the notes of Table A.12. Welfare_{st} represents the maximum benefits for a household with two children in state s and year t. Small takes value 1 when there is a child younger than 4 years old present in the household. All regressions control for marital status, the total number of children in the household, and year and state fixed effects. The experience models were estimated using OLS, while for the participation regressions I used a probit model. The sample pools data of women aged 23 to 37 years old in the NLSY-97. I drop for the sample those women who report positive wages but not employment. I also drop observations corresponding to employed women but who work less than 10 hours or more than 60. I restrict the sample to women with 3 or fewer children, and with at most 18 years of experience. Individuals are split between the two education groups considering their main education attainment (less than 14 years of education and 14 years or more). Standard errors clustered at the state level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Second Step: In a second step, I estimate model (11), including as additional controls the residuals from the first step estimation of models 22 and 23. For the participation model I construct the Inverse Mills Ratio (IMR). The results are presented in Table A.14. These results show that wages exhibit a concave profile, with positive but decreasing returns to labor market experience.

Table A.14: Dependent Variable: ln of Annual Earnings

	(1) Low Education	(2) High Education
Exp	0.344***	0.468***
	(0.050)	(0.072)
Exp^2	-0.032***	-0.075***
	(0.006)	(0.011)
Constant	9.721***	9.555***
	(0.070)	(0.096)
State and Year FE	Yes	Yes
Marital Status	Yes	Yes
Observations	10,741	10,843
R-squared	0.196	0.250

Notes: The dependent variable is the natural logarithm of female annual earnings in real terms (2015 prices). The sample pools data of women aged 23 to 37 years old in the NLSY-97. I drop for the sample those women who report positive wages but not employment. I also drop observations corresponding to employed women but who work less than 10 hours or more than 60. The variable Exp adds the total years a woman participated in the labor market and divides it by 4, to account for the fact that 1 year corresponds to 1/4 of a period in the model. Part-time work is considered as half a year. All regressions control for marital status, and year and state fixed effects. I add as additional controls the residuals from the first-stage regressions in columns (1) and (2) of Table A.13 and the Inverse Mills Ratio from the participation model in columns (3) and (4) of Table A.13. Individuals are split between the two education groups considering their main education attainment (less than 14 years or 14 years or more of education). Standard errors clustered at the state level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Production function of child human capital: I provide additional details on the estimation of the production function of child human capital described in Section 5.1.

Maternal time investments, denoted by H_t^f, are not directly observed in the FFCW data. Then, in order to estimate the share of time mothers spend in childcare related activities, I use auxiliary data from the American Time Use Survey (ATUS). I assume that women allocate one unit of time between working in the market, childcare and other activities.[65] I classify women in both the FFCW and the ATUS data into cells, defined by the combination of the woman's education, partner's presence, the child's age group, and the working status of women.[66] For each of these cells in the ATUS, I construct

[65]In particular, I consider that women have 16 hours available for these activities each day, and I compute the share of time allocated to childcare. I drop from my sample observations corresponding to women who allocate more than 16 hours a day either to work in the labor market or to childcare activities.

[66]In the ATUS, I focus on the age of the youngest child in the household, and I define the following age categories: Ages 1 to 2, Ages 3 to 4, Ages 5 to 7, Ages 8 to 10 and Ages 11 to 16. In the FFCW, I focus on the age of the focal child in each wave of the survey. In the ATUS, I cannot identify whether a partner is the biological father of a child, and hence, I split the sample between women living with a partner and women living alone (with children), irrespective of the biological relationship between the male partner and the household's children. Finally, I classify women in three working categories, consistent with the model: no working in the market (working less than 5 hours per week), part-time work (between 5 and 36 hours

the distribution of the time allocated to childcare activities (I consider 10 deciles of this distribution).[67]

Third, I make use of rich information in the FFCW about the activities mothers do with their children and construct a latent variable of the time mother's invest in their children. I summarize the variables used in the construction of this latent variable in each wave in Table A.15. For each women, I add the listed variables to create an aggregate variable, that I use as a proxy of maternal time investments. For each cell based on labor supply, education, child age, and partner's presence, I create 10 quantiles based on this latent variable (where a lower quantile represent a lower maternal time investment based on the latent variable).[68] Finally, I map at the cell level the 10 quantiles of this latent variable with the corresponding quantile on the share of time spent in childcare from the ATUS. [69]

Table A.15: Measures of Maternal Investments at Different Ages (FFCW)

Wave	**Measures of maternal investments**
Wave 2 (Age 1)	Days per week mom sings songs or rhymes to child Days per week mom read stories to child Days per week mom tell stories to child Days per week mom plays inside with toys (such as blocks) with child
Wave 3 (Age 3)	Same as Wave 2
Wave 4 (Age 5)	Same as Wave 2 and 3, but additionally: Days per week mom plays outside in the yard or park with child Days per week mom takes child on outing or special activity
Wave 5 (Age 9)	Frequency play sports or outdoor activities with child in past month Frequency read or talk about books with child in past month Frequency participated in indoor activities with child in past month Frequency talked about current events with child in past month Frequency you talked about child's day with child in past month

In the estimation, I use data for children age 1 to age 9 (wave 2 to wave 5). At every round (ages 1 to 9), there is rich information about behavioral characteristics of children.

per week), and full-time(between 37 and 60 hours per week).

[67] I consider all activities directly related to childcare (e.g., playing with children, reading to children, bathing a child, or driving a child to school, etc.), excluding activities performed while taking care of the children if childcare is not the main activity (for example: cooking, doing dishes, etc.).

[68] All variables are categorical variables taking values 0 to 7 in waves 2 to 4, and values 1 to 5 in wave 5.

[69] To give an example, a woman in the second quantile of the latent variable in wave 2 will be matched to the percentile 20th of the distribution of the share of childcare for the corresponding cell based on education, partner presence, labor supply status and child age.

At ages 5 and 9, there is also rich information on standardized tests, taken by each child as part of the corresponding survey wave. At each age (except age 1), I construct two different measures of children's human capital: one based on behavioral variables and one based on cognitive variables. Table A.16 summarizes the data used in the construction of these measures.[70]. In the estimation, I use behavioral data for ages 1 and 3 (corresponding to the 'Small' stage in my regressions), and cognitive data at ages 5 and 9.[71]

I estimate the model separately for households in which both parents are present in the household (independently of the marital status) and households in which only the mother is present in the householf (independently of whether she has divorced or separated the child's father or whether she was a single-mom, and independently of the presence of a new partner in the household). The results of the estimation for the two samples are presented in Table A.17.

[70]To construct the child human capital based on behavioral variables, I add the different components listed in Table A.16 and I obtain percentiles based on these aggregate measures. For the cognitive measures, I obtain percentiles for each of the tests, and obtain the mean of these percentiles in each wave.

[71]I do not have consistent information about cognitive outcomes at age 15. Therefore, I use information only until age 9 to estimate the production function of child human capital for 'older' children.

Table A.16: Measures of Child Human Capital at each Survey Wave (FFCW)

	Behavioral	**Cognitive**
Wave 2 (1 year old)	Child tends to be shy (reversed) Child often fusses and cries (reversed) Child is very sociable Child gets upset easily (reversed) Child reacts strongly when upset (reversed) Child is friendly with strangers	No measure
Wave 3 (3 years old)	Child acts too young for age, Child avoids looking others in the eye, Child clings to adults or is too dependent, Child is defiant, Child is disobedient, Child's demands must be met immediately, Child does not answer when people talk to him/her, Child does not get along with other children, Child does not know how to have fun, Child does not seem to feel guilty after misbehaving, Child is easily frustrated, Child is easily jealous, Child's feelings are easily hurt, Child gets in many fights, Child gets too upset when separated from parents Child hits others, Child has angry moods, Child looks unhappy without good reason, Child is overtired, Child screams a lot, Punishment doesn't change his/her behavior, Child refuses to play active games, Child seems unresponsive to affection, Child is self-conscious or easily embarrassed, Child is selfish or won't share, Child is too shy, Child shows little affection towards people, Child shows little interest in things around him/her, Child is stubborn, sullen or irritable, Child has sudden changes in mood or feelings Child has temper tantrums or hot temper, Child is too fearful or anxious, Child is uncooperative, Child is under active, slow moving or lacks energy, Child is unhappy, sad or depressed, Child is unusually loud, Child wants a lot of attention, Child is whiny, Child is withdrawn, he/she doesn't get involved with others	Peabody Picture Vocabulary Test
Wave 4 (5 years old)	Child can't concentrate, can't pay attention for long Child can't sit still, child is restless and hyperactive Child clings to adults or is too depend Child cries a lot Child is disobedient Child does not get along with other children Child does not seem to feel guilty after misbehaving Child has trouble getting to sleep. Child is nervous, highstrung or tense Child has a speech problem Child is stubborn, sullen or irritable Child has sudden changes in mood or feelings Child has temper tantrums or hot temper Child is too fearful or anxious Child is unhappy, sad or depressed Child wants a lot of attention Child is withdrawn or does not het involved with others Child feels worthless or inferior Child acts too young for her/his age	Letter-Word Test Peabody Picture Vocabulary Test
Wave 5 (9 years old)	Same as 5 years old (Child is disobedient is split between at home and at school).	Digit Span Peabody Picture Vocabulary Test Woodcock-Johnson Test 9 (Reading) Woodcock-Johnson Test 10 (Math)
Wave 6 (15 years old)	Same as 5 and 9 years old, but excluding: child does not get along with other children, child has a speech problem, child has sudden changes in mood or feelings, child wants a lot of attention, child is withdrawn, child feel worthless or inferior, and child acts too young for her/his age	School grades (A to D): Math, Reading, History and Science.

Table A.17: Production function of child's human capital

Sample:	Both parents	Only mother
	Child Human Capital (t+1)	Child Human Capital (t+1)
log(Child Human Capital (t)) × Small	-0.229***	-0.130*
	(0.071)	(0.069)
log(Child Human Capital (t))	0.549***	0.475***
	(0.066)	(0.062)
log(Maternal Time (t))(I_t) × Small	0.102**	0.142**
	(0.043)	(0.068)
log(Maternal Time (t))(I_t)	0.017	-0.008
	(0.036)	(0.056)
Mother Low Ed., Father High Ed.	0.062	
	(0.055)	
Mother High Ed., Father Low Ed.	0.044	
	(0.051)	
Mother High Ed., Father High Ed.	0.149***	
	(0.039)	
Mother High Ed. (no partner)		0.145***
		(0.041)
Small Child (< 4 yo)	1.071***	0.757***
	(0.320)	(0.285)
Constant	1.587***	1.768***
	(0.291)	(0.238)
Observations	2,522	1,599
R-squared	0.152	0.172
Sample Child	Age 1 to 9	Age 1 to 9
Sample HH	Both Parents	Only Mom
Human Capital Measure	Cognitive and Behavioral	Cognitive and Behavioral

Notes: Data from the Fragile Families and Child Wellbeing Study (Waves 2 to 5). I pool data from rounds 2 to 5, where *Small* is associated with children younger than 3 years old. I restrict my sample to those children born when the mother was between 20 and 40 years old. I estimate the model separately for households in which both parents are present and households in which only the child's mother is present, irrespective of the specific marital status and the presence of a new partner in the household. Even when I use both behavioral and cognitive data for the estimations, I maintain consistency between periods t and $t+1$. This implies that, if I use behavioral data for the independent variable $Q_{t=2}$, I also use behavioral data for the dependent variable $Q_{t+1=3}$. However, for the next round, I may use cognitive variables for the independent variable $Q_{t=3}$, as long as it is consistent with cognitive variables for the dependent variable $Q_{t+1=4}$. To increase my sample size, I include information about children and their mothers, for which the focal child is the first, second or third biological child of the woman. 'Low Education' and 'High Education' are defined based on whether the parent has a high school degree or less, or some college or more, respectively. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Male Income Shock Process: In Table A.18 I estimate the probability of receiving an income shock in the first period of the life-cycle ($t = 1$), by education group, pooling

data of men who are between 22 and 25 years old (period 1 of the model).[72] Then, for each of the following periods $t = 2$ to $t = 4$ (corresponding to ages 26-29, 30-33, and 34-37), I estimate the probability of receiving an income shock in each period t, conditional on their status in $t-1$ (Table A.19).[73] [74]

Table A.18: Male income shock in $t = 1$, by education group

	t=1
Low Education	0.137
High Education	0.115

Notes: Sample includes men aged 22 to 25 years old in the NLSY-97.

Table A.19: Probability of male income shock in t, conditional on education and income shock status in $t-1$

	$t=2$	$t=3$	$t=4$
	Low Education		
Negative income shock in $t-1$	0.531	0.529	0.603
No income shock in $t-1$	0.078	0.044	0.034
	High Education		
Negative income shock in t-1	0.324	0.327	0.531
No income shock in t-1	0.043	0.015	0.018

Notes: Each period t corresponds to 4-years period of the individual's life, with $t = 2 =$ [26,29], $t = 3 =$ [30,33] and $t = 4 =$ [34-37]. I consider that an individual had a negative income shock in $t-1$ if he was unemployed more than half of the years he appears on the sample in that period.

Fertility Process: I use the NLSY-97 estimation sample (described in Online Appendix OC.1) to estimate the probability of having a first child, by marital status (married, cohabiting or single), woman's education and age. I assume fertility choices are completed by age 37, when I last observe women in the data. I start by computing the probability of having the first child in period 1 (ages 20-25).[75] I then compute the transitions from

[72] I exclude men younger than 21 years old, who are more likely to have not completed their education.

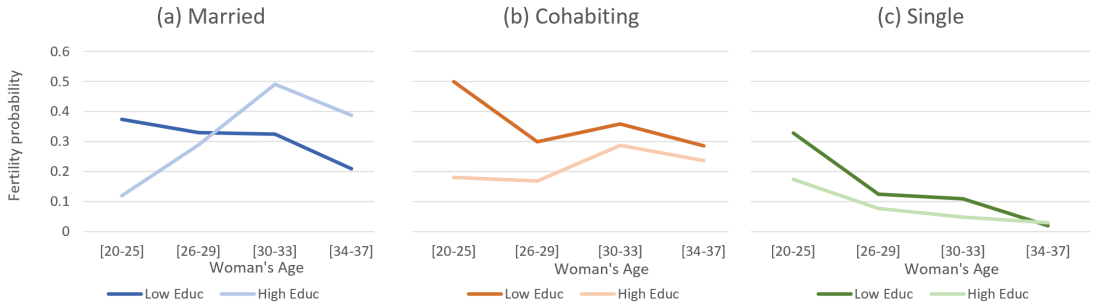
[73] To determine whether the individuals received an income (or unemployment) shock, I construct the employment status of each individual in $t-1$ by averaging their employment status over the years they appear on the sample in that period. I consider an individual to have receive a negative income shock in $t-1$ if he has been out of work less than half of the time in $t-1$. For period t, I pool observations from different years (but I assign to the different years the corresponding period in the model, based on the individual's age). I do not distinguish between individuals who are unemployed or out of the labor force.

[74] For the remainder periods of my model ($t = 5$, $t = 6$ and $t = 7$), I assume the transition probabilities are the same than in period $t = 4$, since I do not observe data for these age groups.

[75] As mentioned in Online Appendix OC.1, I dropped from my sample observations corresponding to women who had a child before age of 20.

being childless to having one child for periods 2, 3 and 4 (ages 26-29, 30-33 and 34-37), conditional on the marital status at the time of the marriage market (as defined in Online Appendix OC.1), the female's education level and the marital status at the end of the previous period.[76] I report the estimated probabilities in Figure A.9.

Figure A.9: Probability of First Child Arrival by Age, Education and Marital Status of Women



Notes: This figures reports the probability of child arrival in period t, conditional on not having a child in $t-1$. I construct these probabilities by age interval in the data, corresponding to periods 1 to 4 in the model. Women are classified to each marital status and education bin ('High Educ' and 'Low Educ') as described in Online Appendix OC.1.

Probability of Child Support by Marital Status: I use the FFCW data to estimate the share of divorced and separated fathers that have a child support order in place by the time a child is 9 years old, conditioning on the marital status at childbirth and maternal education.[77] I then multiply these shares by the probability that the father does not owe child support's arrears. [78] [79] I report these probabilities in Table A.20.[80]

[76] For example, to compute the transition from being childless in period 1 to having one child in period 2, I compute the probability of having a child in period 2, conditional on being assigned to marriage at the time of the marriage market, being childless at age 25, and being still married at age 25.

[77] Divorcees are significantly more likely than separated fathers to have a child support order in place. This is robust to conditioning on the education level of the child's mother or father.

[78] I compute these probabilities separately to increase the sample of fathers for which I have information. The share of fathers that does not owe child support does not change significantly when I restrict the sample to those for whom I have information on whether they have a legal child support order.

[79] A large share of the mothers that report having a legal child support order in place report that the father owes at least some of the child support payments (50% for divorced women and 67% for separated women). Moreover, 28% of divorced women and 41% of separated women report that the father paid nothing of the stipulated amount.

[80] I consider that the father owes child support if they only paid part of the amount stipulated in the child support order. When I adopt a more lenient definition and consider that only those who paid nothing owe child support, the probability of receiving child support increases in all cells (to 31% and 42% for low and high educated divorced women, and to 17% and 25% for low and high educated separated women, respectively), but the patterns are still consistent with those displayed in Table A.20. The FFCW data also

Table A.20: Probability of Child Support by Maternal Education Level

	Low Educated Mother	High Educated Mother
Divorce	0.231	0.297
Separatation	0.104	0.155

Notes: The probability of child support payment is computed as the probability of having a legal child support order times the probability that the father does not owe child support. The sample includes parents who were married or cohabiting at childbirth, but are divorced or separated by the time the child is 9 years old. Women are classified in two education bins, where 'Low Educated' is high school degree or less and 'High Educated' is some college or more.

C.2 Results and Fit

Table A.21: Parameter Estimates

Parameter	**Symbol**	**Estimate**	**s.e.**	**Sensitivity**
Fem. Dis. of Work (No small child, low ed., PP)	$\psi^{(Low,NC)}$	0.945	0.003	LLC^f, LHC^f, LHM^m (48%)
Fem. Dis. of Work (No small child, high ed., PP)	$\psi^{(High,NC)}$	0.145	0.009	$M2$, HLM^f, HLC^m(42%)
Fem. Dis. of Work (Small child, low ed., PP)	$\psi^{(Low,C,P)}$	-0.201	0.224	LHM^f, HLM^f HLC^m (31%)
Fem. Dis. of Work (Small child, high ed., PP)	$\psi^{(High,C,P)}$	-0.567	0.005	$M4$, HLM^f, HLC^m (39%)
Fem. Dis. of Work (Small child, low ed., NP)	$\psi^{(Low,C,NP)}$	1.134	0.068	$M5$, HLM^f, HLC^m (31%)
Fem. Dis. of Work (Small child, high ed., NP)	$\psi^{(High,C,NP)}$	0.975	0.011	$M6$, $M1$, HLM^f (50%)
Match Quality Variance	σ_ξ	7.711	0.035	$M1$, HLM^f, LLC^f (34%)
MgU over Child HK at Divorce (Male)	$\alpha_{D,m}$	0.205	0.201	HLM^m, LHC^m, HLC^m (46%)
MgU over Child HK at Separation (Male)	$\alpha_{S,m}$	0.555	1.100	HLM^m, LHC^m, HLC^m (37%)
MgU over Child HK at Divorce (Female)	$\alpha_{D,f}$	0.833	0.007	HlM^f, LLM^m, HLC^m (32%)
Scale of Marriage Market Pref. Shock	σ_ω	3.478	0.180	HLM^f, HLC^f, HLC^m (47%)
Taste for Singlehood (female, low ed.)	$\theta_s^{f,Low}$	4.004	0.045	LS^f, LHM^f, HLM^f (34%)
Taste for Singlehood (female, high ed.)	$\theta_s^{f,High}$	5.169	0.039	HS^f, HLC^f, HHM^F (34%)
Taste for Singlehood (male, low ed.)	$\theta_s^{m,Low}$	7.379	0.073	LLM^m,LHC^m, HLC^m (42%)
Taste for Singlehood (male, high ed.)	$\theta_s^{m,High}$	7.624	0.090	HS^m, LHM^m, HHM^m (39%)
Taste for Cohabitation (low ed. partner)	$\theta_C^{m,Lf}$	1.467	0.652	HLM^f LHC^m HLC^m (41%)
Taste for Cohabitation (high ed. partner)	$\theta_C^{m,Hf}$	3.749	0.547	$M1$, HLM^f HHC^m (37%)

Notes: The column **Parameter** describes the corresponding parameter, and **Symbol** indicates how the parameter is denoted in the model, as described in Section 4. The third column displays the point estimate for each parameter. The **s.e.** column reports the standard error of the point estimate, computed as the square root of the variance matrix of the estimators, described in Section 5.2. The variance matrix is constructed using numerical gradient methods, using a forward step-size of 1% with respect to the parameter estimate value. In the last column I report the three moments that have the highest impact on each parameter in the estimation, based on the sensitivity measured defined in Section 5.2.4. I also report in parentheses how much of the variation of the parameter is explained by changes in these three moments. The moments denoted by $M1$ to $M10$ refer to the moments reported in Table A.22. The rest of the moments refer to moments related to the matching frequencies and the share of singles. In every case, L denotes Low Education, H denotes High Education, where the first element in a pair refers to the female type and second to the male type. M, C and S refer to marriage, cohabitation and singlehood. The suprascripts f and m refer to female and male, respectively. For example: LHM^f is the matching frequency of a low educated women married to high educated men, baseline of female choices, and HS^f is the share of high educated single women.

contains information on whether the father paid child support even when there is no formal agreement in place. I find no statistically significant differences between divorced and separated fathers for this variable, and I do not use this information to compute the probabilities in Table A.20.

Table A.22: Moments

Moment Description	Data	Model
M1. Fem. LFP (Low Ed., no small child)	0.857	0.878
	[0.847, 0.866]	
M2. Fem. LFP (High Ed., no small child)	0.919	0.922
	[0.914, 0.924]	
M3. Fem. LFP (Low Ed., small child and partner)	0.770	0.782
	[0.749, 0.791]	
M4. Fem. LFP (High Ed., small child and partner)	0.843	0.848
	[0.829, 0.856]	
M5. Fem. Full Time to Part Time Ratio (Low Ed., small child, NP)	0.591	0.632
	[0.552, 0.629]	
M6. Fem. Full Time to Part Time Ratio (High Ed., small child, NP)	0.656	0.667
	[0.607, 0.703]	
M7. Divorce Rate by t=4 (conditional on having a child)	0.290	0.318
	[0.257, 0.327]	
M8. Transition from Cohabitation to Marriage by t=4	0.311	0.269
	[0.265, 0.362]	
M9. Separation Rate by t=4 (conditional on having a child)	0.448	0.430
	[0.387, 0.502]	
M10. Correlation between Partners Education (all couples)	0.398	0.367
	[0.357, 0.442]	

Notes: Bootstrapped 95% confidence intervals of the data moments in square brackets.

Table A.23: Matching Frequencies

Marital Contract	**Household Type** (female, male)	**Data**	**Model** (female choices)	**Δchoices** (female - male)
Marriage	Low, Low	0.087 [0.076, 0.098]	0.084	0.006
	Low, High	0.073 [0.063, 0.083]	0.075	0.008
	High, Low	0.053 [0.045, 0.062]	0.061	-0.016
	High, High	0.27 [0.253, 0.288]	0.264	-0.015
Cohabitation	Low, Low	0.088 [0.076, 0.099]	0.100	-0.002
	Low, High	0.041 [0.033, 0.049]	0.041	-0.004
	High, Low	0.039 [0.032, 0.047]	0.044	0.019
	High, High	0.07 [0.06, 0.081]	0.064	-0.011
Single	Low Female	0.159 [0.146, 0.173]	0.149	NA
	High Female	0.120 [0.108, 0.132]	0.117	NA
	Low Male	0.203 [0.187, 0.22]	0.188	NA
	High Male	0.076 [0.056, 0.095]	0.064	NA

Notes: Bootstrapped 95% confidence intervals of the data moments in square brackets.

Figure A.10: Labor Force Participation for Women with Small Children by Marital Status

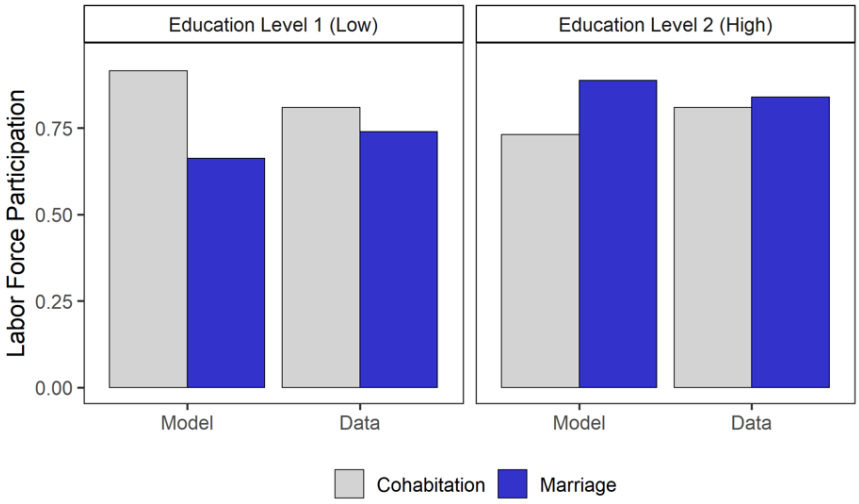
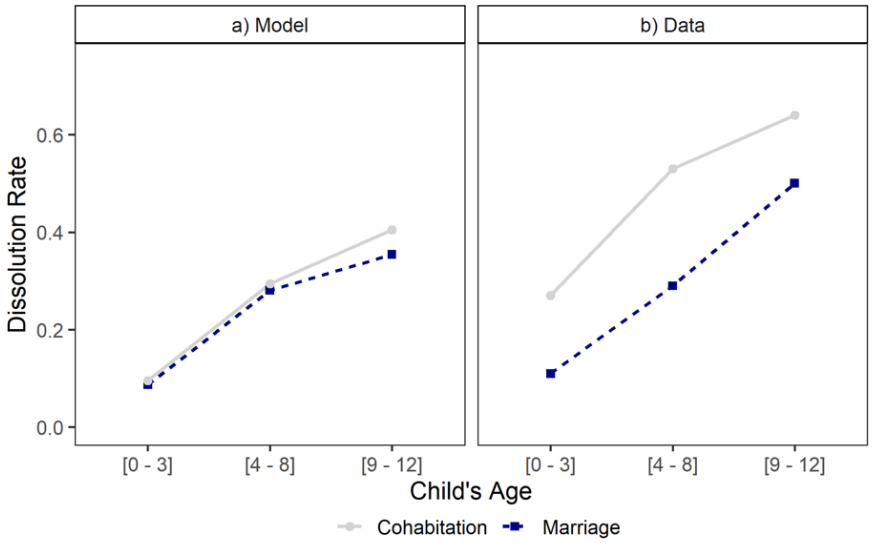


Table A.24: Differences in Labor Market Experience between Married and Cohabiting Women

Female Education	**Data**	**Model**
Low Educated	-0.10	-0.32
High Educated	-0.15	-0.07

Notes: This table measures differences in female experience up to age 37 between women who had children under marriage and under cohabitation. This is computed as $\frac{Avg(Exp_M)-Avg(Exp_C)}{Avg(Exp_C)}$ both in the data and in the model. For consistency in measuring the cumulative experience, I restrict my attention to the sample of women who had children in the first two periods of the life cycle.

Figure A.11: Dissolution Rates by Age of Children



Notes: I compute the divorce share at each age period of the life of a child, irrespective of when the child was born. I truncate the figure to the third period of the life of children, to reduce the problems associated with selection in the data. The reason is that since my data is truncated at age 35-37 of the life of women, I only households with older children when they were born earlier in the life-cycle. This introduces selection, as women who have lower educated are both more likely to have children earlier and to divorce/separate. This selection problem explains part of the differences in the levels in divorce/separation between the model (left panel) and the data (right panel).

Table A.25: Differences in Child Human Capital between Cohabitation and Marriage by Parental Education

	Difference
Overall difference	-7.6%
Educ: Low F, Low M	-1.2%
Educ: Low F, High M	-2.0%
Educ: High F, Low M	0.4%
Educ: High F, High M	0.1%

Notes: Child human capital is measured as average child human capital Q_t by the last period of child development, corresponding to third period of a child in the household in the model (ages 9 to 12). I condition on couple type, based on the education of both parents. In each row, F refers to the female partner and M to the male partner. Differences are computed as (Average Q Cohabitation − Average Q Marriage)/Average Q Marriage. To compute the overall differences I weight the average human capital of each household type by the share of women in each type of household (given by the model choice probabilities).

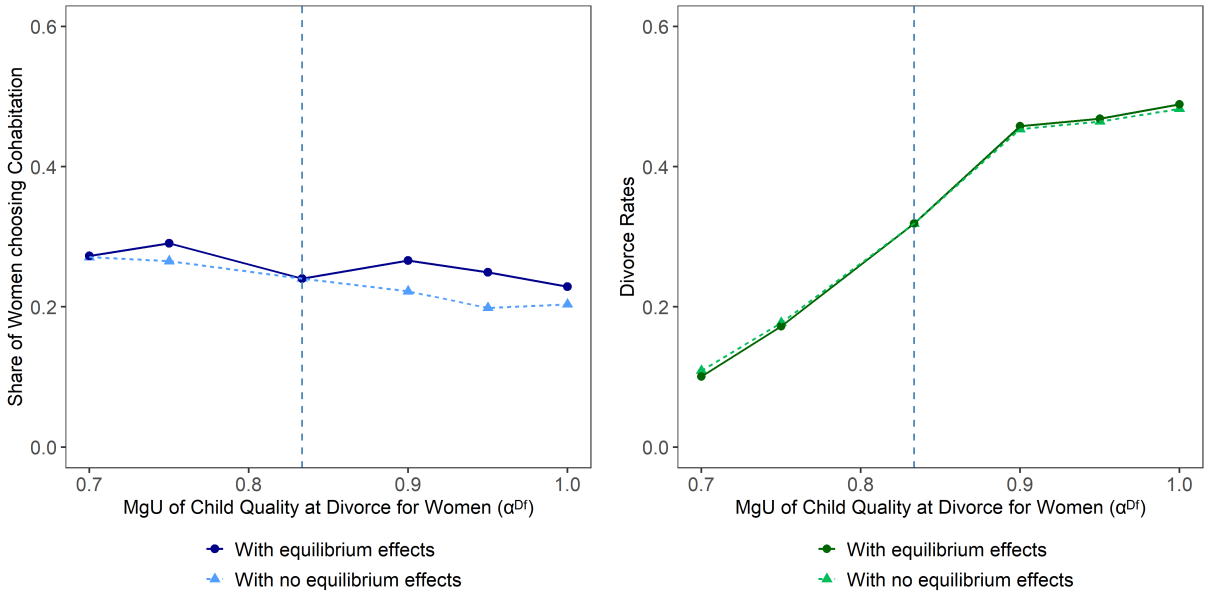
Table A.26: Differences in Child Human Capital between Cohabitation and Marriage: Analysis of Mechanisms

Scenario	Overall (All Women)	Low-Educated Women	Highly-Educated Women
Baseline gaps	-7.6%	-3.4%	-2.5%
1. Ignoring direct effect of parental education	⇓ 88.2%	⇓ 56.0%	⇓ 107.6%
2. Ignoring differences in maternal time investment behaviors	⇓ 3.9%	⇓ 28.2%	⇑ 10.7%
3. Ignoring differences in parameters between couples and single-mothers.	⇓ 15.2%	⇓ 50.0%	⇑ 31.6%

Notes: Child human capital is measured as average child human capital Q_t by the last period of child development, corresponding to third period of a child in the household in the model (ages 9 to 12). In the first row, I report the differences in child human capital between marriage and cohabitation for all women and after splitting them between low-educated and high-educated women (where a negative difference implies lower human capital among children born to cohabiting women). In the following rows, I report the change in the human capital gap across different scenarios: a) ignoring the direct effect of parental education in the production function of child human capital; b) ignoring differences in maternal time investment behaviors; c) equalizing the coefficients of the production function of child human capital for couples and single-mothers (except for the coefficients associated with the household type).

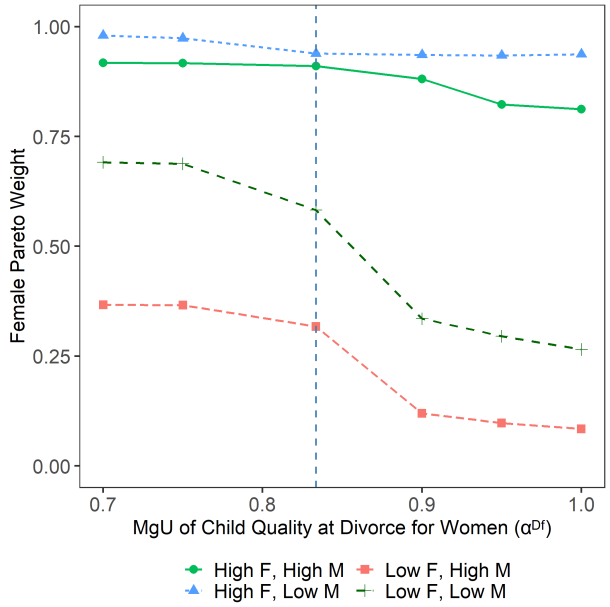
D Analysis

Figure A.12: Comparative Statics: Equilibrium Effects of $\alpha^{D,f}$ on Cohabitation and Divorce



Notes: The dashed lines in the left and and the right panel reproduce the corresponding lines from Figure 7, for the choice of cohabitation and divorce rates, when the equilibrium effects are not taken into account. The solid lines with circle markers plot the same effects but taking into account the equilibrium effects. The vertical dashed blue line represents the baseline value of $\alpha^{D,f}$.

Figure A.13: Comparative Statics: Equilibrium effects of $\alpha^{D,f}$ on the bargaining position of married women



Notes: This figure plots the equilibrium relative Pareto weight of married women in different type of couples, at different values of $\alpha^{D,f}$. 'High' and 'Low' denote High Education and Low Education. 'F' and 'M' correspond to the female and the male partner, respectively. The vertical dashed line represents the estimated baseline value of $\alpha^{D,f}$.

E Counterfactuals

Figure A.14: The effects of equalizing the marginal utility over child human capital at divorce and separation: (a) Share choosing marriage, (b) Share choosing singlehood

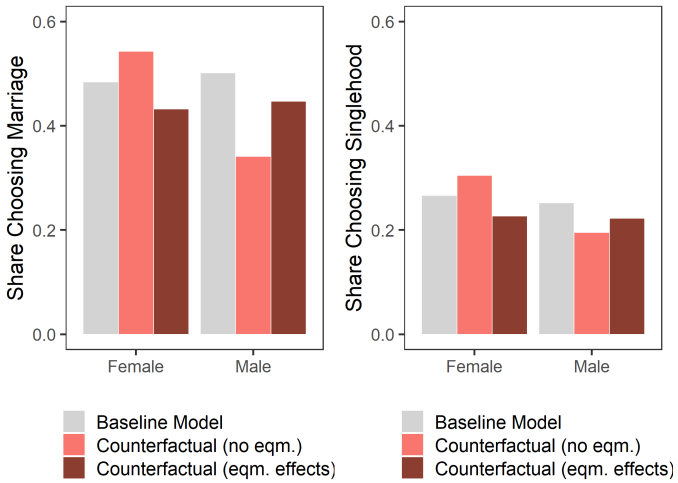


Table A.27: Matching Frequencies: Baseline vs. Counterfactual (equalizing α)

Marital Contract	**Household Type**	**Baseline Model**	**Counterfactual** (Eqm. Effects)
Marriage	Low F, Low M	0.084	0.067
	Low F, High M	0.075	0.043
	High F, Low M	0.061	0.063
	High F, High M	0.264	0.259
Cohabitation	Low F, Low M	0.100	0.127
	Low F, High M	0.041	0.108
	High F, Low M	0.044	0.023
	High F, High M	0.064	0.083
Single	Low Female	0.149	0.105
	High Female	0.117	0.122
	Low Male	0.188	0.182
	High Male	0.064	0.041

Notes: Matching frequencies for couples are computed based on female choices. "Low" and "High" stand for Low Educated and High Educated respectively. "F" and "M" stand for female and male partner.

Table A.28: Counterfactual choices: Child Support Enforcement and Equal Division of Assets

	(1) Baseline Model	(2) Enforce CS (No eqm.)	(3) Enfoce CS (Eqm.)	(4) Equal Assets Split (No eqm.)	(5) Equal Assets Split (Eqm.)
Divorce Rate	0.318	0.327	0.326	0.318	0.319
Separation Rate	0.430	0.436	0.422	0.409	0.405
Choosing Marriage (Fem)	0.484	0.489	0.483	0.479	0.475
Choosing Cohabitation (Fem)	0.250	0.252	0.254	0.257	0.267
Choosing Single (Fem)	0.266	0.260	0.263	0.264	0.258
Choosing Marriage (Male)	0.501	0.506	0.483	0.490	0.475
Choosing Cohabitation (Male)	0.247	0.238	0.254	0.259	0.267
Choosing Single (Male)	0.252	0.255	0.263	0.251	0.258

Notes: Column (1) reproduces the results from the baseline model. In columns (2) and (3) I impose full child support enforcement (100% probability that the father will pay child support), both for divorced and separated fathers, not allowing for equilibrium effects (column 2) and allowing for equilibrium effects (column 3). In columns (3) and (4) I impose equal division of assets between partners at separation, again now allowing and allowing for equilibrium effects, respectively. Divorce rate measures the share of couples that got married in the marriage market and divorced by period 4. Separation rates is the share of couples that chose cohabitation in the marriage market and are separated by period 4 (but excluding couples that first transitioned to marriage and then divorced). 'Choosing marriage', 'Choosing cohabitation' or 'Choosing single' shows the share of women (rows 3 to 5) and men (rows 6 to 8) that would choose each of the marital status by the time of the marriage market, given the equilibrium Pareto weights. In columns (2) and (4), where I do not allow for equilibrium effects to materialize, the choices of men and women do not necessarily coincide.

Table A.29: Counterfactual Pareto Weights: Child Support Enforcement and Equal Division of Assets

Panel (a): Full Child Support Enforcement				
	Marriage		**Cohabitation**	
	Male Low Ed.	Male High Ed.	Male Low Ed.	Male High Ed.
Female Low Ed.	0.560 (-0.038)	0.295 (-0.071)	0.223 (-0.071)	0.023 (-0.234)
Female High Ed.	0.938 (-0.001)	0.912 (0.002)	0.853 (-0.002)	0.468 (-0.026)
Panel (b): Equal Split of Assets				
	Marriage		**Cohabitation**	
	Male Low Ed.	Male High Ed.	Male Low Ed.	Male High Ed.
Female Low Ed	0.581 (-0.002)	0.319 (0.005)	0.237 (-0.013)	0.042 (0.399)
Female High Ed	0.939 (0.000)	0.911 (0.001)	0.775 (-0.093)	0.468 (-0.026)

Notes: Panel (a) shows the equilibrium Pareto weights in the counterfactual in which I impose full child support enforcement and equal access to children, in marriage and cohabitation. Panel (b) reports the equilibrium Pareto weights after also imposing equal division of assets. In each case, I report in parentheses the percentage changes in Pareto weights relative to the baseline values, reported in Table 4.

Table A.30: Child Support Enforcement and Equal Division of Assets: Welfare Effects

	Panel (a) Full Child Support Enforcement		**Panel (b)** Equal Split of Assets	
	Partial Effects	Total Effects	Partial Effects	Total Effects
All	0.017%	0.171%	0.034%	0.037%
Female	0.080%	0.062%	0.027%	0.015%
Male	-0.043%	0.275%	0.039%	0.059%

Notes: In Panel (a) I show the welfare effects (computed based on the measure of social welfare in Equation 15) of full child support enforcement, relative to the baseline model. In Panel (b) I report the welfare effects of imposing equal division of assets after cohabitation, relative to the baseline model. The columns labeled 'Partial effects' refers to the scenario in which I keep the Pareto weights and matching frequencies of the baseline constant. The 'Total effects' columns represent the scenario in which both household formation and the Pareto weights are allowed to change.