Family Law, Marriage, and Household Decisions

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Abstract

I study how changes in divorce and property division laws in the United States affected rates of marriage formation, marital sorting patterns, and decisions within marriage such as asset accumulation and divorce. Through the 1970s and 80s, different states in the United States enacted changes to their divorce and property division laws. While divorce laws changed from *mutual consent* to *unilateral*, property division laws in the event of divorce changed from *title-based* to *equitable division*, favoring the low-income earner in respect of property settlements. To quantify the effect of these legal changes, I embed a dynamic extension of the collective model with endogenous asset accumulation, labor supply and divorce into a frictionless empirical marriage-matching model. I estimate parameters of the model using data from marriages that were formed under mutual consent, equitable division regime and simulate behavior under other legal regimes. Consistent with the data, these simulations indicate that equitable division laws increase rates of non-marriage but reduce rates of asset accumulation and divorce. Further, in line with the original intent of legislators, equitable division laws reduce intra-household inequality in consumption, but this gain in terms of equity is accompanied by a substantial loss in terms of economic efficiency.

Keywords: Unilateral divorce, equitable division, assortative matching, labor supply, asset accumulation

JEL Classification: J12, J22, K36, D15

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1 Introduction

Over the latter half of the past century, the United States, like much of the developed world, experienced dramatic changes in family formation and dissolution behaviors (see Browning *et al.* (2014), Ch. 1). There was a retreat from marriage, and marriages became more unstable over time. Between 1970 and 2000, the rate of marriage in the United States nearly halved, and the rate of divorce nearly doubled (see Figure 1). These long-term trends, i.e., the retreat from marriage and increased marital instability, are both reasons for serious concern, for they presumably affect welfare, not only that of adults but also that of young children, a larger fraction of whom now grow up in less stable (and blended) families — living arrangements that correlate with worse outcomes for children (see Ginther & Pollak (2004)).

In this paper, I quantify the extent to which changes in divorce and property division laws contributed to these long-term trends, ie, the retreat from marriage and decreased marital stability, and affected economic welfare. To be more precise, I study how these legal changes affected rates of marriage formation, marital sorting patterns (i.e., who marries whom), and decisions within marriage such as asset accumulation, family labor supply and divorce; and quantify changes in welfare in the new equilibrium relative to the old, as viewed through the lenses of efficiency and distribution.

The changes that took place in divorce and property division laws may be summarized as follows: Beginning in the late 1960s and through the 1980s, a large number of states in the United States changed their divorce laws from a *mutual consent* to a *unilateral* divorce regime. In a *mutual consent* regime, divorce, on "*no-fault*" grounds, could be obtained only if both partners consented to the divorce. By contrast, *unilateral divorce* statutes allowed any partner to seek and obtain divorce without the consent of the other partner. Contemporaneously, many states also changed their laws governing the division of marital property in the event of divorce. States that changed their property division laws moved from a *title-based* to an *equitable* division regime. In a *title-based* regime marital property would be divided in accordance with the property titles held by each spouse. By contrast, in an *equitable division* regime, a judge would decide on the fair share of marital property in the event of divorce, usually favoring the low-income earner

as compared to what *title-based* property settlements would entail.

Intuitively, it appears plausible that changes in divorce and property division laws changed the nature of the marital contract. For instance, an *equitable* division regime, by allowing a relatively even distribution of marital property in the event of divorce, could raise the outside option of the low-income earner in marriage. *Unilateral* divorce, by allowing any spouse to quit the marriage without the consent of the other, enables any spouse to credibly exercise her outside option.[1] And given that individuals who marry in a *unilateral* divorce and *equitable* division regime foresee the changed nature of the marital contract under the new legal regime, both marital sorting patterns and behaviors within marriage could plausibly be affected by the change in divorce and property division laws.

As an illustration of the mechanism through which changes in divorce and property division laws may affect marriage decisions, consider the decision that a high income earner must make in respect of choosing a spouse. She must decide either to marry a high-earning spouse, or to marry a low-earning spouse, or to stay single. In a *mutual consent* regime, she might be indifferent between marrying a high earning-spouse and a low-earning spouse, if the low-earning spouse were to commit to concede a large enough share of the marital surplus to her. This could compensate the high-earning spouse for the smaller marital surplus generated with a low-earning spouse as compared to the marital surplus that would have been generated if she had married a high-earning spouse. However, such a commitment made by a low-earning potential spouse is no longer credible in a *unilateral* divorce regime. In such a divorce law regime, the high-earning spouse knows that if she were to marry the low-earning spouse, and the marriage were to not work out, the low-earning spouse could *unilaterally* quit the marriage. Moreover, in an *equitable division* regime, the low-earning spouse, while quitting the marriage, would be entitled to half the marital property, to which the high-earning spouse would have principally contributed.

Based on the intuition that we gain from the example above, it seems apparent that

[1] I follow the dominant paradigm in the literature (see Voena (2015) for instance) and assume that the outside option relevant in marriage is divorce. However, the question of what constitutes the relevant outside option in marriage is not settled. Lundberg & Pollak (1993) suggest that the relevant outside option within marriage may not be divorce but a state of non-cooperation within marriage and Lundberg *et al.* (1997) provide some evidence in favor of the suggestion.

the introduction of *unilateral* divorce and *equitable* division laws would lead to greater assortative matching, i.e., we should observe that a higher fraction of couples have the same earnings potential than before. However, marital sorting is not the only relevant behavioral margin in this problem. The shrunken gains from marriage, on account of *limited commitment* induced by *unilateral* divorce could affect behavior on the extensive margin. In other words, *unilateral* divorce laws could increase rates of non-marriage, and affect relative scarcities of different types of men and women who sort into marriage, thereby affecting the split of the marital surplus in the new marriages that form. That, in turn, could affect who marries whom. Given the complexity of mechanisms at play, it is not possible to anticipate changed marital sorting patterns based on intuition alone. Moreover, a precise quantification of the effect of changes in divorce and property division laws would crucially hinge on a precise measurement of the response of key behavioral margins. This can only be accomplished with the help of a rich structural model that allows for general equilibrium effects of the kind described above.

With a view to studying how marriage decisions and behaviors within matches that formed changed in response to changes in *divorce* and *property division* laws, I embed a dynamic extension of the collective model in a frictionless empirical marriage-matching model. In the life-cycle model, I allow for endogenous asset accumulation, labor supply and divorce in an *imperfectly transferable* utility setting. In order to quantify the effect of changes in divorce and property division laws, I follow the following strategy: I first estimate parameters of the model by targeting key moments in the data from marriages that were formed and remained in a *mutual consent, equitable division regime*. Then, I use the estimated parameter values to simulate behavior under the other three legal regimes, namely, *mutual consent, title-based; unilateral, title-based*; and *unilateral, equitable*. The results I obtain may be summarized as follows: For parameter values that best fit the data, divorce and property division laws affect rates of non-marriage but do not substantially affect assortative matching as measured by educational homogamy. However, behavior within marriages that form under different legal regimes are substantially different. For example, given the divorce law regime, rates of asset accumulation and divorce are lower in an *equitable* division regime as compared to a *title-based* regime.

This paper is closely related to a large strand in the literature that investigates the effects of change in divorce and property division laws, on family formation, decisions within marriage, and divorce, both in the U.S. and European contexts. The behaviors studied by previous literature include divorce rates (see Allen (1992), Peters (1992), Friedberg (1998), Wolfers (2006), González & Viitanen (2009)), rates of marriage formation (see Rasul (2003), Matouschek & Rasul (2008)), asset accumulation (see Stevenson (2007)), female labor supply (see Gray (1998), Chiappori *et al.* (2002) and Voena (2015)), rates of violent crime (see Cáceres-Delpiano & Giolito (2012)), spousal homicide and suicide rates (see Stevenson & Wolfers (2006)), the welfare of children (see Gruber (2004)) and college educational attainment (see Blair & Neilson (2018)). However, much of the literature does not carefully distinguish between matches formed before changes in divorce and property division laws and those formed after. An exception to this is found in Voena (2015). Restricting her analysis to couples that married before changes in divorce and property division laws, she finds that female labor force participation decreased and asset accumulation increased after the introduction of *unilateral* divorce and *equitable* division. Further, Fernández & Wong (2017) conduct a welfare analysis of divorce law regimes, assuming equal property division in the event of divorce. Thus, they do not allow for title-based property division in any legal regime. Moreover, they do not let the marriage market equilibrate in their model. Finally, in a paper related very closely to the research in this paper, Reynoso (2017) extends the literature by studying the effect of change in divorce laws on marital sorting and behavior within marriage. However, she neither models any change in property division laws nor allows for savings in her model.

This paper contributes to the literature in a number of ways. First, an obvious consequence of modeling asset accumulation is that I am able to quantify how asset accumulation within marriage was affected by the change in divorce and property division laws, taking into account endogenous marital sorting. Second, by explicitly modeling the split of marital assets in the event of divorce, I am able to trace how the well-being of divorcees changed due to the introduction of *unilateral* divorce and *equitable* division. Third, simulations of my model can generate predictions about the inequality and variability in individual consumption changed due to changes in divorce and property

division laws, and how it varies by education category and type of partner. Fourth, my model generates predictions about changes in marital sorting patterns due to changes in divorce and property division laws. Thus, I am able to quantify if these legal changes had any effect on assortative matching, which has been found to account for income inequality across households.[2] Finally, results from my model speak to the policy-relevant question as to what the effects of introducing "unilateral" divorce would be in a context that has title-based or equitable property division laws.

The remaining part of this paper is structured as follows: Section 2 describes the institutional background of changes in divorce and property division laws. Section 3 details the model. Section 4 describes the dataset and the estimation methodology. Section 5 presents results of simulating the model with estimated parameter values for different legal regimes, and their welfare implications. Section 6 concludes.

2 Institutional Background of Legal Changes

Traditional family law in the United States, drawing upon the British legal tradition that was heavily influenced by Christian religious principles, treated marriage as a sacrament consisting in a commitment between a man and a woman to join one another for life.[3] However, by 1900 all states in the United States permitted divorce on "*fault-based*" grounds. Amongst the commonly accepted grounds for divorce were instances of marital fault such as adultery, cruelty (physical or mental) and desertion. Starting in the 1920s different states in the United States changed their divorce laws to include a "*no-fault*" ground for divorce. In most cases this new ground was termed "*irretrievable breakdown*" of marriage. Thus, under the *no-fault* statutes, the law expressly permitted divorce by *mutual consent* even though there was no claim or evidence of wrongdoing on either side. Beginning in the late 1960s and through the 1980s, many states in the United States enacted further changes to their divorce laws, instituting divorce statutes that came to be

[2]Several papers in the literature have claimed that assortative matching increased between 1980 and 2000 (see Schwartz & Mare (2005),Greenwood *et al.* (2014)) while Gihleb & Lang (2016) and Eika *et al.* (2014) dispute the claim. Without getting into that debate, I investigate if *divorce* and *property division* laws increased or decreased assortative matching.

[3]The actual marital vow was a promise "to take each other to love and to cherish, in sickness and in health, for better, for worse, until death do us part" (see Weitzman (1985), page 1).

known as "*unilateral*" divorce. In such a legal regime, any one spouse, acting on her/his own and without the consent of her/his partner, could obtain a divorce. Further, in a *unilateral* divorce regime, a spouse did not need to establish "marital fault" on part of her/his partner as a pre-condition for divorce. Figure 2 shows how the proportion of states with *unilateral* divorce statutes changed between 1965 and 1992. Note that the fraction of states with *unilateral* divorce increased rapidly in the early 1970s. Adoption of *unilateral* divorce continued through the late 1970s and 1980s, albeit at a slower pace.

In this paper, I follow the existing economic literature (see Gruber (2004), Voena (2015), Reynoso (2017)) and classify divorce law regimes into two broad categories, namely, *mutual consent* and *unilateral* divorce regimes. Thus, the *mutual consent* regime encompasses legal regimes that allowed divorce only on grounds of *marital fault* and those that allowed divorce on grounds of either marital fault or irretrievable breakdown of marriage, subject to the condition that both spouses agreed that there had been an "irretrievable breakdown" of marriage. The rationale for classifying these two legal regimes as *mutual consent* is that even in a *fault-based* regime, a divorce by *mutual consent* was possible. If both spouses wanted divorce, one spouse could falsely accuse the other of having committed some "fault" and the spouse accused could simply choose not to contest the allegations during divorce proceedings.[4] In fact, such acts of perjury were so common that their prevention appears to have been a major motivation for the enactment of *no-fault* statutes.

The laws regarding division of marital property in the event of divorce varied across states. By the middle of the twentieth century, there were three distinct property division regimes, namely, *title-based*, *equitable division* and *community property*. As of 1967, thirty states followed a *title-based* property division regime which mandated that in the event of divorce, marital property be divided in accordance with the property titles held by each spouse. In contrast, eight states, mostly with a Spanish or French historical legacy, followed the *community property* regime, under which marital assets were equally divided between the ex-spouses. The remaining thirteen states followed an *equitable division*

[4]This seems to have been fairly common under *fault-based* statutes. Weitzman (1985)(pg. 8) writes, "Over time, in actual practice, many divorcing couples privately agreed to an uncontested divorce whereby one party, usually the wife, would take the *pro forma* role of the innocent plaintiff. Supported by witnesses, she would attest to her husband's cruel conduct and he would not challenge her allegations." In such cases, a divorce would be granted under the law.

regime, in which the judge adjudicating divorce decided on the fair share of marital property between the ex-spouses. Through the 1970s and the 1980s, a large number of states that had *title-based* property division changed their laws to institute *equitable division* property regimes. In contrast, states that already had *equitable division* or *community property* did not change their property division laws. Figure 2 shows how the fraction of states that had *equitable division* laws increased over time. Further, Table 10 provides the dates of change in both divorce and property division laws.

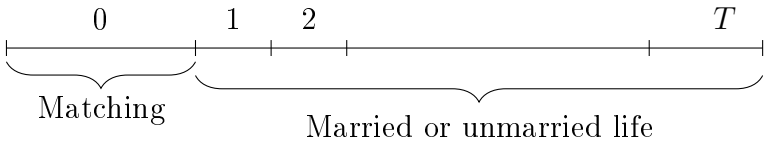
Since the division of marital property in *equitable division* states is left to the judge's discretion, its appropriate treatment in terms of the model should be dictated by usual judicial practice. The Fifth follow-up (1986) of the National Longitudinal Survey that began in 1972 contains data on property settlements in the event of divorce. I find that the average share granted to the wife in *equitable division* states is 0.48. As an approximation, I model *equitable division* as ending in an even split of marital property in the event of divorce. Thus, in the model there is no distinction between *equitable division* and *community property* regimes.

3 The Model

3.1 An Outline

Every individual in the economy is either female or male and has either high education or low education. The highly(low) educated individuals are potential high(low) income earners, ie, they earn a higher(lower) wage if they work over their life cycle. The number of individuals in each education category and gender and their wages over the life cycle are exogenously given and are common knowledge. The life of any individual consists of two stages. In the first stage, each individual draws taste shocks for members of the opposite sex with a given level of education. Note that the taste shock drawn by each person is for different education types of the opposite sex and not for any specific individual of the opposite sex. They then match with members of the opposite sex in a frictionless marriage market. Matches are made and some individuals could remain single. In each

type of marital pairing[5], a contract regarding the split of the marital surplus is negotiated on the marriage market. Once the matches have been made, the marriage market closes. No further matches can be made thereafter. However, existing marriages can end in a divorce. This sequence of events is succinctly depicted in the timeline drawn below:



Individuals enter their adult lives either as an unmarried person or as a spouse in a married couple. The behavior of married couples is modeled using a dynamic extension of the collective model of the household (*à* la Voena (2015))[6]. This stage lasts for T periods. At the beginning of each period except the last, each spouse in a marriage draws a "distaste-for-work" shock. Having observed the values of the shock, the couple makes labor supply, savings and consumption allocation decisions. The labor supply choices that married men and women make are assumed to be discrete. In particular, both married men and married women may choose to work full-time, part-time or to not work at all. The benefit from marriage consists in risk sharing and economies of scale in household consumption.

At the end of each period except the last, each spouse draws a "taste-for-partner" shock. The "taste-for-partner" shock follows a random walk stochastic process. Based on the values of this shock, the couple decides whether to enter the next period married or to divorce. The legal regime, which agents take as given and expect to persist through their lives, enters into the problem of married individuals in two ways. The *divorce law* regime affects conditions under which divorce may be obtained while the *property division* regime affects the division of property in the event of divorce.

The model features a crucial distinction between the *mutual consent* and the *unilateral* divorce regime in terms of what a disagreement between the spouses in respect of whether to stay married or to get divorced entails. In the event of such disagreement in a *mutual consent* regime, the spouse who wants to divorce could attempt to transfer a

[5]There are four types of marital pairing, namely, $\{HighMan, HighWoman\}$, $\{HighMan, LowWoman\}$, $\{LowMan, HighWoman\}$ and $\{LowMan, LowWoman\}$

[6]The original static versions of the collective model can be found in Chiappori (1988) and Chiappori (1992).

share of her marital assets to the spouse who wants to stay married so as to make her indifferent between getting divorced and staying married. By contrast, in a similar situation in a *unilateral* divorce regime, the split of marital surplus contracted in the previous period might be re-negotiated so as to make the spouse requesting divorce indifferent between remaining married and getting divorced. It bears emphasis that in a *mutual consent* regime, the model, under no circumstances, allows re-negotiation of the contract relating to the split of marital surplus that was agreed to at the start of marriage. Thus, in the language of Pollak (2019), the *mutual consent* regime is modeled as being characterized by **B**inding **A**greements in the **M**arriage **M**arket (**BAMM**) while the *unilateral* divorce regime is modeled as being characterized by a very specific form of **B**argaining **I**n **M**arriage (**BIM**). To be precise, the specific form of **BIM** that I impose is known as *limited commitment* (for instance, see Voena (2015) and Kocherlakota (1996)) in the literature.

If a couple divorces, each partner must remain unmarried thereafter, and her/his problem is identical to that of an unmarried woman/man with the same state variables. The problem for unmarried individuals is analogous to that of married couples except for the fact that they do not receive any "taste-for-partner" shock at the end of any period and do not need to make a decision about whether to divorce or not. Further, the legal regime does not enter into the problem of unmarried individuals in any way.

The last period of life is different from all other periods in two respects. First, no individual, whether married or unmarried, works in this period. Thus, consumption in the final period of life is entirely out of savings. Second, for married couples, no "taste-for-partner" shock realizes in the final period of life. At the end of the final period of life both spouses die without leaving any bequest.

I describe the model formally below, beginning with the life cycle.

3.2 The Life Cycle

I first describe the problem of an unmarried individual.

3.2.1 The Problem of an Unmarried Individual

The instantaneous utility of a single individual i at time t is given by

$$u_{it}(C_{it}, l_{it}, h_{it}, \eta) = \frac{C_{it}^{1-\gamma}}{1-\gamma} + \mathbf{1}_{it}(\text{NW}) * \phi(X) + \mathbf{1}_{it}(\text{PT}) * 0.5 * \phi(X) - \mathbf{1}(h_{it})\eta_{it}^{h} \quad (1)$$

where C denotes consumption, l denotes leisure, h denotes hours of work, $h \in \{0, \frac{1}{2}, 1\}$, which corresponds to the alternatives of not working(NW), working part time (PT) and working full-time. $\mathbf{1}(.)$ denotes the indicator function and X denotes demographic characteristics. ϕ denotes the systematic utility from leisure. Associated with each discrete alternative labor supply choice is an alternative-specific taste shock denoted by $\eta_{it}^{h} \overset{iid}{\sim} N(0, \sigma_{\eta}^{2}(X))$. Conditional upon X, η_{it}^{h} is assumed to be independently distributed across individuals and over time. Each individual is endowed with a unit of time in each period and faces the following time budget constraint.

$$h_{it} + l_{it} = 1, \qquad h_{it} \in \{0, 1/2, 1\} \quad \forall t < T \quad (2)$$

and

$$h_{iT} = 0$$

A single individual i with education level e faces the per-period budget constraint

$$\begin{aligned} C_{it} &= w_{it}^{e,g} h_{it} + K_{i,t} - \frac{K_{i,t+1}}{R}, \qquad g \in \{m, f\} \\ &\text{and } K_{it} \geq 0 \quad \forall t \in \{1, 2, .., T\} \end{aligned} \quad (3)$$

where $w_{it}^{e,g}$ denotes the wage earned by a single i with education level e and of gender g at time t, K_t denotes assets at the beginning of period t, and R is the gross rate of interest. The budget constraint requires that total consumption equal the sum of income and assets minus savings.

For a single individual i, define the choice vector $\mathbf{q}_t^s = \{C_{it}, h_{it}, l_{it}, K_{i,t+1}\}$ and the state vector $\omega_t^s = \{K_{it}, \eta_{it}\}$.

The value of a single who enters T with state vector ω_{iT} is defined as

$$V_{jT}(\omega_{iT}) = \frac{K_{iT}^{1-\gamma}}{1-\gamma}$$

Having defined V_{iT}, recursively define $V_{it}(\omega_t)\ \forall t < T$ as follows

$$V_{it}^s(\omega_t^s) = \max_{\mathbf{q}_t^s} \quad u(C_{it}, h_{it}, l_{it}, \eta) + \beta \mathbf{E}\left[V_{i,t+1}^s(\omega_{t+1}^s|\omega_t^s)\right] \tag{4}$$

subject to

the time budget constraint (2)

the budget constraint for singles (3)

Finally, note that the legal regime does not enter into the single's problem in any way.

3.2.2 The Couple's Problem

I describe the problem beginning from the last period, ie period T. The state vector of a couple that enters T married is defined as $\omega_T = \{K_T, \mu_T, \xi_{m,T-1}, \xi_{f,T-1}\}$ where K_T denotes total marital assets at period T. As couples are retired in the last period, the value of the couple is defined by

$$V_T(\omega_T) = \max_{C_{mT}, C_{fT}} \quad \mu_T \frac{C_{mT}^{1-\gamma}}{1-\gamma} + (1-\mu_T)\frac{C_{fT}^{1-\gamma}}{1-\gamma} \tag{5}$$

subject to

$$C_{mT} + C_{fT} = \rho K_T$$

Here, C_{mT} and C_{fT} denote consumptions of the husband and wife at period T respectively, and μ_T denotes the husband's Pareto weight applicable in period T.[7] Denote the policy functions from solving the above problem as $C_{jT}^*(\omega_T)$, $j \in \{m, f\}$. Then the value to

[7] Note the the Pareto weight of the husband and the wife have been normalized to sum to 1.

spouse j in period T given state vector ω_T is defined as

$$V_{jT}(\omega_T) = \frac{\left(C^*_{jT}(\omega_T)\right)^{1-\gamma}}{1-\gamma}$$

In any period t prior to the last, the vector of states and controls at the beginning of period t depend on the property division regime. In a *title-based* property division regime, the state vector at t is given by $\omega_t = \{K_t, \kappa_t, \mu_t, \boldsymbol{\eta}_t, \boldsymbol{\xi}_{t-1}\}$, where K_t denotes total marital assets at the beginning of period t, κ_t ($\in [0,1]$) denotes the default fraction of marital assets that would accrue to the husband if divorce were to occur at the end of period t, μ_t denotes husband's Pareto weight applicable to the marriage at period t, $\boldsymbol{\eta}_t$ is the vector of "distaste-for-work" shocks that realize at the beginning of period t, and $\boldsymbol{\xi}_{t-1}$ is the vector of "taste-for-partner" shocks that realized at $t-1$. The choice-vector in *title-based* property division regime is given by $\mathbf{q}_t = \{C_{mt}, C_{ft}, h_{mt}, h_{ft}, l_{mt}, l_{ft}, K_{t+1}, \kappa_t\}$. In words, couples observe ω_t and make decisions in respect labor supply, consumption allocation, savings and the default division of marital assets if the couple were to split at the end of period t. On the other hand, in an *equitable* or a *community property* regime, the default division of marital assets in the event of divorce is not a choice made in marriage but is fixed by the law. So, the state space in an *equitable* or a *community property* regime are given by $\omega_t = \{K_t, \mu_t, \boldsymbol{\eta}_t, \boldsymbol{\xi}_{t-1}\}$ and $\mathbf{q}_t = \{C_{mt}, C_{ft}, h_{mt}, h_{ft}, l_{mt}, l_{ft}, K_{t+1}\}$ respectively. Notice that κ_t does *not* feature in either the state or the control space in these legal regimes.

At the end of period t (where $t < T$), each spouse draws a "taste-for-partner" shock which I denote as ξ_{jt}, $j \in \{m, f\}$. ξ_{jt} follows a random walk stochastic process as under[8].

$$\xi_{jt} = \xi_{j,t-1} + \zeta_{jt}, \quad \zeta_{jt} \overset{iid}{\sim} N(0, \sigma^2_\zeta), \quad \xi_{j0} = 0 \tag{6}$$

Given the vector of marital choices $\mathbf{q}^*_t$, and having observed the realized vector of "taste-for-spouse" shock $\boldsymbol{\xi}_t$, each spouse j computes her present discounted value from

[8]For the purpose of numerical solution, I discretized the random walk as a Markov process (see Tauchen (1986) and Adda *et al.* (2003))

staying married as follows

$$\widetilde{V}_{jt}^{marr}(\mathbf{q}_t^*, \boldsymbol{\xi_t}) = \beta \mathbf{E}\big[V_{j,t+1}(\omega_{t+1})|\mathbf{q}_t^*, \mu_t, \boldsymbol{\xi_t}\big] + \xi_{jt} \tag{7}$$

The present-discounted value (at the end of period t) to the couple from staying married is computed as under

$$\widetilde{V}_{t}^{marr}(\mathbf{q}_t^*, \boldsymbol{\xi_t}) = \mu_t \widetilde{V}_{mt}^{marr} + (1-\mu_t)\widetilde{V}_{ft}^{marr} \tag{8}$$

The present discounted value to spouse j of divorcing in period t with the default allocation of marital property as specified by the property division regime $\mathcal{P}$ is given by

$$V_{jt}^{d}(\mathbf{q}_t^*, \boldsymbol{\xi_t}) = \beta \mathbf{E}\big[V_{j,t+1}^{s}(\omega_{j,t+1}^{s})|\omega_{jt}^{d}(\mathbf{q}_t^*, \mathcal{P})\big] \tag{9}$$

Here $\omega_{jt}^{d}(\mathbf{q}_t^*, \mathcal{P})$ is the default allocation of marital property (in the event of divorce) to spouse j under the property division regime $\mathcal{P}$ for a couple that has made choice $\mathbf{q}_t$ at period t. For a *title-based* property division regime,

$$\omega_{mt}^{d}(\mathbf{q}_t^*) = \kappa_t^* K_{t+1}^*$$

and

$$\omega_{ft}^{d}(\mathbf{q}_t^*) = (1-\kappa_t^*) K_{t+1}^*$$

On the other hand, in a *community property* regime,

$$\omega_{jt}^{d}(\mathbf{q}_t^*) = K_{t+1}^*/2, \quad j \in \{m, j\}$$

In any property division regime, a couple that has made a given vector $\mathbf{q}_t^*$ of first-stage choices at t and has drawn a given vector of shocks $\boldsymbol{\xi}_t$ at the end of t is faced with exactly one of the following four situations.

1. $\widetilde{V}_{jt}^{marr} \geq V_{jt}^{d} \quad \forall j \in \{m, f\}$
2. $\widetilde{V}_{jt}^{marr} < V_{jt}^{d} \quad \forall j \in \{m, f\}$

3. $\widetilde{V}_{mt}^{marr} < V_{mt}^{d}$ and $\widetilde{V}_{ft}^{marr} \geq V_{ft}^{d}$

4. $\widetilde{V}_{mt}^{marr} \geq V_{mt}^{d}$ and $\widetilde{V}_{ft}^{marr} < V_{ft}^{d}$

In words, (1) and (2) correspond to situations where the couple agrees to stay married or to get divorced. In these cases the unanimously decided outcome of the couple obtains regardless of the divorce law regime. On the other hand, cases (3) and (4) correspond to situations where the couple are divided over whether to remain married or to divorce. In situation (3), the man wants divorce while the woman wants to remain married while in situation (4), the intentions of the spouses are reverse.

The conditions under which the marriage can be dissolved depends on the divorce law regime. In a *mutual consent* regime if spouse j wants divorce and spouse j' wants to remain married, the allocation of marital assets in the event of divorce may be re-negotiated (in favor of spouse j') to make her indifferent between marriage and divorce. In such a situation, spouse j solves for λ^* such that.

$$\begin{aligned} \lambda^* = \min \quad & \lambda \\ \text{s.t. } & \lambda \in \{0,1\} \\ \text{s.t. } & \widetilde{V}_{j',t}^{marr} = \beta \mathbf{E}_{\eta_{j',t+1}} \left[V_{j',t+1}^{s}(\lambda K_{t+1}^{*}, \eta_{j',t+1}) \right] \\ \text{s.t. } & \widetilde{V}_{jt}^{marr} \leq \beta \mathbf{E}_{\eta_{j,t+1}} \left[V_{j,t+1}^{s}((1-\lambda) K_{t+1}^{*}, \eta_{j,t+1}) \right] \end{aligned} \tag{10}$$

If λ^* does not exist, the marriage continues and $D_t^* = 0$. On the other hand, if a solution to (10) exists, divorce occurs (ie, $D_t^* = 1$) and the division of marital property is as per λ^* and the values to spouses j and j' are $\widetilde{V}_{j,t}^{reneg,d}$ and $\widetilde{V}_{j',t}^{marr}$ respectively, where $\widetilde{V}_{j,t}^{reneg,d} = \beta \mathbf{E}_{\eta_{j,t+1}} \left[V_{j,t+1}^{s}((1-\lambda^*) K_{t+1}^{*}, \eta_{j,t+1}) \right]$. Note that in a *mutual consent* regime, the husband's Pareto weight in marriage (denoted by μ) is not re-negotiated under any circumstance. So, in a *mutual consent* regime we have

$\mu_t = \mu \; \forall t \in \{1, 2, ..T\}$, where μ is determined in the marriage market as described later

in Section 3.3. Hence, given $\mathbf{q}_t^*$ and $\boldsymbol{\xi}_t$, the present value to the couple at the end of t is

$$\begin{aligned}\widetilde{V}_t(\mathbf{q}_t^*, \boldsymbol{\xi}_t) = &\mathbf{1}(\widetilde{V}_{jt}^{marr} \geq V_{jt}^d,\ j \in \{m,f\}) * (\mu \widetilde{V}_{mt}^{marr} + (1-\mu)\widetilde{V}_{ft}^{marr}) \\ &+ \mathbf{1}(\widetilde{V}_{jt}^{marr} < V_{jt}^d,\ j \in \{m,f\}) * (\mu V_{mt}^d + (1-\mu)V_{ft}^d) \\ &+ \mathbf{1}(\widetilde{V}_{mt}^{marr} < V_{mt}^d, \widetilde{V}_{ft}^{marr} \geq V_{ft}^d) * \big[D_t^* \big(\mu \widetilde{V}_{mt}^{reneg,d} + (1-\mu)\widetilde{V}_{ft}^{marr}\big) + \\ &(1-D_t^*)(\mu \widetilde{V}_{mt}^{marr} + (1-\mu)\widetilde{V}_{ft}^{marr})\big] \\ &+ \mathbf{1}(\widetilde{V}_{mt}^{marr} \geq V_{mt}^d, \widetilde{V}_{ft}^{marr} < V_{ft}^d) * \big[D_t^* \big(\mu \widetilde{V}_{mt}^{marr} + (1-\mu)\widetilde{V}_{ft}^{reneg,d}\big) + \\ &(1-D_t^*)(\mu \widetilde{V}_{mt}^{marr} + (1-\mu)\widetilde{V}_{ft}^{marr})\big]\end{aligned} \tag{11}$$

The values to the man and woman, denoted $\widetilde{V}_{mt}$ and $\widetilde{V}_{ft}$ respectively are defined as follows

$$\begin{aligned}\widetilde{V}_{mt}(\mathbf{q}_t^*, \boldsymbol{\xi}_t) = &\mathbf{1}(\widetilde{V}_{jt}^{marr} \geq V_{jt}^d,\ j \in \{m,f\}) * \widetilde{V}_{mt}^{marr} + \mathbf{1}(\widetilde{V}_{jt}^{marr} < V_{jt}^d,\ j \in \{m,f\}) * V_{mt}^d \\ &+ \mathbf{1}(\widetilde{V}_{mt}^{marr} < V_{mt}^d, \widetilde{V}_{ft}^{marr} \geq V_{ft}^d) * \big[D_t^*\ \widetilde{V}_{mt}^{reneg,d} + (1-D_t^*)\ \widetilde{V}_{mt}^{marr}\big] \\ &+ \mathbf{1}(\widetilde{V}_{mt}^{marr} \geq V_{mt}^d, \widetilde{V}_{ft}^{marr} < V_{ft}^d) * \widetilde{V}_{mt}^{marr} \\ \widetilde{V}_{ft}(\mathbf{q}_t^*, \boldsymbol{\xi}_t) = &\mathbf{1}(\widetilde{V}_{jt}^{marr} \geq V_{jt}^d,\ j \in \{m,f\}) * \widetilde{V}_{ft}^{marr} + \mathbf{1}(\widetilde{V}_{jt}^{marr} < V_{jt}^d,\ j \in \{m,f\}) * V_{ft}^d \\ &+ \mathbf{1}(\widetilde{V}_{mt}^{marr} < V_{mt}^d, \widetilde{V}_{ft}^{marr} \geq V_{ft}^d) * \widetilde{V}_{ft}^{marr} \\ &+ \mathbf{1}(\widetilde{V}_{mt}^{marr} \geq V_{mt}^d, \widetilde{V}_{ft}^{marr} < V_{ft}^d) * \big[D_t^*\ \widetilde{V}_{ft}^{reneg,d} + (1-D_t^*)\ \widetilde{V}_{ft}^{marr}\big]\end{aligned} \tag{12}$$

By contrast, in a *unilateral divorce* regime, if the husband wants to divorce and the wife wants to stay married for some vector $\mathbf{q}_t^*$ of first-stage choices at t and and a given realization of shocks $\boldsymbol{\xi}_t$ at the end of t, the husband's Pareto weight in marriage applicable in the next period, ie μ_{t+1} might be re-negotiated so that the husband may be made indifferent between marriage and divorce. In such a situation, the wife solves for μ_{t+1}^* such that

$$\begin{aligned}\mu^*_{t+1} = \min \quad & \mu_{t+1} \\ \text{s.t. } & \mu_{t+1} \in \{0,1\} \\ \text{s.t. } & \beta \mathbf{E}\big[V_{m,t+1}(\omega_{t+1})|\mathbf{q}^*_t, \boldsymbol{\xi}_t, \mu_{t+1}\big] = V^d_{mt} \\ \text{s.t. } & \beta \mathbf{E}\big[V_{f,t+1}(\omega_{t+1})|\mathbf{q}^*_t, \boldsymbol{\xi}_t, \mu_{t+1}\big] \geq V^d_{ft}\end{aligned} \tag{13}$$

If a solution to the above problem exists, the marriage continues into the next period with husband's Pareto weight μ^*_{t+1} and $D^*_t = 0$ and the value to spouse $j, j \in \{m, f\}$ is given by

$$\widetilde{V}^{reneg,uni}_{jt} = \beta \mathbf{E}\big[V_{j,t+1}(\omega_{t+1})|\mathbf{q}^*_t, \boldsymbol{\xi}_t, \mu^*_{t+1}\big]$$

Otherwise, divorce occurs with the division of marital property as specified by the default property division regime and $D^*_t = 1$. Here, D^*_t is an indicator for divorce. Note that in a *unilateral* divorce regime, if a divorce occurs, the division of marital property follows the default under the property division regime in question, and is not re-negotiated upon in any circumstance.

Conversely, if the wife wants to divorce and the husband wants to stay married for some vector $\mathbf{q}^*_t$ of first-stage choices at t and and a given realization of shocks $\boldsymbol{\xi}_t$ at the end of t, the husband's Pareto weight in marriage applicable in the next period, ie μ_{t+1} might be re-negotiated so that the wife may be made indifferent between marriage and divorce. In such a situation, the husband solves for μ^*_{t+1} such that

$$\begin{aligned}\mu^*_{t+1} = \max \quad & \mu_{t+1} \\ \text{s.t. } & \mu_{t+1} \in \{0,1\} \\ \text{s.t. } & \beta \mathbf{E}\big[V_{f,t+1}(\omega_{t+1})|\mathbf{q}^*_t, \boldsymbol{\xi}_t, \mu_{t+1}\big] = V^d_{ft} \\ \text{s.t. } & \beta \mathbf{E}\big[V_{m,t+1}(\omega_{t+1})|\mathbf{q}^*_t, \boldsymbol{\xi}_t, \mu_{t+1}\big] \geq V^d_{mt}\end{aligned} \tag{14}$$

If a solution to the above problem exists, the marriage continues into the next period with husband's Pareto weight μ^*_{t+1} and $D^*_t = 0$ and the value to spouse $j, j \in \{m, f\}$ is given by

$$\widetilde{V}^{reneg,uni}_{jt} = \beta \mathbf{E}\big[V_{j,t+1}(\omega_{t+1})|\mathbf{q}^*_t, \boldsymbol{\xi}_t, \mu^*_{t+1}\big]$$

Otherwise, divorce occurs with the division of marital property as specified by the default property division regime and $D_t^* = 1$. Hence, given $\mathbf{q}_t^*$ and $\boldsymbol{\xi}_t$, the present value to the couple at the end of t is

$$\begin{aligned}
\widetilde{V}_t(\mathbf{q}_t^*, \boldsymbol{\xi}_t) = & \mathbf{1}(\widetilde{V}_{jt}^{marr} \geq V_{jt}^d,\ j \in \{m, f\}) * (\mu \widetilde{V}_{mt}^{marr} + (1-\mu)\widetilde{V}_{ft}^{marr}) \\
& + \mathbf{1}(\widetilde{V}_{jt}^{marr} < V_{jt}^d,\ j \in \{m, f\}) * (\mu \widetilde{V}_{mt}^{d} + (1-\mu)\widetilde{V}_{ft}^{d}) \\
& + \mathbf{1}(\widetilde{V}_{mt}^{marr} < V_{mt}^d, \widetilde{V}_{ft}^{marr} \geq V_{ft}^d) * \big[D_t^* \big(\mu \widetilde{V}_{mt}^{d} + (1-\mu)\widetilde{V}_{ft}^{d}\big) + \\
& (1 - D_t^*)(\mu \widetilde{V}_{mt}^{reneg,uni} + (1-\mu)\widetilde{V}_{ft}^{reneg,uni})\big] \\
& + \mathbf{1}(\widetilde{V}_{mt}^{marr} \geq V_{mt}^d, \widetilde{V}_{ft}^{marr} < V_{ft}^d) * \big[D_t^* \big(\mu \widetilde{V}_{mt}^{d} + (1-\mu)\widetilde{V}_{ft}^{d}\big) + \\
& (1 - D_t^*)(\mu \widetilde{V}_{mt}^{reneg,uni} + (1-\mu)\widetilde{V}_{ft}^{reneg,uni})\big]
\end{aligned} \tag{15}$$

The values to the man and woman, denoted $\widetilde{V}_{mt}$ and $\widetilde{V}_{ft}$ respectively are defined as follows

$$\begin{aligned}
\widetilde{V}_{mt}(\mathbf{q}_t^*, \boldsymbol{\xi}_t) = & \mathbf{1}(\widetilde{V}_{jt}^{marr} \geq V_{jt}^d,\ j \in \{m, f\}) * \widetilde{V}_{mt}^{marr} + \mathbf{1}(\widetilde{V}_{jt}^{marr} < V_{jt}^d,\ j \in \{m, f\}) * V_{mt}^d \\
& + \mathbf{1}(\widetilde{V}_{mt}^{marr} < V_{mt}^d, \widetilde{V}_{ft}^{marr} \geq V_{ft}^d) * V_{mt}^d \\
& + \mathbf{1}(\widetilde{V}_{mt}^{marr} \geq V_{mt}^d, \widetilde{V}_{ft}^{marr} < V_{ft}^d) * (D_t^* V_{mt}^d + (1 - D_t^*)\widetilde{V}_{mt}^{reneg,uni}) \\
\widetilde{V}_{ft}(\mathbf{q}_t^*, \boldsymbol{\xi}_t) = & \mathbf{1}(\widetilde{V}_{jt}^{marr} \geq V_{jt}^d,\ j \in \{m, f\}) * \widetilde{V}_{ft}^{marr} + \mathbf{1}(\widetilde{V}_{jt}^{marr} < V_{jt}^d,\ j \in \{m, f\}) * V_{ft}^d \\
& + \mathbf{1}(\widetilde{V}_{mt}^{marr} < V_{mt}^d, \widetilde{V}_{ft}^{marr} \geq V_{ft}^d) * (D_t^* V_{ft}^d + (1 - D_t^* V_{ft}^{reneg,uni})) \\
& + \mathbf{1}(\widetilde{V}_{mt}^{marr} \geq V_{mt}^d, \widetilde{V}_{ft}^{marr} < V_{ft}^d) * V_{ft}^d
\end{aligned} \tag{16}$$

By allowing the Pareto weight to be subject to re-negotiation period-by-period in a *unilateral* divorce regime, the model implies that the marital contract in a *unilateral* regime is characterized by limited commitment rather than full commitment. Limited commitment implies that some splits of the marital surplus are not possible to credibly commit to ex-ante (see Kocherlakota (1996), Ligon *et al.* (2000), Ligon *et al.* (2002), Mazzocco *et al.* (2013)). On the other hand, the marriage contract in a *mutual consent* regime is characterized by full commitment. Couples' decisions to divorce or to stay married coincide with the efficient outcome in a *mutual consent* regime.

I now describe the problem of a couple that enters period t married with state vector

ω_t. First, note that the instantaneous utility to spouse i at time t is given by

$$u_{it}(C_{it}, l_{it}, h_{it}, \boldsymbol{\eta}) = \frac{C_{it}^{1-\gamma}}{1-\gamma} + \mathbf{1}_{it}(\text{NW}) * \phi(X) + \mathbf{1}_{it}(\text{PT}) * 0.5 * \phi(X) - \mathbf{1}(h_{it})\eta_{it}^{h} \quad (17)$$

where C denotes consumption, l denotes leisure, h denotes hours of work, which is constrained to be one of the three discrete alternatives, namely, full time, part time or non-participation in the workforce. Associated with each discrete alternative labor supply choice is an alternative-specific taste shock denoted by $\eta_{it}^{h} \overset{iid}{\sim} N(0, \sigma_{\eta}^{2})$. η_{it}^{h} is assumed to be independently distributed across individuals and over time. Note that the distribution of the vector $\boldsymbol{\eta}_{it}$ is independent of marital status.

I assume that wages are exogenously given and vary by education and gender. Given gender, more educated individuals have higher wages and given education, women may earn less than men due to discrimination. Thus, $w_f^e = \phi w_m^e \quad \forall e \in \{High, Low\}$, $\phi \leq 1$. For a married couple $(m^e, f^{e'})$ with husband's and wife's education levels e and e' respectively, the per-period budget constraint is

$$\begin{gathered} C_{mt} + C_{ft} = \rho.(w_{mt}^{e} h_{mt} + w_{ft}^{e'} h_{ft} + K_t - \frac{K_{t+1}}{R}) \\ \text{and } K_t \geq 0 \quad \forall t \in \{1, 2, ..., T\} \end{gathered} \quad (18)$$

with $K_t = K_{mt} + K_{ft}$, where K_t denotes assets in period t and $\rho > 1$. The budget constraint requires that total household consumption equal the sum of total household income and assets minus savings, inflated by the economies of scale parameter ρ.

The couple solves

$$\begin{aligned} V_t(\omega_t) = \max_{\mathbf{q}_t} \quad & \mu_t \; u_{mt} + (1-\mu_t) \; u_{ft} + \mathbf{E}_{\boldsymbol{\xi}_t}\left[\widetilde{V}_t(\mathbf{q}_t, \boldsymbol{\xi}_t)|\omega_t\right] \\ & \text{s.t. the per-period budget constraint (18)} \\ & \text{s.t. the time budget constraint (2)} \end{aligned} \quad (19)$$

Let $\mathbf{q}_t^*(\omega_t) = \{C_{mt}^*, C_{ft}^*, h_{mt}^*, h_{ft}^*, l_{mt}^*, l_{ft}^*, K_{t+1}^*, \kappa_t^*\}$[9] be a solution to (19). Then the present values to an individual spouse j, $j \in \{m, f\}$, at the beginning of period t is given

[9]Technically, this is the choice vector in a *title-based* property division regime. In a *community* property regime, the corresponding choice vector is $\mathbf{q}_t^*(\omega_t) = \{C_{mt}^*, C_{ft}^*, h_{mt}^*, h_{ft}^*, l_{mt}^*, l_{ft}^*, K_{t+1}^*\}$.

by

$$V_{jt}(\omega_t) = \frac{(C^*_{jt})^{1-\gamma}}{1-\gamma} + \mathbf{1}_{it}(\text{NW}) * \phi(X) + \mathbf{1}_{it}(\text{PT}) * 0.5 * \phi(X) - \mathbf{1}(h_{it})\eta^h_{it} + \mathbf{E}_{\boldsymbol{\xi}_t}\left[\widetilde{V}_{jt}(\mathbf{q}_t, \boldsymbol{\xi}_t)|\omega_t\right] \tag{20}$$

To initialize the problem, I assume that across property division regimes, marriage starts with a given amount of total marital assets, ie, $K_0 = \overline{K}$, where $\overline{K}$ is some constant. Also, I assume the initial split of marital assets is equal between the spouses, ie, $\kappa_0 = \frac{1}{2}$.

Solving the lifecycle problem in any given *divorce* and *property division* regime yields, for each gender g and education level e, the expected values of singlehood (denoted by $\mathbf{E}V^s_{ge}$) and marriage to each education category e' (denoted by $\mathbf{E}V^{e'}_{ge}(\mu_{e,e'})$, $e, e' \in \{High, Low\}$) for that legal regime. Here, the expectation is taken prior to the start of the life cycle. Note that the expected value to a person with a given gender and a given level of education of marrying a partner with a given level of education depends on the Pareto weight applicable in that marital pairing at the time of entering the marriage. These Pareto weights are determined in the marriage market which I describe below.

3.3 The Marriage Market

Following Choo & Siow (2006) (also see Gayle & Shephard (2019) and Chiappori *et al.* (2018)), I assume that an individual i of any gender with any education level receives, over and above the systematic component of utility, an idiosyncratic payoff from marrying each type of individual of the opposite sex. Let θ^e_i denote this idiosyncratic payoff received by individual i for any member of the opposite sex with education level e. Notice that θ^e_i depends only on the type of the individual of the opposite sex but not on her/his specific identity. Thus, the problem of a given individual i of gender g with education level $e \in \{H, L\}$, is

$$\max_{\{H,L,s\}} \{\mathbf{E}V^H_{ge}(\mu_{e,H}) + \theta^H_i, \mathbf{E}V^L_{ge}(\mu_{e,L}) + \theta^L_i, \mathbf{E}V^s_{ge} + \theta^s_i\} \tag{21}$$

Here, superscripts H, L and s refer to the alternatives of marrying a high type, low type and staying single respectively and $\mu_{ee'}$ denotes the husband's Pareto weight in a

marriage of a man with education level e to a woman with education level e'. I assume that the idiosyncratic payoffs θ_i^e follow Type-I extreme value distribution with a zero location parameter and the scale parameter σ_θ. Hence, the proportion of type e males that would be willing to marry type e' females, which is denoted by $p_{me}^{e'}$, is given by

$$\begin{aligned} p_{me}^{e'}(\mu_{ee}, \mu_{ee'}) &= \Pr\left[\mathbf{E}V_{me}^{e'}(\mu_{e,e'}) + \theta_i^{e'} > \max\{\mathbf{E}V_{me}^{e}(\mu_{e,e}) + \theta_i^e, \mathbf{E}V_{me}^{s} + \theta_i^s\}\right] \\ &= \frac{D_{me}^{e'}(\mu_{ee}, \mu_{ee'})}{N_{me}} = \frac{\exp[\mathbf{E}V_{me}^{e'}(\mu_{e,e'})/\sigma_\theta]}{\exp[\mathbf{E}V_{me}^{e'}(\mu_{e,e'})/\sigma_\theta] + \exp[\mathbf{E}V_{me}^{e}(\mu_{e,e})/\sigma_\theta] + \exp[\mathbf{E}V_{me}^{s}/\sigma_\theta]} \end{aligned} \tag{22}$$

where $D_{me}^{e'}$ denotes "demand" for type e' females by type e males and N_{me} denotes the measure of males with education level e in the population. Similarly, the proportion of type e' females that would be willing to marry type e males, which is denoted by $p_{fe'}^{e}$, is given by

$$\begin{aligned} p_{fe'}^{e}(\mu_{ee'}, \mu_{e'e'}) &= \Pr\left[\mathbf{E}V_{fe'}^{e}(\mu_{e,e'}) + \theta_i^{e} > \max\{\mathbf{E}V_{fe'}^{e'}(\mu_{e',e'}) + \theta_i^{e'}, \mathbf{E}V_{fe'}^{s} + \theta_i^s\}\right] \\ &= \frac{S_{fe'}^{e}(\mu_{ee'}, \mu_{e'e'})}{N_{fe'}} = \frac{\exp[\mathbf{E}V_{fe'}^{e}(\mu_{e,e'})/\sigma_\theta]}{\exp[\mathbf{E}V_{fe'}^{e}(\mu_{e,e'})/\sigma_\theta] + \exp[\mathbf{E}V_{fe'}^{e'}(\mu_{e',e'})/\sigma_\theta] + \exp[\mathbf{E}V_{fe'}^{s}/\sigma_\theta]} \end{aligned} \tag{23}$$

where $S_{fe'}^{e}$ denotes "supply" of type e' females to type e males.

The equilibrium in the marriage market consists of a vector $(\mu_{HH}^*, \mu_{HL}^*, \mu_{LH}^*, \mu_{LL}^*)$ such that for each $e, e' \in \{H, L\}$, $D_{me}^{e'}(\mu_{e,e}^*, \mu_{e,e'}^*) = S_{fe'}^{e}(\mu_{e,e'}^*, \mu_{e',e'}^*)$ holds. Proposition 1 in Gayle & Shephard (2019) demonstrates that the equilibrium in such a model exists and is unique. As all relevant regularity conditions hold for each legal regime, it follows the equilibrium in each legal regime in the current model exists and is unique.

4 Data, Identification and Estimation

I estimate the model using data from the Panel Study of Income Dynamics(PSID). The PSID is a long panel of a representative sample of American households. Households in the study were interviewed annually from 1968 to 1997, and bi-annually thereafter. It contains rich information on education and employment history of the household head

and and his/her spouse. Crucial for the current analysis, it contains information on marital histories of the head and his/her spouse. Table 1 provides descriptive statistics on key variables. Something that stands out is that about 22% of all marriages end in a divorce.

I estimate parameters of the model using data on marriages that were solemnized in a *mutual consent, equitable* division regime, and remained in that regime for at least 10 years. For the purpose of estimation, I pre-set the values of a few parameters. These are presented in Table 2. Also, each period in the model corresponds to 5 years in the data. In the model, I have distinguished between two types of individuals on the marriage market, namely, those with high and low education. For the purpose of estimation, I define individuals with thirteen or more completed years of schooling as "high" and the rest as "low". Thus, the high type consists of some college and above, whereas everybody else is classified as "low" type.

The parameters to be estimated are as follows:

1. The scale of taste shocks σ_θ. Recall that these shocks are drawn in the marriage market.

2. The standard deviation of alternative-specific "distaste-for-work" shock σ_η, allowed to vary by education group and gender.

3. The systematic utility form leisure ϕ, allowed to vary by education group and gender.

4. The standard deviation of the "taste-for-partner" shock σ_ζ.

Identification of these parameters is achieved in the following way: The rate of non-marriage (or singlehood) identifies σ_θ. Labor supply decisions of married individuals identify σ_η and ϕ .Divorce rates identify σ_ζ. Finally, the Pareto weights are identified by population vectors of the different education groups by gender. Assuming an even sex ratio, the population vector used is obtained from the CPS and is presented in Table 3.

I estimate the model using the simulated method of moments (see McFadden (1989), Pakes & Pollard (1989)). In order to speed up the estimation, I use an equilibrium constraints (or MPEC) approach (Su & Judd (2012)). In practice, this translates into the

following estimation routine: Given an initial guess of the vector of structural parameters, denoted as $\widehat{\Theta}_{guess}$, and associated marriage-market clearing vector of Pareto weights $\boldsymbol{\mu}^*(\widehat{\Theta}_{guess})$, the model generates moments to which data counterparts exist. The estimation routine iterates on the guess for structural parameters until moments simulated from the model are "close" enough, as measured by a standard criterion function, to the moments in the data. Formally, let any vector of structural parameters be denoted by $\widehat{\Theta}$, and associated moments obtained by simulating the model be $\text{mom}_{sim}(\widehat{\Theta})$. Further, let the data counterparts to which data counterparts exist. I denote the data counterpart as mom_{data}. I choose that vector $\widehat{\Theta}^*$ and associated market-clearing Pareto weights , $\boldsymbol{\mu}^*(\widehat{\Theta}^*)$ such that:

$$\begin{aligned}[\widehat{\Theta}^*, \boldsymbol{\mu}^*(\widehat{\Theta}^*)] = \underset{\Theta,\boldsymbol{\mu}}{arg\min} \big[\text{mom}_{sim}(\Theta, \boldsymbol{\mu}) - \text{mom}_{data}\big]' \mathcal{W} \big[\text{mom}_{sim}(\Theta, \boldsymbol{\mu}) - \text{mom}_{data}\big] \\ \text{s.t. } D^{e'}_{me}(\mu^*_{e,e}, \mu^*_{e,e'}) = S^{e}_{fe'}(\mu^*_{e,e'}, \mu^*_{e',e'}) \quad \forall e, e' \in \{H, L\}\end{aligned} \tag{24}$$

where $\mathcal{W}$ is a diagonal matrix, whose element is proportional to the inverse of the diagonal variance-covariance of the moments in the data.

Parameter estimates are presented in Table 4. The model moments and data moments are presented in Table 5. We notice that for the estimated parameter values, the model is able to replicate several moments of the data, which include male and female labor supply, rates of non-marriage (or singlehood) and the rate of divorce.

5 Results

5.1 Simulation Results

I use the parameter estimates obtained by targeting moments in mutual consent equitable distribution regime to simulate behavior in the other legal regimes. Simulation results are presented in Table 6. In what follows, I describe the a few key patterns observed in the simulations.

First, according to the simulations, introduction of *equitable division* in any legal regime leads to an increase in the rate of non-marriage. This makes intuitive sense. In a

title-based regime each individual knows that she/he can retain her/his own property in the event of divorce. So, an individual is more open to entering into a marriage. On the other hand, in an *equitable division* regime the prospect of the partner taking away half the property in the event of divorce could deter individuals from entering into a marriage. Further, this pattern is starker in a *unilateral* divorce regime. This is reasonable because a *title-based* property division law in a unilateral divorce regime entails maximum flexibility in terms of retaining one's own assets, and in quitting the marriage with it if she/he does not like it at some point. While one's spouse can also exercise this option, ex-ante it makes sense to enter into marriage in hopes of benefiting from economies of scale and risk-sharing. On the other hand, *equitable division* in a *unilateral* divorce regime provides the maximum disincentives against marriage. Entering into marriage is a risky proposition because a spouse can quit with half the property unilaterally. Thus, the model predicts that the retreat from marriage observed in the data (see Lundberg *et al.* (2016)) can, at least in part, be accounted for by change in property division laws.

Second, the simulations indicate that the legal regime had only a minor effect on assortative matching as measured by the proportion of couples with the same level of education. The simulated proportion of assortatively matched individuals is around 0.52 in each legal regime. This result stands in contrast to the results in Reynoso (2017), who finds that the introduction of *unilateral divorce* is associated with a substantial increase in assortative matching.

Third, Figure 3 reveals that in any divorce law regime, accumulation of marital assets is higher in a *title-based* property division regime as compared to a *community* property regime. Intuitively, if the spouse with a higher share in marital assets knows that she/he can still have access to it in the event of divorce, such an individual would have a greater incentive to save. Table **??** shows that assets are unevenly distributed in any type of match in a *title-based* regime, making the mechanism described before a plausible one. These results stand in contrast to those in Voena (2015) who restricts her analysis to couples formed before legal changes and finds that asset accumulation is higher in a *unilateral, community* regime. That the result flips when one endogenizes marital sorting points to the importance of the current analysis.

Fourth, the probability of a marriage ending in a divorce in a *mutual consent, community property* regime is substantially lower as compared to the corresponding probability in a *mutual consent, title-based* or a *unilateral, community property* regime. This makes intuitive sense. In a *mutual consent, community property* regime, the conditions for divorce are the most stringent. First, *mutual consent* implies that the consent of both spouses is necessary for divorce. Moreover, if a partner wants to quit the marriage while the other wants to continue with the marriage, it is extremely hard for a partner desiring divorce to convince the dissenting partner to agree to the divorce. This is because the default divorce allocation is a half-half share to begin with, so in order to convince the dissenting spouse to divorce a lot of compensation needs to be provided, which might make divorce unprofitable for the partner desiring divorce in the first place. By contrast, in a *mutual consent, title-based* regime, if the richer spouse wants to quit the marriage and the poorer spouse wants to stay married, the richer spouse, by virtue of being the richer person, has more resources to transfer to the poorer spouse in the event of divorce. Hence, the richer spouse has a better prospect of convincing the poorer spouse to divorce in this legal regime. Finally, note that the *unilateral, community property* has a high divorce rate as well. This is because *community property* implies the outside option of each spouse is rather high. When hit by a bad "taste-for-partner" shock, the *unilateral* divorce entails that any spouse can quit the marriage on her own volition.

In summary, the simulations indicate that change in divorce and property division laws affect selection into marriage but do not affect patterns of marital sorting. However, behavior within marriage is affected substantially by changes in divorce and property division laws. Marriages in *equitable division* regime accumulate less assets as compared to marriages in a *title-based* property division regime. Further, the stability of marriage is affected by the prevalent divorce and property division laws. Marriages in *mutual consent, equitable division* regime appear to be more stable than marriages in any other legal regime.

5.2 Empirical Validation

As mentioned above, I have estimated parameters of the model by targeting data from marriages that took place and remained in *mutual consent, equitable* division regime. Thus, while the parameter values are chosen to replicate the data under *mutual consent, equitable* division, the model is not disciplined by the data under any other legal regime. Hence, the simulated behavior of agents in the model may or may not align with the behavior of agents in the actual data obtained from any other legal regime. So, the extent to which the model is able to replicate the data in any legal regime other than *mutual consent, equitable* division serves as a test for external validity of the predictions of the model.

Fortunately, the PSID data contain empirical counterparts to quite a few important model moments like marital sorting patterns and marital histories. However, testing the extent to which predictions of the model find support in the data is not straightforward. This is on account of the fact that the legal regimes were changing quickly through the 1970s and 1980s. Hence, for some legal regimes, for example *unilateral* divorce and *title-based* property division, there are not enough marriages in the data that were solemnized in that particular legal regime and remained in it for a reasonable period of time (say, 10 years). Nonetheless, I try to test the predictions of the model in the data to the extent feasible.

First, I test the prediction that divorce and property division laws did not change patterns of assortative matching. To that end, I run the following regression[10] to test if the correlation between the years of schooling of the husband and the wife has been affected by divorce and property division laws:

[10] This regression specification has been used in the prior literature (see Greenwood *et al.* (2014), Reynoso (2017)).

$$\begin{aligned}\text{Yrs of Edu}^{\text{hus}}_{jst} =& \beta_0 + \beta_1 \text{Yrs of Edu}^{\text{wife}}_{jst} + \beta_2 \mathbf{1}(\text{Unilateral})_{st} * \text{Yrs of Edu}^{\text{wife}}_{jst} \\ &+ \beta_3 \mathbf{1}(\text{Equitable})_{st} * \text{Yrs of Edu}^{\text{wife}}_{jst} \\ &+ \beta_4 \mathbf{1}(\text{Unilateral})_{st} * \mathbf{1}(\text{Equitable})_{st} * \text{Yrs of Edu}^{\text{wife}}_{jst} \\ &+ \beta_5 \mathbf{1}(\text{Unilateral}) + \beta_5 \mathbf{1}(\text{Equitable}) + \boldsymbol{\beta_6 X_{jst}} \\ &+ \beta_7 t + \Lambda_s + \Lambda_s * t + \epsilon_{jst}\end{aligned} \tag{25}$$

where j indexes a married couple, s indexes a state and t indexes the year of marriage. The coefficient β_1 measures correlation between the husband's and wife's years of education, controlling for spousal characteristics ($\boldsymbol{X}$), state fixed effects(Λ_s), a linear time trend t, and the interaction of the linear time trend with state fixed effects. $\beta_2(\beta_3)$ measures how the introduction of *unilateral*(*equitable*) divorce into the baseline *mutual consent, title-based* regime affected the correlation between spousal educational attainment. Finally, β_4 measures the extent to which introduction of *equitable* division in an *unilateral* regime affects the spousal correlation between educational attainment over and above the effect on the variable induced by the introduction of *unilateral* divorce. Table 7 provides OLS estimates of equation (25). We notice that estimates of β_2, β_3 and β_4 are all statistically indistinguishable from zero. This suggests that change in legal regime did not affect spousal correlation in educational attainment,[11] thereby providing empirical support for the predictions of the model.

Second, I test if the there is any empirical support for the prediction that the rate of non-marriage was affected by the property division regime. Consistent with the model, I find that regardless of the divorce law regime, the proportion of individuals who had never married by age 30 was higher in *equitable division* than in a *title-based* regime. For instance, amongst individuals who lived in a *mutual consent* divorce regime until age 30, the proportion of never-married individuals who lived in a *title-based* state until age 30 was only 4.38%. Amongst those whose states witnessed a change in property division regime to *equitable*, the proportion of never-married (by age 30) was 9.14%. A similar

[11] How to measure assortative matching is a contentious issue. While the method used above has been used earlier (see Greenwood *et al.* (2014)), its appropriateness has been questioned by Eika *et al.* (2014) and Gihleb & Lang (2016).

and more dramatic pattern is observed amongst individuals living in a *unilateral* divorce regime. In what follows, I restrict attention to individuals whose states had unilateral divorce by the time they were 30. For individuals who lived in *title-based* states until they were 30, the proportion of never-married was 9.12%. By contrast, for individuals whose states had witnessed a transition to *equitable* division regime, the proportion of never-married was was 29.72%.

Third, I test the prediction of the model in respect of asset accumulation. Recall that the model predicts that in any divorce law regime the rate of asset accumulation is lower in an *equitable* division regime than in a *title-based* property division regime. If that is true, we must find the following pattern in the data: Observationally equivalent households that formed and remained in *equitable* division regime accumulated lower assets than their counterparts that formed and remained in *title-based* property division regime. The PSID collects detailed information on assets only in selected years. In order to test the prediction of the model, we must use information from those years where there are sufficiently many households satisfying the aforesaid sample restriction. I find that the asset data in 1989 satisfies this criterion. To test if the rate of asset accumulation was lower in an *equitable* division regime as compared to a *title-based* property division regime, I specify the following regression:

$$\text{Asset}_i = \beta_0 + \beta_1 \mathbf{1}(\text{Equitable}) + X_i + \epsilon_i \tag{26}$$

Here, Asset_i is the dollar value of assets accumulated by couple i in 1989. I restrict the sample to those couples that satisfy one of the following two criteria:

1. The couple married in a *title-based* regime and remained in a *title-based* regime up to 1989.

2. The couple married in an *equitable* division regime and remained in an *equitable* division regime up to 1989.

Notice that the coefficient β_1 measures the difference in assets accumulated by a couple in an *equitable* division regime and assets accumulated by a couple in a *title-based* property division regime, conditioning on background characteristics of the couple given by the

vector X. Here, The vector X includes age of the household head, years of schooling of the husband and the wife and year of marriage. Table 8 presents estimates of equation (26). In line with the predictions of the model, the coefficient estimate of β_1 is negative and statistically significant at the 10% level.

Fourth, I test the prediction of the model in respect to divorce rates. Recall that the model A challenge in doing this is that since the laws changed very quickly over the 1970s, we do not observe sufficient number of marriages to make inferences about life cycle behaviors for all legal regimes. The legal regimes where the sample sizes support such analysis include *mutual consent, equitable division*; *mutual consent, title-based*; and *unilateral divorce, community property*. In all cases, I restrict my analysis to such marriages that would have been in the same legal regime if it had survived for at least 10 years. Figure 4 shows that the cumulative rate of divorce (after the passage of the same amount of time) is lower in a *mutual consent, equitable division* regime as compared to *mutual consent, title-based* or *unilateral divorce, community property* regime. Table 9 shows that this pattern is robust to the introduction of controls for husband's age at marriage and year of marriage fixed effects.

5.3 Welfare Analysis

6 Conclusion

In this paper, I study how changes in divorce and property division laws affected marital decisions and behaviors within marriage such as asset accumulation and divorce. To that end, I formulate a rich structural microeconometric model featuring collective households making labor supply, asset accumulation and divorce decisions. I embed the model of the collective household in an empirical marriage-matching model. To quantify the effect of these legal changes, I estimate parameters of the model using data from marriages that were formed under *mutual consent, equitable division* regime and simulate behavior under other legal regimes, namely, *mutual consent, title-based*; *unilateral, title-based*; and *unilateral, equitable*. Consistent with the data, my simulations indicate that equitable division laws increase rates of non-marriage but reduce rates of asset accumulation and

divorce. Further, in line with the original intent of legislators, my simulations suggest that equitable division laws reduce intra-household inequality in consumption, but this gain in terms of equity is accompanied by a substantial loss in terms of economic efficiency.

While this paper represents the first step in the direction of understanding the longer-term consequences of changes in divorce and property division laws, there are several limitations of the exercise. For instance, I have assumed changes in divorce laws do not affect pre-investment in education. Such an assumption may be reasonable for individuals who were too old to adjust educational attainments in response to changes in these laws. However, a complete understanding of the long-term consequences of these legal changes should factor in endogenous pre-investment in education. Similarly, my framework does not consider cohabitation, which has become more common as a living arrangement over time. To what extent changes in divorce and property division laws changed incentives to cohabit is an interesting question. The exploration of such open questions is left for future research.

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7 Figures

Figure 1: **Trends in Marriage and Divorce Rates in the U.S.**
(from Rasul (2005), ©OUP, reproduced by permission)

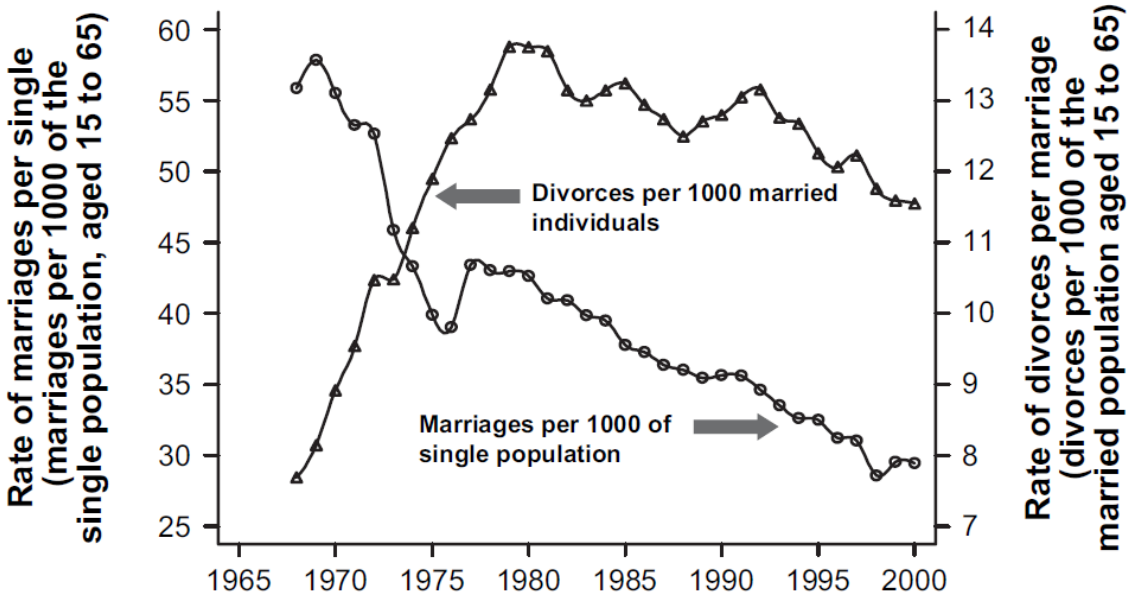


Figure 2

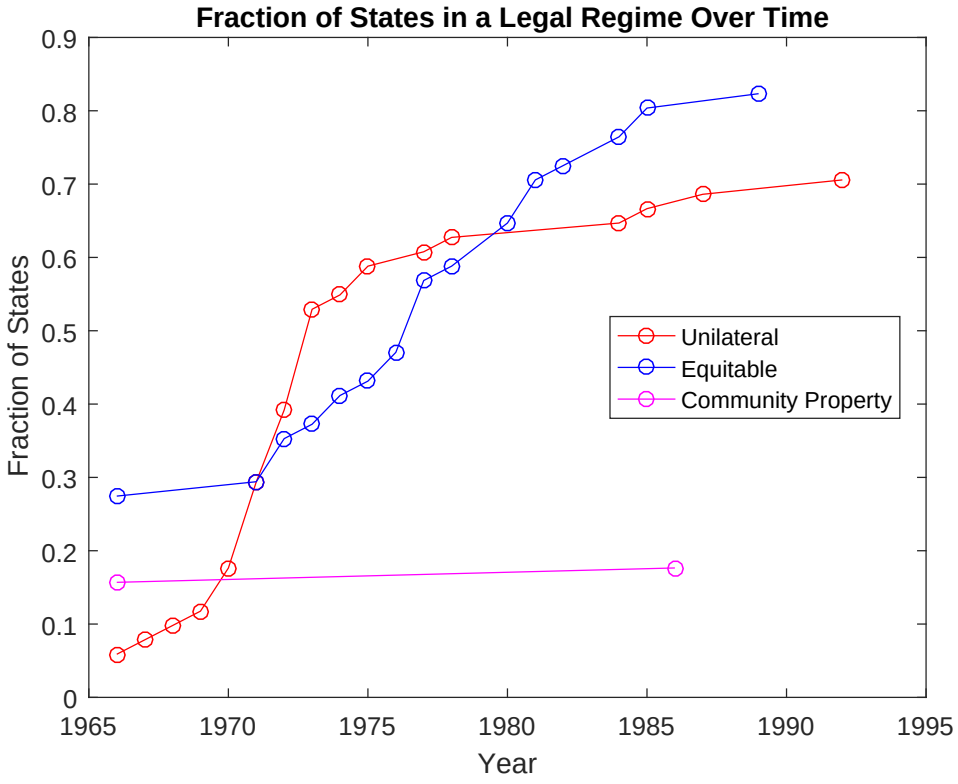


Figure 3

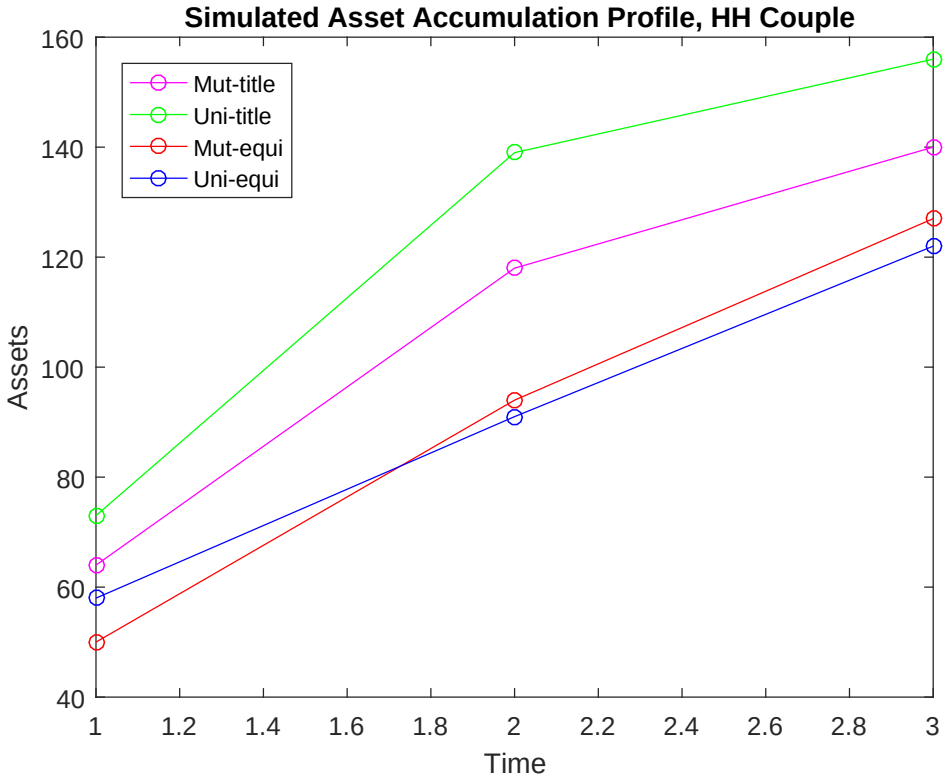
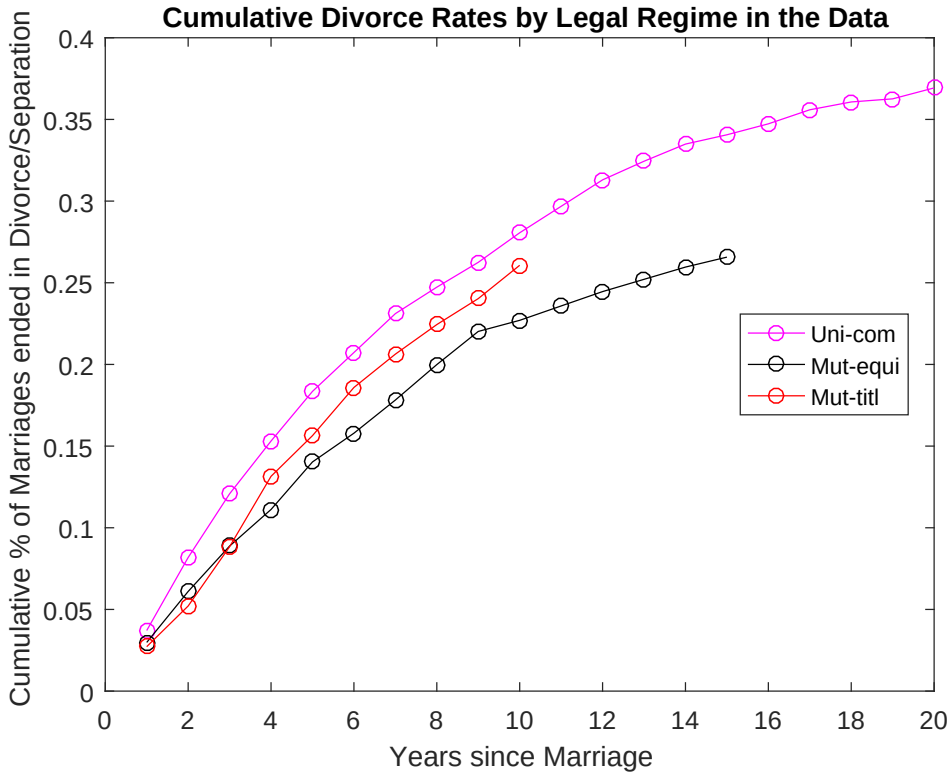


Figure 4



8 Tables

Table 1: Summary statistics

Variable	Observations	Mean	Standard Deviation
Yrs of $\text{school}_{\text{Husb}} - \text{Yrs of school}_{\text{Wife}}$	10228	-.121	2.245
Husband's years of schooling	11029	12.568	2.629
1(Community Property)	12969	.26	.439
1(Equitable)	12969	.556	.497
1(Unilateral)	12969	.511	.5
Order of marriage	12886	1.341	.628
Age at marriage	12890	29.133	10.06
1(Marriage ended in Divorce)	28682	.218	.413
Year of marriage	12969	1987.911	12.1
Labor Force Participation (Male)	124,052	.860	.347
Labor Force Participation (Female)	132,878	.628	.483
Hours of Work Yearly (Male)	106,652	2061.682	696.128
Hours of Work Yearly (Female)	82,942	1670.893	577.447
Annual Household Income	56,792	13194.55	13507.28

Source: My calculations from PSID Data (Family, Individual and Marriage History Files)

Table 2: Pre-set Parameters

Parameter	Value
T(Total time periods in the model)	4
γ (Relative Risk-Aversion Parameter)	1.5 (Attanasio *et al.* (2008))
Some College Male Wage (full-time work)	100(normalization)
High School or less Male Wage(full-time work)	70 (wage gap from CPS data)
Some College Female Wage (full-time work)	71 (gender-wage gap, Blau & Kahn (2017))
High School or less Female Wage(full-time work)	49.7 (gender-wage gap, Blau & Kahn (2017))
Part-time wage	Half of full time wage for corresponding gender and education
ρ (Consumption Economies of Scale)	1.7
β (Discount Factor)	0.98
R (Gross Interest Rate)	1.03

Table 3: Population Vector (CPS Data)

	High Men	Low Men	High Women	Low Women
Numbers	0.48	0.52	0.36	0.64

Table 4: Parameter Estimates

Parameter	Estimates
σ_η(Some college Man)	0.7
σ_η(HS Man)	1.5
σ_η(Some college Woman)	1.98
σ_η(HS Woman)	2.34
ϕ(Some college Man)	-1.56
ϕ(HS Man)	-1.21
ϕ(Some college Woman)	-1
ϕ(HS Woman)	0.2
σ_θ	0.72
σ_ζ	0.96

Table 5: Model Fit

Variable	Data Moments	Model Moments
Proportion full-time Some College Men	0.85	0.82
Proportion part-time Some College Men	0.11	0.15
Proportion full-time HS Men	0.78	0.78
Proportion part-time HS Men	0.16	0.19
Proportion full-time Some College Women	0.47	0.43
Proportion part-time Some College Women	0.31	0.30
Proportion full-time HS Women	0.37	0.43
Proportion part-time HS Women	0.29	0.31
Proportion divorced in 10 years from Marriage	0.24	0.20
Proportion single	0.11	0.11

Table 6: Simulation of Different Legal Regimes

Variable	Mutual, Title	Mutual, Equitable	Unilateral, Title	Unilateral, Equitable
Porportion never-married	0.05	0.11	0.01	0.11
Proportion assortatively matched	0.52	0.51	0.51	0.52
Proportion divorced in 10 yrs	0.29	0.20	0.36	0.31
Assets accumulated in 10 years in marriage	159	94	244	91

Table 7: Change in Correlation between Husband's and Wife's Completed Years of Schooling due to Change in Legal Regime (from **PSID Data**)

	Husband's Years of Schooling
Wife's Years of Schooling	0.617***
	(0.04859)
1(Unilateral) $*$ **1**(Equitable)	-0.0275
*Wife's Years of Schooling	(0.01796)
1(Unilateral) *Wife's Years of Schooling	0.0591
	(0.03700)
1(Equitable) *Wife's Years of Schooling	-0.0624
	(0.05016)
1(Unilateral)	-0.685
	(0.4975)
1(Equitable)	0.866
	(0.6626)
N	3323
R^2	0.383

Note: Model controls for order of marriage, year of marriage, sex ratio in each education category in year of marriage, state fixed effects and a linear time trend interacted with state fixed effects. The sample has been restricted to third or lower order marriages in White-headed households in non-community property states. The omitted category is marriages formed in a *mutual consent, title-based* regime. Standard errors (clustered at state level) in parentheses

Source: PSID, multiple waves

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Property Division Laws and Asset Accumulation

	Accumulated Asset in 1989
1(Equitable)	-36420.9*
	(20081.2)
Head's Age in 1989	128.8
	(117.64)
N	1919
R^2	0.467

Note: Model controls for years of schooling of husband and wife, years elapsed since marriage, year of marriage. The omitted category is title-based property division regime. Standard errors (clustered at the state level are in parentheses.

Source: PSID, multiple waves

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9: Laws and Divorce Probability within 10 years from Marriage (from **PSID Data**)

	1(Divorce in 10 years)
1(Mutual Consent, Equitable or Community)	-0.0492***
	(0.01199)
Age at Marriage	-0.0117***
	(0.0009816)
N	7751
R^2	0.0482
Dep. Var. Mean	0.2240

Note: Model controls for year of marriage fixed effects. The omitted category is marriages formed in mutual consent title-based and marriages formed in unilateral and title-based, equitable or community property regimes. Sample restricted to such marriages that would have been in the same divorce and property division regime 10 years from formation.

Table 10: **Divorce and Property Division Law Reforms in the sample period**

State	Unilateral divorce	Equitable division	State	Unilateral divorce	Equitable division
Alabama	1971	1984	Montana	1973	1976
Alaska	pre-1967	pre-1967	Nebraska	1972	1972
Arizona	1973	community	Nevada	1967	community
Arkansas	no	1977	New Hampshire	1971	1977
California	1970	community	New Jersey	no	1974
Colorado	1972	1972	New Mexico	pre-1967	community
Connecticut	1973	1973	New York	no	1980
Delaware	1968	pre-1967	North Carolina	no	1981
District of Columbia	no	1977	North Dakota	1971	pre-1967
Florida	1971	1980	Ohio	1992	1981
Georgia	1973	1984	Oklahoma	pre-1967	1975
Hawaii	1972	pre-1967	Oregon	1971	1971
Idaho	1971	community	Pennsylvania	no	1980
Illinois	no	1977	Rhode Island	1975	1981
Indiana	1973	pre-1967	South Carolina	no	1985
Iowa	1970	pre-1967	South Dakota	1985	pre-1967
Kansas	1969	pre-1967	Tennessee	no	pre-1967
Kentucky	1972	1976	Texas	1970	community
Louisiana	no	community	Utah	1987	pre-1967
Maine	1973	1972	Vermont	no	pre-1967
Maryland	no	1978	Virginia	no	1982
Massachusetts	1975	1974	Washington	1973	community
Michigan	1972	pre-1967	West Virginia	1984	1985
Minnesota	1974	pre-1967	Wisconsin	1978	community(1986)
Mississippi	no	1989	Wyoming	1977	pre-1967
Missouri	no	1977			

Note: Data from Voena (2015), Online Appendix, Table F.1