Fecundity Differentials and Child Custody

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Abstract

Despite U.S. child custody laws favoring gender neutrality since the mid-70s, fathers' involvement with their children after a divorce remains limited. This paper proposes a plausible mechanism to account for why divorced parents have not reacted to changes in child custody law. I build a model of marriage, divorce and remarriage with fecundity differentials between women and men. Men can have children over a longer period of time compared to women. Thus, if men divorce, they have a higher probability of having more children in comparison to women. This acts as an incentive for women to keep their children after a divorce. I calibrate the model to be consistent with current U.S. child custody arrangements and marriage statistics. Results show that if the chances to meet someone young to remarry increase, fathers' involvement in children's lives decreases.

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1 Introduction

There is large empirical evidence showing that children from divorced parents perform worse in terms of educational achievement than those from intact families (see McLanahan and Sandefur, 1994; Gruber, 2004; Cáceres-Delpiano and Giolito, 2011, among others). Typically after a divorce, the household experiences a loss of income and children tend to have less contact with at least one of their parents, typically the father. Both aspects, the lower household's income and the reduced contact that children have with both parents are determined by child support and child custody arrangements. Thus from a public policy perspective it is important to know how granting of child support payments and allocation of child custody work. This papers focuses on the allocation of child custody and addresses the question of how biological differences between men and women account for the incidence of joint child custody. There exists some research on the allocation of child custody and custody support payments in the context of optimal contracts. Weiss and Willis (1985) present a model of optimal marriage contracts in which couples decide on the allocation of resources within marriage and the terms of a settlement (transfers and child custody) in the event of divorce. Their model can explain why custody and transfers go towards the same person. Rasul (2006) allows spouses to decide ex ante the allocation of the child in case of divorce. Parents differ in their valuation of children. His results point out that if couples valuation of children are relatively similar, then joint custody is optimal. Brown and Flinn (2011) explore the effect of different family law environments on the educational attainment of children, their welfare and parents' welfare using data from the NLSY. The authors find that changes in family law have little effect on children's welfare, but they have lager effects on parents welfare.[1] Halla and Holzl (2007) investigate how the option of joint custody affects divorce in a model of bargaining. Looking at Austrian divorce court records, they find that the introduction of joint custody has no impact on the odds that children are mainly living with their mother. Exploiting time variation across U.S. states on the introduction of family laws favouring gender neutral (joint) child custody, Halla (2010) studies the effects of joint child custody on marriage rates, divorce rates, fertility and female labor force participation. He finds that joint custody leads to an increase in marriage rates and in fertility. I build a model economy of marriage, divorce and remarriage where parents decide whether to have joint or sole custody in case of divorce. I explicitly model differences in fecundity between women and men. Men can have children for a longer time span than women. Upon divorce, men would prefer to marry a young woman who

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[1]see Del Boca (2003) for a review.

can have children. However, having children from the previous marriage is costly. Therefore, child custody arrangements will have an impact on remarriage. There are several papers in the economics literature that take into account fecundity differentials between women and men. Siow (1998) explores how differentials in fecundity interact with marriage, labor and financial markets to affect gender roles. He can account for several difference between women and men in labour participation, time rearing children and age of marriage among others. While previous literature has proposed women's comparative advantage in household production, Siow(1998) relies on biological difference to account for these facts. However, different from the current paper the allocation of child custody is not an issue. Diaz-Gimenez and Giolito (2010) argue that women become less picky when choosing a partner as their biological clocks are ticking. In their paper, fecundity differentials are sufficient to account for the age distributions of ever and never married men and women, for the probabilities of marrying a younger bride and a younger groom, and for the age distributions of first births observed in the U.S. The model in the current paper is calibrated to match U.S. data on child custody arrangements and statistics on marriages, divorces and remarriages. I briefly discuss other competing mechanisms. Moreover, I find that if it is more likely to have more children after a divorce, fathers' involvement in children's lives decreases.

1.1 Custody and Fertility

I provide a brief overview of the empirical evidence on the relationship between marriage, child custody and fertility.

Child custody. The two most common child custody arrangements in the U.S. are mother's sole custody and joint custody. While sole custody assigns all legal rights over the child to one parent, joint custody implies assigning the rights and obligations to make decisions regarding the child's upbringing to both parents. Moreover, joint custody is either legal or physical, the difference being that joint custody involves specific amounts of time spent with each parent. Most researchers have defined joint physical custody (or dual residence) as at least between 30 and 50 percent of time spent with one of the parents (Kelly 1994)[2]

Child custody laws changed in most U.S. states in the mid 1970s towards gender neutrality.[3]Until then, sole custody was assigned to the mother by default. Thus we would expect to

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[2]Child custody arrangements are not necessarily decided by the courts. In the U.S., about 50 % of parents make private arrangements about custody and visitation rights (Kelly, 1994).

[3]The law changed to favour the child's best interests. This criterion means to include: (i) the wishes of the

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observe an increase in custody after the change in law. Table I provides the share of joint physical custody for different US states from 1989 to 1995 as in Halla (2011).[4] The share of joint custody increases over time for most states even though only 25 per cent of divorced couples had joint custody by 1995 on average.[5] We can also observe that the share of joint custody varies significantly across states, ranging from 11 per cent in Nebrasca to 56.3 per cent in Kansas for 1995. Unfortunately there is no more recent data on physical joint custody. In surveys, the custodial parent is the one with whom the child spends more time. This can be misleading as it does not rule out some joint custody arrangement. Brown and Flinn (2011) find that on average custody-visitation rights implies that children spend 80% of their time with their mother and the remaining 20% with the father. Therefore, the mother being the main custodian of children after a divorce remains the norm even though child custody law moved towards a gender-neutral law in the mid 70s .

Table I: Share of joint physical custody

State	Share of joint awards, 1995
Connecticut	47.1
Illinois	22.3
Michigan	14.1
Kansas	56.3
Oregon	23.5
Pennsylvania	16.6

Data Source: Halla(2011)

Non biological children affect remarriage. There is evidence suggesting that the presence of former children reduce the likelihood of remarriage for women while previous children do not matter for the remarriage probability of men, see Chiswick and Lehrer (1990) and Buckel et al (1996). This difference might be explained by the fact that children normally remain with their mother after a divorce and this affects the mother's remarriage opportunities. Meanwhile,

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child's parents, (ii) the child's wishes, (iii) the relationship of the child with parents as well as (iv) the child's adjustment to his /her home, school and community. Thus, there are several factors that can account for the decision to award custody

[4]I focus on joint physical custody as it implies specific amounts of time spent with each parent.

[5]Average taken from Halla (2011).

divorced men do not live with their children and thus, their remarriage chances are not affected.

There exists extensive literature in psychology, sociology and biology suggesting that having children present in the household reduces remarriage probability as new partners do not enjoy raising someone else's child.(White and Booth, 1985; Coleman and Ganong, 1990, Cherlin and Furstenberg, 1994, among others). As a consequence remarriage rates of women tend to be lower than those of men. Table II shows the marital status of U.S. citizens ever divorced by age and sex.

Table II: Marital Status of ever divorced by sex and age, 2001

| | Men | | Women | |
Age	Divorced	Married	Divorced	Married
>25	41.7	54.8	46.6	44
25-29	62.4	35.9	62.1	35.5
30-34	45.5	52	49.9	45.8
35-39	54.5	44.1	48.7	47.1
40-44	42.6	55.3	48.2	47.1
45-49	42	55.4	46.7	49
>50	36.8	58.4	43.5	41(+13.3)

Specially as women age, they tend to remain unmarried more often than men (except at age 35-39). Therefore, it seems that after their fertile years women are less likely to remarry than men.

Fertility after remarriage. Fertility is an important factor to take into account when thinking about remarriage. Stewart (2002) indicates that stepchildren negatively affect child-bearing intentions and childbearing risks for women. However unlike women, men's previous biological children do not affect their intentions of having a child. About 38% of remarried man who had children with their current wife, had children from previous marriage[6]. This implies that after a divorce, men are more likely to form new households than women. Fustenberg et al (1983) and Manning and Smock (2000) find evidence of men "swapping" families. Men forming

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[6]Author´s calcualtions from the Male Respondent File of the National Survey of Family Growth, NSFG , 2006-2008.

new families reduce social and economic investment in their non resident biological children in favour of their biological children from the current relationship. Seltzer (1994) and Bergstrom (1996) argue that parent's interest in a child's well being diminishes in the presence of alternative offsprings. Moreover, men tend to remarry younger women than the first time around (Gelissen, 2004 and Shafer, 2009). The fact that men form new families replacing the older ones and they marry younger women provides some evidence supporting the idea that fertility is an important factor when considering remarriage.

The remainder of the paper is organized as follows. In Section 2 I introduce the model environment and the value functions and in section 3, the equilibrium is defined. In section 4, I calibrate the model to match the US data. Section 5 includes a discussion of the mechanism of the model and I perform some robustness checks. Section 6 concludes.

2 Environment

The economy is populated by overlapping generations of individuals who live for two periods as children and two as adults. Individuals decide about marriage and child custody arrangements only. Children, they make no decisions. There is mass one of women and men of each generation. Individuals are endowed with one unit of time. Individuals differ in their productivity (type) that remains the same over time. Let the productivity of women be denoted by $x \in X = \{x_1, ..., x_N\}$, and that of men by $z \in Z = \{z_1, ..., z_N\}$.

Fertility Fertility is exogenous. Women are fertile when they are young while men are fertile during young and old age. Men can have children only if they are married to a young woman. When a woman is fertile, she has two children who remain with her for all her lifetime. Therefore, only couples formed by a young man and a young woman and couples formed by an old man and a young woman can have children. Single women also have children outside of any marriage.

Marriage market At the start of their adult lives, agents observe their productivity and they form households. Upon their meeting individuals decide whether to form a household or remain single. Individuals can match with individuals of any age cohort. The probability of meeting someone of the same age cohort is p, thus individuals meet someone of a different age cohort with probability $(1 - p)$. A fraction $(1 - p)$ of young individuals meet old unmarried individuals. These are those who did not marry when young and those who divorce. This number is potentially smaller than $(1 - p)$, hence some of the these young individuals will not match with anyone and they remain single for that period. Unlike young agents, old agents will always meet someone, either young or old.

Potential couples draw a match quality $\gamma \in G = \{\gamma_1, ..., \gamma_M\}$ from the distribution $\Gamma(\gamma)$. If two young adults meet, they observe their types and match quality and they form a household if both agree to do so. Otherwise they remain single for that period. Individuals also observe whether their partner would bring children into the household. When a young individual matches with another young each of them have no children. However, if a young matches with an old individual, the old agent might have children associated with them from the previous period. Likewise, if an old individual matches with another old , both of them might have children associated with them. At the end of their lives as young individuals, couples formed by two young individuals draw next period's match quality. They might divorce and there can be divorced couples who share custody and couples where the mother is the sole custodian of the children. Next period they will go to the marriage market as singles with either joint or

sole custody. Those young individuals who married an old individual will enter next period as widows/widowers. Thus, at the beginning of the old period, the pool of old singles will be formed by never married old agents, widows and widowers and divorced agents.

Child custody. Couples formed by two young individuals decide on custody arrangements, a for their children in case they are to divorce. There are two possibilities: they can agree on sharing custody, $a = 2$, or on giving sole custody to the mother, $a = 1$.[7] Custody is thought of as the time that the child spends with each parent. The chosen custody arrangement has implications for the utility that parents receive from having their children at home and for the education that children receive. The custody policy parameter, τ_a determines how much time is allocated to the mother. Thus, τ_a is the share of time the child spends with the mother under child custody arrangement a, while $(1 - \tau_a)$ is the father's share. If the mother is the sole custodian, the children spend all their time with her and so, $\tau_1 = 1$. The father has no involvement in the children's lives. If parents have joint custody, the share of time with the child allocated to the mother is $\tau_2 < 1$. The time children stay with their mothers under joint custody is assumed to be given. We will set $a = 0$, for mothers who had their children outside of a marriage.

Utility Single women care about consumption as well as the quality and quantity of their children. Single men only enjoy consumption as they cannot have children. Couples care about consumption, children and their match quality. Women marry to enjoy economies of scale in consumption and the match quality. Men marry not only to enjoy economies of scale in consumption and the match quality, but also to have children. Parents receive utility from the number of children they have and the education that their children receive. However, they only get utility from their own biological children. An individual has to pay a fixed utility cost φ if there are children in the household who are not his/her own. Divorced mothers with sole custody get utility from their children, however divorced fathers who agreed to assign sole custody to the mother do not get utility from them. Parents who share custody get utility from their children, determined by the parameter τ_2. All individuals have one unit of time and as they do not value leisure, their earnings are given by their types (x for females and z for males).

Education The quality (education) of children living in two parent households or in never married women households depends on the consumption level of the household. However, when the parents are divorced, a child's education depends on the custody arrangements. If parents

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[7]I do not allow for the possibility of fathers having the sole custody of the child as this arrangement is rare in the data.

have agreed on sole custody, the child lives with the mother and the father forgets about the children. Therefore, the education that the child receives under sole custody is determined by the consumption level of the mother's household.

Under joint custody, the education of the child depends on the level of consumption in the mothers' household and the level of consumption in the father's household. As divorced parents can remarry, the consumption in their households also depends on whether they have remarried and to whom they have remarried. This implies that couples agreeing on joint custody will need to keep track of the marital status of their ex-partners. The consumption level of a couple's household is the sum of the woman's income, x and the man's income, z. If a woman of type x shares custody with a man of type $\widetilde{z}$ and she remarries a man of type z, her children's education will depend on her household's consumption $(x + z)$ and her ex-husband's consumption level. If the ex-husband has also remarried a woman of type $\widetilde{x}$, the ex-husband's consumption level is $(\widetilde{z} + \widetilde{x})$. Thus the value of remarrying for this woman will also depend on her ex-husband's type and his marital status.[8]There is no link between the education that children receive and their productivity levels when they become young adults. Education only provides utility to the parents.

When deciding whether to marry or not, young individuals form expectations about future marriage market conditions. If they remain single or they marry someone from the old cohort, they have to anticipate who will be in the single pool in the young generation (all start out as single) as well as in the old generation. If they marry someone young, they also need to anticipate who would be a potential match for their ex in case of divorce, as the education of their children will depend on the consumption level of the ex-partner's household in case of shared custody. Thus they also have to form expectations over the probability of their ex-partner remarrying.

2.1 Value function of Old Individuals

The value of being non-married (single, divorced, or widowed) depends on the type of the woman, x and the children, k. The value of being non-married for a divorced woman also depends on the custody arrangements, a. Widows and never married women have sole custody by default, therefore, the share of time their children spend with them is equal to one and a is set to 0.

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[8]It is important to note that using consumption level as an approximation of the amount of investment parents make is a shortcut that avoids having an impossibly large state space. If one allows parents make an investment decision on children, one has to know not only the types of parent's new couples but also the complete marital connections of these new partners — see Laitner (1991) for a discussion.

If a divorced woman has sole custody, a is equal to 1 and her children spend all their time with her, τ_1 equals 1. However, if she has shared custody with the father, the education of her children depends on the ex-husband's type, $\widetilde{z}$ and if he has remarried, on the type of the new wife, $\widetilde{x}$. Mothers care about the education that their children receive. The education production function depends on k and the education, e. Women also care about consumption, c. There are economies of scale in consumption in the sense that as a household grows, more resources are needed but the need is less than proportionate.

The value of being non-married when old for a woman is given by

$$G_2\left(x, a, k, (\widetilde{x}, \widetilde{z})\right) = \frac{1}{(1-\sigma)} c^{1-\sigma} + \tau_a \phi \ln\left(E\right),$$

where consumption is

$$c = \frac{1}{(1+\epsilon_1 k)^{\epsilon_2}} x, \quad 0 < \epsilon_1 < 1, \quad 0 < \epsilon_2 < 1,$$

and quality-quantity composite for children, E, is given by

$$E = e^\lambda k^{1-\lambda}.$$

Note that parameters ϵ_1 and ϵ_2 determine the economies of scale and the parameter λ is the weight of education (quality) in the quality-quantity composite for children. The education that children receive is a weighted sum of the households' consumption levels where the children lives, and is given by,

$$e = \left(\tau_a x + (1 - \tau_a)\left(\widetilde{x} + \widetilde{z}\right)\psi_a\right),$$

where τ_a is the weight given to the mother's consumption and $(1 - \tau_a)$ is the weight given to the father's consumption. These weights are the same as the share of time the child spends on each of the parents' household. The indicator function ψ_a takes the value of 1 if there is joint custody and so the father's consumption becomes of relevance, else it takes the value of zero and only the mother's consumption is important for the children education,

$$\psi_a = \begin{cases} 1 & \text{if } a = 2 \\ 0 & \text{if } a = 0, 1. \end{cases}$$

The value of being an old never married or widowed man depends on his productivity type. He has no children from previous relationship so he only cares about consumption. However, if he is divorced, he will care about his children depending on the custody arrangements. If he agreed to giving sole custody to the mother, he will not care about the children. However, if he

shares custody with his ex-wife he will care about his children. As the education of the children will also depend on the mother's household, both the type of the mother, $\widetilde{x}$ and the type of the ex-wife's potential new partner, $\widetilde{z}$ are state variables.

The value of being non-married (single, divorced, widower) for an old man is given by

$$B_2\left(z, a, k, (\widetilde{x}, \widetilde{z})\right) = \frac{1}{(1-\sigma)} c^{1-\sigma} + (1-\tau_a)\,\psi_a \phi \ln(E)$$

where consumption is

$$c = \frac{1}{(1+\epsilon_1 k)^{\epsilon_2}} z$$

and the education production function is as follows

$$E = e^\lambda k^{1-\lambda}$$

where e is given by

$$e = \left((1-\tau_a)\, z\psi_a + \tau_a\left(\widetilde{x}+\widetilde{z}\right)\psi_a\right).$$

The old man only cares about the children in case of joint custody. This is the case when the indicator function ψ_a takes the value of 1.

The value of being married when old depends on the age composition of the couple and on whether the couple is newly formed or not. Let $M_{i,j}^n$ denote the value of a newly formed marriage among a woman of age $i \in \{1,2\}$ and a man of age $j \in \{1,2\}$. Age 1 corresponds to being young and age 2 corresponds to being old. Let the value of a newly formed marriage among a woman of age i and a man of age j for a woman be $W_{i,j}^n$ and for a man $H_{i,j}^n$. Similarly let $M_{i,j}^o$ denote the value of an old marriage among a woman of age i and a man of age j and $W_{i,j}^o$ and $H_{i,j}^o$ the value of the marriage for a woman and a man respectively.

The value of a newly formed marriage among old individuals depends on the type of the woman, x and the type of the man, z as well as the match quality they drew at the beginning of the period. It also depends on the children that the woman brings to the marriage, k_w and her child custody arrangements, a_w. It might also depend on the children of the husband, k_h and his child custody arrangements, a_h. If the woman has joint custody, the type of her ex-husband and his potential partner, $(\widetilde{x}_w, \widetilde{z}_w)$ are of relevance. If the man has joint custody, the value of the new marriage will also depend on the type of his ex-wife and his potential partner, $(\widetilde{x}_h, \widetilde{x}_h)$. Having non biological children in the household is costly for the non-biological parent. As all women have two children, the man has to pay a cost φ. The woman will have to pay this same

cost only if the man has joint custody. The couple cares about consumption, their own children, the match quality, γ and they pay a fixed cost for their non-biological children.

The value of a newly formed marriage for an old woman is given by

$$W_{2,2}^n \left(x, z, a_w, a_h, k_w, k_h, (\widetilde{x}_w, \widetilde{z}_w), (\widetilde{x}_h, \widetilde{x}_h), \gamma \right) =$$
$$\frac{1}{(1-\sigma)} c^{1-\sigma} + \gamma + \left[\tau_{a_w} \phi \ln (E_w) - \varphi \psi_{a_h} \right]$$

and for an old man it is equal to

$$H_{2,2}^n \left(x, z, a_w, a_h, k_w, k_h, (\widetilde{x}_w, \widetilde{z}_w), (\widetilde{x}_h, \widetilde{x}_h), \gamma \right) =$$
$$\frac{1}{(1-\sigma)} c^{1-\sigma} + \gamma + \left[(1 - \tau_{a_h}) \phi \ln (E_h) - \varphi \right].$$

Consumption is given by

$$c = \frac{1}{(2 + \epsilon_1 k)^{\epsilon_2}} (x + z)$$

where the total number of children in the household, k is equal to the sum of the children brought by the wife and the children brought by the husband,

$$k = k_w + \psi_{a_h} k_h.$$

The education production function of the woman's children is given by

$$E_w = e_w^\lambda k_w^{1-\lambda}$$

where the education that the woman's children get depends on the household's income, $(x + z)$ and if she has joint custody, on the ex-husband's income $(\widetilde{x} + \widetilde{z})$ according to the time the child spends on the mother's and the father's household, τ_{a_w} and $(1 - \tau_{a_w})$ respectively,

$$e_w = \left(\tau_{a_w} (x + z) + (1 - \tau_{a_w}) (\widetilde{x}_w + \widetilde{z}_w) \psi_{a_w} \right).$$

Similarly for the education of the man's children,

$$E_h = e_h^\lambda k_h^{1-\lambda},$$

where the education that they receive depends on the father's household income $(x + z)$ and the ex-wife's household, $(\widetilde{x} + \widetilde{z})$, if he has shared custody, where $(1 - \tau_{a_h})$ is the share of the man's household income that affects his children education as well as the share of time they spend with him, i.e.

$$e_h = \left((1 - \tau_{a_h}) (x + z) \psi_{a_h} + \tau_{ah} (\widetilde{x}_h + \widetilde{z}_h) \psi_{a_h} \right).$$

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Finally, the indicator function ψ_{a_w} takes the value of 1 if the woman has joint custody,

$$\psi_{a_w} = \begin{cases} 1 & \text{if } a_w = 2 \\ \\ 0 & \text{if } a_w = 0, 1 \end{cases},$$

and the indicator function ψ_{a_h} takes the value of 1 if the man has joint custody, else, he will not care about his previous children,

$$\psi_{a_h} = \begin{cases} 1 & \text{if } a_h = 2 \\ \\ 0 & \text{if } a_h = 0, 1. \end{cases}.$$

A woman and a man will only marry if they both agree to do so. An old woman will only agree to marry an old man if the value as a wife is at least as high and that of remaining single. And the same goes for the old man. Let $I_{2,2}^n$ and $J_{2,2}^n$ be indicators functions for the woman and the man decisions, that take the value of 1 if they would prefer to marry. Therefore, for the woman

$$I_{2,2}^n = \begin{cases} 1 & \text{if } W_{2,2}^n\left(.\right) \geq G_2\left(.\right) \\ \\ 0 & \text{otherwise,} \end{cases}$$

and for the man

$$J_{2,2}^n = \begin{cases} 1 & \text{if } H_{2,2}^n\left(.\right) \geq B_2\left(.\right) \\ \\ 0 & \text{otherwise.} \end{cases}$$

If the couple married when both of them were young and they remain married when old, the value the couple enjoys is similar to that of a newly formed old couple, but all the children in the household are the biological children of the couple. Therefore, the education that children receive depends on the household's consumption level and there is no penalty for raising someone else's children. The value of a continuing couple for a woman is the following

$$W_{2,2}^o\left(x, z, k, \gamma\right) = \frac{1}{\left(1 - \sigma\right)} c^{1-\sigma} + \gamma + \phi \ln\left(E\right),$$

and for the man

$$H_{2,2}^o\left(x, z, k, \gamma\right) = \frac{1}{\left(1 - \sigma\right)} c^{1-\sigma} + \gamma + \phi \ln\left(E\right),$$

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where consumption is given by

$$c = \frac{1}{(2 + \epsilon_1 k)^{\epsilon_2}} (x + z),$$

and the education production function is

$$E = e^{\lambda} k^{1-\lambda},$$

where the education of the children, e now only depends on the household's income

$$e = (x + z).$$

In order to decide whether they wanted to remain married to each other, they have to compare the value of remaining married to the expected value of divorcing. This expected value will be introduced later on in the problem of young individuals. Let $I_{2,2}^o$ be an indicator function taking the value of 1 if an old woman's value of marriage, $W_{2,2}^o (x, z, k, \gamma)$ is at least as high as her expected value of divorce. For the man, the indicator function $J_{2,2}^o$ equals 1 if his value as a husband $H_{2,2}^o (x, z, k, \gamma)$ is at least as large as his expected value of divorce.

If a young man marries an old woman, he cannot have children while he is young, so he gets no utility from children. Moreover, he has a utility cost for raising the children that his wife brings into the marriage. The value of the couple will depend on the custody arrangements of the woman, a_w. If she has joint custody, the type of her ex-husband and his potential partner's type, $(\widetilde{x}_w, \widetilde{z}_w)$ affect the value of the couple through their effect on the education of the woman's children. The couple enjoys consumption and their match quality. The value of the marriage for a woman is

$$W_{2,1}^n (x, z, a_w, k_w, 0, (\widetilde{x}_w, \widetilde{z}_w), \gamma) = \frac{1}{(1 - \sigma)} c^{1-\sigma} + \gamma + [\tau_{a_w} \phi \ln (E_w)]$$

while for a man it is given by

$$H_{2,1}^n (x, z, a_w, k_w, 0, (\widetilde{x}_w, \widetilde{z}_w), \gamma) = \frac{1}{(1 - \sigma)} c^{1-\sigma} + \gamma - \varphi$$

$$+\beta p \int_{\gamma', \Omega_2} \left[\max \left\{ B_2 (z), H_{2,2}^n (x', z, a_w, k_w, 0, (\widetilde{x}_w, \widetilde{z}_w) I_{2,2}^n, \gamma') I_{2,2}^n \right\} \right]$$

$$d\Omega_2 (x', a_w, k_w (\widetilde{x}_w, \widetilde{z}_w)) \, d\Gamma (\gamma') +$$

$$+\beta (1 - p) \int_{\gamma', \Omega_1} \left[\max \left\{ B_2 (z), H_{1,2}^n (x', z, \gamma') I_{1,2}^n \right\} \right] d\Omega_1 (x') \, d\Gamma (\gamma')]$$

where consumption is

$$c = \frac{1}{(2 + \epsilon_1 k_w)^{\epsilon_2}} (x + z)$$

and the education production function

$$E_w = \left(\tau_{a_w} (x + z) + (1 - \tau_{a_w}) (\widetilde{x_w} + \widetilde{z_w}) \psi_{a_w} \right)^\lambda k_w^{1-\lambda}.$$

The indicator function ψ_{a_w} takes the value of 1 if the woman has joint custody,

$$\psi_{a_w} = \begin{cases} 1 & \text{if } a_w = 2 \\ \\ 0 & \text{if } a_w = 0, 1. \end{cases}$$

An old woman will marry a young man if her value of being a wife, $W_{2,1}^n(.,.)$ is greater or equal than her value of being single, $G_2(.,.)$. Let $I_{2,1}^n$ equal 1 if this is the case. For the young man, $J_{2,1}^n$ will take the value of 1 if the value of being a husband, $H_{2,1}^n(.,.)$ is at least as large as the value of remaining single, $B_1(.,.)$ which I introduce below.

Note that the young man will have a continuation value for the second period of his life. The old woman dies at the end of her old period and so the young man will enter next period as a widower. He forms expectations about the future marriage market. With probability p, he will meet an old woman from the distribution $\Omega_2(x', a_w, k_w, (\widetilde{x}_w, \widetilde{z}_w))$. This distribution of old non-married women consists of never married women, widows and divorced women. They draw a match quality γ' from the distribution $\Gamma(\gamma)$ and she observes his type and he observes her type, x' and the child custody arrangements, a_w. If he matches with a divorced woman, she might share custody and he can also observe her ex-husband's household income $(\widetilde{x}_w, \widetilde{z}_w)$. If he matches with a divorced woman with sole custody, a widow or a never married woman, he only observes her type and her children. Then he has to decide whether he stays single for the last period of his life with a value $B_2(z)$ or whether he marries and his utility would be $H_{2,2}^n(x', z, a_w, k_w, 0, (\widetilde{x}_w, \widetilde{z}_w), \gamma')$, both defined above. With probability $(1 - p)$ he meets a young woman from the distribution of single young women $\Omega_1(x')$. The couple draws a match quality and observe each others' types. Then, he decides whether to stay single or marry. If he marries, he will get $H_{1,2}^n(x', z, \gamma')$ which is defined below.

If an old man marries a young woman, they will have children. The old man might bring children, k_h into the marriage if he shares the custody with his ex-wife. Then, the ex-wife's household income will affect the man's children education. In this case, the young woman has to pay a fixed cost for raising someone else's children. However, as both the young woman and

the old man are fertile, they have more children and they will both get utility from the children they have in common, denoted by k_c. The value of this marriage for the young woman is

$$
\begin{aligned}
W_{1,2}^n \left(x, z, a_h, 0, k_h, (\widetilde{x}_h, \widetilde{z}_h), \gamma\right) &= \frac{1}{(1-\sigma)} c^{1-\sigma} + \gamma + (\phi \ln(E) - \psi_{a_h} \varphi) \\
&\quad + \beta \int\limits_{\gamma', \Theta_2} \max \left\{ G_2(x, k), W_{2,2}^n \left(x, z', 0, a_h, k_c, k_h, (\widetilde{x}_h', \widetilde{z}_h'), \gamma'\right) J_{2,2}^n \right\}] \\
&\quad \times d\Theta_2 \left(z', a_h, k_h, (\widetilde{x}_h, \widetilde{z}_h)\right) d\Gamma(\gamma') + \beta(1-p) \times \\
&\quad \times \int\limits_{\gamma', \Theta_1} \max \left\{ G_2(x, k), W_{2,1}^n \left(x, z', 1, k_c, \gamma'\right) J_{2,1}^n \right\} d\Gamma(\gamma') d\Theta_1(z')
\end{aligned}
$$

and for the old man

$$
\begin{aligned}
H_{1,2}^n \left(x, z, a_h, 0, k_h, (\widetilde{x}_h, \widetilde{z}_h), \gamma\right) &= \frac{1}{(1-\sigma)} c^{1-\sigma} + \gamma \\
&\quad + \left((1-\tau_{a_h}) \phi \ln(E_h) \psi_{a_h} + \phi \ln(E)\right)
\end{aligned}
$$

where the household's consumption is

$$
c = \frac{1}{(2 + \epsilon_1 k)^{\epsilon_2}} (x + z)
$$

and the total number of children in the household, k is equal to the number of children they have in common, k_c and the number of the husband's children if he has joint custody, k_h

$$
k = k_c + k_h.
$$

The production function of common children and of the husband's children are given by

$$
E = (x + z)^\lambda k_c^{1-\lambda},
$$

and

$$
E_h = \left((1-\tau_{ah})(x+z)\psi_{a_h} + \tau_{ah}(\widetilde{x} + \widetilde{z})\psi_{a_h}\right)^\lambda k_h^{1-\lambda},
$$

respectively.

The young woman will marry the old man if the value of being single is smaller than the value of being a wife, $W_{1,2}^n(.,.)$. The indicator function $I_{1,2}^n$ equals 1 if this happens. And for the old man, let the indicator function $J_{1,2}^n$ equal 1 if the value of being a single old man, $B_2(.,.)$ is smaller than the value of marrying a young woman, $H_{1,2}^n(.,.)$.

A young woman who married an old man will be a widow next period. She will match with a young man from the distribution $\Theta_1(z)$ with probability $(1-p)$. If she matches with a young man of type z' they will draw a match quality γ' from the distribution $\Gamma(\gamma)$. She will decide on whether to remain single and get utility $G_2(x,k)$ or get married again and enjoy the value of a marrying, $W_{2,1}^n(x, z', 1, k_c, \gamma')$. She will match with an old man from the distribution $\Theta_2(z, a_h, k_h, (\widetilde{x}_h, \widetilde{z}_h))$ with probability p. The distribution of old men depends on the type of the men, z and child custody arrangements, a_h. Never married and widowed men will not have children. However, divorced men might have children attached to them if they have joint custody, $a_h = 2$. Then, if the woman meets a divorced man with joint custody, she will observe his type, the children he has and the ex-wife's household income, $(\widetilde{x}_h, \widetilde{z}_h)$. Upon observing this and the match quality, she will decide on whether to stay single with the value of $G_2(x,k)$ or marry where she would enjoy the utility $W_{2,2}^n(x, z', 0, a_h, k_c, k_h, (\widetilde{x}_h', \widetilde{z}_h'), \gamma')$.

2.2 Young Individuals

A young single woman will have 2 children. She will get utility from consumption, the number of children she has and the level of education they have. The value of being a single young woman is

$$
\begin{aligned}
G_1(x) & = \frac{1}{(1-\sigma)} c^{1-\sigma} + \phi \ln(E) + \\
& + \beta p \int_{\gamma', \Theta_2} \left\{ \left[\max \left\{ G_2(x,k), W_{2,2}^n(x, z', 0, a_h, k, k_h, (\widetilde{x}_h, \widetilde{z}_h), \gamma') J_{2,2}^n \right\} \right] \right\} \\
& \times d\Theta_2(z', a_h, k_h, (\widetilde{x}_h, \widetilde{z}_h)) d\Gamma(\gamma') \\
& + \beta(1-p) \int_{,\gamma', \Theta_1} \left[\max \left\{ G_2(x,k), W_{2,1}^n(x, z', 0, k, \gamma') J_{2,1}^n \right\} \right] \right\} \times \\
& \times d\Theta_1(z') d\Gamma(\gamma')
\end{aligned}
$$

where her household consumes all of her income x

$$
c = \frac{1}{(1 + \epsilon_1 k)^{\epsilon_2}} x
$$

and the children's production function depends on the number of children and the education they receive, being λ the share of education in the education production function,

$$
E = x^\lambda k^{1-\lambda}.
$$

where the education e is equal to her income, x.

Next period, with probability p the young woman will be matched to someone from her generation and with probability $(1-p)$, she will match with a young man. The distribution of non-married old men (never married, divorced and widowers) is denoted by $\Theta_2\left(z', a_h, k_h, (\widetilde{x}_h, \widetilde{z}_h)\right)$ with no custodial rights if $a_h = 0, 1$ and with joint custody if $a_h = 2$. While the distribution of young single men is $\Theta_1\left(z'\right)$. They will draw a match quality, γ' and she will have to decide on whether to remain single and enjoy the value of being a single old woman, $G_2\left(x, k\right)$ or she can get married and enjoy the value of being a married old woman married to an old man, $W_{2,2}^n\left(x, z', 0, a_h, k, k_h, (\widetilde{x}_h, \widetilde{z}_h), \gamma'\right)$ or if she matched with a young man her utility will be $W_{2,1}^n\left(x, z', 0, k, \gamma'\right)$.

A single young man only enjoys consumption as he cannot have children. The value of being a single young man

$$
\begin{aligned}
B_1\left(z\right) \;=\;\; & \frac{1}{(1-\sigma)}c^{1-\sigma} + \beta p \int\limits_{\gamma', \Omega_2} \left[\max\left\{B_2\left(z\right), H_{2,2}^n\left(x, z', a_w, k_w, 0, (\widetilde{x}_w, \widetilde{z}_w), \gamma'\right) I_{2,2}^n\right\}\right] \times \\
& \times d\Gamma\left(\gamma'\right) d\Omega_2\left(x', a_w, k_w, (\widetilde{x}_w, \widetilde{z}_w)\right) \\
& + \beta p \int\limits_{\gamma', \Omega_1} \left[\max\left\{B_2\left(z\right), H_{1,2}^n\left(x', z', \gamma'\right) I_{1,2}^n\right\}\right] \times d\Gamma\left(\gamma'\right) d\Omega_1\left(x'\right).
\end{aligned}
$$

Next period he will enter the marriage market where he will match with an old woman with probability p from the distribution $\Omega_2\left(x', a_w, k_w, (\widetilde{x}_w, \widetilde{z}_w)\right)$ and with a young woman with probability $(1-p)$ from the distribution $\Omega_1\left(x'\right)$. The couple will draw a match quality and then he has to decide whether to marry or remain single. If he matches with an old woman, the value of their marriage will depend on her type, the children she brings into the marriage and her child custody arrangements. If she has joint custody, the type of her ex-husband, $\widetilde{z}_w$ and his potential partner's type, $\widetilde{x}_w$ will also affect the value of the marriage through the education of the woman's children. If she has sole custody or she has never married or she is a widow, there are no links with the father of the child, thus his type and marital status are of no relevance.

Finally, I present the value of a married couple formed by a young woman and a young man. The couple decides on child custody arrangements, a in case of divorce. Child custody arrangements will affect the future utility of each individual and how much they care about their children. These arrangements will also affect the marriage market opportunities if they were to divorce. Bringing children into a new marriage is costly for the non biological parent and thus, the options for remarriage are affected by this. The value of a young woman and a young man

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is given by

$$
\begin{aligned}
M_{1,1}\left(x,z,\gamma\right) \;=\; \max_{a}\{ & \frac{1}{(1-\sigma)}c^{1-\sigma} + \phi\ln\left(E\right) + \gamma + \\
& + \int_{\gamma'}\left(\mu\beta[\max\{W^{o}_{2,2}\left(x,z,k,\gamma'\right)J^{o}_{2,2}, W^{d}_{2}\left(x,a,k\right)]\right. \\
& + \left(1-\mu\right)\beta[\max\{H^{o}_{2,2}\left(x,z,k,\gamma'\right)I^{o}_{2,2}, H^{d}_{2}\left(z,a,k\right)\}]\times \\
& \times d\Gamma\left(\gamma'\right))
\end{aligned}
$$

subject to the budget constraint

$$
c = \frac{1}{(2+\epsilon_1 k)^{\epsilon_2}}\left(x+z\right)
$$

and the education production function,

$$
E = \left(x+z\right)^{\lambda}k^{1-\lambda}.
$$

Given the optimal custody decisions, $a^{*}\left(x,z,\gamma\right)$, let the value of being married for a young female male be denoted by $W^{n}_{1,1}\left(x,z,\gamma\right)$ and $H^{n}_{1,1}\left(x,z,\gamma\right)$. Young individuals will only get married if both agree to do so. The young woman will get marry if the value of being single, $G_{1}\left(x\right)$ is smaller than the value of getting married, $W^{n}_{1,1}\left(x,z,\gamma\right)$. The indicator function $I^{n}_{1,1}$ will equal 1 if the young woman wants to marry. For the young man, $J^{n}_{1,1}$ will equal 1 when the value of being single, $B_{1}\left(z\right)$ is smaller than $H^{n}_{1,1}\left(x,z,\gamma\right)$.

At the end of the first period of their lives, they receive a match quality shock and a productivity shock. They have to decide whether to remain married or divorce. If they were to remain married, the wife will get utility $W^{o}_{2,2}\left(x,z,k,\gamma'\right)$ and the man will get $H^{o}_{2,2}\left(x,z,k,\gamma'\right)$. If they divorce, they enter the marriage market at the beginning of the next period and they have the possibility of remarrying. In order to decide whether to remain married or divorced they compare the expected value of staying married to the expected value of divorcing. The woman's expected value of divorcing, $W^{d}_{2}\left(x,a,k\right)$ depends on the distribution of single old men, $\Theta_{2}\left(z'',a_{h},k_{h},(\widetilde{x}_{h},\widetilde{z}_{h})\right)$ she would match to with probability p and the distribution of single men $\Theta_{1}\left(z''\right)$ that she will match to with probability $\left(1-p\right)$. She might match with an old man who has joint custody and so his children and the type of his ex-wife and her partner, $(\widetilde{x}''_{h},\widetilde{z}''_{h})$ will affect the value of the marriage, $W^{n}_{2,2}\left(x,z'',a,a_{h},k,k_{h},(\widetilde{x}_{w},z),(\widetilde{x}''_{h},\widetilde{z}''_{h}),\gamma''\right)$. Her own custody arrangements, a will have an effect on the value of the marriage. If she has joint custody, $a=2$, her ex-husband's type, z and his new partner's if he remarries, $\widetilde{x}_{w}$ will be taken into account. Else,

she can remain single and she will get utility $G_2(x, a, k, (\widetilde{x}'_w, z))$. This utility will also depend on the custody, a. If she matches with a young man, the problem is similar but the young man has no children attached to him, so the value of their marriage will be $W^n_{2,1}(x, z'', a, k, (\widetilde{x}'_w, z), \gamma'')$. The value of divorcing for a young wife is given by

$$
\begin{aligned}
W^d_2(x, a, k) \;=\; & p \int_{\gamma'', \Theta_2} \max\{G_2(x, a, k, (\widetilde{x}_w, z)), \\
& W^n_{2,2}(x, z'', a, a_h, k, k_h, (\widetilde{x}_w, z), (\widetilde{x}''_h, \widetilde{z}''_h), \gamma'')\} \times \\
& \times d\Theta_2(z'', a_h, k_h, (\widetilde{x}_h, \widetilde{z}_h)) \, d\Gamma(\gamma'') \\
& + (1-p) \int_{\gamma'', \Theta_1} \max\{G_2(x, a, k, (\widetilde{x}'_w, z)), W^n_{2,1}(x, z'', a, k, (\widetilde{x}'_w, z), \gamma'')\} \\
& \times d\Theta_1(z'') \, d\Gamma(\gamma'')
\end{aligned}
$$

The problem for the husband is similar. If he matches with an old woman with probability p from the distribution $\Omega_2(x'', a_w, k_w, (\widetilde{x}_w, \widetilde{z}_w))$, the value of their marriage for the man, $H^n_2(x'', z, a_w, a, k_w, k, (\widetilde{x}_w, \widetilde{z}_w), (x, \widetilde{z}'_h), \gamma'')$ will depend on her child custody arrangements, a_w. If she has joint custody, it will also depend on her ex-husband's household income, $(\widetilde{x}_w, \widetilde{z}_w)$. Again, the value of remarriage also depends on the custody arrangements of the man, a. If he has joint custody, $a = 2$, his ex-wife's type, x and her new partner's if she remarries, $\widetilde{z}_h$ will be taken into account. He has to decide whether to marry to this old woman or remain single and get utility $B_2(z, a, k, (x, \widetilde{z}'_h))$. If he matches to a young woman, he will only observe her type x'' and the value of marrying to her will be $H^n_{2,1}(x'', z, a, k, (x, \widetilde{z}'_h), \gamma'')$. The value of divorcing for a young husband is given by

$$
\begin{aligned}
H^d_2(z, a, k) \;=\; & p \int_{\gamma'', \Omega_2} \max\{B_2(z, a, k, (x, \widetilde{z}'_h)), \\
& H^n_2(x'', z, a_w, a, k_w, k, (\widetilde{x}_w, \widetilde{z}_w), (x, \widetilde{z}'_h), \gamma'')\} \times \\
& \times d\Omega_2(x'', a_w, k_w, (\widetilde{x}_w, \widetilde{z}_w)) \, d\Gamma(\gamma'') \\
& + (1-p) \max \int_{\gamma'', \Omega_1} \{B_2(z, a, k, (x, \widetilde{z}'_h)), H^n_{2,1}(x'', z, a, k, (x, \widetilde{z}'_h), \gamma'')\} \\
& \times d\Omega_1(x'') \, d\Gamma(\gamma'').
\end{aligned}
$$

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3 Equilibrium

Given the child custody sharing rule $\{\tau\}$, and a initial distribution of single young women $\Omega_1(x)$ and single young men $\Theta_1(z)$, a stationary equilibrium is a decision rule on child custody arrangement, $a^*(x, z, \gamma)$, and the distributions of singles in the old period $\Omega_2(x, a, k, (\tilde{x}, \tilde{z}))$ and $\Theta_2(z, a, k, (\tilde{x}, \tilde{z}))$ such that

- The child custody rule is the solution to the value functions described above

- The old age distributions $\Omega_2(x, a, k, (\tilde{x}, \tilde{z}))$ and $\Theta_2(z, a, k, (\tilde{x}, \tilde{z}))$ are stationary distributions that are consistent with the decision rules.

- The probability of remarrying for women and men with joint custody is consistent with the decision rules and the stationary distributions of individuals

4 Simulations

I present some simulations to see how the model performs in terms of fitting the data. The following parameters correspond to the benchmark case. There are initial distributions of single young women, $\Omega_1(x)$ and men, $\Theta_1(z)$. I assume a log normal distribution over types. In the benchmark, there are 4 different types of individuals where the type refers to the productivity of the individual.[9] The individual productivities come from a log normal distribution of per hour wages with mean μ_x and standard deviation σ_x for women and mean μ_z and standard deviation σ_z for men. The mean and standard distribution of the initial wage rate comes for the American Community Survey (ACS), 2009. Women's wage rate is distributed with mean $\mu_x = 2.717$ and standard deviation $\sigma_x = 0.717$. For men, the mean μ_z equals 2.983 and the standard deviation σ_z equals 0.729.

There are 7 parameters which will be calibrated so that the model matches several data moments. The first parameter is the utility cost of living with non biological children, φ and it is set to 2. There are two utility parameters. The first utility parameter corresponds to the curvature of the utility function of consumption, σ, and it is set to 0.22. The other utility parameter is the weight of children in the utility function, ϕ, which is set to 1.8. These two parameters, σ and ϕ, and the fixed cost of non biological children, φ play an important role

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[9]The number of grid points is small since solving the model is computationally quite time-consuming.

in matching the share of couples choosing joint custody, the remarriage probability of women and the remarriage probability of men. There are two match qualities, high $\gamma_h = 2$ and low $\gamma_l = -4.5$, and the probability of getting the high match quality is equal to 0.3. One of the key parameters of the model is the probability of matching with someone from the same cohort, p. For the benchmark economy, p is set to be equal to 0.7. These 4 parameters are used to match some of the marriage statistics of the model.

The share of education of children in the children's production function, λ is set to 0.5.[10] The child custody policy parameter τ represents the share of time that the child spends in the mother's household. I take the share of time spent with the mother in case of joint custody to be 0.7 as it is consider joint physical custody if the children spend 30% of the time with the father, see Kelly(1994). The parameters ϵ_1 and ϵ_2 correspond to the economies of scale in consumption, ϵ_1 takes the value of 0.3 which is an intermediate value from the range that Browning (1992) provides and ϵ_2 takes the value of 0.8 which is within the range of values provided by Cutler and Katz (1992). Finally, the weight of the wife in the couples utility is given by μ and it is set to 0.5 and β is the discount factor and it is consistent with a period of 10 years and 4% yearly interest rate.

Table III shows the parameters that are set based on a priori information. Table IV shows the remaining 7 parameter that are calibrated to match 7 data moments. There are further marriage statistics that the model replicates and they are not used to match the model to the data. These are used to check how well the model does in representing the economy.

---

[10]I take this value from Greenwood, Guner and Knowles (2003).

Table III : Parameters based on a prior information

β	discount factor	0.916
μ_x	mean productivity of women	2.717
σ_x	standard deviation of women's productivity	0.717
μ_z	mean productivity of men	2.983
σ_z	standard deviation of men's productivity	0.729
μ	weight of wife in couple's utility	0.5
λ	share of goods in the education function	0.5
ϵ_1	economies of scale	0.8
ϵ_2	economies of scale	0.3
τ	share of time children spend with mother	0.7

Table IV: Parameters for Calibration

Marriage parameters		
γ_h	high match quality	2
γ_l	low match quality	-4.5
$prob\left(\gamma_h\right)$	probability of γ_h	0.4
p	probability of meeting an agent from same cohort	0.6
Utility parameters		
σ	curvature of utility function for consumption	0.18
ϕ	utility weight of children	1.5
φ	fixed cost of non-biological children	2

Given the parameters in Tables III and IV, I introduce the benchmark case and perform some simulations to check how child custody changes when the possibility of having more children with younger women changes. Then, I discuss how the model works.

4.1 The Benchmark case

Table V shows several moments related to the marriage market and the level of joint child custody that are used to calibrate the parameters in my economy. The demographic structure comes from the American Community Survey (ACS), 2009, and the Current Population Survey (CPS), 1995 Marital History Supplement. The data on percentage of divorced by duration of marriage comes from the U.S. Census as reported by Kreider and Ellis (2011). The marital status corresponds to individuals between ages 25 and 47. I consider young women to be between 25 and 34 and old women to be between 35 and 45. As there exists a gap between age at first marriage for women and men, I consider young men to be between 27 and 36 and old men between 37 and 47.[11] I only consider those ages when fertility is the highest.[12]

Table V: Benchmark Economy: Calibrated moment versus data moments

	Data	Model
% Marriage	54.12	64.48
% divorced women	11.3	11.90
% divorced men	9.1	9.78
% Never married	33.36	23.61
Remarriage of women as % of ever divorced,1995	44.10	22.47
Remarriage of men as % of ever divorced,1995	53.09	54.13
% of divorce choosing joint custody	25	26.65

The model does well in replicating the marriage statistics of the U.S. economy. The aggregate numbers for the share of married and never-married population are over estimated and under estimated respectively, while the shares of divorced women and men are very close to the data. The model underestimates the remarriage probability for women but it does well in terms of the remarriage of men. In terms of child custody, the average joint custody in the US is around 25%. The model does a good job in replicating this fact. In the model, around 26% of divorced couples choose to share custody of the children . The model also provides information on other statistics that are not used to match the model to the data which are summarized in Table VI. These

---

[11]The median age gap at first marriage between man and woman is 2.3 years, see Díaz-Gimenez and Giolito, 2008.

[12]The median age for having a child is 25. I f the ages considered are between 20 and 45, the share of individuals in each category is very similar.

statistics are marriages among individuals from the same cohort and marriages from different cohorts, the number of marriages ending in divorce after 10 years (corresponding to one period in the model) and the percentage of divorce men who have children in 2 households. In the data 38% of men have remarried and have children in 2 households while in the model it is close to 23. The model overestimates marriages among young individuals and individuals of different generations as well as the number of marriages ending in divorce while it underestimates the number of marriages among old individuals but on the whole, it does quite well in replicating these statistics.

Table VI: Additional moments not used for calibration

	Data	Model update
Marriage among young	34	40.96
Marriage Young woman-Old man	9	13.35
Marriage Young man-Old woman	5	6.8
Marriage among old	50	38.88
% of marriages ending in divorce, after 10 years	20	25
% of remarried men with children in 2 households	38	22.64

5 Discussion

5.1 Why choose joint custody?

When deciding whether to choose joint or shared custody in case of divorce, couples face a trade off between enjoying the children and affecting their remarriage probability. For women both sole and joint custody imply a cost in terms of their remarriage probabilities. Under both arrangements, the child remains in the mother's household and potential partners will have to pay a fixed cost φ if they marry, thus the child affects negatively the probability of remarriage. In terms of utility, joint custody implies that the utility she receives from the children is lower compared to what she would enjoy them under sole custody. Under sole custody, there is no link between the father and the child. Men do not get any utility from the children as they have no contact and the father does not have to pay any child support. Under joint custody the father gets $(1-\tau)100$ per cent less utility form children than what he got under marriage. Now, children are also present in the father's household and so the father's potential partners would

pay the same fixed cost φ in case of remarriage.

The main advantage of joint custody is the fact that children might receive more education than under sole custody. The education that a child receives depends on both the mother's household income and the father's household income. Women would always prefer sole custody to joint custody if child custody arrangements had no effect on children's education. The importance of the father's income is determined by the share of time the child spends in his household, $(1 - \tau)$. Thus if the ex-husband's income is high relative to the woman's, then joint custody is more likely. This is consistent with evidence presented in Cancian and Meyer (1998). They look at a sample of Wisconsin divorcees with physical custody arrangements and they find, among other things, that shared custody is more likely the higher the proportion of the couple's income is generated by the father. On the other hand, couples where the woman is of relative higher income prefer sole custody. Sharing children's custody implies a utility loss for the mother that is not compensated by the education the child would receive under joint custody.

5.2 Effects of Fecundity Differentials

In order to explore the effect of fecundity differentials on child custody arrangements, I vary the probability of meeting someone young, p. I look at the impact of changing this probability on the fraction of divorced couples choosing joint custody. Men who meet a young woman have the chance of having more children after a divorce. As having children from a previous marriage is costly for the new partner, the chances of marrying if the man has joint custody decrease. Therefore, if it becomes more likely to meet someone young, men will prefer not to have joint custody. In Table VII, I report several statistics for the benchmark case and for different values of the probability of matching with someone from the same cohort.

Table VII: Changing probability of meeting own cohort, p

	$p = 0.4$	$p = 0.7$ (benchmark)	$p = 1$
% Marriage	59.23	64.48	61.70
% divorced women	7.91	11.90	23.79
% divorced men	6.44	9.78	24.49
% Never married	32.86	23.61	14.50
% of marriages ending in divorce, after 10 years	49	25.39	44
Remarriage of women as % of ever divorced	45.46	22.47	29.09
Remarriage of men as % of ever divorced	74.16	54.13	24.11
% of divorce choosing joint custody	0	26.65	75.24
Marriage among young	17.32	40.96	54.84
Marriage Young woman-Old man	43.21	13.35	0
Marriage Young man-Old woman	22.01	6.8	0
Marriage among old	17.45	38.88	45.16

First, I decrease the probability of meeting someone from your own cohort, p from 0.7 to 0.4. This implies that the probability of meeting someone from a different generation increases. The share of joint custody decreases from 26% in the benchmark case to around 0%.[13] With a higher probability of meeting someone young when old, men's chances of having more children are higher, thus marriages ending in divorce increase. Of those who divorce, less couples decide to have joint custody as it affects remarriage negatively. Thus remarriage rates increase. Note that marriages among individuals from different generations experiment a large increase. This is due to the fact that the probability of meeting someone of a different generation has increased and so the pool of potential matches consists of more individuals from different generation. Now, I consider the extreme case where you can only meet individuals from your own cohort. Therefore, p is equal to 1. In this case, the share of divorced parents agreeing on joint custody increases to 75%. When there is no possibility of meeting someone to have children with, couples choose shared custody more often. Men would like to keep this bond with children as they get utility from them.

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[13]I have tried with different lower values of p than in the benchmark and the share of custody is lower or equal than in the benchmark case.

5.3 Changing τ

Now, I change the policy parameter, τ. This parameter represents the time that a child spends in the mother's household under joint custody. In the benchmark economy, the time the child spent with the mother was equal to 70% of the total time. Now, I make it such that the time the child spends in each household is equal, therefore, τ equals 0.5. Men have more utility from spending time with their children, thus they would prefer more joint custody. This increase in the share of time that children spend with their fathers has ambiguous effects on women's utility. On the one hand, they would spend less time with their children decreasing their utility. On the other hand, the education that children receive might be higher under joint custody. This has a positive effect on mothers' utility as they value children's education. The decrease in τ leads to an increase in couples choosing joint custody. Thus the positive effect of more education outweighs the loss of time spent together while for men, the more utility acquired through time spent with their children outweighs the lower probability of remarriage imposed by the presence of children in their household. In equilibrium there are more divorces as men's outside option has increased. The remarriage rate of women has increased as the value of remaining divorced has decreased, while the opposite is true for men.

Table VIII: Changing τ

	$\tau= 0.7$ (benchmark)	$\tau= 0.5$
% Marriage	64.48	54.63
% divorced women	11.90	24.59
% divorced men	9.78	29.73
% Never married	23.61	20.79
Remarriage of women as % of ever divorced	22.47	51.62
Remarriage of men as % of ever divorced	54.13	20.57
% of divorce choosing joint custody	26.65	88.83

5.4 Changing φ

The cost of having non-biological children in the household, φ is an important parameter. When φ equals 5, no individual would be willing to marry someone with children. This leads to lower remarriages rates for men and women's remarriage rate remains the same. As the cost of children

is higher, couples do not want to share custody. Thus the share of couples choosing joint custody decreases.[14] When the cost associated with children for non biological parents is set to 0.5, the share of joint custody among divorced couples increases to 73%.

Table IX: Changing φ

	$\varphi= 0.5$	$\varphi= 2$ (benchmark)	$\varphi= 5$
% Marriage	54.07	64.48	55.38
% divorced women	12.27	11.90	18.29
% divorced men	12.55	9.78	16.27
% Never married	33.67	23.61	26.32
Remarriage of women as % of ever divorced	65.06	22.47	22.82
Remarriage of men as % of ever divorced	61.91	54.13	42.46
% of divorce choosing joint custody	72.94	26.65	3.03

5.5 Validity of the Mechanism

The purpose of the paper is to propose a plausible mechanism to account for the relative low take up of joint custody by divorced couples with children. However, I do not claim that fecundity differentials can account for the whole process of deciding on child custody arrangement. The decision is complicated and other factors may play a role in accounting for this as well. I provide some discussion on how the mechanism can be reconciled with observed facts on joint custody.

5.5.1 Variation across States

We observe that the share of divorced couples with joint custody varies significantly across U.S. states. The model mechanism cannot account for this everything else constant. The model generates the observed differences by varying the utility cost of having non biological children in the household, φ. States with higher shares of couples choosing joint custody might have more positive attitudes towards step families, represented by lower values of φ. Under the current calibration, if the cost of having non-biological children in the household approaches zero, the share of divorced couples choosing child custody is around 88%. Therefore, the fecundity mechanism can be thought as a natural limit to the share of couples choosing joint custody.

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[14]Fertility is exogenous in the model. This might change if people are allowed to choose how many children to have and they might decide on having no children.

5.5.2 Effect of Introduction of Joint Custody

Halla (2011) finds that the introduction of joint custody in the U.S. has increased marriages and fertility and slight weak effects on divorce, among other effects. With my model, I can check how the possibility of choosing joint custody affects marriage market dynamics. I look at what happens if joint custody s not allowed with the current parameterization. Table X reports the marriage statistics obtained. My model is consistent with an increase in marriages when joint custody is allowed. However, my model finds a decrease in divorces. If there is no joint custody allowed, men have better chances of marrying a young woman if they are matched with one as they don't impose on them the cost of raising non-biological children. This leads to more divorces. However, divorced men remarry less in equilibrium as they are matched with old women who all have children, thus they prefer not to marry. At the same time, women's remarriage rate goes up as the are more matches and thus marriages with young men due to the fact that there are more divorcees.

Table X: No joint custody allowed

	Benchmark	No joint custody
% Marriage	64.48	59.42
% divorced women	11.90	27.07
% divorced men	9.78	24.74
% Never married	23.61	13.51
% of marriages ending in divorce, after 10 years	25	66.80
Remarriage of women as % of ever divorced	22.47	36.91
Remarriage of men as % of ever divorced	54.13	50.96
% of divorce choosing joint custody	26.65	0

5.5.3 Other mechanisms

I briefly discuss other factors that might favor women when deciding on child custody arrangements.

Women are better at raising children. Another explanation might be that women have a comparative advantage in raising children. Women still are the primary care givers of children, thus upon divorce, they would want to keep the children as they have made a large investment. However, we observe men spending more time with their children, thus this trend should have

changed.[15] Moreover, this behavior might be triggered by fecundity differentials. Siow (1998) proposes that the fact that women invest more time in raising children is an outcome of fecundity differentials. If women know they will not be able to have more children in the future, they will invest in their current children so that in case of divorce they are the ones who keep the child, while men do not see the need of investing on children as they can have more children in the future.

Distribution of marital property. Upon divorce, marital property has to be split between the members of the marriage. In the U.S., there are two types of distribution of property: Common property distribution and Equitable property distribution. Up to the 1970s, the majority of states had Common property distribution, which entitled each member to what they owned prior to the marriage, or fault was to play a role in the division of assets, or some states had explicit "two thirds" rules for property division. By the end of the 1970s the majority of states had moved to an equitable property distribution regime. Marital property is shared in a more equitable way under this regime (Rasul, 2003). If women were to receive a larger share of the marital property in case of sole custody, the share of joint custody should be affected by distributional regimes. Under this regime, women would like to remain sole custodians, however men would like to share custody. Thus, this mechanism has ambiguous effects on the share of joint custody.[16]

6 Conclusion

Even though U.S. child custody law moved towards a gender-neutral law in the mid-70s, still most of the children of divorced couples are under the custody of their mothers. In this paper I ask how biological differences between women and men affect child custody arrangements. I explore how the fact that men are fertile for a longer amount of time than women interacts with the share of divorced couples choosing joint custody. Men have to marry a young fertile woman in order to have children. If a couple decides to divorce, they can remarry next period but their choice of child custody arrangement will affect their remarriage opportunities as non biological

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[15]See Sayer, Bianchi and Robinson (2004).

[16]Several papers have analyzed the effects of different regimes on divorce, marriage and marriage-specific investments such as children and homeownership, Gray, 1998; Rasul, 2003; Stevenson, 2007, among others. However, they do not seem to suggest a link between child custody and a larger share of marital property nor any effect of marital property regimes on child custody.

children are costly. Divorced men can have more children with a young woman, however, this is not an option for the divorced woman as she is not fertile anymore. Thus, they might decide on leaving sole custody to the mother. By changing the probability of meeting young women after a divorce, I check whether the possibility of remarrying a young fertile woman affects child custody. When this probability increases, there is less child custody. Thus, to some degree men prefer to give up their children for a chance of forming a new family. If the probability of meeting a young woman decreases, the share of joint custody increases. Men cannot form new families so they want to be linked to their previous children. Therefore, biological differences in terms of fecundity between women and men might play a role when couples decide on how to allocate children after a divorce. From a public policy perspective it is important to be aware of this as changes in public policy and law aiming at increasing joint custody might not have the desired effects on individuals' decisions.

7   References

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