

Betting the House: The Role of Homeownership in Marital Commitment and Child Investments *

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We develop a model where investments in children are a public good enjoyed by both parents, but disproportionately affect the mother's future earning potential. If a husband cannot commit to not divorce unilaterally, investment will be too low relative to the social optimum. We then show that a legal framework that divides joint assets upon divorce allows husbands to “ante up” the marital home to insure their partner against bad relationship shocks, eliciting more optimal child investments. This, in turn, increases the value of marriage for those able to access this “collateralized” version of the contract. The model predicts that individuals able to buy a home at the time of marriage will invest more in children and have greater household specialization, while policy changes that eroded marriage's relative commitment value would have heterogenous effects by asset-holding, both of which appear to hold in US data.

JEL Codes: D13, J12

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1 Introduction

Despite a global decline in marriage and trend toward non-marital fertility in the US, higher socio-economic groups have persisted in marrying at high rates. Why has marriage retained its attractiveness for some, despite losing it for others? This paper hypothesizes that one role of marriage is to offer a way for couples to share the costs of investments in children, allowing higher levels of investment in this “public good.” However, as divorce has become easier and non-marital contracting more secure, the commitment offered by marriage may be too limited to induce such investment, which comes at the cost of one partner’s income, but benefits both. Importantly, the convergence between marriage and non-marital contracting does not extend to the treatment of assets: only in marriage is the marital home divided upon separation. We thus present a model where homeownership, for those able to access it, solves the incentive problem of child investment by “collateralizing” the marriage contract.

As way of motivation, we first establish that today there is an intimate link between marriage and homeownership. Couples who become married drastically increase their homeownership rates within five quarters of marriage, while homeownership for couples who have children in or out of marriage remains flat. We then describe a policy environment where the legal security of marriage has weakened over time, making the division of joint assets—and the privileged status of homeownership in particular—an increasingly important distinguishing factor between marriage and cohabitation. We also show that the US homeownership rate among young married couples rose at exactly the time that divorce rates were rising. At the same time, the traditional household specialization was collapsing. Today, the rates of specialization differ sharply between married and cohabiting couples for those able to purchase homes, whereas the rates are more similar between married and cohabiting couples without such resources. Together, these facts suggest that current models that ignore the role of assets, particularly homeownership, in the marriage contract may be omitting an important factor.

We thus build a model where relationships face a problem of limited commitment, as individuals are unable to assure their partner they will not want to separate, after costly investments in children have been made. Couples who invest in joint marital property essentially have access to a different, and stronger contract. Through the use of collateral, they can offer some insurance to the investing partner, even when divorce is easy. Our model demonstrates that a joint property provides both a disincentive to divorce for the richer partner and consumption insurance in the case of divorce to the poorer partner. Because of this additional commitment, the poorer partner will be more willing to invest in child human capital at the cost of her own earning potential, thus raising the value of marriage. This is the first model that introduces the possibility of collateralizing the marriage contract in response to imperfect commitment by partners.

Our model is unique in combining partnership selection, investments in child human capital, and divorce decisions with homeownership. In the model, two individuals can decide to either stay single, engage in non-marital fertility, or marry. In the last two cases, the female partner must elect the level of investment she wants to make in children, which can be enjoyed by both partners, at the cost of her own future earning potential. Child human capital is, in essence, a public good, and thus we might expect under-investment since the decision is made privately by the mother. The principal difference between the two relationship types is that marriage allows a “commitment technology” which is linked to the purchase of a home. We assume that in the case of a divorce, homes are divided more equally than income, while in the case of a

separation from cohabitation, no such distinction is made. This alters the marginal cost of investment for the mother—in case of divorce, she will have more than her reduced income to fall back on, and her husband will additionally be disincentivized from divorcing in the first place. This in turn raises her incentive to invest substantially, making marriage more valuable for the couple ex-ante.

The partner who will pay more for divorce is willing to enter into this arrangement because he wants to incentivize higher levels of investment from his spouse, thus receiving more value in expectation. Ex-post, however, he is unable to commit to not divorcing if the situation is not sufficiently desirable. We use an extension to show that these results continue to hold if those who can purchase a home are also wealthier, enabling us to use pre-marital wealth as a proxy for being able to purchase a home in some of our empirical results. We also extend the model to a setting where assets are growing over time and obtain that we may also observe that individuals with more growth potential delay marriage in order to secure higher investment marriages. Those with lower assets choose non-marital fertility early in life, since the returns to waiting are lower for that type of union. Thus, homeownership as collateral may also explain why current trends are leading to simultaneously younger non-marital fertility and later marriages.

This model produces a number of predictions. First, couples who can purchase a home will have more commitment in their relationships, more division of labor, and higher child investments. Second, making divorce unilateral or enforcing non-marital fertility payments decreases the attractiveness of marriage to low asset individuals, but much less so for those with higher assets. We simulate the model to help provide a clearer view of the empirical predictions and find that the magnitudes of the changes seem relevant to historical trends—a seemingly small change in the transfers available to unmarried mothers almost completely erases the value of marriage for low-wealth individuals. Furthermore, most of the impact of marriage on child investment comes from the contract of marriage and not because those who select marriage tend to be higher income individuals.

We test the model’s predictions using a variety of data sources. First, to see if homeownership leads to greater child investment and specialization, we use plausibly exogenous variation in home prices to separate preferences for children from ability to commit through homeownership. Using data from the American Community Surveys (ACS) and Federal Housing Finance Agency, we find that couples faced with idiosyncratically low housing prices in their state and year of marriage are more likely to own a home and, as predicted by the model, have higher levels of household specialization and higher child investments. Couples who are thus quasi-exogenously induced to own homes also divorce less. We find the results extremely robust to a variety of additional checks: they do not appear to be driven by migration or the recent housing crisis, and are robust to focusing on finer MSA-level price variation. To eliminate concerns that correlated economic factors may be driving our results, we utilize the strategy of Palmer (2015) to instrument for housing prices, and find this strengthens our results.

We then examine the model’s predicted impact of policy changes that shrank the contractual difference between marriage and cohabitation, comparing individuals who are able to access homeownership as a substitute commitment device to those who cannot. Because both our stylized facts and theory indicate that marriage and home purchase are a joint decision, we need to use a proxy for being able to purchase a home, rather than homeownership itself. We thus employ measures of asset holding that we argue are likely to allow a man to purchase a property upon marriage. First, we use the Survey of Income and Program Participation (SIPP) data to examine the impact of policies increasing the rights and responsibilities of non-

marital father, in particular, the in-hospital voluntary paternity establishment (IHVPE) program, which has been shown by Rossin-Slater (2016) to decrease marriage. Our results show that indeed, the impact of IHVPE policies is strongly heterogenous by asset-holding, with a positive, significant interaction effect between IHVPE and asset-holding on marriage rates. Similarly, we use the PSID to show that the impact of the phasing in of unilateral divorce laws on the probability of marriage is also heterogenous by asset-holding.¹ The introduction of unilateral divorce has a positive interaction with asset-holding, indicating the ability to purchase a home became a more important determinant of marriage decisions when that contract became less secure.

Our theoretical and empirical findings provide some insight into the relationship between marriage and child investments. The fact that children of married parents receive more investment than those of unmarried parents has been relatively well established (Ginther and Pollak, 2004; McLanahan and Sandefur, 1994). However, it is unclear whether this comes from the fact that parents who care more about their children select more into marriage or whether marriage in itself makes parents invest more in their children. It has also been suggested by Lundberg and Pollak (2015) that marriage has remained valuable for those seeking to invest highly in children, because marriage provides a framework to contract over such long-term investments. Our model suggests, however, that the *ability* to insure such investments for the partner who makes them in the case of marriage dissolution is also a crucial factor. Couples who can purchase a home can provide this insurance, and thus harvest additional value from marriage.

This research thus has implications for the source of the “marriage gap” between socio-economic and racial groups, suggesting that wealth inequality, rather than tastes, could be a potentially important driver. The literature has identified a gradient in the United States by socioeconomic status in rates of marriage versus cohabitation (Lundberg et al., 2016). We document in Lafortune and Low (2017) a link between this gradient and asset-ownership: wealthier people marry more, even accounting for differences in race, education, and income. This is also consistent by findings in sociology literature of a relationship between wealth and marriage (Schneider, 2011). Our research suggests a channel through which this inequality could persist across generations, since those with access to homeownership are able to elicit higher investments in children, which will then lead to higher human capital in the next generation. This also implies that access to mortgage credit affects much more than where people live, but also what kind of partnership they choose and human capital investment in the next generation.

At the same time, it explains in part the central importance of home purchases to American families, particularly married couples as shown by Goodman and Mayer (2018). Housing is a large portion of American wealth: principal residences make up 66% of the wealth held by middle-income Americans (Wolff, 2012). This apparent “over-investment” in one type of asset has been documented previously by Fratantoni (1998) and various theories have been provided to explain this pattern (e.g., Henderson and Ioannides (1983) and Flavin and Yamashita (2002)). Why would Americans choose to invest so heavily in an illiquid asset that suffers large price shocks? Our model implies that the illiquidity may actually be an appealing feature of

¹We do not exploit differences between community property states and those with an equitable division regime since our empirical analysis focuses on family homes. It is unclear how these two regimes would differ in our model. On the one hand, the home may be more likely to be divided evenly in community property states than in the others, leading to houses being a better way of showing commitment in those states. On the other hand, homes are likely to make better commitment devices than other assets in equitable division states, since they are still likely to be shared, while other assets may not be. And, in community property states since all of a couple’s assets will be shared, the family home may be a less crucial commitment device.

homeownership in terms of its ability to secure the marriage contract. Although in the case of divorce the investment in an “at risk” asset may seem suboptimal, *ex ante* it provides value by reducing the cost of investments that benefit both spouses. Thus, the husband prefers to “tie his house to the mast” in order to enter a more binding contract, and thus reap more value from the marriage. This also provides an explanation for the relative rarity of prenuptial contracts in the US (Weiss and Willis, 1993), since the husband *wants* to guarantee division of joint assets such as the marital home.²

While many authors have explored the reasons for declining marriage rates, and accompanying increases in non-marital fertility (Akerlof et al., 1996; Mechoulan, 2011; Duncan and Hoffman, 1990; Rosenzweig, 1999; Nechyba, 2001; Neal, 2004), ours is the first to explore the role of homeownership in substituting for other legal protections. Our work thus also relates to literature on child support enforcement (Aizer and McLanahan, 2005; Tannenbaum, 2015; Rossin-Slater, 2016), but is the first to show it may have differential impacts on individuals with access to homeownership, who may continue to prefer marriage even as the alternative contract is strengthened. Many papers have also examined the impact of increased ease of divorce, including the switch to unilateral consent (Friedberg, 1998; Ananat and Michaels, 2008; Holden and Smock, 1991; Gruber, 2004; Cáceres-Delpiano and Giolito, 2008; Wolfers, 2006; Voena, 2015).³ This legal change has been shown to erode the commitment value of marriage, which women optimally respond to by increasing their human capital accumulation (Bronson, 2014) and labor supply (Stevenson, 2008; Fernandez and Wong, 2011) while decreasing their “marriage-specific capital” (Stevenson, 2007).⁴ Reynoso (2017) suggests that for the same reason it will be linked to an increase in assortative mating. Fernandez and Wong (2017) demonstrates that unilateral consent regimes are more likely to be negative for women from a welfare perspective, as men are more likely to want to break up the marriage, something mirrored in our model. We introduce the idea of homeownership as a key alternative source of commitment in the absence of mutual consent to divorce.

Finally, our paper relates to work on assets as commitment devices. Previous literature has shown the importance of collateral in borrowing contracts, helping to overcome both moral hazard and adverse selection, and thus potentially reducing credit rationing (see Steijvers and Voordeckers (2009) for a summary of literature). However, there has been less focus on the role of collateral in increasing commitment in bilateral contracts, perhaps because in few contracts is there formal legal enforcement of collateral division in case the joint venture dissolves. Our work suggests that contracts that allow for collateral to be placed in a pool for division in case the contract dissolves, as the marriage contract does, could potentially allow for an increase in economic efficiency. Broadly, our model suggests that when individuals are unable to commit perfectly, dynamic inefficiencies arise, as it has been discussed by Mazzocco (2007) and Chiappori and Mazzocco (2017). What is novel is that we suggest the use of housing may diminish these inefficiencies. Previously, the role of financial resources in protecting from relationship dissolution has been discussed by Brinig (1990), who examines the role of diamond engagement rings, and Ambrus et al. (2010), who look at

²One may wonder why he does not provide such security through a prenuptial agreement that is punitive toward the husband in case of divorce, but purchasing a home is likely to be more culturally accepted and easier to implement, since it provides other benefits while married. Moreover, if one wished to have such security *without* marriage, it would require extensive, and likely costly, contracting, since the marriage contract specifies the division of resources that are to be created throughout the marriage.

³Mechoulan (2005) summarizes the theoretical approaches to divorce in the literature.

⁴Interestingly, Stevenson (2007) additionally shows no decrease in homeownership on average, which is consistent with our model because homeownership is not so much “marriage-specific capital,” but rather partially a commitment device that will be sought by those who contract marriage, even with easier divorce.

the role of bride prices in Bangladesh.

There is more limited literature on the topic of homeownership and marriage. Farnham et al. (2011) show that higher house prices makes marriages less stable, while Lagomarsino et al. (2017) show that a lottery that provides homes counterintuitively increases reported domestic violence. Wei and Zhang (2011) and Wei et al. (2012) document the role of homeownership as a precursor to marriage in China. We contribute to this literature by discussing for the first time how homeownership may serve to “collateralize” the marriage contract, thus increasing the wedge between the attractiveness of marriage and cohabitation for those able to purchase homes.

The rest of this paper is organized as followed. In Section 2, we describe some stylized facts on the marriage-homeownership link and the changing legal environment to justify the addition of housing as a relevant factor in a marriage model. We then develop such a framework in Section 3. The next section presents our empirical strategy and results while the final section concludes.

2 Stylized Facts and Policy Environment

We start by documenting the intimate link between home purchase and marriage. Figure 1 examines homeownership rates quarterly for men aged 21-35 around the time that they marry or have children. Home acquisition rates spike precipitously for those in the period immediately following marriage, going from around 25% homeownership to 50% within six quarters. For a different life event, though, having children, we see no such spike in home acquisition. Rather than acquiring a home to accommodate a growing family, we see that individuals in fact generally have high rates of homeownership *before* having children. When we specifically look at those who have children outside of marriage, non-marital fertility (NMF), we see low rates of homeownership that do not increase after the birth of a child. This is suggestive evidence that the contract of marriage and homeownership are closely intertwined, which our model explains for the first time.

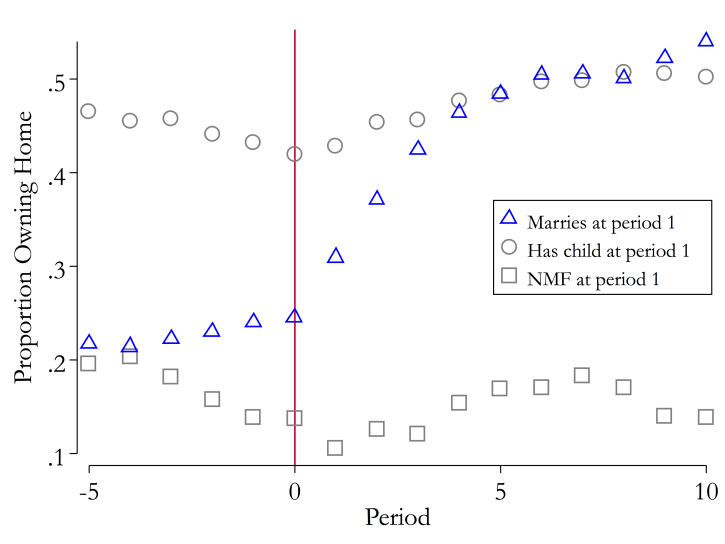
This relationship, we argue, stems partly out of a weakening of the traditional marriage contract, which has left asset (in particular home) division as one of the key distinguishing factors in marriage versus cohabitation. Table 1 shows the evolution of the marriage and cohabitation contracts over time. With the introduction of unilateral divorce in the 1970s and parental rights and responsibilities for non-marital fathers in the 1990s, the marriage and cohabitation contracts became more similar in all regards except for the presumed “jointness” of any assets acquired during the relationship.⁵

Under US law, in cohabitation, assets are owned by whoever acquires them, no matter the duration of the relationship.⁶ The marriage contract, however, stipulates that all assets accumulated during the marriage are *joint* property, because marriage as a legal contract rests on the presumption of division of labor, and thus shared production. Joint assets are to be divided either evenly (in community property states) or

⁵Historically, marriage offered many benefits beyond those available through non-marital fertility, including paternal rights over children as well as legally mandated paternal financial support (Edlund, 2006). Divorce was difficult and extremely rare (Kay, 2000). Starting in the 1960s, divorce rates began to increase, spurred on by state level legal changes that gradually made divorce easier, and created the concept of “no fault” and unilateral divorce (Kay, 2000). Subsequently, enhancement in non-marital rights and responsibilities (as part of the welfare reform in the 1990s) made the income sharing guaranteed through marriage and non-marital fertility highly similar (Mayeri, 2016).

⁶There is also very little “common law marriage” in the United States—only very few states even allow long-term cohabiting couples to petition the court to be treated as married ex-post, and they must present evidence, such as that a wedding ceremony took place.

Figure 1: Association Between Marriage and Home Purchase



Notes: Data uses the 2008 Survey of Income and Program Participation. It restricts the sample to men who enter the first wave without a previous life event (marriage or birth) and for whom we observe such a life event during the subsequent 15 waves. The wave of the event is normalized to 1 and then average homeownership is charted in each wave before and after that point. “NMF” indicates non-marital fertility, which here is individuals who have a child but do not marry over the course of the data.

Table 1: Convergence Between Marriage and Cohabitation Contract

	Pre-1970		Today	
	Marriage	Cohabitation	Marriage	Cohabitation
Bilateral separation required	✓			
Income sharing upon separation	✓		✓	✓
Parental rights for father	✓		✓	✓
Asset division upon separation	✓		✓	

Notes: Assumes cohabitation with children. Unilateral separation from marriage was introduced at the state level in the 1960s and 1970s (see Voena 2015). Parental rights for non-marital fathers and income sharing (child support) was introduced in the 1990s as part of welfare reform (see Rossin-Slater 2016).

“equitably” (Kay, 2000) upon divorce. As one illustration, if a husband is the sole earner, and therefore pays every single mortgage payment on the family home, these payments nonetheless make up a joint asset that will be divided at the time of divorce. And, the division of housing is especially likely to favor the mother. Since child custody is often given to mothers, the family home is also more often allocated to the mother as well (Weitzman, 1981), irrespective of the specific legal regime. The mother may additionally be granted usage rights of the home for some period of time, even if it is to be equitably divided upon sale.

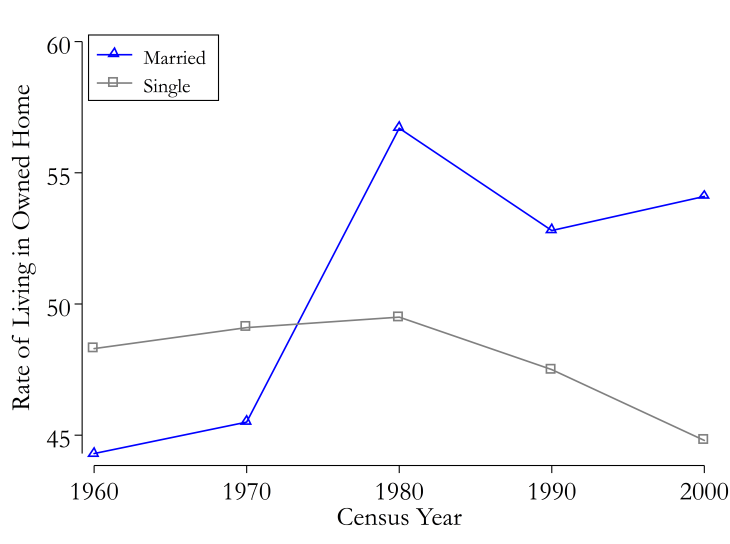
The high rates of assignation of the marital home to mothers as well as the difficulty in hiding or disposing of it prior to official divorce makes homes a particularly important shared asset.⁷ Homeownership plus marriage thus creates a state-contingent contract through which a man can put at stake some resources

⁷Note that this does not mean that cohabiting couples cannot purchase a home jointly, but the equity each puts in remains their own property. Home purchase cannot be used to bind one member of the couple’s resources as joint property. In marriage, even if one spouse pays for every single mortgage payment, the home is still joint property.

in case of a divorce. Alternatives, e.g., divorce insurance, are scant since private markets would be riddled with private information problems.⁸ Moreover, housing has the advantage of offering other useful services, while also being ingrained in US culture—a part of the “American Dream” (Goodman and Mayer, 2018). A quote that has been attributed to various celebrities goes, “Instead of getting married again, I’m going to find a woman I don’t like and just give her a house,” demonstrating the centrality of homeownership to American marriage and divorce “traditions.”⁹

Consistent with the idea that homeownership helps supplement the strength of the marriage contract, data shows that the US home-owning rate by young married couples increased exactly during the period when divorce was being liberalized, and therefore when the need for “collateral” in a now weakened legal contract was heightened. Figure 2 shows the rates of living in an owned home for heads of household who were between 18 and 30 years old, married with spouse present, in the US Census. US homeownership rates for young married couples, increased from 40 percent in 1960 to 54 percent in 1980, at the same time the divorce rate rose. Meanwhile, the ownership rates for singles stayed constant. Moreover, this increase was sharper for states introducing unilateral divorce laws during this period.¹⁰

Figure 2: Rates of living in owned home over time, by marital status, ages 18-30



Notes: Rates of individuals living in a home that is owned (or being purchased) in the US Census from 1960 - 2000. Homeownership is measured for the household head, so not necessarily the individual in question. We include non-heads to ensure that selection between head status is not driving the results.

Why would married couples seek stronger contracts through homeownership? Our intuition is that marriage is particularly valued to induce child investments, which requires one partner to specialize more in home production than the other. Weaker contracts would reduce the degree of insurance that partners obtain. Indeed, the “traditional” division of labor in the household collapsed over the same time period as the

⁸Divorce insurance would suffer from clear adverse selection and moral hazard problems. Joint annuities could be used for this purpose but are also not highly present in the market due to imperfect information issues. Prenuptial agreements are complex and sometimes thrown away by divorce courts, especially when they stray too far from what one is legally entitled to.

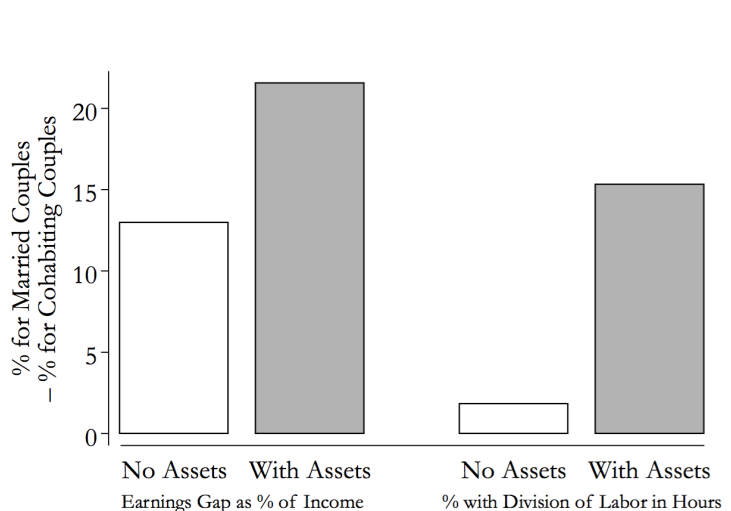
⁹Most reliably attributed to American humorist Lewis Gizzard (Sherrin, 2008), the quote has also been linked to Rod Stewart and Willie Nelson.

¹⁰See Figure A.1, which shows that states implementing unilateral divorce post-1970 have increasing married homeownership relative to states implementing pre-1970.

marriage contract was substantially weakened, and with this change, marriage rates have fallen, indicating its value may be related to the ability to specialize.

We now turn to suggestive evidence of homeownership providing this “specialization insurance.” For couples with assets, and thus the ability to purchase a home, we see a large difference in the degree of household specialization when married compared to cohabiting. We use the 2015 PSID to explore relative earnings and hours for couples who are cohabiting (an official designation in the PSID) versus married. We then compare the differences between married versus cohabiting couples for those with financial assets (indicated by interest income) and those without.¹¹ Figure 3 displays the difference between married and cohabiting couples for two different measures of specialization, for couples with and without assets. We first look at the gap between the male partner and female partner’s earnings, as a percentage of household income. A larger gap indicates more specialization. Married couples have a wider gap between male and female earnings versus cohabiting couples, but this difference is much larger for couples with assets. We then examine the ratio of hours worked between the male and female partner. A couple is defined as having a “traditional” division of labor if the male partner works more than ten hours, and either works more than twice the hours of the female partner or has a female partner who works zero hours. Among couples without assets, married and cohabiting couples show very similar fractions of couples having “traditional patterns.” However, for couples with assets, we see substantially more specialization amongst those who marry versus those who cohabit. This is suggestive of marriage creating a more secure contract, enabling more specialization, when couples have the ability to purchase a home.

Figure 3: Gap Between Married and Cohabiting Couples in Specialization



Notes: Data uses the 2015 Panel Survey of Income Dynamics. Restricted to couples who are either cohabiting or married, where the male partner is between 21 and 44. Having assets is defined as having interest income, reflective of underlying assets. The lefthand side of the graph looks at the earnings gap between the male and female partner as a percentage of total household income. The righthand side looks at couples who have a “traditional division of labor” in hours, defined as the male partner working at least ten hours and the female partner either not working or working less than half as many hours. The height of the bar represents the percentage of each for married couples minus the percentage for cohabiting couples.

¹¹This avoids the strong selection that occurs when looking at couples who choose to purchase homes—in this way, we are splitting the sample by the *ability* to obtain the stronger contract.

These facts motivate a model where the ability to own a home creates a more attractive marriage contract by enabling efficient investments in children: collateralized marriage.

3 Model

We present a standard model of marriage with a public good, children. We initially set up a collective model, where decisions are made Pareto efficiently, but then introduce the fact that individuals cannot commit not to separate or divorce, which leads to inefficient investment in children. We then introduce housing as a “commitment technology” unique to marriage which reduces the inefficient investment problem since it offers insurance to the partner who makes the investment as well as reduces the incentives for divorce for the other partner. We allow for selection into singlehood, marriage, or cohabitation and show that couples’ choices will depend on their capacity to acquire housing since this increases the value of marriage. We then highlight comparative statics that will be explored empirically.

Note that the model assumes a certain gender asymmetry, in that we assume female partners are lower earning, and are therefore the ones to invest in children. Even if partners originally had equal earning potential, this could represent the fact that pregnancy, birth, and breastfeeding all must necessarily be done by the mother, and therefore mothers typically take longer parental leaves than fathers. In line with this, the literature shows that mothers pay a higher price in wages for having a child than their partners (e.g Adda et al., 2017; Kleven et al., 2017; Bronson et al., 2017; Angelov et al., 2016). It is this loss of human capital that represents the cost of children that is unique to women, while the benefits are enjoyed as a public good.

In the model, men share the cost of the public good by dividing their earnings within marriage. Home-ownership further allows them to commit to share resources even in the case the marriage dissolves, through the stipulation in the marriage contract that joint assets be divided. This contract benefits both people, but we show that even if men decided unilaterally, they will be willing to enter such a contract as long as they value child quality sufficiently.

3.1 Collective model with single public good

Individuals live for two periods, and care about child quality and consumption. They can choose to be single or enter one type of relationship r (marriage or cohabitation) and have a child. Utility is linear in child quality, Q_r , and concave in consumption since we wish to capture the impact of uncertainty in the second period. If individuals decide to remain single, each consume their own income and they have no children. If they enter into a relationship, utility for partner k in period t who is in relationship r is of the form $U_{krt} = u(c_{krt}) + Q_r$.

Let Ω_i represent the earnings of the female partner and Ω_j represent the earnings of the male partner. Assume that the distribution of Ω_j stochastically dominates that of Ω_i .

In the first period, individuals select whether to marry, and then select the level of investment to make in any resulting children. We assume that investment must be undertaken by one of the spouses. Because in this model women are assumed to be lower-earning, which is true on average, we assume the mother is the one to invest in children. Investment in children, τ , returns better quality children, which in turn creates utility

gains for parents, but at the cost of time, which could otherwise be used for career investment. As a result, the higher is the level of investment, the higher the child quality, but also the lower the mother's earnings in the second period. Child quality, Q_r , depends on this investment, as well as the parents' endowments. We assume that it is increasing in parental endowment and that the productivity of the investment is also increasing in parental endowments. Consumption will depend on a couple's endowments, the investment level selected, and what is agreed upon regarding the division of resources.

3.1.1 Relationship Dissolution

Utility in the first period is certain, while utility in the second period is subject to a utility shock, ϕ , centered around zero, whose cumulative distribution will be denoted $L(\phi)$. For simplicity, we assume only the male partner experiences this shock. This shock makes individuals reconsider the value of the relationship. Bad shocks may cause individuals to prefer dissolving the relationship, in which case they avoid the shock. Individuals are unable to ex-ante commit to not divorcing.

The incentive problem arises because men and women may not wish to separate under the same circumstances. Since men are wealthier and do not invest in children, the male partner may wish to dissolve the marriage with a higher probability than the woman. We start by thinking about dissolution as bilateral divorce. That means both parties must be happier in the divorced state than in the married state. If men wish to divorce and women do not, under the bilateral policy, men must compensate women in a lump sum payment for their foregone utility. Therefore, marriages will only break up when it is Pareto optimal, i.e., when there are joint gains. If we assume no other benefits to marriage and no costs of divorce, this will be whenever $\phi < 0$. In other words, marriage is functional in the first period, and can be thought of as "recreational" in the second—if the partners get extra utility from being together, the relationship continues; if not, it dissolves. If there are some other benefits of marriage or costs of divorce, this dissolution will happen when $\phi < \bar{\phi} < 0$.

3.1.2 Investment in Children

Parents invest time in children. The amount of investment can represent the decision of both how many children to have and how much parenting time to spend with each child, since each one would decrease the mother's time to make earnings-increasing career investments. The female partner chooses her level of investment to maximize *her own* utility, which is represented by

$$u(c_{1i}(\Omega_i, \Omega_j)) + 2Q_r(\tau, \Omega_i, \Omega_j) + u(c_{2ir}(\widetilde{\Omega}_i, \Omega_j, \tau)) - C_r$$

where $u(c_{2ir}(\widetilde{\Omega}_i, \Omega_j, \tau))$ is the expected second period utility in relationship r , and C_r is the cost of entering relationship r .

Thus, we can represent the decision as:

$$\frac{dQ_r}{d\tau} = -\frac{1}{2} \frac{du(c_{2ir}(\widetilde{\Omega}_i, \Omega_j, \tau))}{d\tau}.$$

Note this condition intuitively simply requires that the marginal benefit of investing in children be equated to the expected marginal cost. Naturally $\frac{\partial Q_r}{\partial \tau} > 0$, child quality is increasing in investment, and both husband and wife enjoy child quality in a non-rival way. Because τ represents a time investment that displaces human capital investments, it reduces the woman's earnings in the second period, and thus expected second period consumption is decreasing in τ .

The optimal level of investment would be achieved when the investment maximizes the sum of the utilities of the spouses. The male spouse's utility is given by:

$$u(c_{1j}(\Omega_i, \Omega_j)) + 2Q_r(\tau, \Omega_i, \Omega_j) + u(c_{2jr}(\widetilde{\Omega}_i, \widetilde{\Omega}_j, \tau)) - C_r$$

which implies that Pareto optimal level of investment would be given by:

$$\frac{dQ_r}{d\tau} = -\frac{1}{4} \left(\frac{du(c_{2ir}(\widetilde{\Omega}_i, \widetilde{\Omega}_j, \tau))}{d\tau} + \frac{du(c_{2jr}(\widetilde{\Omega}_i, \widetilde{\Omega}_j, \tau))}{d\tau} \right).$$

If the female partner consumed only her own earnings, investment in children would be inefficiently low. However, we assume that couples can commit to a sharing rule β that allows a woman to consume a higher fraction of household income than the one represented by her income. Notice this requires commitment, as allocating extra consumption to the wife would be ex-post suboptimal for the husband. To induce the Pareto optimal level of investment, they would need to agree to split household resources (which we will denote by H) in half since in that case, the woman's investment decision:

$$\frac{dQ_r}{d\tau} = -\frac{1}{2} \frac{du(0.5H)}{d\tau} = -\frac{1}{4} \frac{u'(0.5H)dH}{d\tau},$$

would be equivalent to the Pareto optimal case:

$$\frac{dQ_r}{d\tau} = -\frac{1}{4} \left(\frac{u'(0.5H)0.5dH}{d\tau} + \frac{u'(0.5H)0.5dH}{d\tau} \right) = -\frac{1}{4} \frac{u'(0.5H)dH}{d\tau}.$$

This would assume that the couple can commit to a sharing rule both within and outside the marriage, meaning, if a relationship dissolves, the sharing rule is unaltered. Notice that this is possible in the case of bilateral divorce. In that case, for divorce to occur, a woman's utility must be brought up to the same level as within marriage through a transfer from her husband. If not, she will not agree to divorce. Thus, expected second period utility in the case of divorce is the same as the married utility. In other words, the marginal cost of greater τ will be equivalent in the divorced and married state. If the couple agreed to the optimal sharing rule in the first period, bilateral divorce does not alter the efficiency of her decision.

Proposition 1 *Assuming the ability to uphold inter-temporal commitment within marriage, if bilateral consent is required for divorce, investments in children will be efficient.*

Proof. A man will want to divorce when his utility within marriage will be lower than that outside of it. However, to obtain divorce, he will need to offer his wife at least the same utility in divorce as in marriage. She obtains $0.5H$ in marriage and thus, will need to be offered this much in divorce. This implies that a

man will want to divorce when $u(0.5H) + \phi < u(0.5H)$ or when ϕ is below 0. However, from the woman's perspective, divorce is irrelevant since she is guaranteed $0.5H$ in all cases. Thus, her expected consumption becomes simply $0.5H$ and her maximization problem is replicating equation (3.1.2). ■

Note also that since the utility is concave, the marginal cost of investing in τ will be decreasing in H , total household resources. Since we have assumed that the productivity of investing increases in parental endowments, the marginal benefit of the investment will also increase in household resources, implying that τ will be increasing in parental endowments.

3.2 Limited Commitment

We now introduce two possible ways in which relationships could have limited commitment, and derive the result that child investment will be inefficiently low under either scenario.

3.2.1 Unilateral Divorce

We first explore the investment incentives if unilateral divorce is allowed, as is currently the case in most states. In this case, if the man wants to divorce, he does not need to guarantee the same income to his spouse as under marriage. However, his spouse, who will continue to prefer not to divorce, will be willing to re-draft the sharing rule to keep him in the marriage. Divorce will still only occur when the shock reduces the sum of incomes. But if the shock is such that the husband's consumption is lower than what he would obtain when divorced, because he has the "right" to divorce unilaterally, he will need to be compensated to remain within marriage. This will imply that the wife will need to transfer some resources to her spouse within marriage. She will be able to do this until her welfare in marriage is the same as her welfare in divorce, which will be the same point as bilateral divorce, namely when $\phi < 0$ (assuming no other benefits of marriage or cost of divorce).

In divorce, although there may be some income sharing mandated by the court, we assume it will not make up for the full income sharing within marriage. Thus, each partner is more dependent on their own income upon divorce than in marriage.¹² Thus, the cost of her investment in children will be higher when divorced than when married. Higher investment in children, τ , can also increase men's desire for separation, as it makes income sharing with their partner more costly in the second period. Women who invest more will thus need to transfer more resources for them to stay in the relationship in the case of a bad draw. This will occur whenever the utility shock is such that:

$$\phi < \tilde{\phi} = u(c_{2Dj}(\Omega_i, \Omega_j, \tau)) - u(0.5H)$$

where c_{2Dj} represents the consumption level that a man can expect upon divorce.

This will imply that a woman's expected utility will be given by

$$\int_{\tilde{\phi}}^{\infty} u(c_{2Ri}(\Omega_i, \Omega_j, \tau))l(\phi)d\phi + \int_0^{\tilde{\phi}} u(c'_{2Ri}(\Omega_i, \Omega_j, \tau, \phi))l(\phi)d\phi + \int_{-\infty}^0 u(c_{2Di})l(\phi)d\phi$$

¹²This would be linked to the difficulty of obtaining full compensation for the investment in children in court, since such transfers occur for a limited number of periods, whereas the foregone human capital investment affects permanent income.

where c'_{2Ri} , which depends on ϕ , indicates the consumption level that the woman will obtain when she renegotiates the sharing rule.

The woman will invest in children until the benefit of her investment $\frac{\partial Q}{\partial \tau}$ is equal to her expected marginal cost, namely,

$$-\frac{1}{2} \frac{du(c_{2i}(\widetilde{\Omega}_i, \Omega_j, \tau))}{d\tau} < -\frac{1}{4} \frac{u'(0.5H)dH}{d\tau}$$

This implies that her expected marginal cost will be larger than under Pareto optimal conditions. That is because her expected utility will be lower than $0.5H$ since she will have to sacrifice resources either upon divorce or when the utility shock to her husband is such that he wishes to divorce. This will raise her marginal cost by the concavity of the utility function. In addition, because her consumption will be lowered through her investment, in expectation, by a higher fraction than what would be optimal, namely that $\frac{dc_{2i}}{d\tau} < \frac{dH}{d\tau}$, her incentives to invest will also be decreased. Naturally, this will occur in divorce since courts will not compensate her investment in the same manner as when married. It will additionally occur even when she remains married but the couple is hit with a low utility shock, since she will need to transfer resources to her partner and this will require her to receive a lower compensation for her investment.

Because of this, investments in children will be inefficiently low when unilateral divorce is present. Over the range of shocks where both partners prefer to stay married, the cost of investment is equally shared. But over the range of shocks where the husband prefers to divorce, whether the wife is able to compensate him to stay married or not, she bears a disproportionate share of the cost. Thus, her expected marginal cost of investment exceeds her share of the marginal benefit, and she will choose an inefficiently low level of child human capital.¹³

Thus, under unilateral divorce, child investment will be too low compared to the social optimum. This means that if a couple preferred marriage over singlehood under bilateral divorce, their preference for marriage will decrease with the existence of unilateral divorce. This also has another correlate: any force that can increase τ , under unilateral divorce, will also make marriage more attractive, since it will make the investment closer to the social optimum, thus increasing the joint utility of the relationship.

3.2.2 Cohabitation

Couples may also have limited commitment if they choose cohabitation, rather than marriage. In cohabitation, because there are no court-ordered rules about how a relationship can be dissolved, all separation is of this unilateral type. In addition to this and a lower cost of entry, we assume that marriage and non-marital fertility differ only in the consumption levels of partners upon separation. Because the transfer made from the higher earning spouse to the lower earning spouse may be higher in the case of formal marriage than in divorce, a cohabiting man's consumption upon separation may be larger than that of a married man upon divorce, for the same levels of endowments and investments. Symmetrically, we will also assume that a cohabiting woman's consumption upon separation may be lower than that of a married woman upon divorce. This is because courts may be less likely to enforce parental obligations (child support) on cohabiting partners than on divorcees. A policy change that increased the parental obligations of non-marital fathers

¹³A man could sacrifice in marriage more than the efficient level of income so as to incentivize a higher level of investment from his wife. The problem with this is that it would increase his desire for divorce in the second period, thus decreasing her incentives for investment.

would reduce the difference between these transfers.

Because separation will be unilateral in cohabitation, as in marriage with unilateral divorce, investment in children will be inefficiently low. Moreover, because the income sharing upon separation will be lower than in marriage, investment in children will be even lower in cohabitation than in marriage with unilateral divorce.

3.2.3 Partnership selection

We now think about the decision to enter a marriage, with unilateral divorce, compared to remaining single or cohabiting. Individual incentive-compatibility is required for each partner to enter a relationship. However, because the sharing rule in the first period can be adjusted without impacting the level of investment, we assume entry into either cohabitation or marriage will be according to Pareto optimality—the sum of the utilities. Then, if one partner is happy to marry while the other partner is not, an equalizing transfer will be made out of first-period resources.

Since Q_r is increasing in parental endowments and investments, and investments are also increasing in parental endowments, Q_r should be supermodular in Ω_i and Ω_j . Supposing that this is larger than whatever incentives couples have to income share, we should observe assortative matching. Denote the pairing $\Omega_i(\Omega_j)$ as the woman that would be matched with a man whose endowment is given by Ω_j .

Denote $V_S(\Omega_i(\Omega_j), \Omega_j)$, $V_m(\Omega_i(\Omega_j), \Omega_j)$ and $V_c(\Omega_i(\Omega_j), \Omega_j)$ as the expected joint utility a couple with given endowments can achieve. A couple will select the partnership that offers them the highest utility. Factors that will change the utility of one type of partnership may thus affect their optimal choice.

3.3 Home purchase as commitment technology

We now introduce a “commitment technology,” homeownership. This technology is only accessible to those who can purchase a home and can only be used to secure marital relationships. This is because, in many countries including the United States, asset sharing is reserved to marriage contracts and is not mandated in case of separation from cohabitation.

We will thus add to our current framework that men have assets equal to A_j , which can only be consumed in the second period. We assume that only men are endowed with assets.¹⁴ Some men have access to a commitment technology. This technology allows men to commit to share their assets with their wives in the case of divorce (and thus only applies to marital relationships). This division could be equal, as is usually the case in divorce law, but it need not be—any commitment to share assets will produce the effects we outline.¹⁵

¹⁴We focus on male assets because the male partner is the one incentivized to put his assets at risk in order to elicit child investments (since these investments are significantly more costly to women). Men are also more likely to have assets before marriage, since they marry older. Moreover, even the mortgage payments from his earnings during the early years of marriage (when children require high investments, so the mother earns less, and marriage tends to be quite secure) are added to the joint asset, thus creating a gender differential even if none existed initially.

¹⁵In the parametrized version of the model in Appendix B, we specify that this takes the form of adding an additional $\frac{1}{2}A_j$ term to both the husband’s and wife’s consumption in the case of either continued marriage or divorce. For those who do not purchase a home, in the case of continued marriage the $\frac{1}{2}A_j$ remains for both partners, but in the case of divorce the husband consumes the entire asset, and the wife consumes none.

Access to the commitment technology could stand in for marrying in a good housing market or being able to access sufficient credit for a mortgage, such that a small amount of assets can indeed be used to purchase a home. It could also mean having pre-marital assets in order to place a down payment on a home, and thus naturally it may be the case that people with access to this commitment technology might *also* be wealthier. However, for now we assume individuals have equal wealth with or without the technology, to emphasize that our results come through commitment itself. We then extend to the setting where those with the commitment technology are also higher wealth.

We assume that those that do not have access to the commitment technology cannot commit to split assets in the second period when separated or divorced, in which case assets are only consumed by men. The ability of men to keep their assets without the commitment technology, home purchase, can represent the ease of hiding or liquidating assets not embedded in the home, as well as the somewhat different treatment of home versus non-home assets by courts (where in many states other assets may be apportioned more to the earning party). Note, that one could also build in this feature by making assets used to purchase a home divided more equitably than those assets that are not, but we simplify things by having a binary use of assets, and no division without home purchase.

Proposition 2 *Assuming unilateral divorce and thus limited commitment, when a home is purchased, it increases child investment in marriage, increasing division of labor within the household. This makes the marriage more stable and increases its appeal relative to cohabitation.*

Proof. Recall that a woman’s investment decision sets

$$\frac{dQ_r}{d\tau} = -\frac{1}{2} \frac{d\tilde{u}_{2i}^r}{d\tau}.$$

Therefore, anything that reduces the negative impact of investment on the second-period expected utility will increase the woman’s willingness to invest. The commitment technology can do that through 2 channels. First, the addition of an asset payment in the divorced state increases a woman’s expected consumption in the second period. If utility is concave, this will reduce the impact of τ on second period utility in the “bad” state of the world, because the baseline level of consumption is higher, thus reducing the cost of the investment. Second, because the man needs to share his assets in the case of divorce, the obligation to split assets will reduce the man’s desire to divorce relative to the scenario without home purchase, therefore shifting weight toward the “married” state where the cost of τ is shared efficiently between husband and wife. Therefore, the marginal cost of investing in a child is lower when a house is purchased. For married couples, τ will thus be larger when a home is purchased than when it is not since the marginal cost is reduced. Because τ reduces labor participation of women today and future labor earnings in the second period, we should also observe that these couples have a less equal participation in the labor market than those without a home.

This effect is not present for cohabiting couples. Thus, the utility of cohabiting is not influenced by whether or not a home is purchased. However, for married individuals, joint utility is higher when a home is purchased for a few reasons. First, higher τ increases the overall utility, since τ is “too low” for the social optimum. Second, owning a home will lower the probability of renegotiating the marriage contract. Since we know that equal sharing is Pareto optimum, having a higher probability of sharing household resources

equally will raise the benefits of marriage. Third, owning a home will imply that the husband will not be able to extract as much from his spouse when renegotiating the marriage contract, again increasing the joint utility. Fourth, in divorce, resources will be shared more equally, which will increase joint utility. Thus, owning a home will increase the utility of marriage while not affecting that of cohabiting. It will thus increase marriage compared to cohabitation. ■

Proposition 3 *Couples who marry will want to purchase a home. Even if the decision is in the hands of the husband, couples will purchase a home if the husband's valuation of children's quality is sufficiently high.*

Proof. Couples who marry can, by purchasing a home, significantly increase their ex-ante utility by increasing their expected joint utility in the second period. This is because of the same reasons we detailed above since marriage without homeownership is extremely similar to cohabitation.

Even if the decision is only taken by the male partner (abstracting the fact that his partner may not want to marry without a house), the potential loss in expected second period consumption that purchasing a home would imply will be counteracted by a higher child quality via the higher investment that his spouse will make. Thus, a man's desire to purchase a house will depend on the relative value that he puts on child quality vis-a-vis his own consumption. Thus, for a sufficiently high valuation of child quality relative to one's own consumption, there will be some men who will want to purchase a home in the first period. ■

3.3.1 Comparative Statics

In the United States, several changes to the policy environment have made cohabitation more similar to marriage, which Lafortune and Low (2017) argue has eroded the value of marriage. These policies have reduced the commitment value of marriage while raising the commitment possible with non-marital fertility. (Table 1 shows how over time the marriage and cohabitation contracts have become more similar, leaving the division of assets upon separation as a key distinguishing factor.)

With lower commitment, the model predicts women are less willing to invest in children in marriage, which makes the benefits of marriage relative to cohabitation lower. If a couple is able to buy a home, however, marriage may still offer sufficient commitment to offer benefits. Thus, the impact of these legal changes should affect couples who can purchase a home differently from those who cannot.

Proposition 4 *Moving from bi-lateral divorce to unilateral divorce will lower child investment in marriage. It will make marriage less attractive for all, particularly for those who cannot purchase a home.*

Proof. Bilateral divorce guaranteed equal sharing between partners even when divorce occurred. This generated optimal investment in τ . With unilateral divorce, women face more uncertainty and lower incomes in the second period, which leads them to reduce their investment. This fall in investment will be larger for those who do not own a home than those who do since owning a home reduces the probability of less equal sharing as well as reduces the amount of inequality in the sharing rule. Thus, moving from bi-lateral divorce to unilateral divorce will reduce child investment in marriage, particularly for those who do not own a home. This will reduce the attractiveness of marriage ex-ante, again differently depending on homeownership status. In addition to the differential impact on investment, unilateral divorce will also decrease the attractiveness

of marriage because it makes the distribution of resources in the second period less ex-ante optimal since it allows the husband to obtain a larger share of resources when the couple would have a preference for a more equal sharing ex-ante. That second effect is also more relevant for those who are not homeowners than those who are since homeowners are already forced to share some resources equally upon divorce. ■

In the past, one form of commitment offered by marriage was the expectation of income flows from the higher-earning partner upon marital dissolution, which was not offered by non-marital fertility. The movement to formalize non-marital paternity contracts altered this substantially. Once paternity could be established and enforced outside of marriage, even unmarried mothers could expect income transfers in the form of child support in the case a partnership dissolved. Because the division of assets, especially the marital home, continued to be a unique feature of the marriage contract only, this legislation might be expected to have different impacts for couples with sufficient resources to buy a home compared to those without.

Proposition 5 *An increase in paternity enforcement for cohabiting couples will decrease the attractiveness of marriage, particularly for those who cannot purchase a home.*

Proof. Upon separation, a woman who splits from a non-marital relationship is worse off than one who divorces from a marriage. The increase in paternity enforcement rights reduces this gap. It may also make separation less attractive to her partner, who will have greater financial responsibility post separation. Both imply that the marginal cost of investing in a child within a non-marital relationship will fall when paternity enforcement is stronger. This increase in child investments will make non-marital fertility more attractive compared to marriage. However, this will be less so for those who can purchase a home, as they will have a higher investment level in marriage. Thus, cohabitation will become more attractive but more so to those who cannot purchase a home in marriage. ■

3.4 Extension and Simulations

3.4.1 Child quality and divorce

In the model above, child quality is the same within and outside of a relationship. If we assume instead that the enjoyment that parents derive from their children is reduced when divorced or separated, we generate some interesting additional insights.

Formally, let us assume that child quality becomes ηQ , where $\eta < 1$ when a couple is separated. This will reduce the marginal benefits of the investment, both for the mother when she is taking her own private decision, but also for the couple when they determine what would be socially optimal. More importantly, it will now shift the divorce threshold as the husband will be less keen on divorcing than before since he will lose child quality upon divorce. Thus, even with $\phi < 0$, couples will be willing to remain together. Furthermore, the threshold of ϕ that will determine divorce will depend on Q , child quality. This implies that women have an added incentive to invest in their children since, in addition to the factors we highlighted previously, by increasing her investment, she will now reduce the probability of him wanting to re-negotiate the contract or divorce, thus lowering her marginal expected costs.

In this context, if a couple purchases a home, it will increase the incentives for the woman to invest in her children, as we discussed above. Since couples with a house have children with higher child quality, they

will divorce less than those without because this will affect the threshold of ϕ at which couples will find it optimal to separate. We thus obtain the additional theoretical result:

Proposition 6 *If child quality is lower upon divorce, couples who purchase a home will have more stable relationships and less divorce.*

3.4.2 Access to the Commitment Technology Correlated with Wealth

Access to the “commitment technology” of homeownership might be correlated with wealth for two reasons. First, naturally wealthy people will be more able to put a down payment on a home, which is what will allow the second period asset to be “secured” as housing equity. Second, homeownership itself might increase wealth, if home prices rise in value over time. It is therefore of interest whether those with access to homeownership are predicted to invest more in children and marry more if that access also carries with it greater wealth.

Proposition 7 *If the ability to purchase a home depends on the existence of assets or if it increases assets, those who purchase a home will still have higher child investment and will still prefer marriage more often as long as the expected marginal cost of investment is not increasing in assets.*

Proof. If the ability to purchase a home depends on the existence of assets or if it increases assets, we will observe the same type of impact of purchasing a home on investment and on the attractiveness of marriage as we described initially. Those who purchase a home also having more assets will reduce the marginal cost of investment for a woman further since it will make the divorced consumption level even higher. It will also further decrease the probability that her husband will renegotiate the marriage contract since $\tilde{\phi}$ is decreasing in assets. Thus, those who own a home will have higher child investment in this case as well.

This added investment will increase the utility couples receives from marriage. As long as having more assets does not reduce this added benefit, we will thus have that the utility of marriage will be higher for couples with access to the commitment technology in this case as well. Since Q is independent of A , the only interaction will stem from the expected marginal cost. For the added benefit of investment to be increasing in A , we thus need the marginal cost not to be increasing in A . Simultaneously, having more assets will mean that equally sharing resources more often will be more valued by the couple, since a more important fraction of the resources will be legally bound to be divided. Thus, both effects will lead couples who purchase a home to prefer marriage over cohabitation more than those who cannot. ■

3.4.3 Simulations

Given the generality of our model and the fact that if wealth differs between couples, the predictions of the model are a bit more complex, we develop, in Appendix B, a simple example that illustrates that a straightforward utility form can satisfy our assumptions, and provide the predictions above. This example framework allows for those who purchase a home to have higher wealth, since this is likely the empirically relevant case. Thus, throughout we describe those with assets as those who can purchase a home (have access to the technology). In this section, we simulate this example model to illustrate our results more directly, as well as shed additional insights that can be used in the empirical section.

We assume a child quality function where there is complementarity between income, Ω , and investment. This makes higher income couples value child investment more highly, and thus makes Ω the variable determining taste for commitment, and creating heterogeneity in marriage behavior.

We use the function for child human capital $h(\tau) = \tau/(\tau + 4)$. We also assume for simplicity that $\Omega_i = 0.8\Omega_j$ for all couples and that Ω_j are drawn from a uniform distribution between 0.001 and 1. We assume assortative matching.

We then assume that ϕ is also drawn from a uniform $[-0.5, 0.5]$ distribution and that when couples have assets, they have 0.35 units. All couples who have assets purchase a home in marriage. We finally assume that divorced couples share resources such that 30 percent of the man’s income must be given to the woman upon divorce $\delta = 0.3$. We initially set our parameters to the following values:

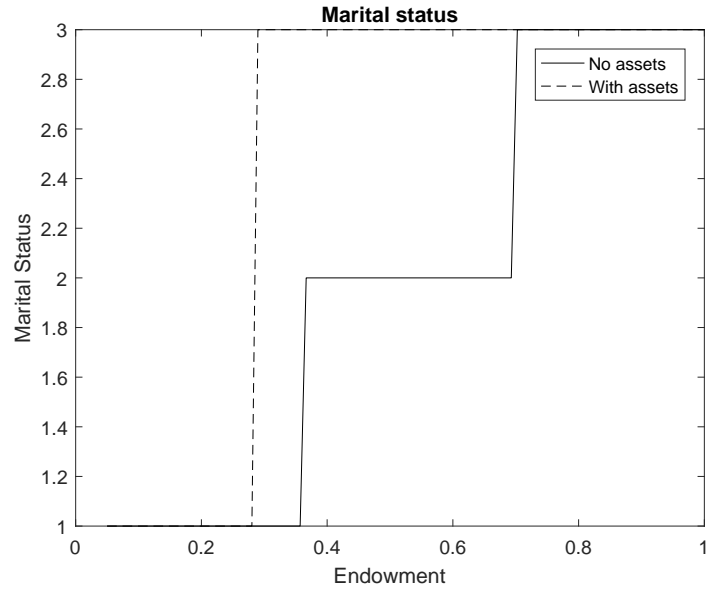
$$\begin{aligned} C_c &= 0.15 \\ C_m &= 0.092 \end{aligned}$$

We solve the optimal τ numerically for each value of Ω_j and A_j using a grid-search with 600 points over the interval $[0,1]$. We first assume that there are no income transfers upon separation from a cohabiting union but there are some from a marital union. Figure 4 shows how, in this context, assets are a determinant of partnership selection, by showing the CDF of selection into a “type 2” partnership—cohabitation—versus “type 3”—marriage. While income is the most important element for explaining these choices, having more assets decreases the attractiveness of non-marital fertility compared to marriage. For those with assets, non-marital fertility disappears at all endowment levels, selecting between singlehood and marriage only (which matches anecdotal evidence). On the other hand, for those with no assets, marriage is only selected in about half of the couples.

We next explore how this translates into differential levels of investments in children. Figure 5 shows child investment by assets and income. We observe that couples with assets invest substantially more in their children than those without assets. This is the case even when the income level allows those who do not own assets to marry. Child investment remains about 20 percent lower than in marriage at that point. Notice as well that many married mothers with assets completely sacrifice their earning potential in the second period by investing fully in their children.

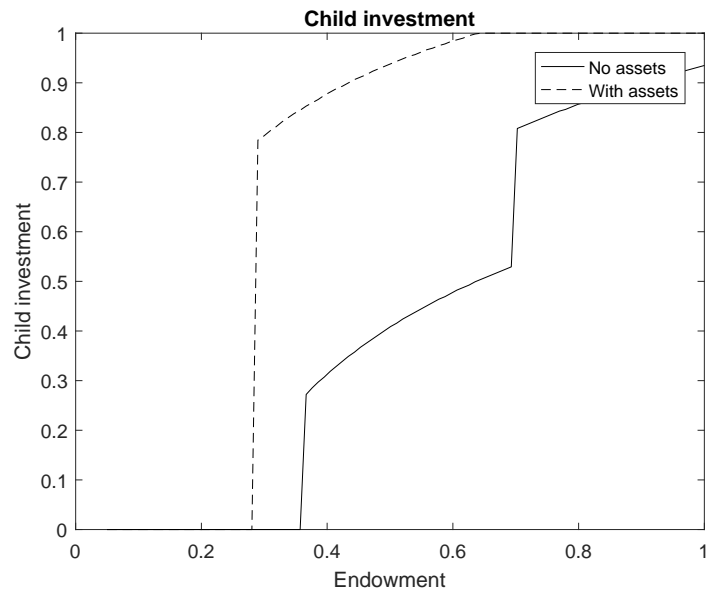
One interesting use of our model is to try to disentangle the role of marriage in child investment into the effect of selection versus marriage *per se*. To do this, we compute the child investment that each couple in our model would have achieved had marriage not been available as an institution. The results are presented in Figure 6. The graph demonstrates that only in marriage do asset holding couples invest more in their children than those who do not hold assets. Given that those with assets enter into cohabitation at lower endowments than those without, we find that those with assets have lower overall investment, conditional on having children. In addition, when cohabiting, those with assets invest less than those without. This is because of our assumption that assets return to the male partner upon separation in cohabitation, thus increasing relationship fragility and through that, the marginal cost of investment. Thus, having assets without the institution of marriage does not generate any benefits for investment in children. Secondly, and

Figure 4: Marital status by assets and income, baseline scenario



Notes: Simulation charts partnership selection by endowment (income) and asset-holding. 1 is singlehood, 2 is non-marital fertility, and 3 is marriage.

Figure 5: Investment levels by assets and income, baseline scenario

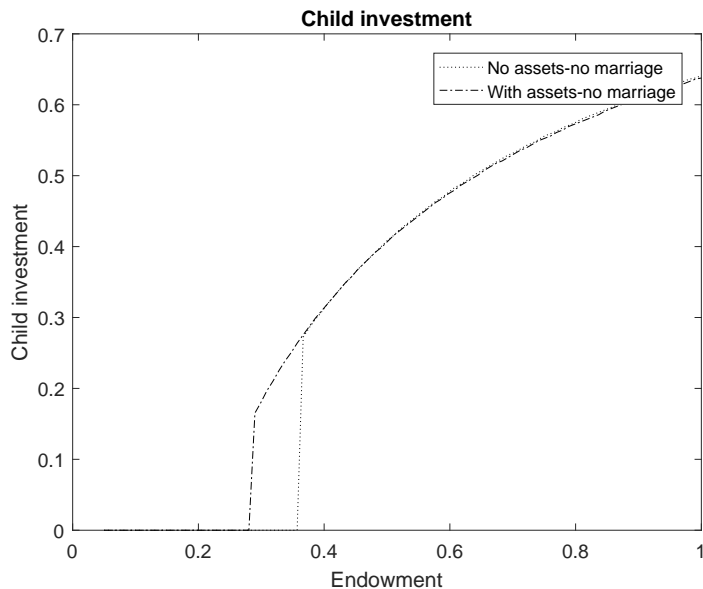


Notes: Simulation charts child investment by endowment (income) and asset-holding.

more importantly, we find that the higher investment levels of married couples that were shown in Figure

5 are almost entirely driven by the institution of marriage instead of by selection into marriage. This is because the investment levels observed in Figure 6 are much lower than those simulated in the actual model with marriage. Thus, our results indicate that it is the contract of marriage per se that is valuable to incentivize the higher level of investment. Contrasting the investment levels that these married individuals would have without marriage to those who elect non-marital fertility would suggest similar or even lower levels of investments for them without that institution existing. Thus, it is not that married couples would always simply invest more in their children irrespective of the contract they face: instead, they invest more *because* of the contract they choose. Furthermore, if we were to account for selection into marriage based on income, we would find that married couples with assets involve individuals who have lower levels of endowments than those who marry without assets. This will make it more difficult for us to find an effect of having assets on child investment, conditional on marriage. Nevertheless, the simulations suggest that the benefits of the marriage contract when combined with assets far outweigh the selection effect of having worse income levels in the pool of married individuals.

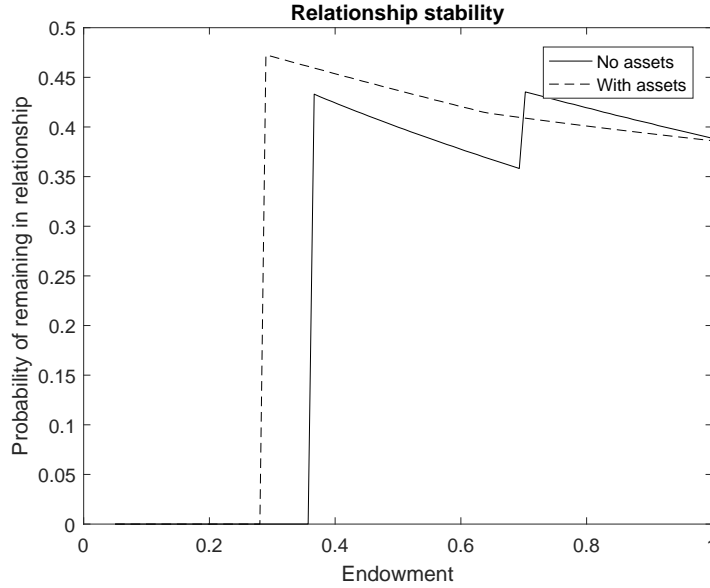
Figure 6: Investment levels by assets and income, without the possibility of marriage



Notes: Simulation charts child investment by endowment (income) and asset-holding, were marriage impossible.

Finally, our last figure shows the probability of maintaining the optimal sharing rule within marriage, again depending on endowments and assets level. We find here that the difference between those with and without assets is less clear than in previous results. This is because the probability of renegotiating the contract is lower for those with assets conditional on the level of investment. However, as we have shown, those with assets invest much more than those without and this, in unilateral divorce, increases the probability of renegotiating (because the lower-earning wife is a “costly burden” in the second period). These two forces go in opposite directions and make the probability of keeping the initial sharing cross in our setting over a small portion of the graph. Nevertheless, conditional on investment level, we observe that couples with assets have a higher probability of maintaining a stable relationship than those who do not.

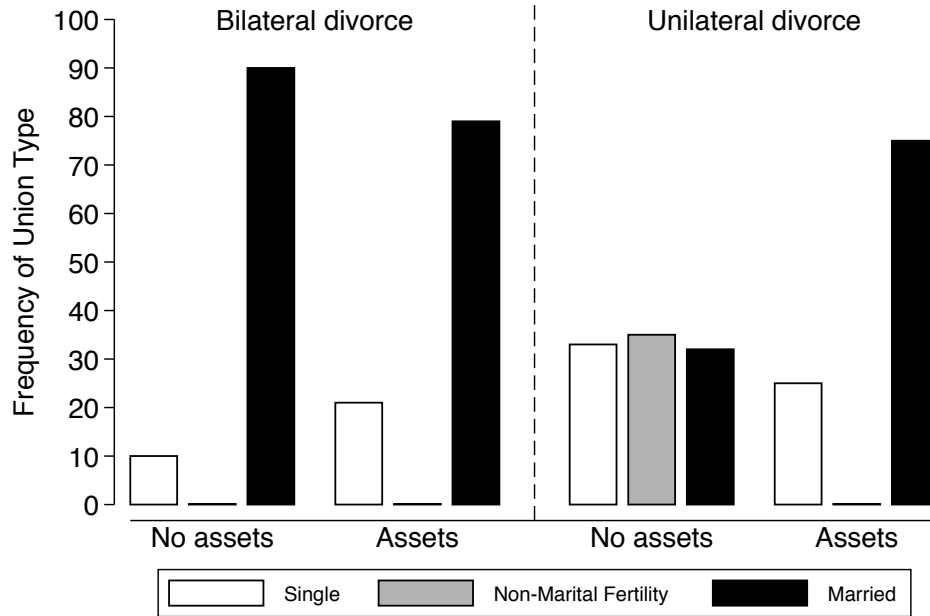
Figure 7: Probability of union stability by assets and income, baseline scenario



Notes: Simulation charts relationship stability by endowment (income) and asset-holding.

We then turn to exploring the comparative statics we presented in the main model. We first look at the impact of unilateral versus bilateral divorce. Figure 8 shows what happens to our baseline results when we make divorce bilateral instead of unilateral. Historical trends suggest a lower importance of assets in predicting marriage when the bilateral divorce regime was in place. Indeed, in the left-hand side of Figure 8, we see that with bilateral divorce, marriage is a dominant contract to non-marital fertility, and so both those with and without assets choose marriage if they wish to enter a partnership. On the right of Figure 8, we see that those with assets prefer marriage even with unilateral divorce, but those without assets substantially substitute for cohabitation, making it an equally prevalent union type as marriage. This implies that the importance of homeownership for commitment has only emerged as unilateral divorce has been introduced, as our stylized facts suggested.

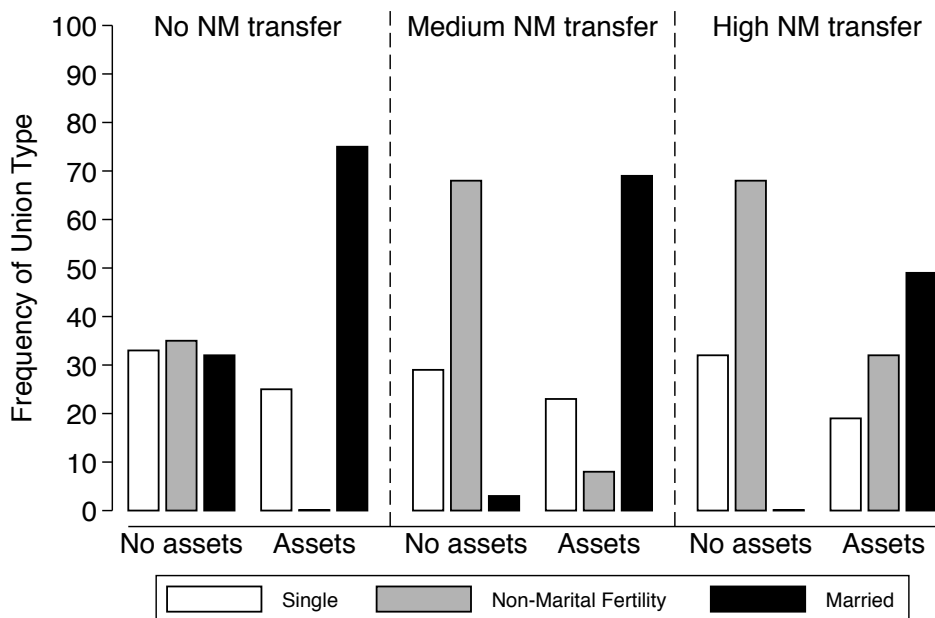
Figure 8: Partnership Selection by Divorce Regime



Notes: Policy simulation of the impact of introducing unilateral divorce by asset level. Height of bar represents the fraction of couples that choose a particular relationship. No non-marital transfer assumed.

Our last exercise examines what happens when we alter γ , which represents the male partner’s financial transfers in the case of non-marital fertility when the partnership dissolves. We contrast three values of transfers from our baseline of none, to 10% and finally to 20% of their endowment being transferred. We assume divorcees transfer 30% of their endowment, so marriage continues to provide more income insurance in case of separation. Figure 9 contrasts the attractiveness of marriage for each value of γ . We find that as cohabitation includes higher post-separation transfers, marriage becomes less attractive compared to non-marital fertility. The difference by asset level is striking: those with assets barely react to the policy change while those without assets strongly respond. By making the post-separation transfer large but still below that of marriage, *no* low asset couples elect to marry while many of those with assets do. This supports our general theoretical model that altering paternity enforcement laws would particularly change marital choices for those whose assets cannot be used to increase the commitment level of the union. The implication is striking—by enforcing the payment of child support outside of marriage, even at a level lower than that in marriage, the value of marriage versus cohabitation is quickly erased for low-wealth individuals.

Figure 9: Partnership Selection by Paternity Enforcement



Notes: Policy simulation of the impact of introducing stronger paternity enforcement by asset level. Height of bar represents the fraction of couples that choose a particular relationship. Unilateral divorce assumed.

3.5 Adding fertility timing

3.5.1 Exogenous asset growth

A potential simplification in our model is that individuals simply decide which arrangements to engage in, not when they do so. We now expand our framework to allow individuals to select when and how they will form a partnership. We show that our previous result that higher asset individuals showed a preference for marriage versus alternative arrangement is only furthered in this case. High asset individuals will choose marriage, but delay it, while lower asset individuals will engage in early non-marital fertility. This matches the fact that there has recently been a crossover in the US between age at first birth and age at first marriage, with people having children younger on average (due to non-marital fertility) despite marrying later (Arroyo et al., 2012).

To explore this, let us imagine now that individuals live for 3 periods. Individuals can either marry or have children without marrying in the first or the second period. They can only have one such event in their life. Children generate benefits for their parents for 2 periods.¹⁶ To proxy for asset growth in our binary setting, we assume that those who marry in period 2 have a higher probability of having a positive level of assets than those who marry in the first period. We will assume that the wage penalty for child investment

¹⁶This is irrelevant for most of the results below.

is for two periods if a woman has a child in the first period.

A woman's utility, in a relationship of type r , who enters in the first period is, similar to before:

$$u(c_{1i}(\Omega_i, \Omega_j)) + 2Q_r(\tau, \Omega_i, \Omega_j) + 2\tilde{u}_{2i}^r(\Omega_i, \Omega_j, \tau, A_{j1}) - C_r$$

except that the "second period" expected utility will now be enjoyed for two periods. If she enters in the relationship in the second period, then her utility is given by

$$\Omega_i + u(c_{1i}(\Omega_i, \Omega_j)) + 2Q_r(\tau, \Omega_i, \Omega_j) + \tilde{u}_{2i}^r(\Omega_i, \Omega_j, \tau, A_{j2}) - C_r.$$

The pay-out to remaining single now becomes:

$$U_i^S = 3\Omega_i$$

$$U_j^S = 3\Omega_j + A_j.$$

As before, the optimal investment level is found at the point where

$$\frac{dQ_r}{d\tau} = -\frac{1}{2} \frac{d\tilde{u}_{2i}^r}{d\tau}$$

when the union begins in the second period while it will be found at:

$$\frac{dQ_r}{d\tau} = -\frac{d\tilde{u}_{2i}^r}{d\tau}$$

when the union begins in the first period. The left-hand side of the equation will be the same no matter when the union is contracted. However, the right-hand side of the equation will differ by timing. Early unions will face a higher cost of the investment since it is born for 2 periods when a child is born in the first period. Furthermore, A_{j2} is more likely to be positive than A_{j1} . This makes non-marital unions less stable but marital relationships more stable. Through that, it influences the level of investment made by each partner. Thus, a delayed marriage is more attractive than an early marriage but a delayed non-marital union may actually be less attractive than an earlier one.

The incentive for forming a relationship young are that one avoids the low payoff from remaining single in the first period and can obtain a higher utility, even if separated. The benefit of delaying is that the investment penalty is paid in only one period, instead of two. The benefits of investment and stability depend on whether the union is a cohabiting one or a marriage.

Proposition 8 *A higher probability of having positive levels of assets in the second period will lead to an increase in the number of late marriages, compared to early non-marital fertility. This will reinforce the difference in child investment between those whose asset holding are larger and those who have lower savings.*

Proof.

For individuals with $A_{j1} = A_{j2} = 0$, timing decisions will be irrelevant of A_j . Individuals will simply pick between marrying or cohabiting depending on their endowments. For couples with $A_{j1} = A_{j2} > 0$,

timing decisions will also be independent of A_j . For those with $A_{j2} > A_{j1} = 0$, assets play a crucial role in the timing decision since delaying will allow the couple to commit much more strongly to the relationship but only in the case they delay marriage. These individuals are thus more likely to switch from cohabitation (and more likely to be from early cohabitation than later since their assets make late cohabitation more fragile) to later marriage. Thus, a higher probability of having positive levels of assets in the second period will lead to more couples wanting to delay marriage as to be able to purchase a property.

We have shown that investments will be smaller in non-marital fertility than in marriages. Since, as the probability of positive A_{j2} increases, marital investments will be even larger in later marriages than in earlier ones, we will see that the investment gap versus non-marital fertility will be widened by later marriage timing, and thus those with higher assets will have even higher relative child investments. ■

3.5.2 Endogenous asset growth

Instead of assuming the probability of having positive assets in the second period to be exogenous, we could instead think that individuals can invest part of their first period income, and that this determines by how much their future assets will grow in the second period. In that case, individuals who form partnerships young will have less incentive to invest in their future assets. This is because they would sacrifice child quality and not acquire more marital stability. This would lead them to have lower levels of assets and thus be more likely to choose non-marital partnerships. On the other hand, individuals who delay fertility would have more incentives to save, which would raise their return to marriage compared to non-marital partnerships and thus those who delay would be more likely to be higher assets individuals, which would lead to higher marriage rates, higher child investments, and lower divorces. Introducing savings into our model, thus, would simply reinforce the pattern we are discussing.

Notably, our model suggests that as the role of homes in collateralizing marriage becomes more important, due to increased divorce risk, the timing would shift away from marrying and then saving for a home toward saving first in order to purchase a home before childbearing. This, again, aligns with the trend toward later first marriage in the US and delayed departure from parental homes.

3.6 Model summary

Our model thus provides a key role for homeownership in marriage that was not considered previously by the literature. In particular, homeownership provides “insurance” to the partner investing in children, by increasing the commitment of the higher-endowment partner to the relationship and providing some guaranteed consumption in the case of marriage dissolution. This allows the female partner to feel “safer” about making higher child investments at the expense of her own earning potential. While most previous models have suggested that marriage may have an advantage for child-rearing, we highlight the fact that, with unilateral divorce, women may fear that marriage will not be as lasting as they had anticipated and thus require some insurance in order to fully invest in children. Thus, the ability to insure investments through asset ownership becomes a key factor in determining the value of marriage. We also show that quantitatively these factors are relevant and that the model can even be used to better understand not only relationship choice but also timing.

Our model provides several intuitive results that align with current marriage patterns and changes over time. We find that conditional on endowment (income), those with access to “collateral” receive more value from marriage. The model also specifies that child investment will be higher in marriage, but this is a consequence of underlying heterogeneity that determines marriage’s value, rather than heterogeneous tastes for investment. Individuals who are more able to purchase homes will have access to the stronger marriage contract, and thus invest more in children. This will lead these couples to adopt more traditional gender roles in the labor markets with women working and earning less. Finally, it will strengthen the marriage contract, which could be construed as a reduced probability of separation. The model additionally predicts that unilateral divorce will increase the importance of access to the commitment technology for determining whether to enter marriage, as will better non-marital contracting.

4 Empirical Results

Having shown that a simple model can explain the correlational relationship between assets and marriage we documented, we now turn to further exploring the predictions of the model empirically using a variety of data sources.

We divide our empirical test of the model’s predictions into two parts. First, we test the model’s key mechanism, by looking at how division of labor and child investment respond to shocks to homeownership driven by housing price variation. Then, we test the model’s policy predictions for how the relationship between marriage rates and assets change with shifts in policies regarding non-marital parental rights and responsibilities as well as US divorce law.

4.1 The link between homeownership and child investment

Our model predicts that homeownership enables greater value from marriage via increasing child investment in marriage, since the investing partner has greater security. Thus, our model predicts that homeownership should have a causal impact on the investment of mothers’ time into child quality. We can measure this in two ways—the direct input of mothers’ time via reduction in work hours, and the number of children and their human capital.

Of course, if we looked at the difference in these outcomes between homeowners and non-homeowners, we might be identifying selection, rather than causality: those that wish to invest more in children might choose to buy homes as one such input. Therefore, we need a source of exogenous variation in homeownership. We therefore use idiosyncratic variation in housing prices at the time of marriage, while controlling for current housing prices. Our hypothesis is that lower housing price at the moment of marriage would make the couple more likely to start their marital life as owners. Clearly, housing prices also influences rental prices, but in periods of “bubbles” the two usually become disjointed, making housing price more likely to affect the appeal of ownership relative to rental.

Our data source is the American Community Survey from 2008-2014. This survey has the advantage of including the age at first marriage, from which we can derive the year in which individuals married. We restrict our sample to households where it is one individual’s first marriage and where the marriage occurred

between 1991 and 2014. We merge this database by year of marriage and state of residence to the Federal Housing Finance Agency’s housing price index (HPI) based on purchase-only data. The data are available at a quarterly frequency and by state, for which we average over all quarters in a year to obtain our annual index. We choose to use state data because individuals are less likely to be able to avoid price shocks at the state-level, since changing state is very costly (compared to changing county if the variation were more highly localized). Importantly, our results are robust to using variation at the MSA level instead, as well as using the state of birth rather than the current state in order to eliminate any possible selection. We also show an alternate strategy using an instrument for housing prices to control for possibly correlated local economic factors.

Importantly, a higher HPI in the year of marriage is expected to lead to *lower* homeownership, and thus lower child investment, per our model’s predictions. For ease of interpretation, we thus regress on the negative of the HPI so that a higher value implies easier access to house purchases.

Our general empirical strategy will consist of estimating the following equation:

$$Y_{ismt} = \beta(-HPI_{sm}) + \eta_s + \nu_m + \delta_t + \gamma X_i + \psi HPI_{st} + \varepsilon_{ismt} \quad (1)$$

where the outcome of interest of a household i , in state s , married in year m and observed in year t is correlated with the household price index that was in place at the time of marriage m in the state where they currently reside s . Given that states may differ in many ways in addition to the evolution of their price index, we include fixed effects for each state. We also include fixed effects for each year of marriage m , to account for other macroeconomic factors and demographic trends at that time, and the survey year t . To rule out that correlation with current housing prices (which may affect these outcomes) drives our effects, we additionally control for the *current* housing price index, which varies by both state and survey year. We include, depending on the specification, some controls such as the age of the married individual, their gender, and their educational attainment.

We initially demonstrate that lower HPI at the time of marriage is indeed linked to higher homeownership. We then examine the hours worked of the parents as a way to see whether investment is altered, as our model directly predicts women who invest more in children will decrease their work investments accordingly. To capture specialization, we look at women’s labor supply relative to men’s, as well as a measure of the “outcome” of their investment choices, wages. Then, to proxy for child investment, we use a measure of the fraction of the children in the household who are in a grade below what their age would suggest. We also measure the number of own children in the household since, while our model supposes that couples have only one child and they are able to increase the quality of that child, it is probably more likely that they may also invest in having more children (which would substantially reduce mothers’ time for career investments). Finally, we examine divorce. Although our model’s predictions about divorce are somewhat ambiguous, they can be interpreted in a less stylized model as separation rates being lower for couples who own homes.

Because our analysis requires us to condition on marriage (because we can only assign a HPI for the year of the marriage if a couple has entered into a marital union), one might worry selection into marriage could affect our results. Our model predicts that access to the commitment technology could affect the choice to marriage in the first place, and housing prices could impact that access. Such selection would actually limit our capacity to find support for our model, since, in periods of lower housing prices, we would then see

“worse” couples enter marriage. This would thus lead to an underestimate of the benefits of lower housing prices for child investment. We document this by running Equation (1) using as an outcome variable the educational attainment of individuals. We find that a lower HPI at the year of marriage is correlated with married couples having fewer years of education, see Table C.1. This provides empirical support that the selection is likely to work against us finding the pattern predicted by our model. The simulations of our model suggest that the effect of the marital institution should dominate the impact of selection, which is in line with our results.

Effect of Housing Prices on Homeownership We first show that our right-hand side variable indeed creates variation in the endogenous variable of interest, homeownership, in Table 2. We divided the price index by 100, implying that a change of 1 in our index corresponds to a decrease of 1 percent in housing prices. The results suggest that an decrease in 1 percent in the housing prices at the time of marriage increases the probability that the household owns a home in later surveys by about 3 percent.

Table 2: Relationship between house price at marriage and homeownership

	Dependent variable: Own Home	
	(1)	(2)
–House Price Index	0.0277*** (0.00543)	0.0324*** (0.00615)
Additional Controls	No	Yes
Observations	3220736	3220736
R-Squared	0.0666	0.124

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, while housing prices in the current year are controlled for. Fixed effects for the year of marriage, current year, and state are included in all specifications. Standard errors are clustered at the state level.

Effect of Housing Prices on Division of Labor Our model suggests that homeownership will enable the female partner to make costly investments in children at less risk, thus leading couples to have a more traditional division of labor within the household. While income effects could create labor supply effects, the key prediction of our model is a very different impact on women’s labor supply, which will be decreased to invest in children, versus men’s labor supply. If we see contrasting effects of HPI on women and men’s labor supplies, it would be difficult to justify this result via housing stock appreciation.

We present these results in Table 3, inserting an interaction term for being female times the house price index to compare women’s working hours to those of men’s. We find that women who faced lower home prices at the time of marriage are less likely to work in the year of the survey relative to men and work fewer hours relative to men. The magnitudes are such that a lower housing price of 1 percent at the time of marriage leads to a 1 percent lower probability of having worked last year for women and to about 0.8-0.9 more hour worked per week.

Importantly, our results show that the labor supply effects of changing house prices go in the opposite direction for men and women for the intensive margin of labor supply. For usual hours worked, the effect

Table 3: Relationship between house prices at marriage and parental labor force participation

	Dependent variable:			
	Worked Last Year (1)	(2)	Usual Hours Worked (3)	(4)
–House Price Index	0.00383 (0.00253)	0.00343 (0.00266)	0.424*** (0.126)	0.409*** (0.117)
–HPI \times female	-0.0134*** (0.00383)	-0.0108*** (0.00355)	-1.335*** (0.258)	-1.186*** (0.249)
Year of Survey FEs	Yes	Yes	Yes	Yes
Additional Controls	No	Yes	No	Yes
Observations	3702212	3702212	3702212	3702212
R-Squared	0.0510	0.100	0.114	0.163

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, while housing prices in the current year are controlled for. Fixed effects for the year of marriage, current year, and state are included in all specifications. Standard errors are clustered at the state level.

of decreased housing prices is positive and significant for men – higher hours – while the interaction effect is negative and significant (and the sum of the coefficients is negative). While income effects from home appreciation could potentially create a stronger labor supply effect for women versus for men, the effect would always go in the same direction. Instead, we see diverging labor supply responses between women and men, indicating that homeownership affects *division* of labor, consistent with our commitment - child investment story.

These results suggest an increase in household specialization when low home prices at the time of marriage increase the ability to purchase a home. In the context of our model, this could be interpreted as marriages being more secure due to the possession of joint marital assets, and thus women having less need to protect their own income through higher labor force participation. This would in turn be tied to higher investments in children, and thus a higher value of marriage overall.

Effect of Housing Prices on Child Outcomes We now turn to measuring child investment more directly. We use two different proxies: whether the child is delayed in school progression and the number of children within the household.

We look at children below age 18 because this makes it more likely that they are the children of the marriage we are examining. The first outcome is only available for households that have children of school age, which implies that our sample size is smaller. Table 4 shows each outcome in two separate columns. The odd columns correspond to our baseline specification; and the even columns add to that additional controls. The table suggests that households that were in a favorable housing market in the year they were married also show some evidence of changes in investment behavior.

In the case of grade retention, we find that couples facing easier housing markets are less likely to see their kids repeat grades. A decrease of 1 percent in the housing price at the time of marriage leads to a decreased probability of having a child who is below the grade for his age by 0.8 percent. This could indicate a higher

Table 4: Relationship between house prices at marriage and child investment

	Grade Retention		Number of Children	
	(1)	(2)	(3)	(4)
–House Price Index	-0.00796*** (0.00233)	-0.00879*** (0.00254)	0.0383* (0.0210)	0.0311 (0.0201)
Additional Controls	No	Yes	No	Yes
Observations	2428234	2428234	3702212	3702212
R-Squared	0.00869	0.0232	0.0936	0.134

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, while housing prices in the current year are controlled for. Fixed effects for the year of marriage, current year, and state as well as year of survey fixed effects are included in all specifications. Standard errors are clustered at the state level.

level of time investment in each child, with children having higher human capital as a result. Parents facing lower housing prices at the time of marriage also have more children, indicating more investment in children. Each child takes more time away from the mother’s career investments, especially because it is the infant and early childhood period that is more time intensive for the mother, and where the investments can least easily be shared between partners. Thus, our model predicts women who are more insured against divorce will increase their investment in children, which can be done through both the number of children and the investment in each one. The magnitude suggests that facing a lower housing price by 1 percent at marriage increases the number of children by 0.03.

Effect of Housing Prices on Relative Wages An implication of the model is that women in more secure relationships will increase their child investments, and therefore experience decreases in their accumulated human capital, leading to decreases in wages. We test this last piece directly in Table 5 by examining the impact of housing-price-induced homeownership on the relative wages of women versus men. We find that lower housing prices are associated with increases in male wage levels, but a negative and significant interaction term for women. The sum of the terms is also negative, indicating that women who married in lower housing price times and areas experienced a decrease in wages.

Note, that although positive income effects may decrease hours, there is no reason they would be expected to increase male wages, or have a differential effect on male and female wages.

These results, together with the child outcomes, provide consistent evidence of the impact of homeownership on τ . Our findings are consistent with evidence that having children decreases women’s wages, while not affecting men’s (e.g Adda et al., 2017; Kleven et al., 2017; Bronson et al., 2017; Angelov et al., 2016), but add evidence that when women experience these declines more when they are in “collateralized” relationships, that provide insurance on their investment. In couples where buying a home was made easier, women’s time is reallocated from career investments toward child investments, yielding better child outcomes, but lower personal human capital accumulation. These results also provide one possible channel for the male marital wage premium—by offering a secure relationship through which gains to division of labor can be captured, men who marry are able to spend less time on home production and more time investing at work, thereby

Table 5: Relationship between house prices at marriage and relative wages

	Dependent variable:			
	Labor earnings (level)		Log hourly wage	
	(1)	(2)	(3)	(4)
–House Price Index	3727.6*** (798.7)	3721.6*** (739.3)	0.0195* (0.00987)	0.0186*** (0.00553)
–HPI \times female	-7859.3*** (992.2)	-7063.3*** (961.9)	-0.0895*** (0.0122)	-0.0666*** (0.0104)
Year of Survey FEs	Yes	Yes	Yes	Yes
Additional Controls	No	Yes	No	Yes
Observations	3702212	3702212	2900523	2900523
R-Squared	0.0756	0.199	0.0729	0.237

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, while housing prices in the current year are controlled for. Fixed effects for the year of marriage, current year, and state are included in all specifications. Standard errors are clustered at the state level.

increasing their wages.

In order to offer some sense of the magnitude of our coefficients, we can do a back-of-the-envelope calculation assuming that lower housing prices at the time of marriage only affect the probability that a household owns a home. This is probably too strong of an assumption but this allows us to put some upper bounds on our effects. If we are willing to make that assumption, we would conclude that being 10 percent more likely to own a home leads to a decrease of 3 percent in the probability of having a child repeat a grade, and increases by 0.1 the number of children in the household. It would lower the probability that the wife works by about 3 percent, increase the usual work hours of men by 1 while decreasing that of women by 2.5 hours. In other words, if a household goes from not owning a home to owning a home (in this calculation), male labor increases by 10 hours and female labor decreases by 25 hours, consistent with the story that owning a home will lead to a significant increase in division of labor.

Robustness We now show that our results are robust to a variety of checks. Our main analysis uses state level variation in housing prices because mobility between states based on housing markets is less likely than mobility between metro areas. To check that our results hold with finer variation, in Appendix Table C.2 we use MSA-level HPI variation instead, and restrict our sample to MSAs only. Lower housing prices are associated with lower probability of grade retention and more children, although that result is no longer statistically significantly different from 0. We also find similar patterns for labor specialization with lower housing prices leading to more traditional gender roles. Thus, our results do not seem to be driven by the fact that we employ a geographic level that, in some cases, may include very different housing markets.

Even across states, one may worry that the state of residence is endogenous to the housing price index and that individuals who wish to marry, for example, locate in a state that has a lower price index. This should, as with the selection story, bias results against our hypothesis, but we are still cautious about migration. In Appendix Table C.3, we use the state of birth as the unit of analysis instead of the state of actual residence.

We find extremely similar patterns in all outcomes. Our results for child investments are almost identical for grade retention and for number of children. Our results for work specialization are even stronger and more significant. This leads us to believe that selective migration is unlikely to explain the patterns we find above.

One could also worry that our results are in part driven by the housing collapse of the Great Recession. We exclude marriages contracted between 2008 and 2011 and find extremely similar results. Those are presented in Appendix Table C.4. We find similar results as for our main sample, suggesting that the variation we exploit goes well beyond that of the Great Recession.

We finally include year of marriage interacted with Census region dummies to try to capture any sort of cultural differences that could be impacting our result. This is extremely demanding on our empirical strategy because it reduces the analysis to within-region between states variation. Nevertheless, as shown in Appendix Table C.5, we find that the magnitudes of the coefficients are barely affected by the introduction of the additional controls. Our standard errors are weakened but the results for labor division remain very robust to this addition.

Finally, one could also be worried that the house price index is endogenous to demand conditions in the local housing market which would influence decisions at the moment of the marriage, or otherwise linked to economic conditions. We thus repeat our analysis instrumenting for housing price indexes using a strategy based on Palmer (2015). A detailed description of our approach can be found in Appendix D, where we show in the first column of Table D.7 that the instrumented HPI indeed predicts homeownership just as strongly as the non-instrumented version.

Table 6's first panel repeats the analysis for labor force participation of men and women with the instrumented housing price index. It shows that the asymmetric reaction of men and women to the change in the housing price remains even once we instrument the house price index. We continue to find that a favorable housing market at the moment of the marriage increases the traditional division of labor between spouses. In response to an exogenously cheap housing market, females work less while men work more. The coefficient for males is insignificant for the extensive margin but strongly positive for the intensive margin on hours, while the interaction for being female is always negative and significant.

The second panel indicates that when a couple faces an exogenously easier housing market at the moment of marriage, they are less likely to have children in the household who experienced grade retention and also to have more children. This confirms the results we observed when the housing price index's endogeneity was not necessarily controlled for. The magnitudes are larger suggesting that unobserved economic conditions correlated with low housing prices were likely to negatively impact our child quality outcomes, as one might expect, since prices rise when the economy is performing well.

We also show in the last two columns of Appendix Table D.7 that the results for wage hold with the IV strategy.

Effect of Housing Prices on Divorce Finally, we examine the impact on divorce. In our baseline model, divorce is unaffected but, conditional on marriage, access to home purchase reduces the probability of renegotiating the marriage contract. We could conceive that more renegotiation would lead to higher divorces in a more complex setting. When we allow for child quality to be experienced differently by parents

Table 6: Relationship between house prices at marriage and child investment and division of labor: Instrumented

	Dependent variable:			
	Worked Last Year		Usual Hours Worked	
	(1)	(2)	(3)	(4)
-House Price Index	0.00131 (0.00269)	-0.0000502 (0.00239)	0.349** (0.160)	0.282** (0.139)
$-\widehat{\text{HPI}} \times \text{female}$	-0.0134*** (0.00383)	-0.0108*** (0.00355)	-1.334*** (0.258)	-1.185*** (0.248)
Additional Controls	No	Yes	No	Yes
Observations	3702212	3702212	3702212	3702212
	Grade Retention		Number of Children	
	(1)	(2)	(3)	(4)
-House Price Index	-0.0275*** (0.00782)	-0.0306*** (0.00851)	0.228** (0.106)	0.191* (0.105)
Additional Controls	No	Yes	No	Yes
Observations	2145451	2145451	3330278	3330278

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, instrumented for by state-level housing amplitude using the methodology of Palmer (2015), while housing prices in the current year are controlled for. Fixed effects for the year of marriage, current year, and state are included in all specifications. Standard errors are clustered at the state level.

within than outside of marriage, divorce itself will be lower for those who are able to purchase a home. Table 7 shows the impact of the home price index at the time of marriage on the probability that the person interviewed is found to be divorced at the time of the survey. The first column presents OLS results while the second the ones instrumented as in the sub-section above. These results confirm that divorce decreases with lower housing prices, particularly once we instrument for the housing price. The results suggest that facing a one percent decrease in the housing price in one's state of residence at the time of marriage decreases the probability that the person is currently divorced by 0.6 percentage points for the year of marriage and almost 5 percent once instrumented. This is relevant given that the average divorce probability in our sample is 13 percent.

Together, the results on the relationship between housing prices and home purchase, child quality, mother's time allocation, and divorce suggest that easier access to housing at the time of marriage has significant consequences on parental outcomes later on, inducing women to invest more strongly in their children and taking on more traditional division of labor. This is very robust to a variety of alternative specifications.

Table 7: Relationship between house prices at marriage and divorce probability

	Dependent variable: Divorce Status	
	OLS (1)	IV (2)
–House Price Index	-0.00609* (0.00364)	-0.0506*** (0.0173)
Additional Controls	Yes	Yes
Observations	3665398	3299318

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, while housing prices in the current year are controlled for. Fixed effects for the year of marriage, current year, and state are included in all specifications. Standard errors are clustered at the state level.

4.2 Heterogenous responses to legal changes by asset-holding

In this section, we show that the connection between marriage rates and assets has grown stronger as US marriage and child custody laws have changed in two ways: 1) Childbearing without marriage has become closer to marriage in legal framework, by allowing for both parental rights and obligations without marriage, and 2) Divorce can now be initiated by one partner, making marriage less resistant to bad shocks. We use state-year variation in these laws to test how marriage rates change for individuals of different asset levels as the legal framework changes.

We use pre-marital assets to stand in for the ability to purchase a home in this analysis (since home purchase may only occur post marriage). Although divorce laws only specify the division of joint marital property, premarital asset-holding is a good predictor of acquiring such joint property. Those who possess pre-marital financial assets will be more able to put a down payment on a home upon marriage. Subsequent mortgage payments are then accumulated into a joint asset, to be divided upon divorce, unlike rent payments for non homeowners.

Importantly, we focus on the interaction between asset-holding and the policy changes. The direct impact of the policies themselves may be difficult to identify due to the possibility of other correlated changes at the state-year level that may relate to marriage rates. However, to our knowledge ours is the only clear mechanism that would indicate a differential change in marriage rates by asset-holding.

Strengthening the Non-Marital Fertility Contract We first use data from the 1992, 1993, and 1996 waves of the SIPP to test whether the impact of in-hospital voluntary paternity establishment (IHVPE) differed for those with and without assets. IHVPE, and the era of non-marital rights and responsibilities (verified through DNA if necessary) it signaled, created an alternative legal partnership, that, from an income-division perspective, was very close to marriage, without the asset-sharing component that marriage offers. Our model would predict this legal change would widen the marriage gap between high and low asset individuals.

We assemble a data set encompassing all men aged 21-35 who enter the SIPP data unmarried. The SIPP data is quarterly, and for the period we use includes individuals in a panel for 9 or 12 waves (quarters). We

Table 8: Paternity establishment laws and marriage rates, by asset status

	Dependent variable: Ever Married		
	(1)	(2)	(3)
IHVPE \times Assets	0.0383** (0.0172)	0.0367** (0.0171)	0.0359** (0.0168)
IHVPE Laws	-0.00826 (0.0140)	-0.00795 (0.0145)	-0.00281 (0.0137)
Owns Assets	0.0399*** (0.00733)	0.0219*** (0.00703)	0.0216*** (0.00710)
Inc, race, and educ control		YES	YES
State-specific time trend			YES
Observations	10670	10670	10670
R-Squared	0.0937	0.102	0.106

Notes: Data uses male individuals in the 1992, 1993, and 1996 Survey of Income and Program Participation age 21-35 who enter the data unmarried. IHVPE represents the adoption of in-hospital voluntary paternity establishment programs, shown by Rossin-Slater (2016) to decrease marriage rates. State and year fixed effects are included in all specifications, as are controls for age. Standard errors are clustered at the state level.

regress “ever married” (during the period we observe) on asset holding and the IHVPE policy in the initial period, controlling for state and year fixed effects, as well as age.

Our data on IHVPE dates comes from Rossin-Slater (2016), and all of these policies were implemented in the 90s, during the period of welfare reform. Assets are specifically listed in the SIPP data, and we divide individuals into “asset holding,” those with assets greater than zero, and not.¹⁷

The equation being estimated is:

$$Evermarry_{ist} = \beta IHVPE_{st} \times assets_i + \nu assets_i + \xi IHVPE_{st} + \gamma X_i + \eta_s + \delta_t + \varepsilon_{ist} \quad (2)$$

Where s and t represent the state and year the individual first appears in the data. We add individual-level controls as well as state-specific time trends in subsequent specifications.

Table 8 shows that the introduction of IHVPE has a positive, significant correlation with asset-holding, indicating that it increased the relative propensity to marry for those without assets. The effect size remains consistent even when state-specific time trends are accounted for. The main effect of the policy is directionally negative, although as we note, it may be difficult to recover an unbiased coefficient in this case. And, holding assets itself is positively associated with marriage rates in this time period, consistent with the earlier evidence in Lafortune and Low (2017). The effect of assets remains highly significant even when income, race, and education are controlled for, indicating that the ability to purchase a home itself is an important determinant of marriage, and becomes more important as cohabitation becomes closer to marriage. This result highlights the role of assets in creating differential value of marriage, above and beyond that of non-marital fertility contracts, even as these alternative contracts are strengthened.

¹⁷We exclude homeownership from assets for two reasons: first, it is only measured for household heads, and secondly, homes owned pre-marriage are unlikely to be divided upon divorce, whereas financial assets that are used to purchase joint marital homes create shared marital property.

Weakening the Marital Contract We next turn to examining whether a switch from mutual consent requirements to unilateral divorce led to an increased relationship between assets and marriage. We implement this empirical test using the PSID, since the PSID contains data for the time period when unilateral divorce laws were introduced, mainly in the 1970s. We follow Voena (2015)’s coding of unilateral divorce laws.

Because the PSID panel is constructed differently than the SIPP, we create our sample using a slightly different methodology. In the SIPP, new people are regularly added to the panel, and the panel itself is short. Thus, we can take “newcomers” of every age (within the 21-35 range that would reasonably be affected) to maximize data availability. In the PSID, because the panel stays largely constant over time, and the panel is long, with new individuals entering only if they marry into a sample household, if we added individuals based on the 21-35 year age range, we would construct a panel with a mix of 21-35 year olds in the beginning, but with essentially *only* 21 year olds coming into the data over time. We thus designate a specific age at which to add individuals to our sample: 26 (our results are robust to other ages). And, as the panel itself is long, we need to limit the time period we are looking at to some extent. We choose to look at a 12 year period, although, again, our results are robust to other choices.

We designate asset-holding individuals based on asset income, which is more likely to indicate the types of financial assets that could be invested in a marital property.¹⁸ Prior to 1975, asset income is measured most cleanly for heads of household, and with noise for non-heads. For non-heads prior to 1975, we must infer asset income based on the individual having a combination of income types, but not being poor enough for the household to receive welfare transfers. From 1975 onward, asset income is not co-mingled with other types of income for non-heads. Our results are also extremely consistent if we use the asset-holding of the head of the household to proxy for all household members (which avoids changing the definition of asset-holding over time), since this would also likely be a strong indicator of the son being able to place a down payment on a home.

The equation being estimated is:

$$Evermarry_{ist} = \beta unilateral_{st} \times assets_i + \nu assets_i + \xi unilateral_{st} + \gamma X_i + \eta_s + \delta_t + \varepsilon_{ist} \quad (3)$$

With, again, individual-level controls as well as state-specific time trends being included in subsequent specifications. A control for age is not necessary here, as everyone “starts” at age 26.

Table 9 shows that the introduction unilateral divorce laws has a significant, positive interaction with asset-holding. This aligns with our hypothesis that having assets allows marriage to retain value—through increased commitment and protection for the lower earning spouse—even in the presence of one-sided divorce decision-making. The effect size remains stable with the introduction of individual controls and state-specific time trends, although it becomes slightly less significant when state trends are included. The coefficient for unilateral divorce itself is directionally negative, although as previously mentioned it may be difficult to measure this in an unbiased way, and the magnitude seems somewhat smaller than we might expect.

Note that in this case the main effect of assets is not significant, and in fact becomes very small and even switches signs as additional controls are introduced. This indicates that asset-holding provides *substitute*

¹⁸For heads of household we can further restrict to only financial asset income, rather than farm income. For non-heads, we cannot restrict the type, but they are also less likely to receive income from a farm or business.

Table 9: Unilateral divorce laws and time to marriage, by asset status

	Dependent variable: Ever Married			(4)
	(1)	(2)	(3)	
Unilateral \times Assets	0.197** (0.0738)	0.185** (0.0808)	0.162* (0.0833)	
Unilateral divorce	-0.0926 (0.0820)	-0.0715 (0.0953)	-0.173 (0.156)	
Own Assets	0.0745 (0.0588)	0.00262 (0.0655)	-0.00345 (0.0681)	
Inc, educ, race controls		YES	YES	
State specific time trend			YES	
Observations	1215	1064	1064	
R-Squared	0.158	0.200	0.243	

Notes: Data uses unmarried male individuals in the 1968-1993 Panel Study of Income Dynamics, starting at age 26. Outcomes are measured over a 12-year period. State and year fixed effects are included in all specifications. Standard errors are clustered at the state level.

commitment for difficult divorce, and thus only matters once unilateral divorce is introduced. Thus, the relationship between asset-holding and marriage is a more recent phenomenon, linked to the decline in the security of the marital contract. Indeed, we see that once the unilateral divorce regimes are commonplace, in our earlier analysis on IHVPE, assets are tied to increased marriage.

5 Conclusion

We present the first model on the role of homeownership in “collateralizing” the marriage contract. We demonstrate that a highly general model of partnership selection with limited commitment can generate the effect that homeownership helps to solve the “public goods problem” of investment in children generated by new contracting rules for marriage. Assets increase investment by reducing the impact of such investment on the investing parent’s expected second period consumption. This comes through two channels: first, reducing the risk of divorce by giving the richer partner “more to lose,” and second, providing a guaranteed level of consumption in case divorce does occur. This causes individuals with sufficient access to home purchase to select marriage over non-marital fertility at much greater rates. Additionally, the model predicts that unilateral divorce and better extra-marital contracting will not remove the appeal of marriage for high-asset individuals, while these policies encourage non-marital fertility for those without wealth.

We show empirical support for this model, by using idiosyncratic variation in housing prices to show that those families who more easily purchase homes upon marriage specialize more within the household and invest more in children. Families who marry at a time of easier home purchase also see higher male relative to female wages, and lower rates of divorce. These results are robust to a number of alternative specifications, including instrumenting for housing prices. We then demonstrate that increased ease of non-marital contracting and the introduction of unilateral divorce have starkly different effects for those without assets than those with assets.

Thus, our model suggests that the uneven retreat from marriage among certain groups may result from underlying heterogeneity in wealth and access to homeownership. This is important because some groups may be particularly disadvantaged in the holding of wealth, and the ability to convert this wealth into housing stock. For example, Hamilton and Tippet (2015) demonstrate that while the white-black income gap is large, the white-black asset gap is *substantially* wider. Moreover, the homeownership gap may be even larger (Charles and Hurst, 2002), since on top of the disparity in financial assets, redlining historically limited the ability of non-white individuals to purchase homes. Our model suggests a mechanism linking this gap to a corresponding gap in marriage rates. Similarly, our model provides an underlying mechanism for the lower marital college premium Chiappori et al. (2017) identifies for black women, which they link to lower human capital investments in children.

More generally, our work suggests credit constraints for home buying penalize couples not just in the housing market but in their child investment choices. Our model additionally suggests that such inequality is unlikely to be self-correcting. Because investment in child human capital is higher in marriage, and such investment must be insured through assets, those who lack assets may be hamstrung in their level of investment in the next generation. This would then produce a mechanism through which inequality is transmitted from one generation to the next. Those with high assets create high-security marriages with high levels of child investment, producing advantaged children. Those without assets end up in less secure non-marital arrangements, with correspondingly less advantaged children. Homeownership has not previously been considered as a driver of marital value, and thus the ability to insure child investment. This paper presents evidence that it could be an important factor, with stark policy and welfare implications.

References

- Adda, Jérôme, Christian Dustmann, and Katrien Stevens**, “The career costs of children,” *Journal of Political Economy*, 2017, 125 (2), 293–337.
- Aizer, Anna and Sara McLanahan**, “The Impact of Child Support Enforcement on Fertility, Parental Investment and Child Well-Being,” Working Paper 11522, National Bureau of Economic Research August 2005.
- Akerlof, George A., Janet L. Yellen, and Michael L. Katz**, “An Analysis of Out-of-Wedlock Child-bearing in the United States,” *The Quarterly Journal of Economics*, 1996, 111 (2), 277–317.
- Ambrus, Attila, Erica Field, and Maximo Torero**, “Muslim family law, prenuptial agreements, and the emergence of dowry in Bangladesh,” *The Quarterly Journal of Economics*, 2010, 125 (3), 1349–1397.
- Ananat, Elizabeth O and Guy Michaels**, “The effect of marital breakup on the income distribution of women with children,” *Journal of Human Resources*, 2008, 43 (3), 611–629.
- Angelov, Nikolay, Per Johansson, and Erica Lindahl**, “Parenthood and the gender gap in pay,” *Journal of Labor Economics*, 2016, 34 (3), 545–579.
- Arroyo, Julia, Krista K Payne, Susan L Brown, and Wendy D Manning**, “Crossover in median age at first marriage and first birth: Thirty years of change,” *National Center for Family & Marriage Research*, 2012.
- Brinig, Margaret F**, “Rings and promises,” *Journal of Law, Economics, & Organization*, 1990, 6 (1), 203–215.
- Bronson, Mary Ann**, “Degrees are forever: Marriage, educational investment, and lifecycle labor decisions of men and women,” *Working Paper*, 2014.
- , **Peter Skogman Thoursie et al.**, “The Lifecycle Wage Growth of Men and Women: Explaining Gender Differences in Wage Trajectories,” Technical Report 2017.
- Cáceres-Delpiano, Julio and Eugenio P Giolito**, “How unilateral divorce affects children,” 2008.
- Charles, Kerwin Kofi and Erik Hurst**, “The Transition To Home Ownership And The Black-White Wealth Gap,” *The Review of Economics and Statistics*, 2002, 84 (2), 281–297.
- Chiappori, Pierre-Andre and Maurizio Mazzocco**, “Static and Intertemporal Household Decisions,” *Journal of Economic Literature*, September 2017, 55 (3), 985–1045.
- Chiappori, Pierre-André, Bernard Salanié, and Yoram Weiss**, “Partner Choice, Investment in Children, and the Marital College Premium,” *American Economic Review*, 2017, 107 (8), 2109–67.
- Darrick, William Darity Anne Price Vishnu Sridham Hamilton and Rebecca Tippet**, “Umbrellas Don’t Make it Rain: Why Studying and Working Hard Isn’t Enough for Black Americans,” *Insight Center for Community Economic Development, Oakland, CA*, 2015.

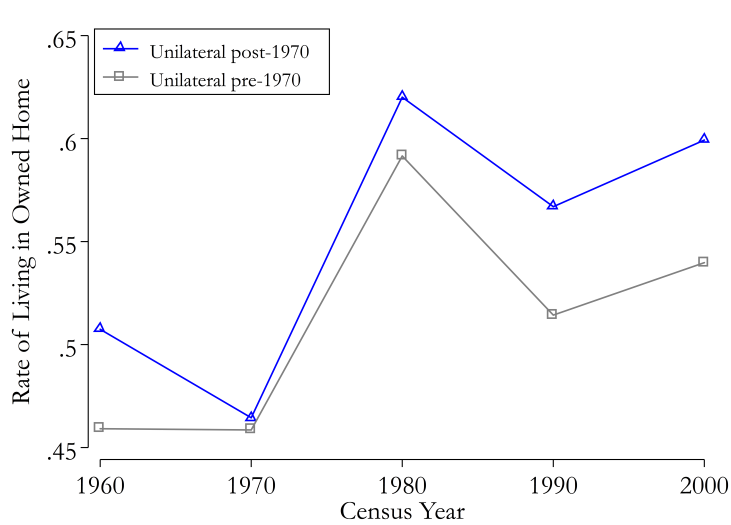
- Duncan, Greg J. and Saul D. Hoffman**, “Welfare Benefits, Economic Opportunities, and Out-of-Wedlock Births Among Black Teenage Girls,” *Demography*, 1990, 27 (4), 519–535.
- Edlund, Lena**, “Marriage: Past, Present, Future?,” *CEsifo Economic Studies*, 12 2006, 52 (4), 621–639.
- Farnham, Martin, Lucie Schmidt, and Purvi Sevak**, “House Prices and Marital Stability,” *American Economic Review*, May 2011, 101 (3), 615–19.
- Fernandez, Raquel and Joyce Cheng Wong**, “The disappearing gender gap: the impact of divorce, wages, and preferences on education choices and women’s work,” Technical Report, National Bureau of Economic Research 2011.
- **and –**, “Free to Leave? A Welfare Analysis of Divorce Regimes,” *American Economic Journal: Macroeconomics*, 2017, 9 (3), 72–115.
- Flavin, Marjorie and Takashi Yamashita**, “Owner-Occupied Housing and the Composition of the Household Portfolio,” *American Economic Review*, March 2002, 92 (1), 345–362.
- Fratantoni, Michael C.**, “Homeownership and Investment in Risky Assets,” *Journal of Urban Economics*, July 1998, 44 (1), 27–42.
- Friedberg, Leora**, “Did unilateral divorce raise divorce rates? Evidence from panel data,” *The American Economic Review*, 06 1998, 88 (3), 608–627.
- Ginther, Donna K. and Robert A. Pollak**, “Family structure and children’s educational outcomes: Blended families, stylized facts, and descriptive regressions,” *Demography*, Nov 2004, 41 (4), 671–696.
- Goodman, Laurie S and Christopher Mayer**, “Homeownership and the American Dream,” *Journal of Economic Perspectives*, 2018, 32 (1), 31–58.
- Gruber, Jonathan**, “Is making divorce easier bad for children? The long-run implications of unilateral divorce,” *Journal of Labor Economics*, 2004, 22 (4), 799–833.
- Henderson, J. Vernon and Yannis Ioannides**, “A Model of Housing Tenure Choice,” *American Economic Review*, 1983, 73 (1), 98–113.
- Holden, Karen C and Pamela J Smock**, “The economic costs of marital dissolution: Why do women bear a disproportionate cost?,” *Annual review of sociology*, 1991, 17 (1), 51–78.
- Kay, Herma Hill**, “From the Second Sex to the Joint Venture: An Overview of Women’s Rights and Family Law in the United States during the Twentieth Century,” *California Law Review*, 2000, 88 (6), 2017–2094.
- Kleven, Henrik Jacobsen, Camille Landais, and Jakob Egholt Sogaard**, “Children and Gender Inequality: Evidence from Denmark,” 2017.
- Lafortune, Jeanne and Corinne Low**, “Tying the Double-Knot: The Role of Assets in Marriage Commitment,” *American Economic Review*, May 2017, 107 (5), 163–67.
- Lagomarsino, Bruno Cardinale, Martín A Rossi et al.**, “Subsidized Home-ownership Programs, Transaction Costs, and Domestic Violence,” Technical Report 2017.

- Lundberg, Shelly and Robert A. Pollak**, “The Evolving Role of Marriage: 1950-2010,” *The Future of Children*, 2015, 25 (2), 29–50.
- , – , and **Jenna Stearns**, “Family Inequality: Diverging Patterns in Marriage, Cohabitation, and Childbearing,” *Journal of Economic Perspectives*, May 2016, 30 (2), 79–102.
- Mayeri, Serena**, “Foundling Fathers: (Non-) Marriage and Parental Rights in the Age of Equality,” *The Yale Law Journal*, 2016, 125 (8), 2182–2555.
- Mazzocco, Maurizio**, “Household Intertemporal Behaviour: A Collective Characterization and a Test of Commitment,” *The Review of Economic Studies*, 2007, 74 (3), 857–895.
- McLanahan, S. and G. Sandefur**, *Growing Up with a Single Parent: What Hurts, What Helps* 1994.
- Mechoulan, Stéphane**, “Economic theory’s stance on no-fault divorce,” *Review of Economics of the Household*, 2005, 3 (3), 337–359.
- Mechoulan, Stéphane**, “The External Effects of Black Male Incarceration on Black Females,” *Journal of Labor Economics*, 2011, 29 (1), 1–35.
- Neal, Derek**, “The Relationship between Marriage Market Prospects and Never-Married Motherhood,” *The Journal of Human Resources*, 2004, 39 (4), 938–957.
- Nechyba, Thomas J.**, “Social Approval, Values, and AFDC: A Reexamination of the Illegitimacy Debate,” *Journal of Political Economy*, June 2001, 109 (3), 637–666.
- Palmer, Christopher**, “Why did so many subprime borrowers default during the crisis: Loose credit or plummeting prices?,” 2015.
- Reynoso, Ana**, “The impact of divorce laws on the equilibrium in the marriage market,” 2017.
- Rosenzweig, Mark R.**, “Welfare, Marital Prospects, and Nonmarital Childbearing,” *Journal of Political Economy*, 1999, 107 (S6), S3–S32.
- Rossin-Slater, Maya**, “Signing Up New Fathers: Do Paternity Establishment Initiatives Increase Marriage, Parental Investment, and Child Well-Being?,” *American Economic Journal: Applied Economics.*, 2016, *Forthcoming*.
- Schneider, Daniel**, “Wealth and the marital divide,” *American Journal of Sociology*, 2011, 117 (2), 627–667.
- Sherrin, Ned**, *Oxford dictionary of humorous quotations*, Oxford University Press, 2008.
- Steijvers, Tensie and Wim Voordeckers**, “Collateral and credit rationing: a review of recent empirical studies as a guide for future research,” *Journal of Economic Surveys*, 2009, 23 (5), 924–946.
- Stevenson, Betsey**, “The Impact of Divorce Laws on Marriage-Specific Capital,” *Journal of Labor Economics*, 2007, 25 (1), 75–94.
- , “Divorce Law and Women’s Labor Supply,” *Journal of Empirical Legal Studies*, 2008, 5 (4), 853–873.

- Tannenbaum, Daniel I**, “The Effect of Child Support on Selection into Marriage and Fertility,” 2015.
- Voena, Alessandra**, “Yours, Mine, and Ours: Do Divorce Laws Affect the Intertemporal Behavior of Married Couples?,” *American Economic Review*, August 2015, *105* (8), 2295–2332.
- Wei, Shang-Jin and Xiaobo Zhang**, “The competitive saving motive: Evidence from rising sex ratios and savings rates in China,” *Journal of political Economy*, 2011, *119* (3), 511–564.
- , – , and **Yin Liu**, “Status competition and housing prices,” Technical Report, National Bureau of Economic Research 2012.
- Weiss, Yoram and Robert Willis**, “Transfers among Divorced Couples: Evidence and Interpretation,” *Journal of Labor Economics*, 1993, *11* (4), 629–79.
- Weitzman, Lenore J.**, “The economics of divorce: Social and economic consequences of property, alimony and child support awards,” *UCLA Law Review*, 1981, *28* (6), 1181–1268.
- Wolfers, Justin**, “Did Unilateral Divorce Laws Raise Divorce Rates? A Reconciliation and New Results,” *American Economic Review*, December 2006, *96* (5), 1802–1820.
- Wolff, Edward N.**, “The asset price meltdown and the wealth of the middle class,” Technical Report, National Bureau of Economic Research 2012.

A Homeownership over time

Figure A.1: Rates of living in owned home by unilateral divorce laws, married individuals, ages 18-30



Notes: Rates of married individuals living in a home that is owned (or being purchased) in the US Census from 1960 - 2000, by state-level unilateral divorce laws. Pre-1970 states include all states who passed unilateral divorce laws before 1970, and post-1970 is states where laws were implemented post-1970 (but were indeed implemented). States that never implement unilateral divorce are excluded.

B Model extensions

We now present a more specific and detailed model that fulfills the assumptions specified in Section 3 required to obtain our key results. This specific version helps to further illustrate the mechanisms driving the results in the general framework.

We have a continuum of men m and women w in an economy. All of them have an endowment Ω which is drawn from a distribution $F(\Omega)$ for women and $G(\Omega)$ for men, where the distribution of men's endowments stochastically dominates that of women. Men also receive an endowment in terms of assets A_j , that are positive with probability h .¹⁹

B.1 Child investment and divorce selection

We assume that $Q_c(\tau, \Omega_i, \Omega_j) = (\Omega_i + \Omega_j)h(\tau)$, with $h(0) = 0$, with $h'(0) = \infty$ and $h(1) < 1$. We also assume here that $c_{1i} = 0.5(\Omega_i + \Omega_j)$, $c_{1j} = 0.5(\Omega_i + \Omega_j)$ in either type of partnership but this is irrelevant. With bilateral divorce, we have already shown in the main text that households will share equally the

¹⁹We assume here that only men have assets. Women could also have assets. As long as their assets are lower than their spouse, the conclusions of the model would be unaltered.

household income in the second period as well. The investment level selected by the woman is then

$$h'(\tau^*) = \frac{\Omega_i u'(0.5 * (\Omega_i(1 - \tau^*) + \Omega_j + A_j))}{4(\Omega_i + \Omega_j)}$$

which is the optimal level.

With unilateral divorce or cohabitation, we will face a different result. Assume that $c_{2Si}^m = \delta\Omega_j + 0.5A_j + \Omega_i(1 - \tau)$ correspond to the woman's payment when divorced and $c_{2Si}^c = \gamma\Omega_j + \Omega_i(1 - \tau)$ to her payment when separated where $0.5 > \delta \geq \gamma$. This implies that married women will receive potentially some post-divorce transfers from their ex-husbands and those are lower than what they received in marriage but at least equal or above what she would received when separated from a non-marital relationship. Men will receive $c_{2Sj}^m = (1 - \delta)\Omega_j + 0.5A_j$ when divorced and $c_{2Sj}^c = (1 - \gamma)\Omega_j + A_j$ upon separation from cohabitation.

In cohabitation, men will be the one making the decision to separate, and they will want to do so when:

$$\phi < \bar{\phi} = u((1 - \gamma)\Omega_j + A_j) - u(0.5 * (\Omega_i(1 - \tau) + \Omega_j + A_j))$$

Note that a higher γ decreases the threshold value while higher assets and higher A_j and τ have the opposite effects.

Their spouse would rather stay in the relationship as long as her income is above that she will receive upon separation. She will thus be able to accept a worse sharing rule. We will assume that whenever $\phi < \bar{\phi}$, the sharing rule will be altered to convince the male to stay in the relationship and thus that they will share resources with $\beta(\phi)$ such that

$$u(\beta(\phi)(\Omega_i(1 - \tau) + \Omega_j + A_j)) + \phi = u(\Omega_j(1 - \gamma) + A_j)$$

Finally, for the worse levels of shocks, such a compensation will not be possible and separation will occur. This will be the case when $\phi < 0$. A similar calculation allows us to determine that a man will want a unilateral divorce when:

$$\phi < \tilde{\phi} = u((1 - \delta)\Omega_j + 0.5A_j) - u(0.5 * (\Omega_i(1 - \tau) + \Omega_j + A_j))$$

In this case, a higher δ decreases the threshold value while higher τ increases it. Note also that $\tilde{\phi} < \bar{\phi}$ namely that a married woman will face a unhappy partner less often than a cohabiting one. If the shock is lower than that value, the female partner will be renegotiating the contract in order to keep the relationship alive. The sharing rule will thus be $\beta'(\phi)$ such that

$$u(\beta'(\phi)(\Omega_i(1 - \tau) + \Omega_j + A_j)) + \phi = u(\Omega_j(1 - \delta) + 0.5A_j)$$

It can be shown that $\beta'(\phi) < \beta(\phi)$ and thus that for a similar "love shock", men will be able to extract more from their partner in cohabitation than in marriage.

A woman in a non-marital fertility relationship will invest in a child up to the point where:

$$h'(\tau^{NM}) = \frac{\Omega_i(0.5(1 - L(\bar{\phi}))u'(c_{2Ri}) + \int_0^{\bar{\phi}} u'(2(1 - \beta(\phi))c_{2Ri})l(\phi)d\phi + 0.5u'(c_{2Si}^e))}{2(\Omega_i + \Omega_j)}$$

It can be shown that $\tau^{NM} < \tau^*$ and thus that the level of investment is below optimal since the woman pays a higher cost than the couple for the investment since she bears it all in the separated state. Using monotone comparative statics, we can show that the optimal investment τ^{NM} will be non-decreasing in γ . To do so, we need to demonstrate that the female's utility function is supermodular in γ and τ , namely

$$\frac{\partial^2 U_i^{NM}}{\partial \gamma \partial \tau} = l(\bar{\phi})\Omega_i \frac{\partial \bar{\phi}}{\partial \gamma} (-0.5u'(c_{2Ri})) - \Omega_i \Omega_j u''(c_{2Sj}^e) + \Omega_i \int_0^{\bar{\phi}} u''(2(1 - \beta(\phi))c_{2Ri}) \frac{\partial \beta(\phi)}{\partial \gamma} (2c_{2Ri})l(\phi)d\phi > 0$$

This is positive by the concavity of the utility function, the fact that $\frac{\partial \bar{\phi}}{\partial \gamma} > 0$ and $\frac{\partial \beta(\phi)}{\partial \gamma} < 0$. By increasing the sharing post-separation, women have a higher consumption when their husband wants to leave and when they separate, which through concavity, makes them willing to invest more. Furthermore, their partner threatens to leave less often which reduces their expected marginal cost.

Married women will pick their optimal level of investment in children:

$$h'(\tau^M) = \frac{\Omega_i(0.5(1 - L(\tilde{\phi}))u'(c_{2Ri}) + \int_0^{\tilde{\phi}} u'(2(1 - \beta'(\phi))c_{2Ri})l(\phi)d\phi + 0.5u'(c_{2Si}^m))}{2(\Omega_i + \Omega_j)}$$

Married women will invest more in children for a few reasons. Because their marriage is more stable than cohabitation, they will have to bear the entire cost of investment less frequently. Second, since their consumption level when divorced is higher than when a cohabiting partner separates, the marginal cost of the investment will be less difficult to bear in that case.

Women will underinvest in their children compared to Pareto optimum for the same reasons as in the case of the cohabitation but the difference will be smaller.

By an identical argument as the one presented above, investments will be non-decreasing in δ . Investment will be also non-decreasing in A_j . Formally,

$$\begin{aligned} \frac{\partial^2 U_i^M}{\partial A_j \partial \tau} &= -\Omega_i((1 - L(\tilde{\phi}))0.25u''(c_{2Ri}) + \int_0^{\tilde{\phi}} u''(2(1 - \beta')c_{2Ri})l(\phi)d\phi + 0.25u''(c_{2Si}^m)) \\ &\quad - 0.5\Omega_i l(\tilde{\phi}) \frac{\partial \tilde{\phi}}{\partial A_j} u'(c_{2Ri}) + \int_0^{\tilde{\phi}} u''(2(1 - \beta')c_{2Ri}) 2 \frac{\partial \beta'}{\partial A_j} c_{2Ri} l(\phi) d\phi > 0 \end{aligned}$$

This is positive for 3 main reasons. Concavity implies that the marginal cost is diminished when assets are present. Second, assets increase relationship stability $\frac{\partial \tilde{\phi}}{\partial A_j} < 0$ since husbands find it less attractive to leave the relationship when they hold assets. Finally, more assets also imply that husbands extract less from their wives when they threaten to leave, which makes the marginal cost of investment fall for the wife.

Thus, this more specific model satisfies the key assumptions required for our propositions in the general framework.

B.2 Partnership selection

As child quality is larger for those in marriage than for those in cohabitation and expected consumption is also less volatile and that this is impacting more individuals with higher levels of endowments, we will have that as endowments increase, the fixed cost of entering in the relationship will be less relevant and thus that there will be a threshold of Ω for which individuals will first remain single, then cohabit, then marry. There will be positive assortative matching.

By the logic of the more general model, individuals with assets will receive more benefits from marriage. This is because their child investments are closer to the Pareto optimum, and thus the utility gap between marriage and non-marital fertility is higher, and therefore the fixed cost of marriage is justified by even those with a lower level of endowments. By the same logic, this more specific model also echoes the policy experiments from the more general model.

C Appendix Tables

Table C.1: Relationship between house prices at marriage and individual's years of education

	Dependent variable: Educational attainment	
	OLS (1)	IV (2)
–House Price Index	-0.117* (0.0685)	-0.464*** (0.153)
Additional Controls	No	No
Observations	3198890	2883502
R-Squared	0.0174	0.0164

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, with the second column instrumented using the approach in Palmer (2015), while housing prices in the current year are controlled for. Fixed effects for the year of marriage, current year, and state are included in all specifications. Standard errors are clustered at the state level.

Table C.2: Relationship between house prices at marriage and child investment and division of labor: MSA-level variation

	Dependent variable:			
	Grade Retention		Number of Children	
	(1)	(2)	(3)	(4)
–House Price Index	-0.00339* (0.00200)	-0.00455** (0.00210)	0.0201 (0.0156)	0.0167 (0.0160)
Additional Controls	No	Yes	No	Yes
Observations	775099	775099	1094095	1094095
R-Squared	0.00671	0.0288	0.124	0.153
	Worked Last Year		Usual Hours Worked	
	(1)	(2)	(3)	(4)
–House Price Index	0.00222 (0.00322)	0.00284 (0.00333)	0.425** (0.168)	0.439** (0.166)
–HPI \times female	-0.0101** (0.00497)	-0.00860* (0.00479)	-1.250*** (0.249)	-1.158*** (0.237)
Additional Controls	No	Yes	No	Yes
Observations	1094095	1094095	1094095	1094095
R-Squared	0.0603	0.102	0.124	0.168

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years who currently live in a MSA. House Price Index represents MSA-level housing prices from the Federal Housing Finance Agency in the year of marriage, while housing prices in the current year are controlled for. Fixed effects for the year of marriage and MSAs are included in all specifications. Standard errors are clustered at the MSA level.

Table C.3: Relationship between house prices at marriage and child investment and division of labor: State of birth

	Dependent variable:			
	Grade Retention		Number of Children	
	(1)	(2)	(3)	(4)
–House Price Index	-0.00657*** (0.00215)	-0.00657*** (0.00220)	0.0381* (0.0209)	0.0297 (0.0195)
Additional Controls	No	Yes	No	Yes
Observations	1867030	1867030	2888992	2888992
R-Squared	0.00864	0.0221	0.0905	0.137
	Worked Last Year		Usual Hours Worked	
	(1)	(2)	(3)	(4)
–House Price Index	0.00794** (0.00377)	0.00415 (0.00341)	0.724*** (0.196)	0.545*** (0.181)
–HPI \times female	-0.0156*** (0.00529)	-0.0130*** (0.00475)	-1.520*** (0.362)	-1.381*** (0.334)
Additional Controls	No	Yes	No	Yes
Observations	2888992	2888992	2888992	2888992
R-Squared	0.0375	0.100	0.102	0.160

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state of birth level housing prices from the Federal Housing Finance Agency in the year of marriage, while housing prices in the current year are controlled for. Fixed effects for the year of marriage, current year, and state of birth are included in all specifications. Standard errors are clustered at the state level.

Table C.4: Relationship between house prices at marriage and child investment and division of labor: without 2008-2011

	Dependent variable:			
	Grade Retention		Number of Children	
	(1)	(2)	(3)	(4)
–House Price Index	-0.00906*** (0.00266)	-0.0102*** (0.00300)	0.0280 (0.0252)	0.0180 (0.0232)
Additional Controls	No	Yes	No	Yes
Observations	2102540	2102540	3063008	3063008
R-Squared	0.00883	0.0230	0.0719	0.126
	Worked Last Year		Usual Hours Worked	
	(1)	(2)	(3)	(4)
	–House Price Index	0.00203 (0.00221)	0.00206 (0.00266)	0.359*** (0.128)
–HPI \times female	-0.00904** (0.00361)	-0.00647* (0.00335)	-1.100*** (0.236)	-0.958*** (0.225)
Additional Controls	No	Yes	No	Yes
Observations	3063008	3063008	3063008	3063008
R-Squared	0.0527	0.101	0.118	0.167

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, while housing prices in the current year are controlled for. We exclude all marriages contracted between 2008 and 2011. Fixed effects for the year of marriage, current year, and state are included in all specifications. Standard errors are clustered at the state level.

Table C.5: Relationship between house prices at marriage and child investment and division of labor: adding year of marriage times region dummies

	Dependent variable:			
	Grade Retention		Number of Children	
	(1)	(2)	(3)	(4)
–House Price Index	-0.00378 (0.00263)	-0.00416 (0.00272)	0.0318 (0.0262)	0.0299 (0.0258)
Additional Controls	No	Yes	No	Yes
Observations	2428234	2428234	3702212	3702212
R-Squared	0.00885	0.0234	0.0942	0.134
	Worked Last Year		Usual Hours Worked	
	(1)	(2)	(3)	(4)
	–House Price Index	0.00131 (0.00269)	-0.0000502 (0.00239)	0.349** (0.160)
–HPI \times female	-0.0134*** (0.00383)	-0.0108*** (0.00355)	-1.334*** (0.258)	-1.185*** (0.248)
Year of Survey FEs	Yes	Yes	Yes	Yes
Additional Controls	No	Yes	No	Yes
Observations	3702212	3702212	3702212	3702212
R-Squared	0.0511	0.100	0.114	0.163

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, while housing prices in the current year are controlled for. Fixed effects for the year of marriage, its interaction with Census region dummies, current year, and state are included in all specifications. Standard errors are clustered at the state level.

D Instrumental Variable strategy

In this section, we explore whether endogeneity of the housing price index could bias our results. To eliminate this problem, we would need to find a variable that predicts housing price variation at the local level but is uncorrelated with local economic shocks that may affect other household decisions (except the house buying one) at the time of marriage. To do this, we follow Palmer (2015) by exploiting the fact that there is a pattern of volatility in housing prices that is persistently different between locations in the United States. Some regions of the country are more subject to housing booms and busts than others. To measure this, we use the yearly price index (all transactions) from 1975 to 1995 to measure the variability in the housing price index. We calculate the standard deviation in the year-to-year fluctuation in the housing price and obtain a value of σ_i for each state. We then assume that the only difference in the price index post 1995 is due to the difference in volatility across location. Formally, we construct a predicted house price index as:

$$\widehat{HPI}_{it} = HPI_{-i1996} + \sum_j^t = 1997\sigma_i * (HPI_{-ij} - HPI_{-ij-1})$$

where HPI_{-it} is the house price index in year t in all other states minus i (we weight the state-level price index by state level population). Thus, our predicted measure simply assumes that the house price index that a state experiences is the one experienced in the other states but amplified or not depending on its past variability. It should thus be exogenous to current local economic conditions since it does not depend on these in any ways. The only way in which this instrument could be correlated with local economic shocks is if the variance we calculated in previous years reflect not only a sensitivity to house prices but also to other economic shocks and that these shocks are reflected in the national price index. Palmer (2015) conducts the analysis using time dummies instead of the national price index but the logic is very similar.

The first stage is very strong between the instrument and the actual price index. In Table D.6, we show that our instrument

We have obtained extremely similar results when simply interacting the σ_i by the house price index in other states in level because we include fixed effects, which implies that our instrument works as in first differences. We also have found that the weighting of the price index of the other states is not relevant.

Table D.6: First stage between the house price index and instrument

	Dependent variable: House Price Index	
	(1)	(2)
$-\widehat{HousePriceIndex}$	0.0005*** (0.0002)	0.0005*** (0.0002)
Additional Controls	No	Yes
Observations	3330278	3330278

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, while housing prices in the current year are controlled for. Fixed effects for the year of marriage, current year, and state are included in all specifications. Standard errors are clustered at the state level.

Similar results were obtained when using flat weights between states.

We next show that the results presented in our paper are robust to instrumenting for the house price index using the above instrument. We focus on the results only with all controls but the elimination of these controls do not change in any significant way the results presented. Table D.7 confirms our results that when the housing price index is lower in the year in which a couple was married, the probability that this couple owns a home rises. The magnitude is even larger than the one presented in the main text suggesting that a low price index may also be correlated with bad economic conditions, which dampened the effect. The results for divorced status and wages are similarly stronger in the instrumented version.

Table D.7: Relationship between house price index (instrumented) and various outcomes

	Own Home (1)	Dependent variable: Labor Earnings (2)	Log hourly wage (3)
-House Price Index	0.0828*** (0.0229)	6190.8*** (2128.0)	0.00179 (0.0128)
-HPI \times female		-7671.6*** (938.5)	-0.0685*** (0.0117)
Additional Controls	Yes	Yes	Yes
Observations	2883502	3330278	2612991

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, instrumented for by state-level housing amplitude using the methodology of Palmer (2015), while housing prices in the current year are controlled for. Fixed effects for the year of marriage, current year, and state are included in all specifications. Standard errors are clustered at the state level.