Collateralized Marriage *

Jeanne Lafortune† and Corinne Low‡

September 27, 2021

We study the role of wealth in the marriage contract by developing a model of the household where investments in public goods can be made at the cost of future earnings. If couples cannot commit ex ante to a sufficiently equal post-divorce allocation, specialization and public good creation will be sub-optimal. However, accumulating joint assets, which the marriage contract specifies are to be divided in the case of divorce, can reduce this problem by offering insurance to the lower earning partner. Our model demonstrates that access to this "collateralized" version of the contract will lead to more household specialization, more public goods, and a higher value of marriage. To test the model's predictions, we use homeownership as a proxy for access to joint savings technology, since homes are particularly likely to be divided in a way that favors the lower earning partner. We use idiosyncratic variation in housing prices at the time of marriage and an instrumental variables strategy to show that quasi-exogenous variation in homeownership access leads to greater specialization. We then show that as policies made marriage and non-marital fertility more similar in other ways, wealth has become a more important determinant of who marries. Our model and empirical results suggest wealthy individuals can access a more advantageous marriage contract, which has important policy implications.

JEL Codes: D13, D14, D31, J12, J22, J24

*We are grateful for helpful comments and suggestions from Manuela Angelucci, Pierre-André Chiappori, Anthony DeFusco, Jonathan Dingel, Fernando Ferreira, Edward Glaeser, Larry Katz, Ben Keys, Alexandra Killewald, Christopher Palmer, Krishna Pendakur, Aloysius Siow, Maisy Wong, and Alessandra Voena, as well as seminar participants at the University of Toronto, University of Pennsylvania, Harvard, University of Southern California, PUC - Rio, University of California - San Diego, Columbia, Princeton, Dartmouth, University of Massachusetts - Boston, and participants in LACEA-LAMES, the ASSA meetings, the Family Inequality meeting in Leuven, the Penn–Wharton marriage and households conference, and the NBER Summer Institute. Lafortune acknowledges financial support from Fondecyt Regular No 1150337.

†Pontificia Universidad Catolica de Chile, jlafortune@uc.cl

‡University of Pennsylvania, The Wharton School, corlow@wharton.upenn.edu

1 Introduction

Marriage has declined as the central organizing structure of the American family. As more individuals choose non-marital fertility, one might wonder whether marriage is too strong a contract, leaving people seeking a weaker alternative. Yet marriage rates have remained persistently high for wealthy individuals, even after controlling for other factors like education, income, and race (Lafortune and Low, 2017), and despite divorce being complicated by the presence of assets. In fact, recent news and policy reports have speculated that marriage is becoming a "luxury good."[1] In this paper, we propose an explanation for this by arguing that wealth can strengthen the marriage contract by serving as collateral.

In particular, because the marriage contract uniquely specifies that joint assets are to be divided in the case of divorce, we model wealth as allowing a couple to commit to more equal consumption sharing in case their union dissolves.[2] This provides protection to a partner who specializes in home production, and would therefore be left with lower earnings, and hence consumption, upon divorce. Our model demonstrates that couples with "collateralized" marriages will thus be able to choose a more optimal level of specialization and public goods, and receive more value from marriage. We first show empirical evidence that quasi-exogenous variation in access to collateralization, using housing prices, is linked to higher specialization. We then demonstrate that asset ownership has become a more important determinant of marriage as the relative strength of the marriage contract was otherwise eroded. This has the important policy implication that wealth inequality may directly lead to inequality in family structure and child investments, and that this problem has worsened over time.

It has long been thought that one of the advantages of marriage may be in the ability to specialize (see, e.g., Pollak, 2011). Although female labor force participation is much higher than 50 years ago, household specialization still persists, as evidenced by the gender hours gap, women's greater time outside the workforce when having children, and the large difference between wages when women enter the workforce versus at age 40 (Mazzocco et al., 2014; Gayle and Shephard, 2019; Bronson et al., 2017). A simultaneous convex return to hours in the labor market (Cortés and Pan, 2019; Gicheva, 2013; Kuhn and Lozano, 2008; Goldin, 2014) and high returns to time investments in children (Del Boca et al., 2013; Doepke and Zilibotti, 2017; Ramey and Ramey, 2010) mean specialization can persist even in couples who can afford to outsource many household tasks. Even beyond children, the ability to sacrifice one partner's earning capacity for the other may be an important source of value in marriage (e.g., location choices for one partner's career).

Under complete marital contracting, a partner specializing in home production receives the assurance that her consumption level will be protected, even if the relationship sours. However, the introduction of unilateral divorce and other commitment challenges mean that couples will fall short of efficient decision-making, as shown in Mazzocco et al. (2014) and Chiappori and Mazzocco (2017). Specifically, unilateral divorce has been shown to lead to women increasing human capital accumulation (Bronson, 2014) and labor supply (Stevenson, 2008; Fernandez and Wong, 2011), decreased investments in "marriage-specific capital"

[1] "Affluent Americans Still Say 'I Do.' More in the Middle Class Don't," Wall Street Journal, March 8th, 2020, and "Middle Class Marriage is Declining, and Likely Deepening Inequality," Brookings Institute, March 11th, 2020. This is also consistent with findings in sociology literature of a relationship between wealth and marriage (Schneider, 2011).

[2] Note we abstract away from different property division regimes, as in our theoretical analysis we only need that joint assets are divided more evenly than income, and in our empirical analysis we focus on homes, which are likely to be divided equally no matter the regime.

(Stevenson, 2007), and increases in assortative mating due to lower ability to specialize (Reynoso, 2017).[3]

Our model introduces the idea that joint savings can provide a commitment device that substitutes for the lost contracting security of marriage. In the model, a couple faces a choice of how much each partner should invest in a public good, at the expense of private human capital in the next period.[4] As the two partners' costs of investment are not equal, they will optimally choose some specialization. However, the inability to commit to a post-divorce allocation causes the lower-earning partner's consumption to fall in the case of divorce (as shown by Foerster et al. (2020) and Fernandez and Wong (2017)), which creates a higher marginal cost of investment. This will lead to inefficiently low specialization, resulting in lower public good creation, and a lower value of marriage.[5]

A couple with assets can reduce this problem by passing some savings into the next period, where they will be divided in the case of divorce.[6] This offers the lower earning partner some insurance, blunting the "tax" of her lower second-period consumption on home production investment, and thus increasing specialization.[7] In addition to higher specialization, collateralized marriages will have greater public good investment and marital stability. This, in turn, increases the joint value of marriage, which means that when we allow couples to select between marriage and non-marital fertility (which does not offer asset division), wealthier couples will select marriage at higher rates. While the fact that transferring resources to the spouse that specializes will lead to more specialization and marriage gains has been discussed by Chiappori and Mazzocco (2017), how wealth enables this and is thus a determinant of the gains from marriage has not been shown before.

Ideally, to empirically test the model, we would want variation in two things: first, the contracting environment in terms of how assets are divided and second, the level of baseline assets a couple has. However, as both of these things are unlikely to be separable from other factors, we use the model to develop two testable implications for which we can find quasi-exogenous variation. In terms of access to a contract with asset division, we turn to variation in ease of home purchase, since housing is an asset that is particularly likely to be divided in a way that favors the lower earning partner. Our model provides the implication that if there is a down payment required to purchase a home, lowering this threshold will result in more specialization and greater investment. Fluctuation in housing prices thus provides local, time-varying access to a contract with strong asset division.

We use data from the American Community Survey and the Federal Housing Finance Agency to assign

[3]Other work focusing on the broader effects of unilateral divorce include Friedberg (1998); Ananat and Michaels (2008); Holden and Smock (1991); Gruber (2004); Cáceres-Delpiano and Giolito (2008); Wolfers (2006). Mechoulan (2005) summarizes the theoretical approaches to divorce in the literature. 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 assets in substituting for other legal protections. We also relate to literature looking at the strengthening of non-marital contracting, including child support enforcement in the US (Aizer and McLanahan, 2005; Tannenbaum, 2015; Rossin-Slater, 2017; Brown et al., 2015), common law marriage (Grossbard and Vernon, 2015, 2014), and protections for cohabitants in other countries (Chiappori et al., 2017b; Chigavazira et al., 2019).

[4]In this way, our model is unique from literature that has framed women's labor supply as reflecting bargaining power to spend time on leisure (e.g., Chiappori et al., 2002; Voena, 2015; and Chiappori and Oreffice, 2008) by emphasizing the productive value of time away from work for creating household public goods.

[5]This is an application of the general result that limited commitment reduces risk-sharing between agents, see Kocherlakota (1996).

[6]The positive role of a "storage" technology was discussed in the more general problem of limited commitment by Árpád Ábrahám and Laczó (2018).

[7]If offered the choice, the couple will always prefer to save in this "high commitment device," since it moves them closer to the full-commitment optimum. In fact even if the decision were in the hands of the husband, he would choose to save in the vehicle with stronger commitment as long as he values child quality sufficiently highly relative to second-period consumption.

local housing prices in the year of marriage to individuals, and then examine their impact on specialization, public goods, and marital stability.[8] Controlling for other local and time-varying factors, we show that idiosyncratic variation in housing prices at the time of marriage creates persistent variation in homeownership that can be used for identification. We then show these lower housing prices, and thus higher homeownership, are tied to greater household specialization, with men working more and women working less when they were married in a low-housing-price environment. Wages follow the same pattern, with men's earnings responding positively to easier homeownership while women's decline, directly linking to our model's predictions for second period earnings.[9]

To address the possibility that selection into time or place of marriage, or whether to marry at all, based on favorable housing prices drives our effects, we show our results are robust to an alternate specification looking at housing prices at age 25 in the state of birth. Additionally, by focusing on outcomes for which the effects for women can be compared to men, we essentially create a triple difference specification, which mitigates concerns that other factors that could affect housing and labor supply can be driving the results.[10]

We then do some additional analysis to further pin down the mechanism of our effect and rule out alternative channels. To demonstrate the reallocated labor force time is tied to home production, we employ our prices-at-age-25 identification strategy on American Time Use Survey data, where home production is observable. We demonstrate that women more likely to own homes reallocate substantial minutes from work to home production, with no change in leisure. This not only directly ties to our model's predicted effects on public good investments, but also assists in ruling out increases in bargaining power or income effects as possible channels, since in both cases we would expect leisure to shift.

We further rule out alternative explanations by showing that results are similar amongst couples who saw limited home appreciation, and thus not driven by substantial price changes, and couples who remained in the central business district, and thus not driven by commuting. Moreover, the effect is absent for renters and childless couples, reversed for couples where the woman out-earns the man, and stronger for college-educated individuals, who may have more at risk from lost human capital due to specialization. Consistent with our model, we also find evidence of higher public good provision (as proxied by number of children and educational achievements) and lower divorce rates with easier home access.

A remaining concern is that the idiosyncratic variation in housing prices is itself driven by changing tastes for marriage and specialization or other local economic factors that affect them. To address this, we

[8]It should be noted that this empirical exercise assumes a gendered pattern of specialization that is not inherently necessary in our model, but aligns with the pattern in over 75% of couples and a widespread documentation of the higher career costs of children to women (e.g Adda et al., 2017; Kleven et al., 2019; Bronson et al., 2017; Angelov et al., 2016). "Defiers," couples who specialize the opposite way, and same sex couples, will bias our coefficient estimates downward, and, in fact, we show the opposite effects are present for these couples.

[9]This may help explain 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 homeownership in terms of its ability to secure the marriage contract. Although in the case of divorce the possession of an "at risk" asset may seem sub-optimal, *ex ante* it provides value by reducing the cost of investments that benefit both spouses. Other types of protection against divorce, if available, would potentially be both more equitable and efficient.

[10]Importantly, for our main outcome of labor supply, the results go in opposite directions for men and women. While it may be the case that women's labor supply could be more or less elastic to, for example, wealth effects, there has never been a documented finding of opposite-sign impacts (McClelland and Mok, 2012).

implement an instrumental variables strategy following Palmer (2015), who documents that states exhibit persistent patterns of housing price volatility, either amplifying or dampening national trends. Thus, one can use this historical "multiplier" together with the national price trend to produce an instrument for local housing prices that is not actually driven by local time-varying factors. We find a stronger first stage on homeownership with this instrument, since, if anything, economic factors correlated with low housing prices may have weakened the ability to purchase and maintain a home, and find our results extremely robust to instrumentation.

To then examine how assets impact marriage selection, we exploit the fact that the model predicts that assets matter little for the decision to marry under perfect contracting, but become more important as the marriage and non-marital fertility contracts converge. To test this, we use panel data on assets and marriage from the Panel Study of Income Dynamics and Survey on Income and Program Participation, and state-year variation in two policies that made marriage and non-marital fertility contractually more similar. First, the introduction of unilateral divorce, which made the inter-temporal commitment offered by marriage imperfect, and second, the strengthening of child support enforcement for non-marital relationships. We regress the marriage propensity over time on an individual's wealth interacted with the policy introductions. Our results show that an individual's wealth became a much stronger predictor of marriage rates as the marriage contract was weakened relative to non-marital fertility. In addition to confirming our model, this suggests an increasing role for wealth in determining who can access the benefits of marriage for supporting optimal specialization and child investment.

This is of crucial importance because there is currently a policy debate as to whether wealth accumulation among a small portion of society has a deleterious effect, and what policy instruments should be used to correct it (Saez and Zucman, 2016; Alvaredo et al., 2017; Jakobsen et al., 2020). If wealth determines access to a more advantageous marriage contract, which allows for greater specialization and thus more investment in children, it could also impact the inter-generational transmission of poverty. It has long been known that children of married parents receive more investment than those of unmarried parents (Ginther and Pollak, 2004; McLanahan and Sandefur, 1994), but our model suggests that in addition to likely selection effects, marriage itself may causally induce higher public good provision through greater contract strength, and this benefit is not equally available to all. While Lundberg et al. (2016) and Lundberg and Pollak (2015) speculated that the growing socioeconomic stratification in marriage may be due to it retaining value for those who need stronger commitment due to preferences for investing in children, our model suggests that contract access may be an underlying confounding factor. This could help explain other persistent inequalities: the racial wealth gap is much larger than the racial income gap (Kuhn et al., 2020; Hamilton and Tippet, 2015), and there is substantial racial stratification in marriage rates as well (see, for example Caucutt et al. (2018)). The role of contract access through wealth in the choice of family formation has not been previously explored.

Our paper brings existing literature on the role of assets as collateral in contracts to the household domain. It is well understood that collateral in market transactions has the power to increase efficiency (e.g., by reducing inefficient credit rationing–see Steijvers and Voordeckers, 2009, for a summary of literature). However, while others have discussed the role of asset division in marriage,[11] we are the first to demonstrate

[11]Most notably, this has been discussed by Voena (2015), who shows that unilateral divorce has differential impact on existing marriages depending on the property division regime. Marital assets also feature in Brinig (1990) and Ambrus et al. (2010).

the potential of wealth to create greater *ex ante* value of marriage, through increased specialization and great production of household public goods. Thus, our paper is the first to suggest that the erosion of marriage's comparative contracting space has created inequality, since wealthy couples can use collateralization to substitute for other legal protections.

Our analysis has some limitations. First, it specifically focuses on US marriage and divorce law, and thus may not be generalizable to other settings, where both marriage law and social insurance substitutes may differ substantially (see, for example, Frémeaux and Leturcq, 2018, and Bayot and Voena, 2015).[12] Second, our model applies to couples who may have some gains to specialization, and wish to invest in public goods. Part of the disappearance of marriage may be due to the fact that specialization is less sought by couples, although studies have suggested that US women may not properly anticipate the type of specialized pattern they tend to face once married (Kuziemko et al., 2018), which would make a "collateralized" contract ex-post more attractive.[13]

The rest of this paper is organized as follows. We present the model and its predictions in Section 2. We then demonstrate that access to a more collateralized version of the marriage contract alters the behavior of married couples in accordance to our framework in Section 3, and demonstrate that the role of assets in determining selection into marriage has increased as marriage and non-marital fertility have become more similar in Section 4. Section 5 concludes.

2 Model

We present a standard model of marriage with a public good in which both parents can invest, at a cost to their future earning potential. We assume household decisions while married are made collectively, and first develop the full commitment baseline, where the resulting allocations are efficient. We then introduce the fact that couples cannot commit to the resource allocation in divorce, which leads to inefficient reduction in household specialization and investment in public goods. We then introduce the possibility of a savings vehicle whose returns are divided more equally than income upon divorce. Access to this product reduces the inefficient investment problem since it offers insurance to the partner who makes the greater investment as well as reduces the other partner's incentives for divorce. This increases household specialization, raises public good creation, and in turn raises the value of marriage.

2.1 Setup

A couple lives for two periods, and care about private consumption (c), over which they have concave utility, and a public good (Q). Utility for partner k in period t is thus of the form $U_{kt} = u(c_{kt}) + Q$.

In terms of housing as a marital asset specifically, Farnham et al. (2011) show that higher house prices make 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.

[12] In particular, our model relies on a framework for marital property where husband and wife are assumed to be a single economic production unit. Countries with different marital contracting regimes and greater social insurance outside of marriage may require different analysis frameworks.

[13] Our work thus also relates to literature on rising female labor force participation and the decline in specialization more broadly (Goldin, 2006; Fernández, 2013; Greenwood et al., 2005).

Let Ω_i represent the earnings potential of the lower earning partner and Ω_j represent the earnings potential of the higher earning partner. For convenience, we will call the higher-earning partner, j, the male partner or husband, and the lower-earning partner, i, the female partner or wife, matching the empirical fact that women tend to be lower earners on average. However, one can think of the market earning capacity as being adjusted for home productivity, as we discuss below.[14]

In the first period, couples select the level of time investment for each partner to make in the public good, τ_i and $\tau_j \in [0, 1]$. One example of a household public good would be children, but there can be other household public goods as well. These investments come at the cost of future earnings. We assume partners are restricted to spend a unit of time investing in either work or the public good.[15] Thus, partner k's second period earnings will be $\Omega_k(1 - \tau_k)$. As a result, the higher is the level of investment, the higher the utility partners derive from the public good, but also the lower the consumption possibilities in the second period.

The function $Q(\tau_i, \tau_j)$ is concave in both arguments, and for simplicity is symmetric in τ_i and τ_j and has the property that $\frac{\partial Q}{\partial \tau_k} \to \infty$ as $\tau_k \to 0$. These restrictions mean that neither partner has an absolute advantage in investing, and both partners would find it optimal to invest at least a small amount.[16] Note that it would be easy to replace the unequal earnings capacity with an unequal return to investing in public goods. [17] Thus, one should think of the partner with the lower Ω as the partner with the comparative advantage in household investments, and the partner with the higher Ω as the partner with the comparative advantage in market work.[18]

In the first period, couples earn only fraction μ of their Ω, representing income growth over time. However, they also have access to assets, A. They can transfer resources from the first to the second period through savings, s, with a return of r.

Utility in the first period is certain, while utility of each partner in the second period if they remain married is subject to a common utility shock, ϕ, centered around zero, whose cumulative distribution will be denoted $L(\phi)$. Bad shocks may cause individuals to prefer dissolving the relationship, in which case they avoid the shock. Assuming divorce does not destroy any value for the couple, Pareto separation occurs whenever $\phi < 0$.

Individuals may receive different consumption when divorced than when married, so second-period consumption utility will be given by $E(u(c_{2k})) = (1 - p)u(c^m_{2k}) + pu(c^d_{2k})$, where $p = P(\phi \leq 0)$ and c^m_{2k} denotes the consumption of individual k when married and c^d_{2k} denotes the consumption when divorced. Individual k's utility is thus:

$$U_k = u(c_{1k}) + E(u(c_{2k})) + (1 - p)E(\phi|\phi > 0) + 2Q(\tau_i, \tau_j).$$

[14]Our theoretical analysis can apply to any couple with a difference in relative earning power. However, our empirical estimations will follow the statistics that women tend to be the lower earning partners on average, which is true for 75% of couples in our sample. In addition to traditional gender norms, this may follow from the fact that pregnancy, birth, and breastfeeding all must necessarily be done by the mother, and therefore mothers typically have a higher household productivity in these aspects, although the gender wage gap also persists for adoptive parents (Kleven et al., 2020).

[15]Unlike Voena (2015) and Chiappori and Oreffice (2008), our model does not feature leisure, Our results would still go through if we allowed men and women to split their time between labor, leisure, and investment–the key is simply that some time is spent on the creation of public goods, which is supported by time use data showing that for married women with children, non-labor hours are split roughly equally between leisure and investment in public goods.

[16]Relaxing that assumption would simply make our results more stark.

[17]The fact that there is evidence of convex returns to work hours, particularly for high skill occupations, would also increase incentives for specialization between partners (Cortés and Pan, 2019). There is also evidence that higher skill parents may have higher productivity than hired care.

[18]It is also possible for women's smaller Ω to result from labor market discrimination.

The public good function Q is multiplied by 2 since parents enjoy the public good in both periods.[19]

2.2 Couple's problem

We assume that a couple maximizes the sum of their utilities, or joint household production, over the choice variables of husband's and wife's investments in the public good and savings.[20] Then, the couple's problem can be summarized as:

$$\max_{\tau_i,\tau_j,s} \quad u(c_{1i}) + u(c_{1j}) + E(u(c_{2i})) + E(u(c_{2j})) + 2(1-p)E(\phi|\phi>0) + 4Q(\tau_i,\tau_j,s) \tag{1}$$

subject to the following constraints:

$$c_{1i} + c_{1j} = \mu\Omega_i + \mu\Omega_j + A - s$$

$$c_{2i}^m + c_{2j}^m = c_{2i}^d + c_{2j}^d = \Omega_i(1-\tau_i) + \Omega_j(1-\tau_i) + s(1+r)$$

$$\tau_i, \tau_j \leq 1$$

When there is an interior solution (as long as A is sufficiently small relative to Ω_i and Ω_j) investments in the public good will be made until:

$$-\frac{\partial\left[E(u_{2i}) + E(u_{2j})\right]}{\partial\tau_k} = 4\frac{\partial Q}{\partial\tau_k}, \tag{2}$$

because investing in τ increases child quality while decreasing second period consumption through the budget constraint. Note this condition simply requires that the marginal benefit of investing in public goods in terms of utility derived from them be equated to the expected marginal cost, born in the second period.

2.2.1 Full commitment

To first establish the full commitment benchmark, we assume individuals can reliably commit to how to share resources when divorced. Since they behave cooperatively (or collectively with equal Pareto weights), the optimum will be equal sharing of resources in all periods and states of the world such that consumption of both partners in the first period will be given by $c_1 \equiv \frac{1}{2}*(\mu\Omega_i+\mu\Omega_j+A-s)$ and consumption of both partners in either marriage or separation in the second period will be given by $c_2 \equiv \frac{1}{2}*(\Omega_i(1-\tau_i)+\Omega_j(1-\tau_j)+s(1+r))$.

Using the fact that we will have equal sharing and perfect commitment, and that divorce does not affect income, second period consumption will be the same no matter the love shock received.

Thus, savings decisions will be made such that:

$$u'(c_1) = u'(c_2)(1+r).$$

[19] The exact assumption as to when the public good is enjoyed is irrelevant to our results.

[20] This is isomorphic to a collective model with symmetric weights, and our conclusions would also hold for unequal weights, as long as consumption is shared more equally in marriage than is mandated in divorce. Our predictions would also go through with private decision making, as we further discuss in Section 2.6.

And, to solve for optimal public good investments, we can collapse the left-hand side of equation 2 as follows:

$$\begin{aligned}-\frac{\partial\left[E(u_{2i})+E(u_{2j})\right]}{\partial\tau_k} &= -(1-p)\left(\frac{\partial u(c^m_{2k})}{\partial\tau_k}+\frac{\partial u(c^m_{2k'})}{\partial\tau_k}\right)-p\left(\frac{\partial u(c^d_{2k})}{\partial\tau_k}+\frac{\partial u(c^d_{2k'})}{\partial\tau_k}\right)\\ &=(1-p)(\frac{1}{2}\Omega_k u'(c_2)+\frac{1}{2}\Omega_k u'(c_2))+p(\frac{1}{2}\Omega_k u'(c_2)+\frac{1}{2}\Omega_k u'(c_2))\\ &=\Omega_k u'(c_2).\end{aligned}$$

Yielding the following condition for optimal investment of either partner:

$$\Omega_k u'(c_2) = 4\frac{\partial Q}{\partial\tau_k}.$$

As such, the optimal household specialization will be proportional to the ratio of endowments between partners:

$$\frac{\Omega_i}{\Omega_j} = \frac{\frac{\partial Q}{\partial\tau_i}}{\frac{\partial Q}{\partial\tau_j}}.$$

That is, the partner with the higher earning capacity will spend more time investing in market work, while the partner with the lower earning capacity will spend more time investing in public good production, but both will consume equally.

Note that mutual consent to divorce assists in the implementation of the full commitment equilibrium. This is because if the shock is such that the richer partner wishes to divorce while his partner does not, he would need to offer her the same consumption level she would receive in marriage in order to obtain her consent to do so. However, it is not sufficient since once both partners want to divorce, mutual consent does not guarantee that the pre-determined division of resources would be maintained. However, if negative love shocks of that magnitude are rare, a mutual consent regime can be close to full commitment.

2.2.2 Imperfect commitment

Let us now assume that partners cannot commit to a post-divorce division of resources. This is equivalent to assuming unilateral consent to divorce. Although there may be some income sharing mandated by the court in divorce, we assume it will not make up for the full income sharing within marriage (Del Boca and Flinn, 1995). Thus, in the case of divorce, each partner will consume a share $\beta > \frac{1}{2}$ of their own income, and $1-\beta < \frac{1}{2}$ of the other party's income, making consumption when divorced more reliant on one's own earnings. Additionally, savings will be divided with some proportion $\delta \leq 1-\beta$ going to the lower-earning partner, and $1-\delta$ going to the higher earning partner. Thus, we assume for now that assets are less equally divided upon divorce than income to illustrate the impact of imperfect commitment.

Second period consumption will thus now be given by:

$$c^d_{2i} = (1-\beta)\Omega_j(1-\tau_j)+\beta\Omega_i(1-\tau_i)+\delta s(1+r)$$

and

$$c_{2j}^d = \beta\Omega_j(1-\tau_j) + (1-\beta)\Omega_i(1-\tau_i) + (1-\delta)s(1+r).$$

This will imply that some men will wish to divorce when their partner will not want to, since men are assumed to be the higher earning partner. Specifically, they will want to divorce when $u(c_2) + \phi < u(c_{2j}^d)$ which will occur when $\phi < \bar{\phi} = u(c_{2j}^d) - u(c_2) > 0$. Because the husband has the "right" to seek divorce, if a wife wishes to remain married, she will need to offer her partner the utility he would obtain in divorce. We call this state "renegotiation," and it occurs whenever $0 < \phi < \bar{\phi}$. Divorce will continue to occur only when $\phi < 0$.

The couple's problem remains as in (1), but consumption whenever $\phi < \bar{\phi}$ will deviate from the married values. Specifically, when divorced, $\phi < 0$, it will be c_{2i}^d and c_{2j}^d above, and when consumption is renegotiated, but divorce avoided, consumption will be c'_{2i} and c'_{2j}, where $u(c'_{2j}(\phi)) = u(c_{2j}^d) - \phi$. The expectation in the second period of (1) is now a weighted average of three scenarios:

$$E(u(c_{2i})) + E(u(c_{2j})) = \underbrace{(1-\bar{p})(u(c_{2i}^m) + u(c_{2j}^m))}_{\text{marriage}} + \underbrace{\int_0^{\bar{\phi}} (u(c'_{2i}) + u(c'_{2j}))l(\phi)d\phi}_{\text{renegotiation}} + \underbrace{p(u(c_{2i}^d) + u(c_{2j}^d))}_{\text{divorce}} \quad (3)$$

where $\bar{p} = P(\phi < \bar{\phi})$ and $p = P(\phi < 0)$.

It is easy to show that equal sharing will continue to occur in the first period, and in the second period whenever $\phi \geq \bar{\phi}$. However, the lower level of consumption sharing in either the renegotiated or divorced state will affect first period child investment decisions.

Proposition 1 *Households will specialize less and will save less with imperfect commitment. Public good creation will be lower. The less income sharing there is upon divorce, the less specialization there will be.*

Proof. See Appendix A. ■

The key driver of this result is that specialization worsens the commitment problem in the second period, because it reduces the lower-earning partner's guaranteed share of income. Thus, her investment carries two additional costs: first, it further reduces consumption of the partner whose marginal utility of consumption is higher, making it much more costly than if the burden could be shared efficiently, and secondly, it increases his temptation to divorce since she brings less to the household in the second period, which shifts weight toward the scenario where specialization is more costly. Thus, specialization carries an efficiency cost when there is imperfect commitment, and couples will specialize less than is optimal, and therefore also produce a lower level of household public goods.

2.3 Commitment technology

We now introduce a commitment technology that allows savings to be shared more favorably to the lower-earning partner than second-period income. This correlates to the special status in the marriage contract given to assets accumulated during the marriage. Upon divorce they are treated as *joint* property, because

marriage as a legal contract rests on the presumption of division of labor, and thus shared production.[21] Under perfect commitment, this technology would have no effect on decisions. However, under imperfect commitment, we will show that this alters public good investment decisions.

To allow for the fact that there is some choice as to whether to intermingle pre-existing assets, such as by opening a joint marital account or purchasing a joint home, we now allow couples to choose whether to save in a vehicle that will be split according to $\delta \leq 1-\beta$, or to save in a vehicle where the lower earning partner receives share $\alpha > 1-\beta$. Denote savings placed in the vehicle split by α as s_α, and savings placed in the vehicle split according to δ as s_δ.[22] Then, the couple's second period divorced consumption levels will now be given by:

$$c_{2i}^d = (1-\beta)\Omega_j(1-\tau_j) + \beta\Omega_i(1-\tau_i) + \delta(1+r)s_\delta + \alpha(1+r)s_\alpha$$

and

$$c_{2j}^d = \beta\Omega_j(1-\tau_j) + (1-\beta)\Omega_i(1-\tau_i) + (1-\delta)(1+r)s_\delta + (1-\alpha)(1+r)s_\alpha.$$

Define $\bar{\alpha}(s^*)$ as the savings-sharing rule that would make $c_{2i}^d = c_2$, the full commitment consumption level. Up to that point, the higher is α, and the higher portion of savings placed in the α vehicle, the closer resource sharing gets to the perfect commitment case, leading to more specialization and more public good investments. This gives rise to the following proposition:

Proposition 2 *Under imperfect commitment, if a couple has access to a savings vehicle through which savings are divided more favorably to the lower-earning partner than is income, they will choose to save 100% of their savings in this vehicle as long as* $\alpha < \bar{\alpha}(s^*)$

Proof. Denote the optimal utility obtained from the relationship by the couple as V_M. By the envelope theorem, the impact of an increase in α on the ex-ante utility of the couple will be given by

$$\frac{\partial V_M}{\partial \alpha} = p(1+r)s * (u'(c_{2i}^d) - u'(c_{2j}^d)) > 0 \quad \forall \alpha < \bar{\alpha}(s^*)$$

Thus, a couple will always prefer having a larger α. The return on their investment will be larger, and they will save all their savings in this vehicle. ■

Proposition 3 *Under imperfect commitment, if a couple has access to a savings vehicle through which savings are divided more favorably to the lower-earning partner than is income, they will have more specialization within the household than couples without access to that vehicle for high enough values of* α*. Public goods will be larger and the relationship will be more stable.*

[21] Joint assets are to be divided either evenly (in community property states) or "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.

[22] One should have in mind that the higher earning partner could choose savings vehicles that are easy for him to liquidate or dissolve in case of marriage dissolution, or savings vehicles that are illiquid and easily observable by both parties. Joint marital accounts and homeownership are examples of the latter vehicle.

Proof. What determines specialization is the ratio of the marginal costs of investment, given by:

$$\frac{\Omega_i \left((1-\bar{p})u'(c_2) + p(\beta u'(c_{2i}^d) + (1-\beta)u'(c_{2j}^d)) + \int_0^{\bar{\phi}} (\gamma_\phi u'(c'_{2i}) + (1-\gamma_\phi)u'(c'_{2j}))l(\phi)d\phi \right)}{\Omega_j \left((1-\bar{p})u'(c_2) + p(\beta u'(c_{2j}^d) + (1-\beta)u'(c_{2i}^d)) + \int_0^{\bar{\phi}} (\gamma_\phi u'(c'_{2j}) + (1-\gamma_\phi)u'(c'_{2i}))l(\phi)d\phi \right)}.$$

If savings were held constant, it is easy to show that the above expression would be closer to the optimal specialization of Ω_i/Ω_j when having access to the α vehicle, because in the divorced or renegotiated state, the lower-earning partner's consumption would increase while the higher earning partner's would decrease. It would also make renegotiation less probable, making the ratio of marginal costs closer to the full commitment case. Thus, to prove that specialization increases with α sharing, we only need to show that savings respond in a way that does not undo these results, which is shown in the extended proof in Appendix A.

Increased specialization will increase Q, the public good investment, since the burden of the investment will now lay less heavily on the higher cost partner and more on the low-cost partner. Finally, relationships will be renegotiated less often, since consumption in the divorced state for the high-income partner will be lower, reducing his desire to want a divorce, leading to more relationship stability. ■

Note that saving into joint assets provides a way for a couple to make up for the lost contracting security of full commitment. The couple prefers to "tie their savings to the mast" in order to enter a more binding contract, and thus reap more value from the marriage. Although here we assume cooperative decision making, even if the decision were in the husband's hands alone, as long as he cares about child quality sufficiently relative to private consumption in the second period, he, too, would prefer to put at least some savings into the commitment channel. Meaning, his total utility can *increase* in the share of assets that are given to his partner upon divorce, up to the value that makes her fully specialize in home production. This also provides an explanation for the relative rarity of prenuptial contracts in the US (Weiss and Willis, 1993), since the husband may prefer to guarantee division of joint assets in order to align incentives for public good production.[23]

2.4 Selection into marriage

We now allow a couple to decide, in the first period, between non-marital fertility and marriage (abstracting away from matching). While non-marital fertility is free, marriage has a utility cost of F, drawn from a random distribution.

We model non-marital fertility as a union that has potentially less income sharing upon separation than marriage, and that does not offer commitment to share assets.[24] In the United States, non-marital relationships traditionally offered no protection to partners at the moment of separation. Over time, income sharing post-separation has been introduced, in the form of non-marital child support enforcement.[25] However, a similar change has not happened in the case of assets. In non-marital fertility, assets are owned

[23] One may wonder why he does not provide such security through a prenuptial agreement that is punitive toward the husband in case of divorce, but investing in joint savings, such as purchasing a home, is likely to be more culturally accepted and easier to implement, as well as providing other benefits.

[24] This is in line with Gemici and Laufer (2011), where cohabitation is considered to offer less commitment than marriage, and accordingly, empirically found to have less specialization.

[25] See Section 4.

by whoever acquires them, no matter the duration of the relationship.[26] We will thus assume all assets are shared according to $\delta < 1 - \beta$, as in our imperfect commitment case. Our assumption that savings in non-marital relationships are always shared in a way that favors the richer partner stems from the fact that the higher-income partner is more likely to be able to acquire the savings. Replicating asset sharing outside of the marriage contract would be quite costly and legally complex.[27]

If couples can choose which relationship to enter, the decision will be made based on the total utility partners can ex ante anticipate to receive in each case. Let $V_R(A, \Omega_i, \Omega_j, F)$ denote the joint maximized utility of a couple in a given type of relationship R, including the fixed cost of entering the union. Couples will pick the relationship that offers the highest V_R. We will assume that F is centered above 0, thus that marriage has higher average fixed costs than non-marital fertility, and therefore will be preferred by couples who receive sufficiently large benefits from the stronger contract to justify the costs.

Proposition 4 *If there is imperfect commitment in both marriage and non-marital fertility, but only marriage provides access to the commitment technology, the relative preference for marriage will increase in A for large enough α. Formally, $\frac{\partial V_M(A,\Omega_i,\Omega_j,F) - V_N(A,\Omega_i,\Omega_j,0)}{\partial A} > 0$.*

Proof. From the envelope theorem, we know that $\frac{\partial V_R}{\partial A} = u'(c_1) > 0$. As A increases, marriage and non-marital fertility thus provide more utility. We already know that in equilibrium $c_1 = 0.5(\mu\Omega_i + \mu\Omega_j + A - s^*)$. Thus, how assets will influence the utility of each type of relationship will entirely depend on the level of optimal savings elected in a given type of relationship. Appendix A demonstrates that savings will be larger in marriage than in non-marital fertility for large enough α, which will mean that first period consumption will be lower in that case. Given that, $\frac{\partial V_M}{\partial A} > \frac{\partial V_N}{\partial A}$. ■

Intuitively, since assets can be consumed in two periods, the marginal utility of consumption between them must be equal (up to the return), and thus the value of assets can be summarized by people's willingness to defer consumption in the first period in order to harness its value in the second. The fact that individuals save more under marriage (when the commitment technology is available) indicates that assets contribute more to utility. And, if assets contribute more to utility in marriage than in non-marital fertility, joint utility from marriage will increase relatively more quickly in assets.

2.5 Empirical implications

Two natural empirical predictions of our model would be that a legal regime that divides assets more favorably to the lower-earning partner would encourage specialization and public good provision, and moreover that couples with more assets should be more likely to marry. Unfortunately, variation in assets are likely to carry substantial selection effects. And, while states do differ in how marital property is divided, these laws have not changed *over time*, meaning there is no way to separate these differences from state fixed effects. While we can show that stylized facts are consistent with the predictions of our model in these

[26] There 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.

[27] This does not imply that it is impossible for cohabiting couples to at least partially replicate this through a legal contract. However, it will be more difficult, more costly, and less secure than marriage. Nevertheless, the key element is that it will be reserved for wealthy individuals who will be able to put something "at risk." Thus, again, those with higher assets will have more household specialization and higher public good provision.

domains, to develop a more dispositive test of our model's validity, we turn to two related implications in our model where we can find quasi-exogenous variation.

First, homes are a type of asset particularly likely to be divided in a way that favors the lower-earning partner. This is because usage rights of the home are often granted to the person who has primary custody until the children reach adulthood. Thus, the same specialization decision that makes the wife lower earning *also* makes her more likely to get a greater share of the value of the home, making it an ideal insurance vehicle. For identification purposes, the ability to purchase a home depends on having sufficient assets for a down payment. The amount of assets required at a specific time will depend on local housing market conditions. Our model offers the result that if access to the commitment savings technology depends on initial asset level, variation in the "threshold" for access will create variation in specialization and public good provision.

Proposition 5 *Assume only couples with initial $A > \lambda$ are able to access to a commitment technology. A fall in λ will lead to more specialization, higher public good provision, and more relationship stability. Conditional on marriage, this will be the case unless selection into marriage undoes the main effect.*

Proof. Denote V_M as the value of marriage when a couple has access to the commitment technology and $\widetilde{V_M}$ when it does not with $V_M(A, \Omega_i, \Omega_j, F) > \widetilde{V_M}(A, \Omega_i, \Omega_j, F)$. Define F_M as and $\widetilde{F_M}$ as the maximum cost such that marriage (with commitment and without, respectively) is preferred to non-marital fertility where $\widetilde{F_M} < F_M$. From Proposition 4, we know that $\frac{\partial F_M}{\partial A} > 0$ while $\frac{\partial \widetilde{F_M}}{\partial A} = 0$. This allows us to separate the population into 3 different groups based on F. For those with $F > F_M$, $V_N > \widetilde{V_M}$, a fall in λ will have no effect. For those with $F < \widetilde{F_M}$, $V_M > \widetilde{V_M} > V_N$, a fall in λ will not impact selection into marriage. However, for those where A was originally lower than λ but now can access the commitment device, Proposition 3 details that they will have more specialization, higher public good provisions and higher relationship stability. Finally, for $F_M > F > \widetilde{F_M}$, a fall in λ will cause those for which $A > \lambda$ to select into marriage and from Proposition 3, have more specialization, higher public good provisions and higher relationship stability. However, they have lower levels of A than existing married couples, which could influence their specialization, household public good provision, or relationship stability. Thus, a fall in λ will increase public good provision and specialization. *Conditional on marriage* specialization and public good provision should also increase, unless the proportion of new couples selecting into marriage is very large, and their lower A leads to lower public good provision and specialization, dominating the effect for existing married couples. ■

Second, although variation in asset level by couple is likely to be endogenous, changes in the policy environment substantially impact the way asset holding correlates with marriage. The role of assets in determining marriage selection will be much more important when marriage offers less commitment relative to non-marital fertility. For example, the introduction of unilateral divorce, which decreased marital commitment, and child support outside of marriage, which increased non-marital commitment, should both raise the importance of assets in determining the value of marriage.

Proposition 6 *For large enough α and low enough δ, the correlation between A and the probability of marriage will increase when marriage becomes more similar to non-marital fertility. If there is a level of assets λ required to access the commitment device, this will strengthen this effect.*

Proof. Assume that marriage changes from offering perfect commitment to featuring unilateral divorce. From the proof of Proposition 4, we know that the return to assets in a union can be measured through savings, which captures the marginal utility of first period consumption. Appendix A shows that for α large enough, savings will be larger with imperfect commitment than with perfect commitment. Since savings are larger, the slope of the joint utility function with respect to A will be more positive for imperfect than perfect commitment. Thus, the correlation between assets and the probability of marriage will increase when divorce changes from bilateral to unilateral.

Assume that non-marital fertility sees an increase in its degree of income sharing upon separation, making it more similar to that of marriage. For small enough δ, Appendix A shows that savings will be smaller when the degree of income sharing rises. Since savings will be smaller, this implies that the slope of the joint utility function with respect to A will become less positive for non-marital fertility compared to marriage. Thus, the correlation between assets and the probability of marriage will increase as non-marital fertility becomes more similar to marriage in terms of income sharing. ■

The role of assets in determining marital selection thus grows as marital commitment *not* from assets weakens. This is the case for large enough α and low δ, that is to say for couples where assets would particularly benefit the high earner without commitment technology and would be given with a large enough share to the lower earning partner in presence of that technology.

We simulate these two empirical implications using a parameterized version of our model in Figure 1. Panel (a) shows that falling house prices, when a down payment is required to purchase a home, result in increased specialization and public good production, including when restricting to married couples. Panel (b) shows that as marriage becomes more similar to non-marital fertility, the gradient between marriage selection and asset-ownership increases, with a much larger gap between marriage rates for those without and those with assets when marriage and non-marital fertility are most similar. Moreover, it shows persistently high marriage rates for wealthy individuals under any policy environment, demonstrating a key implication of our model that wealth provides access to a more advantageous marriage contract.

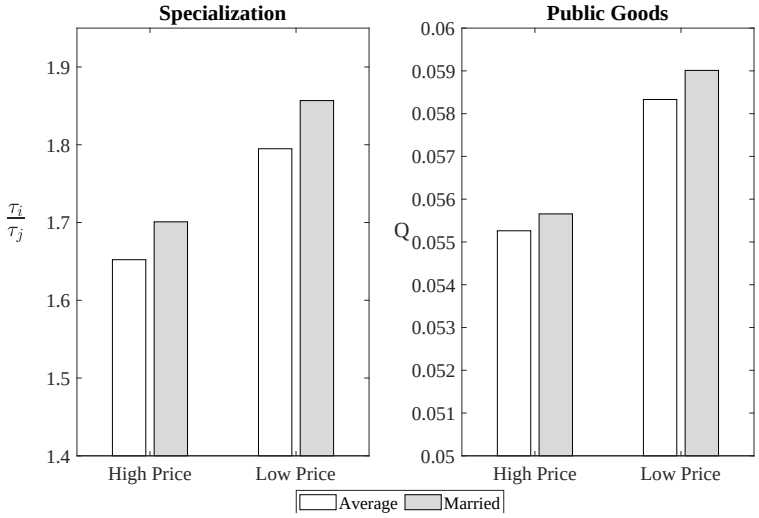
2.6 Extensions

The key ingredient for our result is that imperfect commitment leads to inefficient investment decisions that can be in part be mitigated by having savings at "stake" to protect the lower earning partner. There are many ways we could generalize this result.

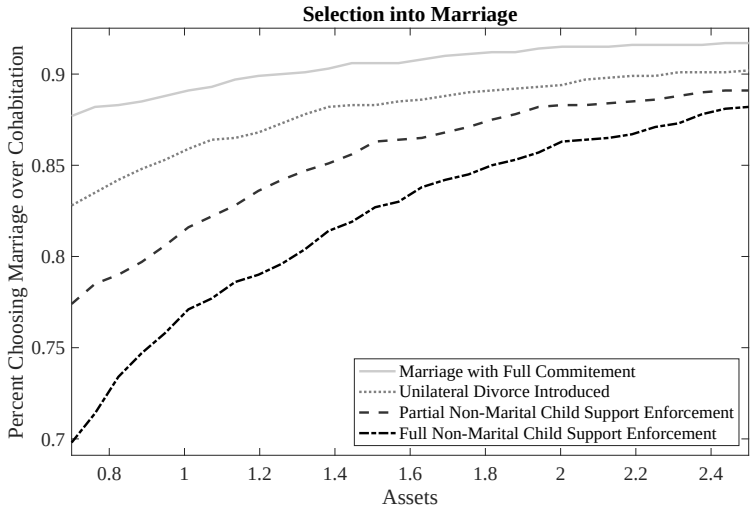
Alternative decision-making Our model assumes collective decision-making, but the result of joint savings increasing specialization would carry through with a non-cooperative model where each partner picks individually the amount of investment they wish to make in the public good. Joint savings would decrease the differential in marginal utilities of consumption between women and men in the second period, thus bringing investments closer to the efficient Ω-driven ratio. In this case, one can think of joint savings as lessening the "public goods' problem" of specialized investment. As we earlier discussed, our model is also robust to collective decision making with unequal weights, as long as the weights are such that consumption is shared more equally in marriage than in divorce.

Figure 1: Simulations of Empirical Implications

(a) Proposition 5: Down Payment Requirement with High and Low House Prices



(b) Proposition 6: Relationship Between Marriage and Assets, by Policy Environment



Notes: Panel (a) simulates the impact of lower home prices, reducing the λ required to access the commitment device, demonstrating that specialization and public goods increase. The gray bars restrict to the married population, which builds in the selection effect that also results from this change. Panel (b) simulates the impact of making the marriage and non-marital contracts more similar on marriage selection by initial asset level, first through the introduction of unilateral divorce, and then through strengthening non-marital child support.
Simulation parameters: CRRA utility with $\rho = 1.4$. $\Omega_i = 0.2$ and $Omega_j = 0.5$. First period income share $\mu = 0.5$. Child production $Q = 0.15 * tau_i^{0.2} * tau_j^{0.2}$. Interest rate $r = 1.0204$. Income sharing in marriage: $\beta = 0.75$, in non-marital fertility: $\gamma = 0.9$, and then raised to 0.825 and 0.75. Asset division in marriage: $\alpha = 0.3$, in non-marital fertility: $\delta = 0.1$. Love shock normal(0,2), cost of marriage lognormal(3.8, 2.1). High price $\lambda = 2$, low price $\lambda = 1.2$.

Linear utility If we assume that a couple makes investment decisions jointly, like in the above model, for joint utility to fall with imperfect commitment, we rely on the concavity of the utility function. Since our model emphasizes uncertainty, it is natural to include risk aversion in the model. However, we could alter our model to one where consumption is valued linearly as long as investment decisions were taken individually, as stated above. With linear utility, the role of joint savings would be to reduce the probability that a man would want to divorce, and thus decrease the marginal cost of investments to the woman by shifting weights to a scenario where they absorb less of the cost.

Other sources of heterogeneity In addition to selection on assets, higher earning couples will be more likely to choose marriage, as would, for example, couples who had a Q function that yielded higher utility from public goods, e.g., children. But note, one key insight of our model is that this relationship between marriage and public good provision like children may not only be selection, but may be a causal effect of marriage. In our model, couples who choose marriage will have more specialization and higher public goods than that same couple would have had counterfactually if they were restricted to a non-marital relationship.

Utility cost of divorce Also, in the model above, the utility a couple obtains from household public goods is the same within and outside of a relationship. If we assume instead that the enjoyment that a couple derives from public goods is reduced when divorced or separated, we generate some interesting additional insights. Formally, let us assume that the utility from public goods becomes ηQ, where $\eta < 1$ when a couple is separated. This will now shift the divorce threshold as the husband will be less keen on divorcing than before since he will lose public goods 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.

In this context, if a couple has access to a joint savings technology, they will have higher household public goods, which will raise the cost of divorce. The probability of divorce influences investment in return through two channels: it makes specialization more likely since the couple will be with a higher probability in the "married state" where marginal costs of investing for the lower earning partner are lower; it can also decreases specialization since the lower earning partner will have a lower incentive to invest as to decrease the probability of divorce. As long as the second effect does not undo the first, we will have even lower costs of divorce. These couples would thus have higher relationship stability than those without access to the commitment technology.

Marriage timing Another potential simplification in our model is that individuals marry in the first period as we abstract from marriage timing. To explore this, let us imagine now that individuals live for 3 periods. Individuals can either marry in the first or the second period. They can only have one such event in their life. They all receive the love shock after the second period. Those who marry early can enjoy the public goods of marriage for an extra period. For individuals with little assets, this change will be irrelevant. They will marry in the first period (if at all) and will not use the commitment technology. But for couples with more assets, there will be an advantage to will delay marriage as to either gain access to the commitment technology or to increase the amount of savings that can be placed in the commitment vehicle if the benefits of adding or increasing commitment to the relationship compensates for the loss of one period of marriage. Thus, individuals who have higher endowments would delay marriage more since this allows them to save

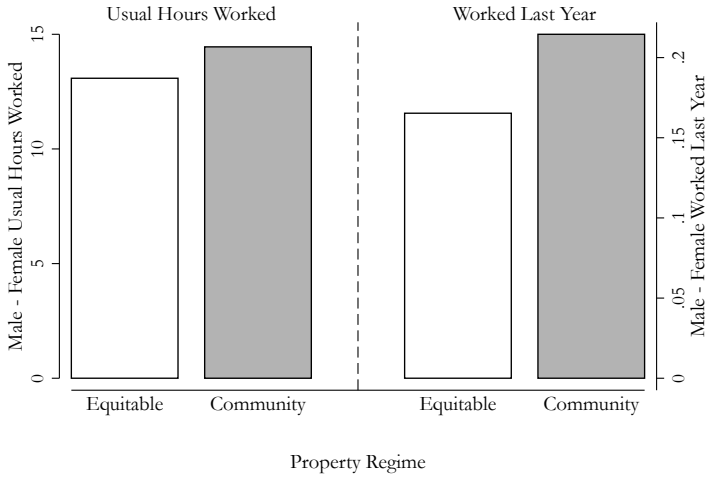
larger amounts in the joint savings vehicle, thereby strengthening the relationship more. Poorer individuals would see less benefits to delaying marriage since they would not be able to improve commitment in that fashion. In that world, wealthier individuals will choose marriage, but delay it, while 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).

3 The Relationship Between Collateral and Specialization

Having shown a model where collateralizing marriage increases labor specialization, household public goods, and relationship stability, we now turn to exploring that relationship empirically. Proposition 3 in our model states that stronger asset division upon divorce leads to more specialization. Indeed, comparing states with community property (where everything is divided evenly) versus equitable division (where relative contributions are taken into account) shows substantially greater specialization in states with more protection for the lower-earning partner.

Figure 2 uses data from the American Community survey to show the difference between male and female labor supply measures, both on the intensive and extensive margin, in community versus equitable states. The male–female hours gap is 10% larger in community property states, while the gap in extensive margin labor supply is nearly 30% larger, and this is significant in a regression with demographic controls (shown in Appendix Table B.1).

Figure 2: Association Between Community Property Laws and Male − Female Labor Supply



Notes: Both the difference in usual hours worked and worked last year are significant in a regression with controls for race, age, and education, as shown in Appendix Table B.1. Data uses individuals married within the last 18 years in the 2008-2014 ACS. Arizona, California, Idaho, Louisiana, Nevada, New Mexico, Texas, Washington, and Wisconsin are community property states, while the remaining stats are equitable division.

Unfortunately, while this evidence is suggestive, these laws have not changed over time, and thus their

effect cannot be distinguished from state fixed effects.

To provide evidence that this relationship between the level of commitment and specialization persists with exogenous variation, we now turn to testing Proposition 5, the impact of a changing asset "threshold" to access the commitment technology, in the form of a down payment to own a home. We argue that being able to purchase a home as a married couple substantially increases the capacity of a couple to save in a vehicle that will benefit the lower-earning partner. But, the ability to own a home is limited by having sufficient savings to cover the down payment, given the local housing market.

3.1 Homeownership as Commitment Technology

Investing in a family home creates a way for a couple to save in an asset with high commitment to sharing upon divorce. As 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.[28] 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. Moreover, whereas other forms of savings can be hidden or liquidated before divorce, homes are observable and illiquid. Thus, variation in access to homeownership can be viewed as variation in access to the commitment technology in our model.

The centrality of homeownership to American marriage and divorce "traditions" is demonstrated by a quote attributed to various celebrities: "Instead of getting married again, I'm going to find a woman I don't like and just *give* her a house."[29] Legally, homeownership plus marriage creates a state-contingent contract through which a man can put at stake some resources in case of a divorce.[30] Alternatives, e.g., divorce insurance, are scant since private markets would be riddled with private information problems.[31] 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).

Because houses tend to be purchased immediately in the period following marriage, there is a particular window of influence during which home prices are especially pertinent. Figure 3 examines homeownership rates per 4 month SIPP period 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 2 years. For a different life event, the birth of a first child, 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 a first child 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, and means that differential access to homeownership at the time of marriage may have long-lasting effects.

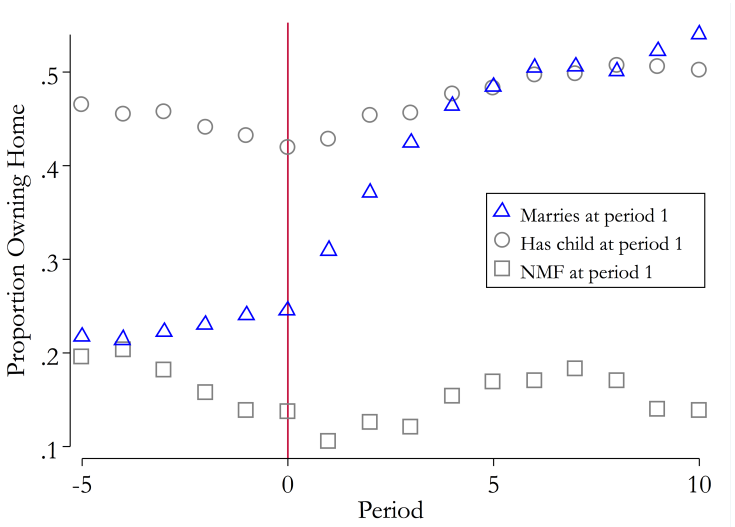
[28] And, specialization may strengthen the chance of this allocation (Wong, 2016).

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

[30] Note 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.

[31] Divorce 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.

Figure 3: Association Between Marriage and Home Purchase



Notes: Data uses the 2008 Survey of Income and Program Participation (as this dataset has 16 waves, versus more recent surveys that have shorter panels). 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, with each period being 4 months. 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.

Thus, we use idiosyncratic variation in local housing prices at the time of marriage as a source of exogenous variation in the ability to invest in joint assets, controlling for state and year fixed effects. To address worries about selection, we also use housing prices at age 25. And, to address issues of simultaneous causality of housing prices and other economic factors that could impact labor specialization, we further implement an instrumental variables strategy where housing prices are instrumented with historical patterns.

3.2 Empirical Specification

As Figure 3 shows that the year of marriage is a crucial time when couples acquire homes, we can think of low housing prices in the year of marriage as easier access to the commitment technology in our model. This would then be predicted to have a causal impact on specialization, and the resulting second period wages. We can directly measure these outcomes using work hours and wages for men and women.

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

$$Y_{i(smt)} = \beta_1 \left(-HPI_{sm}\right) + \beta_2 \, female_i \times \left(-HPI_{sm}\right) + \eta_s + \nu_m + \delta_t + \gamma \, X_i + \psi \, HPI_{st} + \varepsilon_{i(smt)} \qquad (4)$$

where the outcome of interest of an individual i, in state s, married in year m, and observed in year t in the ACS is regressed on the negative house price index at the time of marriage (in the current state) interacted with whether the individual is female.[32] We include state fixed effects, η_s, year of marriage fixed effects, ν_m, and year of survey fixed effects, δ_t, to isolate idiosyncratic variation. To rule out that correlation with current

[32] We divide the index by 100 to make the size of our coefficients more manageable, thus making it normalized to 1 in the base year and state.

housing prices (which may affect these outcomes) drives our effects, we additionally control in subsequent specification for the *current* housing price index, which varies by both state and survey year. In addition to controlling for gender, we also add controls for the age of the married individual and their educational attainment in subsequent specifications.

By looking at the differential effect for labor supply and wage outcomes for women versus men, we are able to rule out that direct effects of housing on, e.g., wealth, drive our effects, in essence creating a triple difference specification. For this reason, these outcomes regarding specialization are our primary outcome measures, and we present at the end additional results for outcomes that our model has predictions for that cannot be measured differentially for men and women: children's outcomes and divorce.

Note that assuming all women are the spouses likely to specialize in home production likely attenuates the effects we measure. For 76% of our sample, the husband works more hours than the wife, and thus the typical gendered pattern of specialization is sufficiently more prevalent than the reverse for this to be effective empirical shorthand. We examine "reverse specialized" couples in our robustness checks.

One threat to our identification would be if people select into the place or time of marriage based on housing prices, or low housing prices could induce people to marry who otherwise would not have. Thus, we also use a specification where instead of using housing prices at the time of marriage in the current state, and therefore needing to restrict to married individuals, we use housing prices at age 25, in the state of birth, for all individuals.

It is also possible that local time-varying factors co-determine specialization and housing prices, such as tastes for children, or other economic factors. To address this, we use an instrumental variables strategy introduced by Palmer (2015). To create the instrument, historical housing volatility in a state is multiplied by the national housing market trend, either amplifying it or dampening it locally, creating a measure that predicts housing prices, but cannot be related to concurrent local factors.

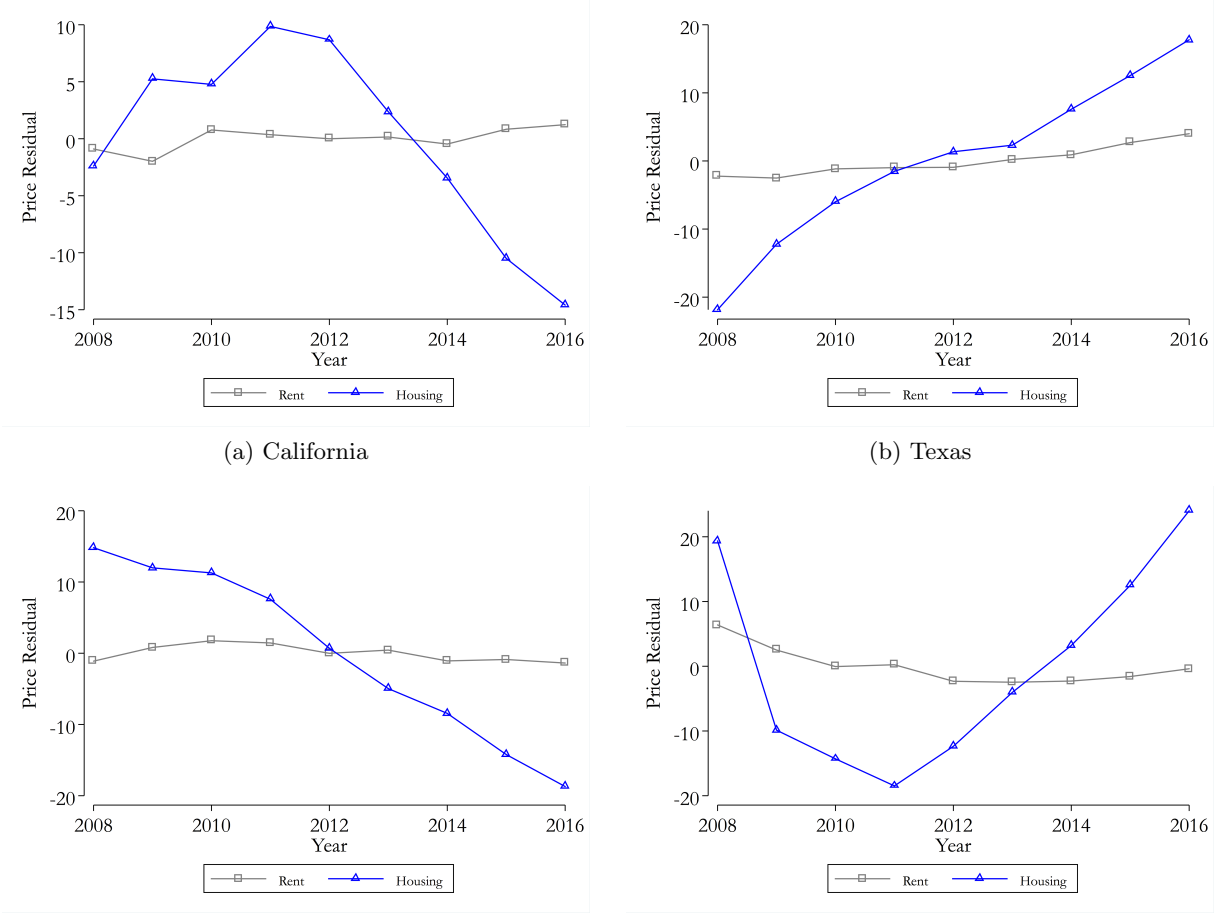
Our data source is the American Community Survey from 2008-2014. This cross-sectional survey has the advantage of including the age at first marriage, beginning in 2008, from which we can derive the year in which individuals married. For the time of marriage results, we restrict our sample to households where it is one individual's first marriage and where the marriage occurred between 1991 and 2014. (For age 25, this is done by individuals turning 25 in the specified years.) 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. The HPI is normalized to 100 in the base quarter of Q1, 1991, for each state. In the period of our data, it ranges from around 80 in Hawaii in the 90s to over 400 for Washington, DC in the late 2000s.

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). However, our results are robust to using variation at the MSA level instead.

In order to illustrate the variation we exploit, we graph residualized housing versus rental prices in example states in Figure 4. Housing prices and rental prices are clearly related, but housing prices tend to be much more volatile, exhibiting "boom and bust" cycles, whereas rental prices tend to change relatively smoothly with cost of living. We compare data on state-level rental prices from the Bureau of Economic

Analysis (available after 2008) to the housing price index in four large states to show that once state and year fixed effects are taken out, rental prices are basically flat, whereas housing prices exhibit significant local variation. It is exactly this idiosyncratic divergence in the two types of housing costs that would cause housing prices to influence home ownership decisions.

Figure 4: Comparison of rental and housing price index residuals by state



(a) California (b) Texas

(c) Illinois (d) Florida

Notes: Housing price index from the Federal Housing Finance Agency based on purchase-only data. Rental price index from the Bureau of Economic Analysis. Both series represent the residuals of the data against year fixed effects and state fixed effects.

To make this point more generally, we graph each state-year data-point for the residualized housing and rental prices against one another in Appendix Figure B.1, demonstrating that there is little correlation between the two series. This suggests that our housing price index measure will capture variation beyond those shocks that would affect renters.

3.3 Effect of Housing Prices on Homeownership: OLS

We first show that the housing price index at marriage indeed creates variation in the endogenous variable of interest, homeownership, in Table 1. These results suggest that a 1 point change in the re-normalized price index at the time of marriage, approximately the appreciation California experienced from 2011 to 2016, corresponds to an approximately 3 percentage point change in the rate of homeownership. That is, when the housing price index was lower by 1 point when they married, couples were 3 percentage point more likely to own a home in the survey year (on a base rate of around 68 percent).

This is robust to the inclusion of a control for the year of the survey HPI and for additional controls as described before. It is almost identical if instead we use the home price index at age 25 to avoid problems of endogeneous timing or location.

Table 1: Relationship between house price and home ownership

	At the time of marriage			At age 25 (state of birth)		
	(1)	(2)	(3)	(4)	(5)	(6)
−House Price Index	0.027***	0.028***	0.032***	0.041***	0.041***	0.040***
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.007)
Year of Survey HPI	No	Yes	Yes	No	Yes	Yes
Additional Controls	No	No	Yes	No	No	Yes

Notes: Data uses individuals in the 2008-2014 ACS who married within the last eighteen years, left, or turned 25 within the last 18 years, right who are head of the household or spouses of head of households. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage (in the first three columns) and at age 25 (in the last three), divided by 100. Fixed effects for the year of marriage (birth year), current year, and state are included in all specifications. Additional controls include a linear control for age and dummies for 4 educational categories. Standard errors are clustered at the state level. N=3,220,736 in the first three columns and N=2,585,764 in the last three.

3.4 Effect of Housing Prices on Specialization: OLS

3.4.1 Labor Supply

Our model suggests that access to a collateralized contract will enable the couple to have more division of labor within the household, captured by decisions over τ_i and τ_j in our model. We examine this by looking at the differential effect of housing prices on men's and women's labor supply, presented in the first three columns of Table 2, Panel A. The baseline effect is the effect for men, while the effect for $-HPI \times female$ is the effect for women relative to men. 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 sum of the coefficients is also negative, indicating that they also worked absolutely less. The magnitudes are such that housing prices being lower by 1 point at the time of marriage, which corresponded to a 3 percentage point higher homeownership rate, leads to a 1 percentage point lower probability of having worked last year and to about 0.8-0.9 less hours worked per week for women (summing the main and interaction effects).

Importantly, our results show that on the intensive margin, the effect of lower HPI go in the opposite direction for men and women. For usual hours worked, the effect of decreased housing prices is positive and

significant for men, while both the interaction effect and the sum of the two coefficients–which is the effect for women–are negative and significant at the 1% level. 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 (McClelland and Mok, 2012).[33] Instead, we see diverging labor supply responses between women and men, indicating that homeownership affects *division* of labor, consistent with our commitment story.

These results are consistent with our model where a fall in the threshold that gives access to the savings technology increases specialization. In the context of our model, this could be interpreted as marriages being more secure due to the investment in joint marital assets, and thus women having less need to protect their own income through higher labor force participation.[34]

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 affects 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 percentage points more likely to own a home lowers the probability that the wife works by about 3 percentage points and increases the usual work hours of men by 1 while decreasing that of women by 2.5. 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.

One could be worried that our results are driven by selection in either marriage timing in location, or selection into marriage. It should be noted that selection into marriage is most likely to work against us, since if affordable housing made marriage more appealing, it would be more marginal people drawn into the pool. Indeed, we see that marrying in a favorable housing markets is correlated with lower education.[35] It is possible that selection into time or place of marriage based on housing prices is correlated with propensity for specialization, though this would only be the case if indeed homeownership were useful as insurance for specialization. Nonetheless, to verify that the causal chain runs from easier homeownership, and thus more marital collateral, to specialization we redo our analysis in the last three columns of Table 2 using all individuals, married or not, and housing prices at age 25, the modal age at marriage, in the state of birth.[36] We find that, if anything, our results are stronger than before, confirming that selection was likely reducing the true effect.

[33]While Fortin (1995) suggests homeownership could affect women's labor supply through the channel of needing to pay off the mortgage, this would go in the opposite direction from what we find, and would again be expected to be directionally consistent for men and women.

[34]While other studies connect changes in women's hours to bargaining power (e.g., Voena, 2015), we emphasize the impact on public good provision, which we also measure directly in the next sub-section. Since in our empirical setting there is no legal shock to existing unions, but rather the endogenous decision to purchase a home, any increase in bargaining power results from a joint decision, which we show in our model can be ex ante optimal in order to increase public good provision. Further, in our robustness checks, we show no similar effect for childless couples.

[35]We check if the identity of those in our married sample changes depending on housing conditions at the moment of their marriage. We find that a lower HPI at the year of marriage is correlated with married couples having fewer years of education, see Appendix Table B.3. This provides empirical support that the selection is likely to work against us finding the pattern predicted by our model.

[36]While there may be consequences of graduating in a period of good housing conditions, it is unlikely that these economic shocks would make one gender work more and the other work less.

Table 2: Relationship between house price at marriage or age 25 and specialization

	At the time of marriage			At age 25 (state of birth)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Labor Supply					
	Worked Last Year					
−House Price Index	0.004	0.004	0.003	0.010***	0.011***	0.008***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
−HPI × female	-0.013***	-0.013***	-0.011***	-0.018**	-0.018**	-0.017**
	(0.004)	(0.004)	(0.004)	(0.268)	(0.273)	(0.255)
	Usual Hours Worked					
−House Price Index	0.418***	0.424***	0.409***	0.919***	0.963***	0.846***
	(0.127)	(0.126)	(0.117)	(0.930)	(0.932)	(0.871)
−HPI × female	-1.335***	-1.335***	-1.186***	-1.713***	-1.713***	-1.626***
	(0.258)	(0.258)	(0.249)	(0.474)	(0.474)	(0.442)
	Panel B: Wages					
	Wage (level)					
−House Price Index	3680***	3728***	3722***	6016***	6160***	5807***
	(809)	(799)	(739)	(1282)	(1319)	(1329)
−HPI × female	-7858***	-7859***	-7063***	-8371***	-8370***	-8126***
	(992)	(992)	(962)	(1288)	(1289)	(1221)
	Log hourly wage					
−House Price Index	0.018*	0.020*	0.019***	0.062***	0.065***	0.052***
	(0.010)	(0.010)	(0.006)	(0.012)	(0.013)	(0.013)
−HPI × female	-0.090***	-0.090***	-0.067***	-0.095***	-0.095***	-0.076***
	(0.012)	(0.012)	(0.010)	(0.013)	(0.013)	(0.010)
Year of Survey HPI	No	Yes	Yes	No	Yes	Yes
Additional Controls	No	No	Yes	No	No	Yes

Notes: Data uses individuals in the 2008-2014 ACS who married within the last eighteen years, left, or turned 25 within the last 18 years, right. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year and state of marriage, left, or age 25 in the state of birth, right, divided by 100. Fixed effects for the year of marriage (or birth year), current year, and state are included in all specifications. Additional controls include a linear control for age and dummies for 4 educational categories. Standard errors are clustered at the state level. At time of marriage, N=3,702,212 for all outcomes except log hourly wage where N=2,900,523. At age 25, N=3,709,453 for all outcomes except log hourly wage where N=2,956,363.

3.4.2 Wages

As the model predicts an effect of collateralization on future earning ability, we should also be able to see a change in wages, which in our model are determined by $\Omega_k(1-\tau_k)$. Moreover, if men are relieved from some of their responsibility to invest in household public goods by greater specialization, they should reap a benefit in wages. We test this piece directly in Table 2, panel B, by examining the impact of housing-price-induced homeownership on the relative wages of women versus men. The first three columns use the house

price at the time of marriage while the second three the one at age 25.

We find that lower housing prices (either at the time of marriage or at age 25) 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 lower 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. The magnitude of these coefficients reflects the substantial risk undertaken by women specializing in home production, and why they may only be willing to do it when collateral is present.

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., 2019; Bronson et al., 2017; Angelov et al., 2016), but add evidence that women experience these declines more when they are in collateralized relationships, which provide greater insurance for specialization. In couples where buying a home was made easier, women's time is reallocated toward child investments but lower personal human capital accumulation, with the opposite holding for men. 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 increasing their wages.

3.4.3 Time use

To demonstrate that the mechanism of the changes in labor hours is through greater specialization, and rule out alternative channels, we turn to a data source where we can examine time in home production directly. The American Time Use Survey documents time spent in a variety of tasks, for a "diary" covering a single 24-hour day for each respondent. The survey is linked to the CPS, and thus basic demographic information is available for each respondent. The demographic data does not include year of marriage, so we can only examine this using housing prices at age 25.

To examine the impact of lower house prices around the time of marriage, and thus higher home ownership, on investments at work and at home, we divide daily time use into three broad categories, adding up to the entire day (with the exception of a few missing or uncoded minutes): work, home production, and leisure. Home production includes chores, childcare, and home management. Leisure includes both traditional leisure activities, such as parties and recreation, and things one might be expected to do more of with more bargaining power, such as sleep.

Table 3 regresses each of these mutually-exclusive time use categories on the negative home price index, and its interaction with being female. The first panel focuses on our main sample for the labor outcomes analysis, those who turned 25 no more than 18 years ago. Women's time shows a substantial reallocation from work hours to home production, with no increase in leisure, consistent in the specialization story.

The second panel in Table 3 provides further evidence of our specified mechanisms. By restricting to individuals who are under 35, we restrict the sample to couples likely still to have young children, and thus still be in the first-period "investing" stage outlined in our model. During this period, we see that men's time in home production is in fact lower, while women's is sharply higher.[37]

[37]Note, that although we do not see large changes in men's minutes of work, we note that due to the possibility to be conducting a secondary activity in the ATUS, it is possible that work time or investments are changing–these investments may

Table 3: Relationship between house prices at age 25 and time use (in minutes per day)

	Dependent variable:					
	Time in work		Time in home production		Time in leisure	
	(1)	(2)	(3)	(4)	(5)	(6)
	Less than 43 years old					
−House Price Index	1.503	-0.086	1.143	1.713	-0.469	0.605
	(6.813)	(6.729)	(5.336)	(5.472)	(7.604)	(7.465)
−HPI × female	-18.31***	-16.28**	18.03***	17.25***	0.948	-0.328
	(6.733)	(6.321)	(4.154)	(3.869)	(4.803)	(4.712)
Observations	55801	55801	55801	55801	55801	55801
R-Squared	0.231	0.240	0.120	0.122	0.179	0.183
	Less than 35 years old					
−House Price Index	5.268	4.374	-12.56**	-11.90*	9.178	9.454
	(7.483)	(7.617)	(6.025)	(6.459)	(7.692)	(7.537)
−HPI × female	-23.65**	-21.29*	28.52***	27.05***	-2.578	-3.496
	(10.94)	(10.99)	(5.424)	(5.359)	(6.729)	(6.718)
Observations	33015	33015	33015	33015	33015	33015
R-Squared	0.224	0.234	0.126	0.133	0.178	0.180
Year of Survey HPI	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls	No	Yes	No	Yes	No	Yes

Notes: Data uses American Time Use Survey from 2003 to 2019, for individuals who either turned 25 no more than 18 years ago or no more than 10 years ago. Work is both work and work related travel. Home production includes childcare, housework, and errands, and all related travel. Leisure includes recreation, sleep, and volunteer and educational time. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of turning 25, divided by 100. Fixed effects for the year of birth, current year, and state are included in all specifications. Additional controls include a linear control for age and dummies for 4 educational categories. Standard errors are clustered at the state level.

Finally, we examine whether somehow the physical space or location of the home itself could be driving a change in time allocation. We confirm in Appendix Table B.6 that there is no change for time spent on the physical space of the home, such as interior or exterior maintenance, demonstrating that owning a home itself does not increase the household tasks workload for women.

These results demonstrate that the increase in specialization in labor hours is tied to a large increase in women's time in home production, and not tied to changes in leisure. We discuss how this assists in ruling out possible alternative explanations such as bargaining or income changes in Section 3.5 below.

3.5 Ruling out alternative explanations

3.5.1 Robustness

We first show that our results are not dependent on a particular sample or time period being selected. First, given that our mechanism of impact is through homeownership, one would like to see that there is no effect on individuals who do not own homes. In other words, if broad economic trends were at play, or if rental housing were equally efficient in delivering the benefits we find, one might expect an impact also on renters. Although this is conditioning on an endogenous variable, and should be interpreted with caution, Appendix Table B.4 shows that our effect is entirely absent for renters, with a slightly negative—rather than positive—impact of low HPI on men's labor supply.

Our hypothesized channel would also imply that those who never marry should not respond to the housing price at the modal age for marriage. We repeat our analysis of housing price at age 25 but this time restricting ourselves to *unmarried* individuals at the time of the survey. We show, in the top panel of Appendix Table B.5, that the coefficients are opposite signs for those never married, demonstrating that the channel of impact from housing prices to specialization runs through marriage.

We then perform several additional robustness checks, both for the original analysis, in Appendix Table B.4 and the age 25 identification strategy, in Appendix Table B.5. First, while using states is helpful in limiting selection effects, it also means aggregating results at a level that may contain very different housing markets. Thus, to check that our results hold with finer variation, we use MSA-level HPI variation instead, and find our results the same.[38]

We may think that high skill women may be facing particularly high costs of specialization, due to lost earning potential, and may thus be more affected by the presence of assets to "insure" her investments. The third panel of Appendix Table B.4 and the second of Appendix Table B.5 shows that the response we have documented is much stronger for college-educated men and women than for the rest of the population. This lends credit to the fact that our results are not driven by other shocks, but rather through the channel that we identified.

Then, to check the effects of using state of birth or prices at age 25 separately, we repeat the standard analysis with state of birth, and the age 25 analysis with state of residence, drawing identical conclusions.

be coded as things not typically classified as work in the ATUS. Additionally, due to the mutually exclusive nature of the categories, the sum of men's work and leisure must be increasing in Panel B.

[38]This can only be done for the first strategy since the second one uses state of birth and we do not have information on MSA at birth.

Finally, we show our results are robust to excluding the Great Recession, and to including year-times-region dummies to try to capture any sort of time-varying cultural differences that could be impacting our result.

3.5.2 General economic conditions

We next address several possible alternative explanations for our findings. First, one may be worried that housing prices stand in for other economic factors that influence specialization. In particular, low housing prices are likely to be correlated with a poorer labor market, which could have a differential impact by gender. We explore this by running the same regression we did above but this time using the unemployment rate at the time of marriage as the explanatory variable, in place of housing prices. The results are presented in Panel A of Table 4. They show that unemployment at the moment of marriage does not appear to influence the probability that either men or women worked last year. Being married in a state and year where unemployment was high leads men to work fewer hours and women to work more. This would be consistent with an environment where as unemployment increases, men are squeezed out of the labor market and women must work more to ensure higher household income. As high unemployment periods should correlate with low housing prices, this suggests that far from being likely to explain our main result, correlated economic conditions may weaken the effects we observe.

3.5.3 Suburbanization

Another possible explanation is that cheaper housing prices at the time of marriage may induce couples to move to the suburbs, and thus the specialization we observe is due to longer commuting times faced by these new suburbanites. First, we note that being exogenously induced to own a home by low home prices may in fact make it easier for people to live in more central areas, and thus low HPI is not necessarily correlated with moving far away. Second, we provide a more direct test by restricting our analysis to those in the central city only, shown in Panel B of Table 4. Effects are no weaker for this group.

3.5.4 Wealth effects

As we have outlined, although owning a home may assist in acquiring wealth, it seems implausible that wealth effects could explain the opposite effects for men and women. Moreover, if income effects account for the change, we might expect total home production time to fall (due to outsourcing) and leisure to increase, when in fact we see higher total home production and flat leisure in 3.

We then restrict our samples to women who earn more than their spouses, that is, those who have a non-traditional ratio of Ωs. We understand that this is endogenous but it is interesting to see in Panel C of Table 4 that the results are reversed in signs for these couples. Cheaper housing makes men work less and women work more. Coefficients are not as statistically significant as before in part because we now have only a quarter of the original sample, but these findings support the theoretical implication that the gendered nature of the model's predictions should only hold for couples where women are the lower-income partner. This would be inconsistent with wealth effects always leading women to work less and men to work more.

Finally, to directly limit the influence of wealth effects, we also examine impacts in Table 4 Panel D for those who experience no more than a 10% rise or fall in home prices since the reference year, which restricts

Table 4: Alternative mechanisms: Specialization

	Worked Last Year		Usual Hours Worked	
	(1)	(2)	(3)	(4)
	Panel A: Unemployment as independent variable (N=3,702,212)			
Unemployment	-0.001	-0.001	-0.198***	-0.186***
	(0.001)	(0.001)	(0.039)	(0.037)
Unemp × female	0.002	0.002	0.317***	0.313***
	(0.002)	(0.002)	(0.064)	(0.061)
	Panel B: Only those living in central city (N=443,497)			
−House Price Index	0.014**	0.016***	0.637*	0.702***
	(0.006)	(0.004)	(0.348)	(0.235)
−HPI × female	-0.029***	-0.027***	-1.565***	-1.435***
	(0.007)	(0.007)	(0.383)	(0.378)
	Panel C: Couples where wife earns more (N=740,515)			
−House Price Index	-0.010***	-0.009***	-0.317*	-0.247
	(0.003)	(0.002)	(0.169)	(0.156)
−HPI × female	0.019***	0.018***	0.188	0.135
	(0.003)	(0.003)	(0.157)	(0.163)
	Panel D: Only college educated (N=1,408,667)			
−House Price Index	0.016***	0.016***	1.518***	1.493***
	(0.004)	(0.004)	(0.251)	(0.249)
−HPI × female	-0.035***	-0.035***	-3.259***	-3.252***
	(0.006)	(0.006)	(0.469)	(0.472)
	Panel E: Childless couples (N=1,272,778)			
−House Price Index	0.009**	0.001	0.051	-0.341***
	(0.005)	(0.003)	(0.169)	(0.125)
−HPI × female	-0.006**	0.004	0.278*	0.687***
	(0.003)	(0.002)	(0.149)	(0.158)
Year of Survey HPI	Yes	Yes	Yes	Yes
Additional Controls	No	Yes	No	Yes

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, divided by 100. Housing prices in the current year are controlled for in all columns. Fixed effects for the year of marriage, current year, and state are included in all specifications. Additional controls include a linear control for age and dummies for 4 educational categories. Standard errors are clustered at the state level.

our sample to a quarter of its original size, and find consistent, although noisier, effects.

3.5.5 Bargaining power

Finally, we explore whether our results could simply be due to the fact that the balance of power between men and women is altered by the presence of housing assets without being related to the collateralization of the relationship. As a proxy for couples that could see a shift in balance of powers but little impact on the capacity to specialize, Panel E of Table 4 restricts the sample to childless couples. We see reverse results for hours worked for this group, suggesting that what we capture is more than a change in bargaining weights within the household.

Furthermore, if there were an increase in women's bargaining power, as seen in Voena (2015), we would expect leisure to respond, whereas we found no change in Table 3. The fertility increase for couples with easier homeownership which we detail in Section 3.7 is also inconsistent with a bargaining explanation, since increased female bargaining power is typically tied to fertility declines.

3.6 Instrumenting for Housing Prices

There remains the possibility that the residual state-year variation in the housing price index is codetermined with factors influencing specialization, such as local economic conditions, or tastes for children or specialization. Note, for this to explain our result, it would need to be that these factors were also tied to *low* housing prices, which is the opposite of what one might expect if demand for children were higher, but could possibly occur if specialization reduces joint income, and therefore purchasing power. To rule this out as the driver of our results, we seek an instrument that is correlated with the housing price index but not influenced by time-varying local factors. Palmer (2015) provides such an approach, by exploiting the fact that there is a pattern of volatility in housing prices that is persistently different between states. Some regions of the country are more subject to housing booms and busts than others. Thus, it is possible to multiply contemporaneous national housing cycles by past local volatility multipliers to obtain an instrument for housing prices that is free from the influence of current local economic conditions or tastes.

To measure the past volatility of the housing price index, we use the yearly price index (all transactions) from 1975 to 1995. We calculate the standard deviation in the year-to-year fluctuation in the housing price and obtain a value of σ_i, housing volatility, for each state. We then use this volatility as a multiplier on the leave-one-out national average price changes. Formally, we construct a predicted house price index as:

$$\widehat{HPI_{it}} = HPI_{-i1996} + \sum_{k=1997}^{t} \sigma_i * (HPI_{-ik} - HPI_{-ik-1}) \tag{5}$$

where HPI_{-ik} is the house price index in year k 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 amplified or dampened by its past variability. It should thus be exogenous to current local economic conditions since it does not depend on these factors in any way.[39] Palmer (2015) conducts the analysis using time dummies instead of the national price index

[39]The only way in which this instrument could be correlated with local economic shocks is if the variance we calculated in

but the logic is very similar.[40]

The first stage is very strong between the instrument and the actual price index, as shown in the first two columns of Table 5. The F-stat for the first stage, in columns 1 through 3, is around 8.8. We next show that the results presented in our paper are robust to instrumenting for the house price index using the above instrument. We do this analysis for both the time of marriage and age 25 identification approaches. Table 5 also shows that the positive impact of low HPI on home-buying persists even with an instrumented price index. The magnitude is even larger than the one with the direct HPI, suggesting that a low price index may also be correlated with bad economic conditions, which dampened its effect on ability to own.

Table 5: Relationship between instrument, house prices and home ownership

	At the time of marriage			At age 25 (state of birth)		
	(1)	(2)	(3)	(4)	(5)	(6)
	First stage					
$\widehat{HPI_{it}}$	0.053***	0.053***	0.053***	0.058***	0.058***	0.058***
	(0.018)	(0.018)	(0.018)	(0.015)	(0.015)	(0.015)
	Home ownership					
−House Price Index	0.056**	0.056**	0.083***	0.136***	0.135***	0.134***
	(0.023)	(0.022)	(0.023)	(0.033)	(0.033)	(0.034)
Year of Survey HPI	No	Yes	Yes	No	Yes	Yes
Additional Controls	No	No	Yes	No	No	Yes

Notes: Data uses individuals in the 2008-2014 ACS who married within the last eighteen years, left, or turned 25 within the last 18 years, right, and are also a head of household or married to the head of household (to be able to assess homeownership status). House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year and state of marriage, left, or age 25 in the state of birth, right, divided by 100. Fixed effects for the year of marriage, current year, and state are included in all specifications. Additional controls include a linear control for age and dummies for 4 educational categories. Standard errors are clustered at the state level. N=2,883,502 for the first three columns and N= 2,296,509 for the last three.

Table 6 repeats the analysis for specialization with the instrumented housing price index at the time and state of marriage, as well as at age 25 in the state of birth. Note that following Wooldridge (1997), we interact the predicted values from the first stage rather than the instrument itself with our gender dummy and use these as instruments for $-HPI$ and $-HPI \times female$ to maximize efficiency.

Table 6 Panel A shows that the asymmetric reaction of men and women in labor supply 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 division of labor between spouses. In response to an exogenously cheap housing market, women work less while men work more. The coefficient for males is insignificant for the intensive margin but strongly positive for the extensive margin, while the interaction term between female and HPI is always negative and significant (and the sum is also negative).

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.

[40] 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 leave-out average does not matter. Similar results were obtained when using flat weights between states.

Table 6: Relationship between instrumented house price and specialization, at marriage and age 25

	At the time of marriage			At age 25 (state of birth)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Labor Supply					
	Worked Last Year					
−House Price Index	0.012**	0.013**	0.017**	0.008	0.004	0.007
	(0.005)	(0.005)	(0.007)	(0.008)	(0.008)	(0.006)
−HPI × female	-0.019***	-0.019***	-0.017***	-0.021**	-0.021**	-0.020**
	(0.005)	(0.005)	(0.005)	(0.010)	(0.010)	(0.009)
	Usual Hours Worked					
−House Price Index	-0.105	-0.101	0.239	1.114*	1.136*	1.076**
	(0.546)	(0.553)	(0.570)	(0.566)	(0.570)	(0.446)
−HPI × female	-1.518***	-1.517***	-1.399***	-2.637***	-2.635***	-2.711***
	(0.316)	(0.316)	(0.293)	(0.624)	(0.624)	(0.572)
	Panel B: Wages					
	Wage (level)					
−House Price Index	3594	3620	6191***	14285***	13530***	14223***
	(2428)	(2388)	(2128)	(3561)	(3468)	(3662)
−HPI × female	-8337***	-8330***	-7672***	-8765***	-8753***	-8677***
	(1003)	(1007)	(939)	(1387)	(1385)	(1260)
	Log hourly wage					
−House Price Index	-0.063**	-0.062**	0.002	0.151***	0.153***	0.147***
	(0.030)	(0.030)	(0.013)	(0.033)	(0.033)	(0.035)
−HPI × female	-0.089***	-0.088***	-0.069***	-0.100***	-0.099***	-0.084***
	(0.014)	(0.014)	(0.012)	(0.016)	(0.016)	(0.013)
Year of Survey HPI	No	Yes	Yes	No	Yes	Yes
Additional Controls	No	No	Yes	No	No	Yes

Notes: Data uses individuals in the 2008-2014 ACS who married within the last eighteen years, left, or turned 25 within the last 18 years, right, and are also a head of household or married to the head of household (to be able to assess homeownership status). House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year and state of marriage, left, or age 25 in the state of birth, right, divided by 100. Fixed effects for the year of marriage, current year, and state are included in all specifications. Additional controls include a linear control for age and dummies for 4 educational categories. Standard errors are clustered at the state level. At time of marriage, N=3,330,278 for all outcomes except log hourly wage where N=2,900,523. At age 25, N=3,348,288 for all outcomes except log hourly wage where N=2,674,859.

When using HPI at age 25, impacts for men are now strongly positive for hours worked while the interaction for women is always negative and significant.

Repeating the analysis for wages in Panel B of each table shows highly consistent results for wage level. With log hourly wage in Table 6, there is a small anomaly where without controls the effect on men's wages is found to be negative, but this disappears with controls, and in the age 25 results the coefficient for men is always positive and significant, whereas the interaction for women is negative and significant.

These instrumented results show that even with no possible influence from local economic factors at the

time of marriage, and eliminating the possibility that local tastes drive both specialization patterns and housing prices, our results that easier homeownership predict greater specialization hold.

3.7 Effect of Housing Prices on Secondary Outcomes

Having shown that housing prices have a strong effect for outcomes for which we are able to essentially implement a triple difference, by comparing men's outcomes to women's, we now turn to secondary outcomes for which we cannot rule out wealth effects or other direct impacts of housing ownership. Nonetheless, it is important to show that the effect on these outcomes are consistent with our model.

We measure household public goods, Q, with 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.[41]

We then measure whether the individual has been divorced. In our baseline model, divorce is unaffected but access to a joint savings vehicle reduces the probability of renegotiating the marriage contract. When we allow for child utility to be experienced differently by parents within versus outside of marriage, the model predicts divorce itself will be lower for those who are able to purchase a home.

Table 7 shows each outcome for all three specifications, OLS, IV, and the IV for age 25. 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 child outcomes and divorce rates.

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 point in the housing price at the time of marriage, and corresponding 3 percentage point higher homeownership rate, leads to a decreased probability of having a child who is below the grade for his age by 0.8 percentage points. This could indicate a higher total time investment in each child, with children having higher human capital as a result.

Each child takes more time away from parents. Thus, our model predicts couples who are more insured against divorce will have larger Q, which can be done through both the number of children and the investment in each one. We find that facing a 1 point lower housing price at marriage increases the number of children by 0.03 in the OLS specification, with a larger coefficient in the IV.[42] The results for divorce suggest that divorce decreases when couples are more likely to own a home due to lower HPI. The results for secondary outcome measures are stronger in the IV specifications, suggesting that the correlated economic factors may work against the model's channels, since getting married in poor economic times may make one less likely to invest in children and more likely to divorce.

The main threat to identification of these results is possible income effects resulting from housing appreciation when couples face an idiosyncratically low housing price at marriage compared to today's prices. Thus, we acknowledge that these results are suggestive only, but are nonetheless consistent with the predictions of

[41] To get some sense of the impact on public goods, we also use total labor supply as an outcome, in Appendix Table B.2. These results indicate that being married when housing prices were lower leads to less total labor supply from a couple (with women's hours decreasing more than men's increase), and thus potentially greater provision of public goods.

[42] This outcome may not be well served by a linear model. We thus also estimated a Poisson Regression and found that the results are stronger when using that type of model. Specifically, the coefficient on $-HPI$ in the Poisson is 0.038-0.044 with standard errors of about 0.015, thus leading to t-statistics above 2.45 in all specifications.

Table 7: Relationship between house prices at marriage and other outcomes

	OLS		IV		IV-age 25	
	(1)	(2)	(3)	(4)	(5)	(6)
	Grade Retention					
−House Price Index	-0.008***	-0.009***	-0.028***	-0.031***	-0.024***	-0.021***
	(0.002)	(0.003)	(0.008)	(0.009)	(0.006)	(0.005)
Observations	2,428,234	2,428,234	2,145,451	2,145,451	1,558,315	1,558,315
	Number of Children					
−House Price Index	0.044***	0.038**	0.228**	0.191*	0.348***	0.336***
	(0.016)	(0.015)	(0.106)	(0.105)	(0.121)	(0.116)
Observations	3,702,212	3,702,212	3,330,278	3,330,278	3,348,288	3,348,288
	Divorced					
−House Price Index	-0.006	-0.006*	-0.047***	-0.051***	-0.010**	-0.008*
	(0.004)	(0.004)	(0.016)	(0.017)	(0.004)	(0.005)
Observations	3,665,398	3,665,398	3,299,318	3,299,318	1,910,614	1,910,614
Year of Survey HPI	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls	No	Yes	No	Yes	No	Yes

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years or who turned 25 in the last 18 years. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of marriage, divided by 100. Fixed effects for the year of marriage, current year, and state as well as year of survey fixed effects are included in all specifications. Additional controls include a linear control for age and dummies for 4 educational categories. Standard errors are clustered at the state level.

our model.

One may worry that the positive effect we observe on fertility is driving all of our other results above. First, we note that if fertility alone were the driving mechanism, we would expect leisure time to be reduced, and no fall in home production for men when children were young, which is not what we see in Section 3.4.3 when we examine time use. We also note that we see increases in child *quality* in the age-for-grade results, which points to increased investment per child, which is counter to what instrumented fertility effects show (Bhalotra and Clarke, 2020). Additionally, whereas fertility has been shown to universally decrease women's wages, even when they are high earning (Kleven et al., 2020), we showed in Table 4 that reverse specialized couples in our data react in the reverse manner to the housing shock, with women increasing their labor supply and wages and men decreasing theirs. An increase in women's wages is unlikely to be consistent with fertility effects as the principal driver.

Together, the results on the relationship between housing prices and home purchase, parental time allocation, relative wages, child quality, and divorce suggest that easier access to housing as a joint savings vehicle at the time of marriage has significant consequences on parental outcomes later on, inducing couples to specialize more, shown in both hours and wages, and produce more public goods, proxied by child outcomes. This is very robust to a variety of alternative specifications and suggests that there is real power in collateralizing marriage contracts through housing.

4 The Role of Assets in Marriage Selection

Our model predicts that since marriage specifically provides a contractual obligation to share joint savings, it may be more valuable to people who have assets, and are therefore able to take advantage of the commitment device. This aligns with existing evidence in the literature showing a strong relationship between socioeconomic status and marriage (Lundberg et al., 2016; Schneider, 2011). In Lafortune and Low (2017), we demonstrate that marriage rates are higher for people with higher wealth even conditioning on wages, education, and race.[43] In order to separate this from a selection effect, we now test Proposition 6 in our model, that the differential value of marriage versus non-marital fertility for people with assets will grow as marriage and non-marital fertility become more similar in other ways. Showing that the correlation between assets and marriage has increased in response to these policies additionally provides evidence that the collateralization channel has played a role in the stratification in marriage behavior over time.

Table 8 shows how the marriage and non-marital fertility contracts have increased their similarity over the last 50 years, leaving asset division as the remaining separator. With the introduction of unilateral divorce in the 1970s and parental rights and responsibilities for non-marital fathers in the 1990s, the marriage and non-marital fertility contracts became more similar in all regards except for the presumed "jointness" of any assets acquired during the relationship.

Table 8: Convergence Between Marriage and Non-Marital Fertility (NMF) Contract

	Pre-1970		Today	
	Marriage	NMF	Marriage	NMF
Mutual consent to separate required	✓			
Income sharing upon separation	✓		✓	✓
Parental rights for father	✓		✓	✓
Asset division upon separation	✓		✓	

Notes: 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).

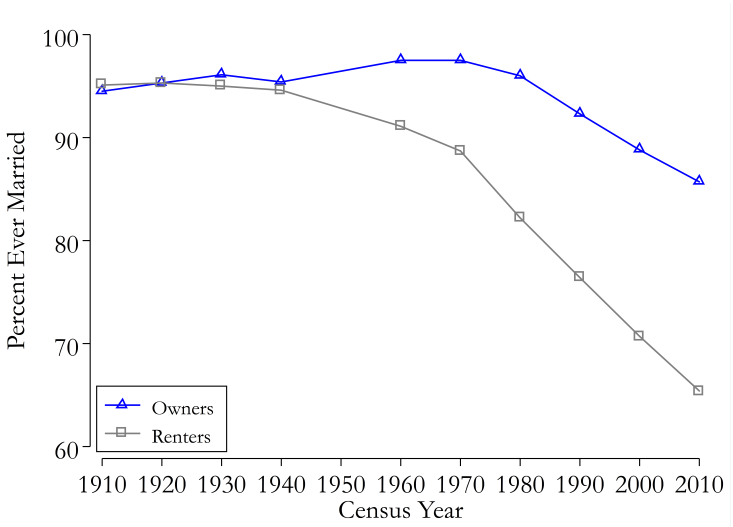
As a first check on whether assets have played an increasing role in marriage selection over time, we use data from the US Census on marriage rates by homeownership, which we have argued is an important asset for American families. We see in Figure 5 that the decline in ever marrying has been experienced by those who rent homes much more than people who own. And, going back to the early part of the 20th century, there was in fact no relationship between homeownership and marriage rates, whereas there is quite a strong relationship today.

For a stronger test of Proposition 6, we can use the state-year variation in the policy changes outlined in Table 8. In particular, we focus on the introduction of unilateral divorce and paternity enforcement for non-marital fathers, whose adoption by states has been treated as quasi-exogenous by other papers in the literature.[44]

[43] To do this, we used the panel nature of the Survey of Income and Program Participation (SIPP) to show that single individuals who have more assets in the first wave are more likely to marry in subsequent periods.

[44] We focus on these policies because there is state-level variation in the roll-out of these policies, which can be used for identification. Historically, marriage offered many benefits beyond those available through non-marital fertility, including

Figure 5: Rates of Ever Married by Home Ownership Status



Notes: Rates of individuals age 30-50 ever being married by whether they live in an owned or rented home, from US Census data from 1910 - 2010. Homeownership is measured for the household head, rather than the individual respondent.

Unilateral divorce was passed in a series of state-level policy changes between 1967 and 1992, with the most states changing status between 1970 and 1980 (Friedberg, 1998; Voena, 2015). In our model, unilateral divorce would decrease the level of inter-temporal commitment possible in marriage. Mutual consent divorce is closer to the perfect commitment case than the imperfect commitment one. Division of income within marriage will never be renegotiable when both partners must consent to the divorce, and a post-divorce split, if agreed upon, would be more favorable to the lower-earning partner. Unilateral divorce, by contrast, will be more similar to the case of imperfect commitment. Courts will determine the way resources are shared ex-post and one partner can trigger the divorce procedure, forcing the other partner to renegotiate the sharing rule within marriage.

Enforcement of financial responsibilities for non-marital fathers was increased rapidly during the welfare reform in the 1990s, and made the income sharing guaranteed through marriage and non-marital fertility much more similar (Mayeri, 2016). We focus on one dimension of this enforcement for which we have state-level variation, namely establishing paternity at the hospital at the time of birth Rossin-Slater (2017). Once the father's paternity is formally established, it is easier for courts to enforce his financial obligation to support the child, even if the relationship between the mother and father dissolves. Establishing paternity at the hospital proved effective, because fathers typically attend births, and may be more willing to take on responsibility during this happy period. These "In Hospital Voluntary Paternity Establishment Programs" were thus not themselves a form of enforcement, but enabled enforcement of child support outside of marriage. And, they were rolled out in a staggered fashion by states throughout the 1990s.

We focus on the interaction between the policy changes and the impact of asset-holding on the propensity to marry, in panel data. 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

paternal rights over children (Edlund, 2006), and divorce was difficult and extremely rare (Kay, 2000).

our knowledge ours is the only clear mechanism that would indicate a differential change in marriage rates by asset-holding.

4.1 Weakening the Marital Contract

We first examine 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.

We want to measure how the decision to marry is impacted by the interaction of unilateral divorce laws and asset holding at the time when individuals are considering marriage. As the PSID does not regularly add new individuals (other than the children of panel participants), we need to choose a specific time to start looking at individuals. We choose to start looking at individuals at age 22, as this ensures we will cover the period of highest "marriage hazard" for men during the time period we analyze, when median age at first marriage ranged from 24 to 26. Our sample is thus all men who appear as unmarried at age 22 at any point during the sample timeframe. We attach the unilateral divorce status in the year they enter our sample in the individual's state of residence. We then follow them for a maximum of 12 years and measure whether they marry or not. Formally, we regress "ever marry" over the subsequent 12 years on state-of-residence unilateral divorce policy and asset-holding at age 22, controlling for state and year fixed effects.[45]

The equation being estimated is:

$$Evermarry_{ist} = \beta\, unilateral_{st} \times assets_i + \nu\, assets_i + \xi\, unilateral_{st} + \gamma\, X_i + \eta_s + \delta_t + \varepsilon_{ist} \qquad (6)$$

on a panel of men i who turned 22 in year t living in state s. We include individual-level controls as well as state-specific time trends in subsequent specifications.

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.[46] 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 non-labor income, 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 or save in other ways.

Table 9 shows that men who turned 22 in a state that had unilateral divorce saw an increased relationship between their asset holding and their probability of marrying within the next 12 years. The coefficient is significant at the 5 percent level in specifications with controls. This aligns with our hypothesis that

[45] The analysis is robust to other choices of entry points and time windows.

[46] For heads of household we can further restrict to only financial asset income, rather than farm or business income. For non-heads, we cannot restrict the type, but they are also less likely to receive income from a farm or business. We 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 or save in other ways create shared marital property.

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

	Dependent variable: Ever Married		
	(1)	(2)	(3)
Unilateral × Assets	0.143*	0.170**	0.164**
	(0.0734)	(0.0746)	(0.0723)
Owns Assets	0.0829	-0.0366	-0.0255
	(0.0572)	(0.0641)	(0.0614)
Inc, educ, race controls	No	Yes	Yes
State specific time trend	No	No	Yes
Observations	1967	1463	1463
R-Squared	0.144	0.207	0.233

Notes: Data uses unmarried male individuals in the 1968-1993 Panel Study of Income Dynamics, starting at age 22. 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.

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. Note that the main effect of assets is not significant, and switches signs as additional controls are introduced. This indicates that asset-holding provides *substitute* 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.

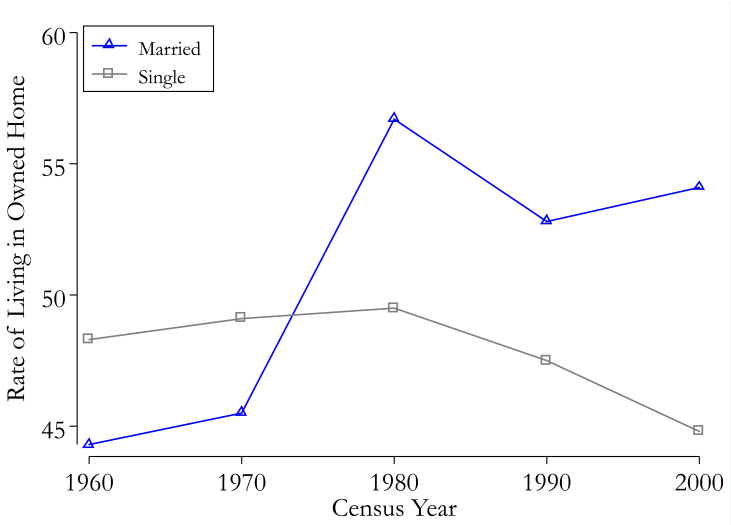
To examine this more directly, while Figure 3 shows that today marriage and homeownership are closely related, and Figure 5 shows this association has strengthened over time, we would like to see if young couples changed their behavior based on prevalent laws. Figure 6 shows the homeownership rates for young married couples (18-30) from 1960 to 2000. Rates of ownership increased from 40 percent in 1960 to 54 percent in 1980, during the period when divorce was being liberalized, and therefore when the need for "collateral" in a now weakened contract was heightened. Meanwhile, the ownership rates for singles stayed constant. In other words, young couples appeared to seek homeownership increasingly as the security of the marriage contract declined, suggesting an active demand for this source of collateral.

4.2 Strengthening the Non-Marital Fertility Contract

We now use data from the 1992, 1993, and 1996 waves of the Survey of Income and Program Participation (SIPP) to test whether the relationship between marriage and assets was affected by the introduction of IHVPE policies. IHVPE created a mechanism to enforce income sharing in the case a non-marital relationship dissolved, offering one protection previously only provided through marriage. Our model would predict this legal change would widen the marriage gap between high and low asset individuals.

As new individuals regularly enter the SIPP data, there is no need to designate a specific age to begin considering people. We thus assemble a data set encompassing all men aged 21-35 who begin unmarried. The SIPP data is quarterly, and for the period we use includes individuals in a panel for 9 or 12 quarters.

Figure 6: 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. Singles includes all unmarried (even if cohabiting). Homeownership is measured for the household head, so is not necessarily the individual in question. We include non-heads to ensure that selection between head status is not driving the results.

The panel itself is short, so we use the full time period for each individual, and naturally will thus have lower overall marriage rates than in the PSID analysis. We regress "ever married" (during the period we observe) on asset holding and the IHVPE policy in the initial period, controlling for state, year, and initial age.

The equation being estimated is:

$$Evermarry_{ist} = \beta\, IHVPE_{st} \times assets_i + \nu\, assets_i + \xi\, IHVPE_{st} + \gamma\, X_i + \eta_s + \delta_t + \varepsilon_{ist} \tag{7}$$

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

Our data on IHVPE dates comes from Rossin-Slater (2017), 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.[47]

Table 10 shows that individuals who entered the SIPP at a moment where their state of birth had implemented the IHVPE policy observed a greater correlation between assets and the probability of marriage than those who entered when the policy was not yet implemented. The effect size remains consistent even when state-specific time trends are accounted for. And, holding assets itself is positively associated with marriage rates in this time period, consistent with the earlier evidence in Lafortune and Low (2017). Since all states have implemented unilateral divorce over this period, this is consistent with the hypothesis that assets become relevant when marriage provides less commitment. 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.

[47] As explained in footnote 46, we exclude homeownership from assets.

Table 10: Paternity establishment laws and marriage rates, by asset status

	Dependent variable: Ever Married		
	(1)	(2)	(3)
IHVPE × Assets	0.0383**	0.0367**	0.0359**
	(0.0172)	(0.0171)	(0.0168)
Owns Assets	0.0399***	0.0219***	0.0216***
	(0.00733)	(0.00703)	(0.00710)
Inc, race, and educ control	No	Yes	Yes
State-specific time trend	No	No	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 (2017) 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.

Overall, we find this evidence persuasive of an increasing role of assets and wealth in determining who enters into marriage and who does not. This suggests that as the marriage contract has been weakened by various policy changes, wealth increasingly provides access to a more advantageous contract, and thus confers benefits for family formation beyond those which have been previously considered.

5 Conclusion

We present the first model on the role of assets in "collateralizing" the marriage contract. We demonstrate that a highly general model of investment in a public good with limited commitment can generate the effect that joint savings helps reduce the problems generated by limited commitment. Our model provides the empirical implications that greater access to the commitment technology will lead to more specialization and public good creation.

We show empirical support for this by using idiosyncratic variation in housing prices to proxy for access to the commitment technology, since homes are especially likely to be divided in a way that favors the mother. We show that those families who more easily purchase homes upon marriage due to idiosyncratically low house prices specialize more within the household, which further results in diverging wages between men and women. We use a number of alternative specifications to deal with selection, employing housing prices at age 25, and endogeneity, using an instrumental variables strategy, and find our results very robust. We also show that households with easier home purchase display more relationship stability and public goods, and that women's time is reallocated from work to home production, with no change in leisure.

The model also suggests that the value of marriage will be increasing in wealth, and that this gradient in marriage by wealth will substantially increase as marriage and non-marital fertility become more similar in ways other than their treatment of assets. We test this empirically using the introduction of unilateral divorce and increased ease of non-marital contracting, showing that both made wealth a stronger predictor of marriage.

Together, our empirical results suggest that wealthy individuals will have access to a more advantageous marriage contract, and more easily specialize and invest in public goods. This problem has worsened over time, matching the transformation of marriage into a "luxury good." The model also suggests that investment in homes may be a way of purchasing "divorce insurance," which could potentially lead to the documented "over-investment" in homeownership (Fratantoni, 1998). Other protections against immiseration resulting from divorce through either the public or private market could potentially increase efficiency and equity, if they were more accessible to all than is homeownership.

From this stems important implications for inequality and poverty traps. Less access to wealth now means a lower ability to secure investments in the next generation, which will lead to strong intergenerational transmission of poverty. Thus, our paper provides microfoundations for an emerging "parenting gap," pointed to by Doepke and Zilibotti (2019) as a major driver of inequality. Moreover, access to wealth, and particularly homeownership, has historically been differential along racial lines, highlighting a new axis of racial disparity.[48] Our model suggests a mechanism linking this gap to a corresponding gap in marriage rates, documented in Caucutt et al. (2018). Similarly, our model provides an underlying mechanism for the lower marital college premium for Black women in Chiappori et al. (2017a) and the differential in high investment parenting in Ramey and Ramey (2010). Asset ownership and homeownership have not previously been considered as a key enabler of parental investments, and thus drivers of marital value. This paper presents evidence that it could be an important factor, with stark policy and welfare implications.

Our model also suggests that access to the commitment technology facilitates investment in public goods, and thus that a weakened marriage contract may change how families form and invest.[49] Indeed, the "traditional" division of labor in the household collapsed over the same time period as the marriage contract was substantially weakened (Sayer, 2005). This does not mean a collateralized marriage needs to be a traditional one: As more women increasingly become high-earners, it is possible there would be more specialization in the opposite direction if the legal framework supported it. As the marriage contract has weakened, marriage rates have also fallen, indicating its value may be related to the ability to specialize and insure investments. The way a limited contracting space may have hampered the efficiency gains from marriage, and therefore eroded marriage's value for those not able to collateralize the contract, has received limited consideration. By showing that marriage appears more valuable to those able to collateralize the contract we shed light on the economic value of marriage, and how its returns may be unevenly distributed.

[48] For example, while the white-black income gap is large, the white-black asset gap is *substantially* wider (Kuhn et al., 2020; Hamilton and Tippet, 2015). 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.

[49] There of course may be compelling reasons to weaken the marriage contract, such as allowing women to leave abusive situations (Stevenson and Wolfers, 2006), but our model highlights some unintended consequences.

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 Childbearing in the United States," *The Quarterly Journal of Economics*, 1996, *111* (2), 277–317.

Alvaredo, Facundo, Lucas Chancel, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman, "Global inequality dynamics: New findings from WID. world," *American Economic Review*, 2017, *107* (5), 404–09.

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.

Bayot, Denrick and Alessandra Voena, "Prenuptial contracts, labor supply and household investments," *Unpublished manuscript, Department of Economics, University of Chicago, Illinois*, 2015.

Bhalotra, Sonia and Damian Clarke, "The twin instrument: fertility and human capital investment," *Journal of the European Economic Association*, 2020, *18* (6), 3090–3139.

Boca, Daniela Del and Christopher J Flinn, "Rationalizing child-support decisions," *The American Economic Review*, 1995, pp. 1241–1262.

_ , Christopher Flinn, and Matthew Wiswall, "Household choices and child development," *Review of Economic Studies*, 2013, *81* (1), 137–185.

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.

Brown, Meta, Christopher J Flinn, and Joseph Mullins, "Family Law Effects on Divorce, Fertility and Child Investment," *Unpublished Manuscript, NYU*, 2015.

Cáceres-Delpiano, Julio and Eugenio P Giolito, "How unilateral divorce affects children," 2008.

Caucutt, Elizabeth M, Nezih Guner, and Christopher Rauh, "Is marriage for white people? Incarceration, unemployment, and the racial marriage divide," 2018.

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-André and Maurizio Mazzocco, "Static and Intertemporal Household Decisions," *Journal of Economic Literature*, September 2017, *55* (3), 985–1045.

_ **and Sonia Oreffice**, "Birth control and female empowerment: An equilibrium analysis," *Journal of Political Economy*, 2008, *116* (1), 113–140.

_ **, Bernard Fortin, and Guy Lacroix**, "Marriage market, divorce legislation, and household labor supply," *Journal of political Economy*, 2002, *110* (1), 37–72.

_ **, Bernard Salanié, and Yoram Weiss**, "Partner Choice, Investment in Children, and the Marital College Premium," *American Economic Review*, 2017, *107* (8), 2109–67.

_ **, Murat Iyigun, Jeanne Lafortune, and Yoram Weiss**, "Changing the rules midway: the impact of granting alimony rights on existing and newly formed partnerships," *The Economic Journal*, 2017, *127* (604), 1874–1905.

Chigavazira, Abraham, Hayley Fisher, Tim Robinson, and Anna Zhu, "The Consequences of Extending Equitable Property Division Divorce Laws to Cohabitants," Technical Report, IZA Discussion Papers 2019.

Cortés, Patricia and Jessica Pan, "When Time Binds: Substitutes for Household Production, Returns to Working Long Hours, and the Skilled Gender Wage Gap," *Journal of Labor Economics*, 2019, *37* (2), 351–398.

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.

Doepke, Matthias and Fabrizio Zilibotti, "Parenting with style: Altruism and paternalism in intergenerational preference transmission," *Econometrica*, 2017, *85* (5), 1331–1371.

_ **and** _ , *Love, money, and parenting: How economics explains the way we raise our kids*, Princeton University Press, 2019.

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.

Fernández, Raquel, "Cultural change as learning: The evolution of female labor force participation over a century," *American Economic Review*, 2013, *103* (1), 472–500.

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.

Foerster, Hanno et al., "Untying the Knot: How Child Support and Alimony Affect Couples' Decisions and Welfare," Technical Report, University of Bonn and University of Mannheim, Germany 2020.

Fortin, Nicole M, "Allocation inflexibilities, female labor supply, and housing assets accumulation: are women working to pay the mortgage?," *Journal of Labor Economics*, 1995, *13* (3), 524–557.

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.

Frémeaux, Nicolas and Marion Leturcq, "Prenuptial agreements and matrimonial property regimes in France, 1855–2010," *Explorations in Economic History*, 2018, *68*, 132 – 142.

Gayle, George-Levi and Andrew Shephard, "Optimal taxation, marriage, home production, and family labor supply," *Econometrica*, 2019, *87* (1), 291–326.

Gemici, Ahu and Steve Laufer, "Marriage and cohabitation," *New York University, mimeo*, 2011.

Gicheva, Dora, "Working long hours and early career outcomes in the high-end labor market," *Journal of Labor Economics*, 2013, *31* (4), 785–824.

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.

Goldin, Claudia, "The quiet revolution that transformed women's employment, education, and family," *American economic review*, 2006, *96* (2), 1–21.

_ , "A grand gender convergence: Its last chapter," *American Economic Review*, 2014, *104* (4), 1091–1119.

Goodman, Laurie S and Christopher Mayer, "Homeownership and the American Dream," *Journal of Economic Perspectives*, 2018, *32* (1), 31–58.

Greenwood, Jeremy, Ananth Seshadri, and Mehmet Yorukoglu, "Engines of liberation," *The Review of Economic Studies*, 2005, *72* (1), 109–133.

Grossbard, Shoshana and Victoria Vernon, "Common law marriage and couple formation," *IZA Journal of Labor Economics*, 2014, *3* (1), 16.

_ **and** _ , "Common Law Marriage, Labor Supply, and Time Use: A Partial Explanation for Gender Convergence in Labor Supply," in "Gender Convergence in the Labor Market," Emerald Group Publishing Limited, 2015.

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.

Jakobsen, Katrine, Kristian Jakobsen, Henrik Kleven, and Gabriel Zucman, "Wealth taxation and wealth accumulation: Theory and evidence from Denmark," *The Quarterly Journal of Economics*, 2020, *135* (1), 329–388.

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, Camille Landais, and Jakob Egholt Søgaard, "Children and gender inequality: Evidence from Denmark," *American Economic Journal: Applied Economics*, 2019, *11* (4), 181–209.

_ **,** _ **, and** _ , "Does Biology Drive Child Penalties? Evidence from Biological and Adoptive Families," Technical Report, National Bureau of Economic Research 2020.

Kocherlakota, Narayana, "Implications of Efficient Risk Sharing without Commitment," *Review of Economic Studies*, 1996, *63* (4), 595–609.

Kuhn, Moritz, Moritz Schularick, and Ulrike I. Steins, "Income and Wealth Inequality in America, 1949–2016," *Journal of Political Economy*, 2020, *128* (9), 3469–3519.

Kuhn, Peter and Fernando Lozano, "The expanding workweek? Understanding trends in long work hours among US men, 1979–2006," *Journal of Labor Economics*, 2008, *26* (2), 311–343.

Kuziemko, Ilyana, Jessica Pan, Jenny Shen, and Ebonya Washington, "The Mommy Effect: Do Women Anticipate the Employment Effects of Motherhood?," Technical Report, National Bureau of Economic Research 2018.

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, Claudia Ruiz, and Shintaro Yamaguchi, "Labor supply and household dynamics," *American Economic Review*, 2014, *104* (5), 354–59.

McClelland, Robert and Shannon Mok, "A review of recent research on labor supply elasticities," *Congressional Budget Office, Working Paper 2012-12*, 2012.

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.

Pollak, Robert A, "Allocating Time: Individuals' Technologies, Household Technology, Perfect Substitutes, and Specialization," Technical Report, National Bureau of Economic Research 2011.

Ramey, Garey and Valerie A Ramey, "The Rug Rat Race," *Brookings Papers on Economic Activity*, 2010.

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*, 2017, *9* (2), 93–130.

ΩÁrpád Ábrahám and Laczó

Árpád Ábrahám and Sarolta Laczó, "Efficient Risk Sharing with Limited Commitment and Storage," *Review of Economic Studies*, 2018, *85* (3), 1389–1424.

Saez, Emmanuel and Gabriel Zucman, "Wealth inequality in the United States since 1913: Evidence from capitalized income tax data," *The Quarterly Journal of Economics*, 2016, *131* (2), 519–578.

Sayer, Liana C, "Gender, time and inequality: Trends in women's and men's paid work, unpaid work and free time," *Social forces*, 2005, *84* (1), 285–303.

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.

_ **and Justin Wolfers**, "Bargaining in the shadow of the law: Divorce laws and family distress," *The Quarterly Journal of Economics*, 2006, *121* (1), 267–288.

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.

Wong, Ho-Po Crystal, "Credible commitments and marriage: when the homemaker gets her share at divorce," *Journal of Demographic Economics*, 2016, *82* (3), 241–279.

Wooldridge, Jeffrey M., "On two stage least squares estimation of the average treatment effect in a random coefficient model," *Economics Letters*, 1997, *56* (2), 129–133.

A Omitted proofs

A.1 Proof of Proposition 1

Recall the couple will choose τ_i and τ_j such that:

$$-\frac{\partial\left[E(u_{2i})+E(u_{2j})\right]}{\partial\tau_k}=4\frac{\partial Q}{\partial\tau_k}.$$

Defining the income sharing that occurs for any level of ϕ where renegotiation occurs as γ_ϕ weight placed on own income, where $\beta>\gamma_\phi>\frac{1}{2}$, the left-hand side of the expression will become:

$$\Omega_k\left((1-\bar{p})u'(c_2)+p(\beta u'(c^d_{2k})+(1-\beta)u'(c^d_{2k'}))+\int_0^{\bar{\phi}}(\gamma_\phi u'(c'_{2k})+(1-\gamma_\phi)u'(c'_{2k'}))l(\phi)d\phi\right). \tag{A.1}$$

Note that while investment will alter the renegotiation threshold $\bar{\phi}$, that derivative is not included in the expression since the utility of partners is the same in the married and the renegotiated outcome when ϕ is exactly equal to $\bar{\phi}$.

Given that $c^d_{2j}>c'_{2j}>c_2>c'_{2i}>c^d_{2i}$, then $u'(c^d_{2j})<u'(c'_{2j})<u'(c_2)<u'(c'_{2i})<u'(c^d_{2i})$. Since $\beta>\gamma_\phi>\frac{1}{2}$, we have

$$p(\beta u'(c^d_{2i})+(1-\beta)u'(c^d_{2j}))>p(\beta u'(c^d_{2j})+(1-\beta)u'(c^d_{2i}))$$

$$\int_0^{\bar{\phi}}(\gamma_\phi u'(c'_{2i})+(1-\gamma_\phi)u'(c'_{2j}))l(\phi)d\phi>\int_0^{\bar{\phi}}(\gamma_\phi u'(c'_{2j})+(1-\gamma_\phi)u'(c'_{2i}))l(\phi)d\phi.$$

This implies that what is inside the parenthesis of Equation (A.1) will be larger for women than for men, thus leading to:

$$\frac{\Omega_i}{\Omega_j}<\frac{\frac{\partial Q}{\partial\tau_i}}{\frac{\partial Q}{\partial\tau_j}},$$

which implies less specialization than in perfect commitment.

As β increases, the ratio of marginal costs of the i to j partner will increase. This is because $\frac{\beta u'(c^d_{2i})+(1-\beta)u'(c^d_{2j})}{\beta u'(c^d_{2j})+(1-\beta)u'(c^d_{2i})}$ is increasing in β since its derivative with respect to β is proportional to:

$$\begin{aligned}&\left(\beta u'(c^d_{2j})+(1-\beta)u'(c^d_{2i})\right)\left(u'(c^d_{2i})-u'(c^d_{2j})+(\beta u''(c^d_{2i})-(1-\beta)u''(c^d_{2j}))\frac{\partial c^d_{2i}}{\partial\beta}\right)\\&\quad-\left(\beta u'(c^d_{2i})+(1-\beta)u'(c^d_{2j})\right)\left(u'(c^d_{2j})-u'(c^d_{2i})-(\beta u''(c^d_{2j})-(1-\beta)u''(c^d_{2i}))\frac{\partial c^d_{2i}}{\partial\beta}\right)>0.\end{aligned}$$

A similar argument can be made for the ratio of marginal costs when the couple renegotiates. And thus, the greater is β, the less specialization there will be.

This will lead to lower Q with imperfect commitment, since the household has added constraints compared

to the case of perfect commitment. The only way that public good creation could rise is if households previously sacrificed public goods to achieve more consumption sharing. But this is impossible since perfect household sharing decreases the marginal cost of investing in public goods for the household. Thus, imperfect commitment will also decrease household public goods.

A.2 Completion of Proof of Proposition 3

We need to show that under the commitment technology, savings do not adjust so as to undo the impact of the commitment technology on the ratio of marginal utilities of consumption, which drives specialization.

If a couple has access to the commitment technology, they will pick an optimal savings level $s^*(\tau_i, \tau_j)$ which will give the higher earning partner a consumption level of $c^d_{2j}(\tau_i, \tau_j)$ for each level of investment and the lower earning partner $c^d_{2i}(\tau_i, \tau_j)$. If they do not have access to that technology, they will pick a savings level given by $\tilde{s}(\tau_i, \tau_j)$ which will give them consumption levels $\tilde{c^d_{2j}}(\tau_i, \tau_j)$ and $\tilde{c^d_{2i}}(\tau_i, \tau_j)$, respectively.

In the absence of any adjustment to savings, the consumption by partner i would increase with the commitment technology, due to her higher share of assets, and the consumption of partner j would decrease. We will first show that it is not possible that savings decrease with commitment enough that partner i's consumption stays the same (or decreases). For that, we can show that a savings level $s^* < \tilde{s}$ such that $c^d_{2i}(\tau_i, \tau_j) = \tilde{c^d_{2i}}(\tau_i, \tau_j)$, which necessarily implies that $c^d_{2j}(\tau_i, \tau_j) < \tilde{c^d_{2j}}(\tau_i, \tau_j)$, is not possible, because the marginal return to savings under commitment when divorced is given by:

$$(1+r)\left(\alpha u'(c^d_{2i}) + (1-\alpha)u'(c^d_{2j})\right),$$

while the return without commitment is:

$$(1+r)\left(\delta u'(\tilde{c^d_{2i}}) + (1-\delta)u'(\tilde{c^d_{2j}})\right).$$

If savings were decreased to the point that $c^d_{2i}(\tau_i, \tau_j) = \tilde{c^d_{2i}}(\tau_i, \tau_j)$, then the return with commitment is clearly lower, since the two marginal utilities of consumption are the same or lower, $u''(\cdot) < 0$, and $\delta < \alpha$. Furthermore, the probability of renegotiating would be larger, since $c^d_{2j} < \tilde{c^d_{2j}}$, which would further reduce the return to savings. But then this means that there would be a higher return to savings under commitment than not, meaning it would be impossible for savings to adjust to that point or beyond with commitment.

Thus, the optimal savings with the commitment technology would thus necessarily imply that the consumption of the lower income partner would be higher in divorce when one has access to the commitment technology.

We next show that for α large enough, it is not possible that savings increase with commitment enough that partner j's consumption stays the same (or increases). For that, we can show that a savings level $s^* > \tilde{s}$ such that $c^d_{2j}(\tau_i, \tau_j) = \tilde{c^d_{2j}}(\tau_i, \tau_j)$, which necessarily implies that $c^d_{2i}(\tau_i, \tau_j) > \tilde{c^d_{2i}}(\tau_i, \tau_j)$, is not possible because at that point the marginal return to savings when divorced is lower under commitment for large enough values of α. To see this, note that the marginal return is clearly lower for $\bar{\alpha}(s^*)$, the savings-sharing rule that makes $c^d_{2i} = c_2$, since at that point, $c^d_{2j} = c^d_{2i} = \tilde{c^d_{2j}} > \tilde{c^d_{2i}}$. Thus for $\alpha = \bar{\alpha}$, for j to have equal consumption under commitment, the return to savings under commitment must be lower, making it

impossible for savings to adjust to that point or beyond with commitment. More generally, the difference in the return to savings with commitment to that without commitment (when $c^d_{2j}(\tau_i, \tau_j) = \tilde{c^d_{2j}}(\tau_i, \tau_j)$) changes with α in the following way:

$$-u'(c^d_{2i}) - u'(c^d_{2j}) + (1+r)s^* \left((\alpha - \delta)u''(c^d_{2j}) + \alpha u''(c^d_{2i}) + \frac{\delta u''(\tilde{c^d_{2i}})}{1-\delta} \right)$$

The first term is positive while the second is negative. For high enough values of α, the first term is relatively small and the second will be large, leading to the derivative being negative. Thus, for large enough values of α, if savings made up for partner j's lost consumption, the return would be lower for the case with commitment when divorced, which would make that option not optimal. A similar argument would hold for the renegotiation case. Here, the probability of renegotiation remains the same because the higher earning partner has the same level of consumption.

Thus, the optimal savings with the commitment technology would necessarily imply that the consumption of the higher income partner be lower in divorce when the couple has access to the commitment technology, for large enough values of α.

Thus, when a couple has access to the commitment technology, we know that the difference between the divorced consumption of the high- and low-income partner will shrink.

A.3 Completion of Proof of Proposition 4

To complete the proof presented in the main text, we must show that savings will be larger when one has access to the α asset than when one only has access to the δ asset. Denote the consumption levels of partners when divorced when having access to the α asset as c^d_{2i} and c^d_{2j} and that when having only access to the δ asset as $\widehat{c^d_{2i}}$ and $\widehat{c^d_{2j}}$.

Since $\alpha > 1 - \beta \geq \delta$, we can show that the ratio of marginal returns to savings when investing in the α asset compared to the marginal return when investing in the δ asset is always larger than the ratio of marginal costs of investing in τ_j in both cases since this is akin to:

$$\frac{\alpha u'(c^d_{2i}) + (1-\alpha)u'(c^d_{2j})}{\delta u'(\widehat{c^d_{2i}}) + (1-\delta)u'(\widehat{c^d_{2j}})} > \frac{(1-\beta)u'(c^d_{2i}) + \beta u'(c^d_{2j})}{(1-\beta)u'(\widehat{c^d_{2i}}) + \beta u'(\widehat{c^d_{2j}})}$$

Thus, to prove by contradiction, assume the optimal savings when having only access to the δ asset is higher than the one when having access to the α savings. It must then be the case that $\tau_j > \widehat{\tau_j}$, that is the optimal investment of partner j in child quality must be higher when having access to the commitment device than when not since the higher return to savings require a higher marginal cost for that partner. The combination of lower savings and higher investment will automatically imply that $c^d_{2j} < \widehat{c^d_{2j}}$. By proposition 3, we also know that $\tau_i > \widehat{\tau_i}$ since having access to α asset increases specialization thus leading to the low-income partner to invest more. If this increased investment was such that $c^d_{2i} < \widehat{c^d_{2i}}$, then the marginal return to investment when having access to the α asset would automatically be larger than when not having access to that asset, which would contradict our assumption above. We must thus have $c^d_{2i} > \widehat{c^d_{2i}}$. In this case, we can show that for α large enough, δ small enough, or for $u''' < 0$, the return to saving with commitment

would be larger than that without, which would imply that optimal savings cannot be smaller when having access to the α asset than when not.

A.4 Completion of Proof of Proposition 6

Let us define the consumption level in the second period for a marriage with full commitment as $\overline{c_2}$ while that of marriage with imperfect commitment but access to α assets as c_{2i}^d and c_{2j}^d.

Because $\alpha > 1 - \beta$, the ratio of marginal returns to investing in savings between marriage with full commitment and that with imperfect commitment (but access to α savings) will be smaller than the ratio of marginal costs of investing in τ_j for both cases since this is akin to:

$$\frac{u'(\overline{c_2})}{\alpha u'(c_{2i}^d) + (1-\alpha)u'(c_{2j}^d)} < \frac{u'(\overline{c_2})}{(1-\beta)u'(c_{2i}^d) + \beta u'(c_{2j}^d)}$$

Assume by way of contradiction that the optimal savings in the case with full commitment are larger than that in imperfect commitment. It must then also be that investments in τ_j in the case of full commitment are lower than that in imperfect commitment based on the above inequality. For α large enough (necessarily if $\alpha > 0.5$), this implies that $\overline{c_2} > c_{2j}^d$ which would then imply that the return to saving would be larger for the case with imperfect than perfect commitment, which contradicts our premise. Thus, savings will be larger in the case where there is imperfect commitment than when there is full commitment.

Let us now compare savings in non-marital fertility when income sharing increases such that we compare low income sharing at $\underline{\beta}$ with higher income sharing at β, where $\underline{\beta} > \beta$ (i.e., each partner retains a higher share of their own income). In both cases, savings are divided using the δ sharing rule. Defining consumption as c_{2i}^d and c_{2j}^d when income sharing is higher and $\underline{c_{2i}^d}$ and $\underline{c_{2j}^d}$ when income sharing is lower, we can argue that the ratio of marginal returns to savings with high versus low income sharing will always be less than the ratio of marginal costs of investing in τ_j in both cases since

$$\frac{\delta u'(c_{2i}^d) + (1-\delta)u'(c_{2j}^d)}{\delta u'(\underline{c_{2i}^d}) + (1-\delta)u'(\underline{c_{2j}^d})} < \frac{(1-\beta)u'(c_{2i}^d) + \beta u'(c_{2j}^d)}{(1-\underline{\beta})u'(\underline{c_{2i}^d}) + \underline{\beta} u'(\underline{c_{2j}^d})}.$$

Given this, if the optimal savings with more income sharing was above that with less income sharing, it must also be true that the investment in child quality by the high income partner must be lower when non-marital fertility has higher income sharing since the marginal cost will be higher in this case. These combined imply that $c_{2j}^d > \underline{c_{2j}^d}$. By a similar argument as in the proof of the previous proposition, it must also be that $\underline{c_{2i}^d} > c_{2i}^d$. Combining these, for δ low enough or for $u''' < 0$, returns to savings would be larger in marriage than in non-marital fertility, which would imply that the optimal savings cannot be smaller with less income sharing. Thus, savings are decreasing in income sharing.

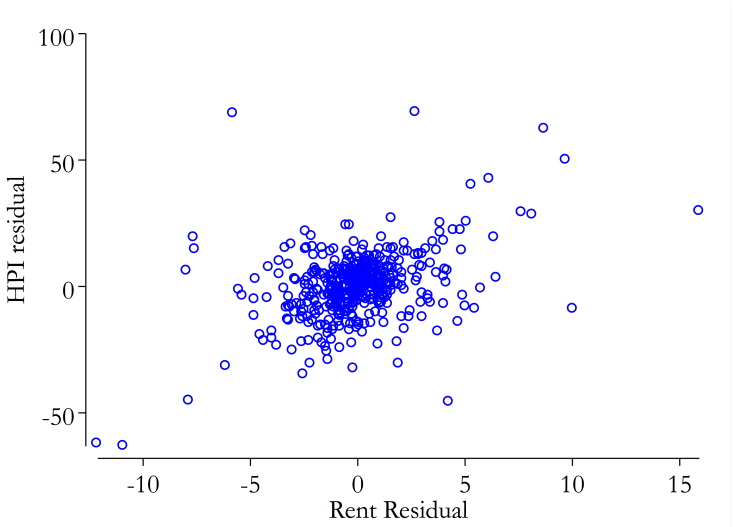
B Appendix Tables and Figures

Table B.1: Relationship between property regime and female − male working behavior

Dependent variable:	Usual hours worked (1)	Worked last year (2)
Female × Comm. Prop.	-0.839***	-0.0183***
	(0.0565)	(0.00118)
Female	-14.47***	-0.203***
	(0.0265)	(0.000553)
Comm. Prop.	0.900***	0.00761***
	(0.0401)	(0.000837)
Constant	36.10***	0.855***
	(0.0726)	(0.00152)
Observations	2048018	2048018
R-Squared	0.188	0.107

Notes: Data uses all couples in the 2008-2014 ACS married within the last eighteen years. Controls for age, educational category, and race fixed effects included. Arizona, California, Idaho, Louisiana, Nevada, New Mexico, Texas, Washington, and Wisconsin are community property states, while the remaining stats are equitable division.

Figure B.1: Comparison of rental and housing price index residuals across all states and years



Notes: Housing price index from the Federal Housing Finance Agency based on purchase-only data. Rental price index from the Bureau of Economic Analysis. Both series represent the residuals of the data against year fixed effects and state fixed effects.

Table B.2: Relationship between house prices at marriage and total work hours of a couple

	OLS			IV		
	(1)	(2)	(3)	(4)	(5)	(6)
−House Price Index	-0.756***	-0.748***	-0.665***	-2.766**	-2.762**	-2.230*
	(0.211)	(0.209)	(0.231)	(1.184)	(1.190)	(1.260)
Year of Survey HPI	No	Yes	Yes	Yes	Yes	Yes
Additional Controls	No	No	Yes	No	No	Yes

Notes: Data uses all couples 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, divided by 100, with the last three columns instrumented for with $-\widehat{\text{HPI}}$, as defined in equation 5. Fixed effects for the year of marriage, current year, and state are included in all specifications. Standard errors are clustered at the state level. N=1,440,093 for the first three columns and N=1,299,414 for the last three.

Table B.3: Relationship between house prices at marriage and individual's years of education

	(1)	(2)	(3)	(4)
−House Price Index	-0.113*	-0.110*	-0.573**	-0.572**
	(0.059)	(0.059)	(0.224)	(0.222)
Year of Survey HPI	No	Yes	No	Yes
Additional Controls	No	No	No	No
Observations	2,800,101	2,800,101	2,520,831	2,520,831

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, divided by 100, with the last two columns instrumented for with $-\widehat{\text{HPI}}$, as defined in equation 5. 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 B.4: Relationship between house prices at marriage and specialization: robustness

	Worked Last Year		Usual Hours Worked	
	(1)	(2)	(3)	(4)
	Renters (N=1,165,178)			
−House Price Index	-0.0008	0.001	-0.333***	-0.224**
	(0.002)	(0.002)	(0.115)	(0.109)
−HPI × female	-0.006	-0.005	-0.053	0.028
	(0.005)	(0.005)	(0.208)	(0.203)
	MSA-level variation (N=1,094,095)			
−House Price Index	0.002	0.003	0.425**	0.439**
	(0.003)	(0.003)	(0.168)	(0.166)
−HPI × female	-0.010**	-0.009*	-1.250***	-1.158***
	(0.005)	(0.005)	(0.249)	(0.237)
	Only college educated (N=1,408,667)			
−House Price Index	0.016***	0.016***	1.518***	1.493***
	(0.004)	(0.004)	(0.251)	(0.249)
−HPI × female	-0.035***	-0.035***	-3.259***	-3.252***
	(0.006)	(0.006)	(0.469)	(0.472)
	Using state of birth (N=2,888,992)			
−House Price Index	0.794**	0.415	72.42***	54.53***
	(0.377)	(0.341)	(19.62)	(18.12)
−HPI × female	-1.555***	-1.296***	-152.0***	-138.1***
	(0.529)	(0.475)	(36.20)	(33.40)
	Without 2008-2011 (N=3,063,008)			
−House Price Index	-0.000***	0.000	-0.016***	0.002**
	(0.000)	(0.000)	(0.002)	(0.001)
−HPI × female	-0.017***	-0.013***	-1.626***	-1.388***
	(0.004)	(0.004)	(0.294)	(0.273)
	Adding year × region dummies (N=3,702,212)			
−House Price Index	0.001	-0.000	0.349**	0.282**
	(0.003)	(0.002)	(0.160)	(0.139)
−HPI × female	-0.013***	-0.011***	-1.334***	-1.185***
	(0.004)	(0.004)	(0.258)	(0.248)
Additional Controls	No	Yes	No	Yes

Notes: Data uses individuals in the 2008-2014 ACS married within the last eighteen years. House Price Index represents state or MSA-level housing prices from the Federal Housing Finance Agency in the year of marriage, divided by 100. Fixed effects for the year of marriage, current year, and state / state of birth / MSA are included in all specifications. Standard errors are clustered at the location level.

Table B.5: Relationship between house prices at age 25 and specialization: robustness

	Worked Last Year		Usual Hours Worked	
	(1)	(2)	(3)	(4)
	Never married individuals (N=1,540,216)			
−House Price Index	-0.004	-0.004	-0.350	-0.360*
	(0.004)	(0.004)	(0.216)	(0.188)
−HPI × female	0.017***	0.017***	1.129***	1.178***
	(0.003)	(0.003)	(0.205)	(0.197)
	Only college educated (N=1,364,477)			
−House Price Index	0.029***	0.029***	2.412***	2.412***
	(0.005)	(0.005)	(0.322)	(0.322)
−HPI × female	-0.052***	-0.052***	-4.271***	-4.271***
	(0.008)	(0.008)	(0.559)	(0.559)
	Using state of residence (N=4,609,404)			
−House Price Index	0.010***	0.011***	0.759***	0.780***
	(0.003)	(0.003)	(0.180)	(0.175)
−HPI × female	-0.022***	-0.020***	-1.824***	-1.695***
	(0.005)	(0.005)	(0.332)	(0.312)
	Without 2008-2011 (N=2,953,635)			
−House Price Index	0.009**	0.007*	0.943***	0.828***
	(0.004)	(0.004)	(0.232)	(0.216)
−HPI × female	-0.017**	-0.015**	-1.607***	-1.514***
	(0.006)	(0.006)	(0.409)	(0.379)
Additional Controls	No	Yes	No	Yes

Notes: Data uses individuals in the 2008-2014 ACS who turned 25 within the last eighteen years. House Price Index represents state or MSA-level housing prices from the Federal Housing Finance Agency in the year of marriage, divided by 100. Fixed effects for the year of marriage, current year, and state / state of birth / MSA are included in all specifications. Standard errors are clustered at the location level.

Table B.6: Relationship between house prices at age 25 and time spent on physical space

	Dependent variable: Time on physical space			
	Younger than 43		Younger than 35	
	(1)	(2)	(3)	(4)
−House Price Index	1.913	1.348	1.424	10.07
	(2.073)	(7.200)	(2.111)	(7.301)
−HPI × female	-0.819	-0.670	-0.640	-3.802
	(1.261)	(4.563)	(1.438)	(6.509)
Additional Controls	No	Yes	No	Yes
Observations	33015	33015	55801	55801
R-Squared	0.0254	0.187	0.0257	0.190

Notes: Data uses American Time Use Survey from 2003 to 2019, for individuals who either turned 25 no more than 18 years ago or no more than 10 years ago. Physical space upkeep includes interior and exterior maintenance and lawn and garden care. House Price Index represents state-level housing prices from the Federal Housing Finance Agency in the year of turning 25, divided by 100. Fixed effects for the year of birth, current year, and state are included in all specifications, as are controls for year-of-survey HPI. Additional controls include a linear control for age and dummies for 4 educational categories. Standard errors are clustered at the state level.