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**Yours, Mine and Ours:
Do Divorce Laws Affect the Intertemporal Behavior of Married Couples?**

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YOURS, MINE AND OURS: DO DIVORCE LAWS AFFECT THE INTERTEMPORAL BEHAVIOR OF MARRIED COUPLES?*

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Abstract

Divorce laws regulate when divorce is allowed and establish each spouse's property rights over household assets. This paper examines how such laws affect the intertemporal behavior and the welfare of married couples. I build a dynamic model of household choice in which moving from a mutual consent to a unilateral divorce regime results in limited commitment and renegotiation of intra-household allocations. I estimate the key parameters of the model by exploiting panel variation in U.S. divorce laws across states from the late 1960s to the 1990s. In states that imposed an equal division of property, couples responded to unilateral divorce by increasing savings about 20% more than in states in which assets were retained by the spouse who had formal title to the property, suggesting that equal division may have been costly for primary earners. Furthermore, wives responded to unilateral divorce by temporarily reducing their employment by more than 5 percentage points, only in states in which the division of property was equal. These findings indicate that the threat of unilateral divorce and the leverage provided by the equal division of property allowed wives to appropriate a larger share of household resources (consumption and leisure). My estimates also suggest that equal division of property benefited divorcing women when it was first introduced, since they had a smaller share of resources in marriage and thus less assets in their name than their husbands. However, counterfactual experiments indicate that the equal division of property may be detrimental to women who consume as much as their husbands in marriage, but have lower wages. When spouses consume approximately equal amounts, secondary earners are better off under a separate property regime because they may need more savings than the breadwinners to smooth consumption when going into a divorce.

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1 Introduction

This paper examines how property rights in marriage regulated by divorce laws influence the intertemporal behavior of couples and the intra-household allocations. Between the end of the 1960s and the early 1990s, most couples in the United States entered a legal system in which each spouse can obtain divorce without the consent of the partner and keep approximately 50% of the marital assets, independently of who holds the formal title to the property (Turner 1998, Golden 1983). In this paper, I explore the implications of these reforms, namely, the introduction of unilateral divorce and equitable distribution, on the intertemporal behavior of couples. I also analyze the impact of the current divorce legal system on intra-household allocation and on the welfare of women, who are often believed to face more negative consequences of divorce than men (e.g. Weitzman 1985 and 1996, Peterson 1996).

To understand the welfare implications of changes in divorce laws, I build a dynamic model of household decision-making that captures the key aspects of these laws. The model suggests that the impact of divorce laws crucially depends on how spouses divide resources while married: only a spouse who has a share of household resources in marriage (consumption, leisure, assets) sufficiently lower than that of the other spouse benefits from the equal division of property in a divorce. To address the unobservability of intra-household allocation and to identify its parameters, I use panel variation in U.S. divorce laws and estimate the responses of household economic behavior to divorce law reforms, examining household savings and wives' employment status. These estimates provide identification for the parameters of the structural model, including the intra-household allocation parameters. Then, I use the estimates of the structural parameters to compute the welfare effects of the reforms and to perform counterfactual experiments, which examine who benefits and who loses in various legal regimes and quantify the impact of prenuptial agreements on welfare.

I exploit the variation in U. S. divorce laws over time and across states using data from the Panel Survey of Income Dynamics and from the National Longitudinal Survey of Young and Mature Women on a sample of couples who were married *before* the reforms. These samples span from the late 1960s to the 1990s. Two main facts emerge from examining the data. First, the introduction of unilateral divorce in states where property is divided equally leads to a significantly higher accumulation of assets (approximately 20%) than when unilateral divorce is introduced in states where property is not divided by the courts, but rather assigned to the spouse who holds the title to the property. Second, when unilateral divorce is introduced in states in which property is divided equally, women exhibit a lower likelihood of employment (up to 5.5 percentage points). The same is not true in states in which there is no equal division of property.

These findings are consistent with a model in which unilateral divorce results in limited

commitment and renegotiation of the intra-household allocations, while spouses can more easily commit to a Pareto-optimal allocation as long as divorce requires mutual consent. Under a mutual consent divorce regime, spouses' allocations in divorce should not influence the allocation in marriage. If, instead, one spouse can divorce (or threaten to divorce) unilaterally, then spouses' valuations of divorce, partially determined by property division laws, have a significant impact on intra-household allocation. I show that this model replicates the response of asset accumulation and female employment observed in the data when the wives' share of household resources *before* the reforms is sufficiently low. In the model, this concept is represented by a lower Pareto weight for the wife in the household planning problem. The Pareto weights determine spouses' consumption shares of household expenditure and the wives' likelihood of employment in a mutual consent divorce regime. For couples married before the reforms, I estimate wives' Pareto weight to be equal to a third of their husbands' Pareto weight.

The interpretation of the observed responses of asset accumulation and labor supply follows from the structural estimates and simulations. Because women had a lower share of the couples' resources than their husband while married, they benefited from laws that imposed an equal division of property upon divorce. My simulation suggests that women obtained 35% more assets at the time of divorce in community property states (when assets are divided equally) than in a title-based system (when assets are assigned to the spouse who holds the title to the property; they then reflect intra-household allocation). Thus, equal division of property altered the allocation of resources in divorce compared to that in marriage.

The response of asset accumulation during marriage, which increased when unilateral divorce was introduced in states with equal division of property, can be seen as the result of two competing forces that operated because the distribution of property at the time of divorce did *not* match the distribution of resources in marriage. Equal division of property, which is more often enforced in unilateral divorce, acts as a tax on savings for the spouse who consumes more in marriage. Such tax implies a substitution effect and an income effect. The substitution effect makes current consumption cheaper than future consumption for the spouse with a larger share of resources in marriage, thus potentially discouraging saving. However, the income effect encourages asset accumulation because the equal division of property is costly for the spouse with a higher Pareto weight, who may need more savings to smooth the marginal utility of consumption in the case of divorce. For sufficiently risk-averse households, the income effect dominates, leading to higher accumulation of assets than in the presence of a separate property regime. As suggested by the data, when unilateral divorce is allowed, equal division of property distorts spouses' individual incentives to save.

The behavior of female employment following the reforms is also captured by the model.

The presence of unilateral divorce allowed women who lived in community property states to credibly exercise the threat of divorce and to gain, on average, more consumption and leisure also *during* marriage: a more symmetric distribution of consumption achieved during marriage followed from the symmetric distribution of resources in divorce that was imposed by the equal division of property. This explains why, after unilateral divorce was introduced, we observe that married women, *on average*, were less likely to work in states where property was divided equally at divorce; because they gained power in household decision-making, women reduced their labor supply.

Simulations from the model also replicate the impact of divorce laws on the probability of divorce. As observed in the data used in this study as well as documented in the literature (Mechoulan 2006, Wolfers 2007), the introduction of unilateral divorce led to a sharp, short-term increase in the probability of divorce among couples married before the reforms, whereas no effect was observed following changes in property division rules.

I use the estimated parameters to examine the welfare implications of the current rules of property division. Given the estimates of the intra-household allocation parameters, my simulations suggest that the equal division of assets was beneficial to the average woman in the 1970s and '80s. While such system still benefits those women with a low share in household resources, it may prevent those women who have consumption equal to that of their husband from smoothing the marginal utility of their consumption upon divorce. My counterfactual experiments suggest that these women might be better off in a separate property regime or with prenuptial agreements: that is, because of the gender wage gap, women may need to accumulate more savings than men to smooth consumption when going through a divorce. Community property may preclude women from doing so, leaving them even more exposed to the costs of marriage disruption.

The contribution of this paper is threefold. The first contribution is documenting the empirical relationship between divorce laws (unilateral divorce and property division rules) and the saving behavior of married couples, adding to the literature that has examined the link between unilateral divorce and household outcomes, such as labor supply (Gray 1998, Stevenson 2007), the welfare of children (Gruber 2004), the divorce rate (Friedberg 1998, Wolfers 2007), household specialization (Stevenson 2007) and domestic violence (Stevenson and Wolfers 2007).¹ In addition to the unilateral divorce reform, I document and exploit the variation in the introduction of equitable distribution over the course of the 1970s and 1980s. Using panel household data, I show that asset accumulation and female employment respond to divorce law reforms in a way that is consistent with the predictions of the model. To isolate such a relationship from selection and sorting issues, I examine a sample of couples who married prior to such reforms. Understanding how the divorce laws affect the incentives

¹This large and contentious literature is discussed in greater detail in Section 2.

to save and invest may have important policy implications, given the frequency of divorce in the United States and the fact that divorce laws are subject to continuous changes in the United States through the actions of courts and lawmakers.² For example, in the summer of 2010, the state of New York approved unilateral divorce (Confessore 2010). Other states have introduced or consider introducing covenant marriages, which are substantially more difficult to break.³ Little is known about how the saving behavior during marriage might respond to such reforms. Today, judges, legal authors and lawyers primarily rely on anecdotal evidence and personal experience in evaluating property division rules (Turner, 2005).

The second contribution of this paper is estimating a dynamic model that explicitly incorporates mutual consent versus unilateral divorce and property division laws. In a dynamic setting, the introduction of unilateral divorce results in limited commitment in intra-household allocation, which is not present in the mutual consent regime. Intra-household renegotiation in favor of wives, due to limited commitment, provides a straightforward explanation for the reduction in their likelihood of employment that is observed when unilateral divorce is introduced in community property states. This finding supports the evidence for the presence of inefficiencies (Udry 1996) and, in particular, of limited commitment (Mazzocco 2007, Mazzocco *et al.* 2007) in intra-household allocation.

The third contribution is examining the implications of the current U.S. property division laws on the welfare of secondary earners and showing how the equal division of property can sometimes result in the antithesis of what policymakers intended when equitable distribution was introduced. Divorce can generate significant economic costs, such as direct legal and relocation costs, as well as loss of economies of scale and risk-sharing. It can be especially costly for the spouse with lower permanent income, who can no longer benefit from sharing resources with the partner. Because there is no market insurance for divorce, self-insurance plays a central role in consumption smoothing. In this paper, I investigate how different ways of dividing property at the time of divorce can affect the ability of secondary earners to use savings to smooth consumption in divorce. Recently, some legal scholars have suggested that to protect secondary earners, all household property should be subject to division, including property acquired *before* marriage (Motro 2008). Others have instead suggested that joint bank accounts should be banned to encourage spouses to manage their resources separately and let women have “a purse of their own” (Mahle 2006). My study shows that

²Divorce is common in the United States. According to the National Center for Health Statistics, in 1995 the probability that a first marriage would end in a divorce in the first 10 years of marriage was 30% and grew to more than 50% by the 25th year of marriage (Bramlett *et al.* 2002). While the number of divorcees as a fraction of the total population increased significantly in the 1970s, it has stabilized and even decreased slightly recently. The number of divorces rose with respect to the number of marriages until the 1980s but has been declining ever since (Stevenson and Wolfers, 2007).

³The first state to approve covenant marriages was Louisiana in 1997, followed by Arizona and Arkansas. Many more states are currently debating the issue (Nock *et al.* 2008).

an unobservable parameter, wives' consumption share in marriage, has crucial implications for this debate. For a large set of values of this parameter (that imply, for instance, equal allocation of consumption between husband and wife), mandated equal division of property hurts secondary earners compared to a regime in which spouses can retain their own property or can jointly choose a division rule at the time of marriage. Thus, current property division rules may be inadequate to enable many secondary earners to self-insure against a drop in consumption at divorce.

The paper is organized as follows. Section 2 describes divorce laws in the United States and reviews the related literature. Section 3 illustrates the dynamic model. Section 4 describes the data used in the empirical estimation and examines the effects of the changes in U.S. divorce laws on household savings and labor supply. Section 5 uses the results from the analysis of the effects of the reforms to estimate the parameters of the dynamic model. Section 6 discusses the policy implications of the estimation results and describes the welfare and counterfactual analysis. Section 7 concludes. The Appendix presents additional evidence and robustness checks.

2 U.S. divorce laws: overview and literature review

Widespread and fundamental changes to state divorce laws occurred between the late 1960s and the 1980s. Across states and over time, the grounds for divorce shifted from mutual consent to unilateral choice, and property division rules were rewritten to promote equitable distribution of assets.

2.1 Grounds for divorce

Over the decades of analysis, the legal regimes governing the grounds for divorce in the United States can be described as mutual consent regimes or unilateral divorce regimes. Mutual consent permits divorce only when both husband and wife agree to it or based on fault grounds, such as adultery or domestic violence. Unilateral divorce permits divorce on the grounds of “irreconcilable differences” or “irretrievable breakdown,” thus allowing one party to obtain divorce without the consent of the other.

Prior to the 1960s, state regulation allowed divorce only under mutual consent. The late 1960s brought about the start of the so-called “unilateral divorce revolution.” From 1970 to 1990, the number of states allowing unilateral divorce grew from three to thirty-five. As of 2009, only eleven states, including New York and Illinois, did not recognize irreconcilable difference or irretrievable breakdown as legal grounds for divorce.⁴ Table 15 in Appendix F

⁴American Bar Association (2010). These states require “living separate and apart” or a judicial sepa-

presents detailed information about the introduction of unilateral divorce and legal changes to property division rules across states between 1967 and 1999 and suggests that there is a considerable variation in the content of these laws across states and over time.⁵

The economic and sociology literature has examined the effect of unilateral divorce predominantly with respect to the following outcomes: the divorce rate, the welfare of children, marital conflict and the labor supply of women.

The literature on the effects of the unilateral divorce revolution on the likelihood of divorce is diverse and contentious. In his seminal book, Becker (1993) suggests that, in the absence of transaction costs and under symmetric information, the change from mutual consent divorce to unilateral divorce should not affect the probability of divorce because the laws only determine the allocation of property rights (who owns the right to decide whether divorce occurs or not), and by the Coase theorem the efficient outcome should always be achieved. Clark (1999) and Chiappori *et al.* (2007) analyze the assumptions of the Becker-Coase theorem and conclude that the result holds only under very restrictive assumptions. On the empirical side, Friedberg (1998) uses time and cross-sectional variation in the introduction of unilateral divorce and concludes that unilateral divorce increased the divorce rate. Wolfers (2007) shows that the long-term effect is not robust to controlling for pre-existing time trends in the divorce rate. He does, however, document a short-term positive relationship in the early years following the reform, suggesting that unilateral divorce may have increased the probability of divorce for couples that were *already* married. The difference between short-term and long-term effects may be driven by changes in selection into marriage and in the quality of matching in the marriage market. Thus, when the reform occurs, couples who are already married are more likely to respond. As time passes, people may take the new legal regime into account when deciding whether and who to marry.

Recent research has suggested that unilateral divorce significantly decreased female suicide rate and domestic violence (Stevenson and Wolfers 2006). Moreover, while Gray (1998) observed that unilateral divorce has no independent effect on female labor force participation, Stevenson's work (2008) suggests that unilateral divorce increased female employment rates. Unilateral divorce also had a negative effect on the adult wages of children who grew up when it was first introduced (Gruber 2004): this finding may be explained by the fact that divorce may influence parents' investment in their children (Tartari 2006), although the magnitude the impact of divorce laws on this channel appears to be small (Brown and Flinn 2006).

ration to allow divorce. In practice, spouses may then be able to eventually obtain a divorce without the consent of their spouse, through a longer and more difficult process (Friedberg 1998).

⁵The years of introduction of unilateral divorce are obtained from Gruber (2004) and have been updated using the issues of the *Family Law Quarterly* (1977-1990). The reforms in property division laws are from American Bar Association (1977-2005), Turner (1998) and state-level sources.

Unilateral divorce may also have important effects on household savings and investment. Yet, there is little research on this subject. A relevant paper is Stevenson's (2007) who evaluates the impact of unilateral divorce on marriage-specific investments using Census data on newlywed couples. She finds that the introduction of unilateral divorce negatively affects the propensity to undertake marriage-specific investments, such as the financial support of a spouse through school or the purchase of a house.

2.2 Property division laws

Property division regimes over the period of analysis can be classified into three principal regimes:⁶

- a) Title-based regimes (TB), in which assets are allocated according to the title of ownership;
- b) Community property regimes (CP), in which assets are divided equally, under the presumption that they are jointly owned by the spouses;
- c) Equitable distribution regimes (ED), in which assets are divided by courts, which have some discretion, in order to achieve equity. This process may result in equal division or in a division that favors the spouse who contributed the most to the purchase of the asset or that favors the spouse who has higher needs.⁷

At the turn of the 20th century, common law title-based property division was the dominant legal regime, with the exception of eight states, primarily those with a French or Spanish colonial legacy, such as Louisiana, New Mexico or California, which had community property regimes. Over the course of the century, title-based states shifted towards equitable distribution, while community property states maintained their laws. By the 1930s, 17 title-based states had introduced equitable distribution (Golden 1983). After the federal Uniform Marriage and Divorce Act (UMDA) of 1970, all the remaining 27 states that had

⁶The legal classification distinguishes between community property and common law regimes (Golden 1983). It then classifies common law states as strict title-based states and equitable distribution states. I follow the economic literature (Gray 1998, Stevenson 2007) by classifying states as title-based common law, community property and equitable distribution regimes, but I collect data about the timing of changes from legal sources such as the *Family Law Quarterly*.

⁷Even among equitable distribution and community property regimes, states vary in the definition of marital assets that are subject to division in a divorce settlement. In most states, assets owned prior to marriage, plus inheritances and gifts received during the marriage are separate property that spouses are allowed to own individually. In other states, even intangible assets, such as the earnings from a law or medical degree are subject to a form of division. Furthermore, household debt that is held in both spouses' names, such as a mortgage, is also subject to division by courts.

a title-based property division system adopted equitable distribution (Golden 1983, p. 3).⁸ In fact, the UMDA created the legal ground for the introduction of equitable distribution in all states and by the early 1980s a number of populous states, such as Illinois (1977), New York (1980) and Pennsylvania (1980), introduced equitable distribution. The final title-based state to transition to equitable distribution was Mississippi, in 1994 (Family Law Quarterly, 1977-2005).⁹ These reforms, which were meant to protect secondary earners in divorce (Turner 2005), can be seen as a further expansion in the property rights of women after the long process of rights acquisition that commenced in the middle of the 19th century in the United States and granted women control over their assets and earnings (Doepke and Tertilt 2009, Fernandez 2009). Appendix A illustrates that the timing of the transition from title-based into equitable distribution is uncorrelated with pre-reform measures of the economic condition of women in a given state.

Although prenuptial agreements may blur the impact of these property division reforms, legal scholars believe that prenuptials had only minor incidence. First of all, these contracts were not enforced by courts until the 1980s. Since the 1983 Uniform Premarital Agreements Act, the enforcement of prenuptial agreements has become more likely. However, even today, prenuptial agreements are signed by only 5% to 10% of couples (Rainer 2007), a fact potentially explained by social stigma and lack of information on their benefits (Mahar 2003).

The effect of property division laws has been subjected to only a limited amount of analysis. Gray (1998) and Stevenson (2007) allow the impact of unilateral divorce to have a different effect on female labor supply in states with different property division rules, but do not explore the mechanism through which these laws operate nor their variation over time. Marcassa (2008) suggests that changes in the laws that govern settlements are likely to affect a couple's decision to divorce. Chiappori *et al.* (2002) use cross-sectional variation in property division rules as a distribution factor that influences intra-household allocation.

⁸These legal reforms were salient to U.S. households. For instance, a search of the *Lexis Nexis* archives (www.lexisnexis.com) revealed that between June and July 1980, when equitable distribution was introduced in New York state, seven articles were published in *The New York Times* regarding this legal change, including some long and detailed ones. Moreover, between 1974 and 1990 eighty articles from *The New York Times* were classified as focusing on both “marital property” and “divorce and dissolution.”

⁹Alimony or maintenance payments are transfers awarded to the poorer spouse upon divorce. Traditionally, alimony was awarded to the wife who had no “fault” in the divorce. Since the Uniform Marriage and Divorce Act of 1970, alimony can be awarded to the poorer spouse, irrespectively of gender, to ease the transition into the labor market. It has thus been redefined as “rehabilitative” alimony (Turner 1998). Even before these changes, data on alimony payments show that these were generally infrequent transfers. For instance, in the National Longitudinal Survey of Young and Mature Women only 10% of divorced women ever report receiving alimony between 1977 and 1999, for a median payment is 4,000 real 2008 dollars, approximately 15% of the divorcee's household income. Child support is usually a larger transfer from the non-custodial parent to the parent who is granted custody of the children. Del Boca and Flinn (1995) examine a sample of divorce cases in Wisconsin between 1980 and 1982, where the average child support transfer is about 20% of the father's income.

Aura (2003) develops a game theoretic model of asset allocation in limited commitment under different property division legal regimes. Modeling divorce as an out-of-equilibrium event, he shows that property division laws may affect household bargaining and intertemporal behavior. Chiappori *et al.* (2008) develop a model of couple formation and disruption with different income division rules upon divorce, which influence household formation and matching.

3 The model

To identify the channels through which divorce laws influence household behavior and welfare, I develop a dynamic model of household choice in which spouses jointly decide how much to save, how to allocate consumption and whether or not to work. Since prime age men were rarely non participants in the period of study, I only focus on the participation of women in the labor market. In each period, spouses can decide to divorce and live off their income in addition to the assets left to them in the divorce. Whether divorce occurs and how resources are allocated depend on the divorce law system. I model two grounds for divorce regimes (mutual consent and unilateral divorce), and three property division rules (community property, a title-based regime, equitable distribution) to mirror the legal framework described in Section 2.

The model represents the behavior of two individuals, H and W , who are married at time 1 and live until time T . The symbol H denotes the primary wage earner and the symbol W the secondary wage earner, whose employment is a choice variable for the household. They can be thought of as husband and wife, but the gender characterization at this stage is only for expositional convenience.

In every period from time 1 to T , the household chooses how much to save and how to allocate private consumption between the spouses, in the presence of economies of scale. Between time 1 and time $T - R$, the household also makes decisions about W 's labor supply. From time $T - R + 1$ to time T , spouses are retired and thus make no labor supply decisions. Thus, both longevity and retirement are exogenous in this model.

3.1 Preferences

Both husband and wife derive utility from own consumption c^j and disutility from own labor force participation P^j for $j = H, W$. Utility functions are separable across periods and across states of the world.

Furthermore, each spouse has a subjective taste-for-marriage parameter ξ_t^j , which changes over time and affects the divorce decision. This parameter reflects the spouses' affection for

one another (e.g. love) and their attachment to marriage based on other idiosyncratic factors (e.g. attachment to the children, fear of the social stigma associated with divorce).

Period utility thus takes the form:

$$u_{married}^j = u(c_t^j, P_t^j) + \xi_t^j \quad u_{divorced}^j = u(c_t^j, P_t^j).$$

The taste shocks follow a random walk:

$$\xi_t^j = \xi_{t-1}^j + \epsilon_t^j \quad \text{where } \epsilon_t^j \text{ is distributed as } N(0, \sigma_\epsilon^2), \quad \text{for } j = W, H.$$

The random walk process captures the persistence of feelings for the partner.

The utility function $u(c, P)$ is Constant Relative Risk Aversion (CRRA) with separability between consumption and labor:

$$u(c, P) = \frac{c^{1-\gamma}}{1-\gamma} - \psi P, \quad \text{with } \gamma \geq 0 \text{ and } \psi > 0.$$

3.2 Budget constraints

Here, I describe the consumption technology, the process for spouses' income and the budget constraints in marriage and divorce.

3.2.1 Consumption technology and children

Goods consumed in the marriage are partially public. This feature is captured by assuming that for a given level of household expenditure x , spouses' consumption depends on the household inverse production function

$$\frac{x}{e(k)} = F(c^H, c^W) = [(c^H)^\rho + (c^W)^\rho]^{\frac{1}{\rho}}.$$

This inverse production function, when $\rho \geq 1$, implies that a couple is able to consume more, for a given level of expenditure, than what they could consume if they were living alone. The constant elasticity of substitution functional form allows the magnitude of economies of scale in the household to depend on the consumption gap between spouses. That is, if one spouse, for instance the husband, does not consume anything, then $z = c^W$ and there are no economies of scale. Economies of scale are maximized when spouses consume the same amount. Of course, children affect household consumption according to an equivalence scale (denoted as $e(k)$). The birth of children takes place at predetermined ages of the parents.

3.2.2 Income over the life-cycle

Spouses are uncertain about their future labor income and receive permanent income shocks that are correlated between husband and wife. The wife's labor income (y^W) depends on her human capital (h^W):

$$\ln(y_t^W) = \ln(h_t^W) + z_t^W$$

where z_t^j represents the permanent component of income that follows a random walk process

$$z_t^W = z_{t-1}^W + \zeta_t^W. \quad (1)$$

Note that in the empirical model, in estimating the distribution of ζ_t^j , I will allow spouses' income data to be measured with an i.i.d. error, represented by ι_t^j ($j = H, W$).

Human capital is accumulated through labor force participation. The law of motion for the wife's human capital h^W is:

$$\ln(h_t^W) = \ln(h_{t-1}^W) - \delta \cdot (1 - P_{t-1}^W) + (\lambda_0^W + \lambda_1^W \cdot t) \cdot P_{t-1}^W.$$

If a woman participated in the previous period, her human capital increases at a rate $\lambda_0^W + \lambda_1^W t$. If she did not, her human capital depreciates at a rate of δ . If W participates, the household faces childcare expenses d^k .

Men always work until they retire. I assume that the husband's income increases over the life cycle, consistent with the patterns observed in the data:

$$\ln(y_t^H) = \ln(h_t^H) + z_t^H, \quad \ln(h_t^H) = \ln(h_{t-1}^H) + \lambda_0^H + \lambda_1^H \cdot t.$$

The initial offer wage y_1^j is lower for W than for H .

At time $T - R$, spouses retire and obtain a share of their pre-retirement income.

3.2.3 Budget constraints in marriage

In marriage, the budget constraints depend on the property division regime. It can be formulated as:

$$A_{t+1} = (1 + r) \cdot A_t + y_t^H + (y_t^W - d_t^k) \cdot P_t^W - x_t. \quad (2)$$

In a title-based regime, spouses save in separate "accounts" A^H and A^W that have the same market rate of return r . Thus: $A_t = A_t^H + A_t^W$.

If divorce is not an option, spouses are indifferent between the two accounts because they pool their resources during marriage. If divorce is possible, spouses make a portfolio allocation decisions over household total assets. If divorce occurs, each spouse retains his/her

own assets. In equitable distribution and community property states, assets are treated as jointly owned upon divorce; thus, spouses save jointly.

3.2.4 Budget constraints in divorce

In divorce, spouses live off their individual income and assets. They both contribute to the consumption of their children as a fraction of their own consumption (according to the equivalence scale $e(k)$, which is meant to capture the cost of child custody and of child support) and share childcare expenses. The budget constraint is thus simply:

$$A_{t+1}^j = (1 + r) \cdot A_t^j + (y_t^j - \frac{d_t^k}{2}) \cdot P_t^j - c_t^j \cdot e(k_t). \quad j = H, W \quad (3)$$

Each spouse’s level of assets in that first year depends on the property division regime:

$$A_t^H = \begin{cases} \text{husband’s own assets in a title-based regime} \\ \frac{1}{2}A_t & \text{in community property} \\ \alpha A_t & \text{in equitable distribution, where } \alpha \sim \text{Uni}[\frac{1}{2}, \frac{2}{3}] \end{cases}$$

In a title-based system, spouses maintain their own “account” A^j upon divorce. In equitable distribution and community property states, wealth is divided according to a sharing rule that spouses cannot influence, unless they both agree to it at the time of divorce. Assets are divided equally in community property, while spouses they are uncertain about the division of property in equitable distribution. This is meant to capture the fact that under equitable distribution between half and two thirds of the property is usually assigned to the spouse with the highest earnings (Woodhouse and Fetherling 2006).¹⁰

Spouses can contract around property division rules at the time of the divorce, as long as both agree to a division criterion. However, at the time of marriage they cannot commit to a specific property division rule: this assumption reflects the fact that prenuptial agreements were rarely enforced before the mid 1980s and remain infrequent today (Mahar 2003). I discuss the welfare effects of binding prenuptial agreements in a counterfactual simulation exercise in Section 6.¹¹

¹⁰“The essential feature of equitable distribution is the absence of fixed rules for the division of property” (Brake 1982).

¹¹This model captures important features of the actual legal system, but also includes some important simplifications. For instance, in the past if spouses had a joint title of property on the house, then such a house would be divided between them upon divorce even under a title-based regime. Furthermore, in community property or equitable distribution not all assets owned by a couple are subject to division. Some states have a “dual property” system that allows spouses to keep all assets accumulated before the marriage or inherited.

3.3 Problem of the divorcee

Having described the budget constraints, I now characterize the value of being divorced, given state variables ω . In this problem, $\omega_t = \{A_t^H, A_t^W, y_t^H, y_t^W, \xi_t^H, \xi_t^W, h_t^W, \Omega_t\}$ where Ω_t represents the vector of divorce laws in force at time t .

In the last period, the problem is simpler because people are retired and they choose consumption and assets in the next period (when they are dead). The value of being divorced in the last period is:

$$V_T^{jD}(\omega_T) = \max_{c_T^{jD}, A_{T+1}^{jD}} u(c_T^{jD})$$

s.t. budget constraint in divorce (3) $A_{T+1}^j \geq 0 \quad j = H, W.$

In each period t , a divorcee has an exogenous probability π_t of remarrying with another person. If remarriage occurs, the problem is analogous to the one of a married couple. The second marriage, if it occurs, is an absorbing state.¹² In an arbitrary period t , the divorcee chooses consumption, savings and whether or not to work (if she is a woman). Thus, the the value of being divorced at time t is:

$$V_t^{jD}(\omega_t) = \max_{c_t^{jD}, P_t^{jD}, A_{t+1}^{jD}} u(c_t^{jD}, P_t^{jD}) + \beta \left\{ \pi_{t+1} E[V_{t+1}^{jR}(\omega_{t+1}|\omega_t)] + (1 - \pi_{t+1}) E[V_{t+1}^{jD}(\omega_{t+1}|\omega_t)] \right\}$$

s.t. budget constraint in divorce (3), for $j = H, W$

The budget constraint depends on the property division regime at the time of divorce. For simplicity, define the continuation value

$$E[V_{t+1}^{jDR}(\omega_{t+1}|\omega_t)] = \pi_{t+1} E[V_{t+1}^{jR}(\omega_{t+1}|\omega_t)] + (1 - \pi_{t+1}) E[V_{t+1}^{jD}(\omega_{t+1}|\omega_t)].$$

3.4 Household planning problem

The couple's problem depends on the existing divorce law regime. In mutual consent divorce, the couple remains married unless *both* spouses want to divorce; in unilateral divorce, the couple divorces if only one spouse want to divorce.

The household solves a Pareto problem subject to constraints, where the husband's Pareto

¹²The value of being remarried is $V_t^{jR}(\omega_t) = u(c_t^{jR}, P_t^{jR}) + \beta E[V_{t+1}^{jR}(\omega_{t+1}|\omega_t)]$ for $j = H, R$, from the solution to the problem

$$V_t^R(\omega_t) = \max_{c_t^{HR}, c_t^{WR}, P_t^{WR}, A_{t+1}^R} \theta u(c_t^{HR}, P_t^{HR}) + (1 - \theta) u(c_t^{WR}, P_t^{WR}) + \beta E[V_{t+1}^R(\omega_{t+1}|\omega_t)]$$

s.t. budget constraint in marriage, for $j = H, W.$

weight is indicated by θ and the wife's by $1 - \theta$.¹³ The parameter θ is given exogenously.¹⁴

Define $q_t = \{c_t^H, c_t^W, P_t^W, A_{t+1}^H, A_{t+1}^W, D_t\}$ the vector of variables over which the household maximizes, where D_t represents the divorce decision at time t .

3.4.1 Mutual consent regime

In a mutual consent divorce regime, state variables are $\omega_t = \{A_t^H, A_t^W, y_t^H, y_t^W, \xi_t^H, \xi_t^W, h_t^W, \Omega_t\}$, where D_t represents the decision to divorce. A couple that enters period t as married solves:

$$\begin{aligned} V_t(\omega_t) = \max_{q_t} & (1 - D_t) \{ \theta u(c_t^H, P_t^H; \xi_t^H) + (1 - \theta) u(c_t^W, P_t^W; \xi_t^W) + \beta E[V_{t+1}(\omega_{t+1}|\omega_t)] \} \\ & + D_t \theta \{ u(c_t^H, P_t^H) + \beta E[V_{t+1}^{HDR}(\omega_{t+1}|\omega_t)] \} \\ & + D_t (1 - \theta) \{ u(c_t^W, P_t^W) + \beta E[V_{t+1}^{WDR}(\omega_{t+1}|\omega_t)] \} \end{aligned}$$

$$\left. \begin{aligned} \text{s.t. budget constraint in marriage (2)} \\ \text{budget constraints in divorce (3) for } j = H, W \\ u(c_t^H, P_t^H) + \beta E[V_{t+1}^{HDR}(\omega_{t+1}|\omega_t)] > V_t^{HM}(\omega_t) \\ u(c_t^W, P_t^W) + \beta E[V_{t+1}^{WDR}(\omega_{t+1}|\omega_t)] > V_t^{WM}(\omega_t) \\ A_t^H + A_t^W = A_t \end{aligned} \right\} \begin{array}{l} \text{if } D_t = 0 \\ \\ \\ \\ \text{if } D_t = 1 \end{array}$$

where

$$V_t^{jM}(\omega_t) = u(c_t^{*j}, P_t^{*j}; \xi_t^j) + \beta E[V_{t+1}^j(\omega_{t+1}|\omega_t)]$$

is each spouses' value of marriage that comes from solving the problem for $D_t = 0$. The continuation value is

$$V_t^j(\omega_t) = D_t V_t^{jD}(\omega_t) + (1 - D_t) V_t^{jM}(\omega_t)$$

for $j = H, W$ and $\forall t$ and $\forall \omega_t$.

The allocation in marriage in mutual consent divorce corresponds to the Pareto optimal allocation. In every period t , the couple remains married unless *both spouses* prefer the divorce allocation described in Subsection 3.3 (the value of being divorced).

If spouses disagree about the divorce under the default property division rule, the spouse

¹³An interesting alternative to a cooperative solution would be to model the household decision between such solution and a non-cooperative one (Del Boca and Flinn 2009). My formulation is a special case of the collective model with non-participation, examined in Blundell *et al.* (2007), extended to a dynamic setting (Browning 2000, Mazzocco 2004) and subject to constraints that are imposed by the divorce option. Here, spouses' realizations of offer wages do not directly influence spouses' consumption shares, unless they lead one spouse to prefer the divorce allocation to the marriage allocation.

¹⁴It could be seen the result of matching in the marriage market (Choo *et al.* 2008). Alternatively, it can be seen as the outcome of initial intra-household bargaining based on threat-points that are internal to the marriage, such as the threat of a non-cooperative equilibrium (Lundberg and Pollak 1993).

who wants to divorce can persuade the other by offering her (him) a larger fraction of the household assets than that dictated by the law. I will call this share κ , where $\kappa \in [0, 1]$. Thus, if spouse i wants to remain married when j wants to divorce given the default property division law, then spouse j will offer i to keep an amount $\kappa(A_t^j + A_t^i)$ that would make him indifferent between marriage and divorce and would push him to consent to divorce.

Such an amount may not exist, if for instance i 's realization of the preference parameter is very high; and then, the divorce would not occur even if one spouse prefers it.

3.4.2 Unilateral divorce regime

In a unilateral divorce state, the couple maximizes the weighted sum of spouses' utilities in marriage under the constraint that *both* spouses must prefer the marriage allocation to the value of being divorced. Because the marriage allocation has to satisfy these participation constraints, the solution may depart from the Pareto optimal allocation of the mutual consent case. The formulation of the unilateral divorce case follows from the limited-commitment literature (e.g. Ligon *et al.* 2002), which has previously been applied to models of intra-household allocation (Ligon 2002, Mazzocco 2007, Mazzocco *et al.* 2007). Define M_t^j (for $j = H, W$) two additional state variables in the problem in unilateral divorce regime. $M_t^j > 0$ indicate by how much the intra-household allocation must depart from the solution to the intertemporal Pareto problem because of the presence of binding participation constraints from time 1 up to time t . State variables are $\omega_t = \{A_t^H, A_t^W, y_t^H, y_t^W, \xi_t^H, \xi_t^W, h_t^W, \Omega_t, M_t^H, M_t^W\}$.

The problem is:

$$\begin{aligned}
V_t(\omega_t) = \max_{q_t} & (1 - D_t) \{(\theta + M_t^H) u(c_t^H, P_t^H; \xi_t^H) + (1 - \theta + M_t^W) u(c_t^W, P_t^W; \xi_t^W) \quad (4) \\
& + \beta E[V_{t+1}(\omega_{t+1}|\omega_t)]\} \\
& + D_t (\theta + M_t^H) \{u(c_t^{HD}, P_t^{HD}) + \beta E[V_{t+1}^{HDR}(\omega_{t+1}|\omega_t)]\} \\
& + D_t (1 - \theta + M_t^W) \{u(c_t^{WD}, P_t^{WD}) + \beta E[V_{t+1}^{WDR}(\omega_{t+1}|\omega_t)]\}
\end{aligned}$$

s.t. budget constraint in marriage (2)

$$u(c_t^H, P_t^H; \xi_t^H) + \beta E[V_{t+1}^H(\omega_{t+1}|\omega_t)] \geq V_t^{HD}(\omega_t)$$

$$u(c_t^W, P_t^W; \xi_t^W) + \beta E[V_{t+1}^W(\omega_{t+1}|\omega_t)] \geq V_t^{WD}(\omega_t)$$

budget constraints in divorce (3) for $j = H, W$

$$A_t^H + A_t^W = A_t$$

$$\left. \begin{array}{l} \text{if } D_t = 0 \\ \text{if } D_t = 1 \end{array} \right\}$$

where

$$V_t^{jM}(\omega_t) = u(c_t^{*j}, P_t^{*j}; \xi_t^j) + \beta E[V_{t+1}^j(\omega_{t+1}|\omega_t)]$$

is each spouses' value of marriage that comes from solving the problem for $D_t = 0$. The continuation value is

$$V_t^j(\omega_t) = D_t V_t^{jD}(\omega_t) + (1 - D_t) V_t^{jM}(\omega_t)$$

for $j = H, W$ and $\forall t$ and $\forall \omega_t$.

In sum, in every period t , the couple remains married unless *one spouse* prefers the divorce allocation described in Subsection 3.3 (the value of being divorced). If spouses disagree about divorcing, given the solution to the unconstrained problem, the spouse who wants to remain married can persuade the other by offering her (him) a larger fraction of the intra-household resources that the one established by the Pareto-efficient household planning problem. The ratio of spouses' marginal utilities would permanently shift, as described in the literature about risk sharing without commitment (Kocherlakota 1996). Thus, if spouse W wants to remain married when H wants to divorce, then spouse W will offer H another intra-household allocation that would make him indifferent between marriage and divorce and would convince him to remain married. This corresponds to the solution to a Pareto problem where spouses' weights correspond to $(\theta + M_t^H + \mu_t^H)$ and $(1 - \theta + M_t^W + \mu_t^W)$, where $M_t^j = \sum_{\tau=1}^{t-1} \mu_\tau^j$, for $M_1^j = 0$ and $\mu_t^j > 0$ is spouse's j binding participation constraint at time t , for $j = H, W$ (Marcet and Marimon 1992). Such an amount that satisfies the household intertemporal budget constraint may not exist, if for instance H 's realization of the preference parameter is very low (e.g. he *really* wants to divorce, because he has met another more suitable partner); in that case, the divorce would occur even if one spouse prefers to remain married.

3.5 Solution method

The household problem does not have a closed form solution and is solved numerically using backward induction.

3.5.1 Value of divorce

The problem of the female divorcee W has three state variables: A^W , h^W and the offer labor income y^W and two choice variables, c^W and P^W . The model is solved by backward induction (Adda and Cooper 2003) under the terminal condition that $A_{T+1}^W = 0$ for a discrete vector of possible values for A_t^W . The solution leads to a sequence of values $V_t^{WD}(A_t^W, y_t^W, h_t^W)$ that represent the wife's valuation of the divorce. For the male divorcee, the problem is identical with the exception that the decision to work is not a choice variable.¹⁵

¹⁵If remarriage occurs, then the problem is again solved by backward induction under the same zero-assets terminal condition.

3.5.2 Household planning problem

The married couple's problem has eleven state variables: the assets level A^j for each spouse, the level of the wife's human capital h^W , the levels of preferences for marriage for each spouse ξ^j , the income level for each spouse y_t^j , the spouses' renegotiation parameters M_t^j and the divorce laws vector Ω_t (which represents two state variables: grounds for divorce law and property division rule). The household takes the divorce laws Ω_t as given and assumes that they are going to persist in time: changes in Ω_t are thus unanticipated and exogenous to household behavior. Divorce laws impose restrictions on the state variables. In community property, $A_t^H = A_t^W \quad \forall t$ and in equitable distribution $(1 - \alpha)A_t^H = \alpha A_t^W \quad \forall t$. In mutual consent divorce, $M_t^j = 0 \quad \forall t$ and $j = H, W$.

The problem is again solved numerically by backward induction with the terminal condition

$$A_{T+1}^j = 0$$

since there is no bequest motive in the model. In the other periods, the solution is obtained by solving the problem recursively.¹⁶ Appendix B provides a detailed description of the solution algorithm for both the mutual consent divorce case and the unilateral divorce case.

3.6 Implications of the model

The model has implications for three observable elements of household behavior: divorce, asset accumulation and female labor supply (human capital) decisions. These implications derive from both the direct effect of each law and the interaction effects between grounds for divorce and property division laws.

3.6.1 Divorce laws and the divorce decision

In this model, spouses can only transfer a finite amount of consumption goods to each other, subject to the intertemporal budget constraint, while they experience shocks to their taste for marriage whose support goes from negative infinity to positive infinity. Because of the lack of fully transferable utility in this model, unilateral divorce increases the likelihood of divorce, violating of the Becker-Coase theorem.¹⁷ Assume, for example, that the realization of the wife's taste shock ξ_t^W is very low (i.e. tends to $-\infty$), for instance because she meets another more suitable partner. Then, a reallocation of intra-household resources (i.e. transfer

¹⁶To obtain the numerical solution I discretize the vector of assets A and the vector of h^W , y_t^j and of ξ_t^j . I solve the value function for a subset of the vector of discrete values of A and then use linear interpolation to speed up computation. I discretize the random walk processes into a Markov chain and use the transition probabilities to compute the expected values $E[u(\cdot)]$ (Adda and Cooper 2003).

¹⁷See Clark (1999) and Chiappori *et al.* (2007) for discussions of the other environments where this theorem would not hold.

of consumption goods and leisure from the husband to the wife) may not always be sufficient to compensate her for such a low ξ_t^W and to convince her to remain married.

The lack of transferable utility makes divorce more likely in unilateral divorce regimes than in mutual consent regimes, even when spouses contract around property division laws (allocation in divorce) in mutual consent divorce: there exist values of the preference shocks that make it impossible for the spouse who wants to divorce to persuade the one who wants to remain married by transferring more assets than is dictated by the divorce law.

3.6.2 Divorce laws and intra-household allocation

Under mutual consent divorce, the intra-household allocation is fully determined by the Pareto weights θ and $(1 - \theta)$. This is because spouses cannot exercise the threat of divorcing without the consent of the other party and thus divorce cannot be a relevant threat-point of intra-household negotiation. If unilateral divorce is introduced, the consumption shares shift to incorporate spouses' outside options that are represented by divorce allocations and are not incorporated in θ . Even though it is not always possible, for a large section of the state space couples in unilateral divorce can renegotiate household allocations based on the divorce outside-options and remain married. For instance, if the husband's Pareto weight θ is high (e.g. because of social norms or conditions of the marriage market at the time of marriage that are unrelated to the divorce outside-option), but the realizations of W 's income are sufficiently high to allow her to be better off after divorce than in marriage, W can use the threat of divorce to increase her intra-household share of resources (more consumption and less work).

Similar to an income shock, changes in property division rules impact spouses' resources in divorce. An increase in spouse's j welfare in divorce (e.g. due to a more favorable property division rule, or a work promotion, or a better potential new partner) improves her outside option V^{jD} . If the increase is large enough to lead her/him to seek a divorce, the other spouse may offer a better allocation within marriage V^{jM} . Property division law only affects the intra-household allocation if there is a unilateral divorce: in this case, they shift the consumption share in favor of the spouse who also would get more in the divorce.

3.6.3 Divorce laws and assets

Divorce laws affect household assets in two ways. First, they regulate the proportion of household total assets *each spouse* can access upon divorce. Second, they influence the amount of *total* savings that a household accumulates.

Property division laws allocate assets to spouses in divorce settlements and, thus, influence resources available to each spouse in case of a divorce. In a title-based property

division regime, the household can decide how much to allocate to each spouse in the event of a divorce. The lower the θ , the higher the wife's consumption in marriage relative to her husband's consumption.¹⁸ Therefore, to allow her to smooth consumption in divorce, without income pooling with her husband, A^W will also have to be high and increasing in the wife's Pareto weight $(1 - \theta)$. Each spouse's asset level increases in his/her share in consumption in marriage, just as their consumption does.

In equitable distribution and community property states, households can only choose the *total* amount of savings A and the share attributed to wife is equal to the one attributed to the husband in community property and a little less than their husband in equitable distribution, in expected value. Thus, women with low Pareto weight will benefit from these property division regimes compared to a title-based regime. On the contrary, in those households in which women have high share in household consumption (e.g. $\theta = \frac{1}{2}$) but lower wage than the husband, assets chosen in a title-based regime may be larger than the husbands' share (and, thus, larger than that chosen in community property), to allow consumption smoothing.

During marriage, divorce laws influence household behavior via multiple channels. Due to unilateral divorce and the corresponding increase in the likelihood of divorce, households may increase savings in order to allow the smoothing of the marginal utility of consumption when facing the loss of economies of scale and the other costs of divorce (Cubeddu and Rios-Rull, 1997 and 2003). In addition, by influencing the amount of assets available to spouses in the event of a divorce, property division laws have multiple effects on household behavior. First, they alter the household intertemporal choice by affecting each spouse's individual returns on the assets. Second, they influence the divorce allocation option and thus intra-household bargaining. Third, equitable distribution introduces uncertainty in the returns on savings. Specifically:

a) **Spouses' individual returns on savings** In community property and equitable distribution, the division of assets imposed by courts may alter the returns on assets relative to a title-based regime. In marriage, each spouse's consumption is increasing in his/her Pareto weight, holding expenditure fixed. Thus, an equal division of assets acts as a tax on savings for the high-power spouse and as a subsidy for the low-power one. Spouses' weight in the household decision function determines the overall effect in the household intertemporal problem: that is, equal property division in a household with and unequal intra-household allocation of consumption decreases the returns on savings. Similarly to a change in the

¹⁸From the intra-temporal first order conditions, the optimal consumption allocation, for a given level of expenditure x , is

$$\frac{c^H}{c^W} = \left(\frac{\theta}{1 - \theta} \right)^{\frac{1}{\gamma + \rho - 1}},$$

market return on assets or to a tax on savings (Bernheim *et al.* 2002), such a decrease has a substitution effect (consumption is cheaper at time t than at time $t + 1$ and may decrease savings) and an income effect (for a net saver, resources available at time $t + 1$ are lowered, which may increase savings). Preferences and spouses' need for insurance determine whether the income or the substitution effect dominates.

b) **Spouses' divorce allocations** Property division rules determine the fraction of household resources available to each spouse in a divorce. Thus, by affecting spouses' outside option, property division rules also affect spouses' bargaining power when spouses can initiate divorce without the consent of the other party.

c) **Uncertainty** Spouses are uncertain about how the property will be divided in equitable distribution. Uncertainty on the returns on assets negatively affects the welfare of a risk-averse family.

3.6.4 Divorce laws and female labor supply

If divorce generates a loss of resources for women (such as the loss of their share of the husbands' income), women have an incentive to increase their labor supply to accumulate human capital (cf. Johnson and Skinner 1986). This mechanism is also present in this model. However, the more favorable the property regime is to women, the weaker this incentive would be, since tangible assets provide women with sufficient insurance in case of divorce.¹⁹

Furthermore, a woman's labor force participation is *decreasing* in her Pareto weight and her share of household resources (thus, increasing in $\frac{\theta + M_t^H}{1 - \theta + M_t^W}$): the lower a woman's weight in the household planning problem, the lower the utility cost of working in the household value function. By increasing a woman's value of divorce, divorce laws that favor women may lead to an increase in their share in household resources and a reduction in their labor supply. Again, this mechanism would only operate when spouses can exercise the divorce outside option without the consent of the other party.

This link between the distribution of power in the household and the labor supply of women has to be interpreted taking into account the fact that in this model the alternative to labor market participation is leisure. One could argue that, if home production was another option, a woman with very low bargaining power in her household might supply all of time to housework and domestic production, if that is beneficial to the household. But if leisure is the only alternative to labor market work, then the fact that leisure increases in a spouse's Pareto weight is a straightforward implication of the optimization problem.

¹⁹This model does not consider alimony, since data suggest that it is a relatively infrequent transfer, which may be difficult to enforce. Alimony in this model would imply a reduction in the scope for self-insurance for women and an increase in women's bargaining power in marriage when unilateral divorce is allowed.

4 Data and empirical analysis of divorce law reforms

4.1 The data

I use data from the the Panel Survey of Income Dynamics (PSID), the National Longitudinal Survey of Mature Women (NLS-MW), and the National Longitudinal Survey of Young Women (NLS-YW). These surveys provide longitudinal information on U.S. households from the end of the 1960s until the 2000s. In this paper, I exploit 26 waves of the PSID (between 1968 and 1993), 19 waves of NLS of Mature Women (between 1967 and 1999), and 20 waves of NLS of Young Women (between 1968 and 1999).

The PSID provides key information on labor force participation and income. I do not use data after the 1993 wave, since several important questions were significantly modified after that year. The NLS-MW and NLS-YW are part of the Original Cohorts of the National Longitudinal Surveys. The NLS-MW was administered from 1967 to 2003 on an initial sample of 5,083 women who were between 30 and 44 years of age in 1967. The NLS-YW was administered from 1967 to 2003 to an initial sample of 5,159 women who were between 14 and 24 years of age in 1968. In addition to information on income, education and fertility, these surveys provide rich data on household asset holdings that is not available in other longitudinal surveys from the 1970s and 1980s. Since the NLS does not disclose state identifiers, I matched women to their state of residence using the geographical variables provided in the surveys. The geographical variables that I use to match women to their state of residence are the size of the labor market in the 1960 Decennial Census in the area of residence, an index of the demand for female labor in the area of residence and the Census division of residence.²⁰

Since the model does not consider family formation, but takes couple matching as exogenous, my empirical analysis only considers couples who married *before* legal reforms took place: divorce laws may in fact also affect the decision to marry and the matching in the marriage market. Thus, my sample includes women from the NLS and the PSID married before the introduction of unilateral divorce in their state and before changes were made to divorce settlement laws.

²⁰A similar approach is used in Powers (1998) on the NLS-YM. I thank Jeff Gray for providing the list of geographical characteristics at the Primary Sampling Unit (PSU) level and the PSU-state matches. Since this information is only available for the waves between 1967 and 1971, I can only identify the state of residence for those survey respondents who did not move to another state between 1971 and 1999. Thus, I match 10,086 women out of 10,242 at least once in the sample, but for a total of 2,856 women, the state of residence eventually becomes unavailable since they are recorded having changed it. On the one hand, to the extent that people do not change their state because of divorce laws, I am unable to exploit variation in divorce laws that couples are exposed to as they change their state of residence. On the other hand, since divorce laws may not be immediately salient, focusing on couples who have lived in the same state for a long time may reduce the measurement error.

4.2 Characteristics of the samples

The PSID provides detailed longitudinal information on female employment and divorce. Table 1 summarizes characteristics of the pooled sample of the 3,858 women I analyze. Eighty-eight percent are married, while 12% are separated or divorced. Average female employment in the sample is 54%.

Table 1: **Summary statistics of the PSID (1968-1993) and the National Longitudinal Survey of Young and Mature Women (1967-1999): Pooled sample of women married before divorce law reforms**

	Obs.	Mean	Median	St. Dev.
PSID				
Age (women)	52,223	40	41	11
Number of children	52,223	1.69	1	1.68
Years since marriage	43,884	17	19	12
Woman is employed	52,223	0.54	1	0.5
NLSW				
Age	15,399	40	40	10
Number of children	15,399	2	2	1.79
Years since marriage	12,022	21	21	10
Assets (1990 dollars)	15,399	70,573	32,658	136,870

Note: NLSW sample limited to couples with non-missing asset data.

The NLSW provides uniquely rich data on household wealth. The women I analyze are slightly older than the PSID sample due to the sampling age of the initial cohort. Data on wealth is collected for a subset of years, leaving me with asset data for 4,538 couples.²¹ Assets include real estate, financial assets and business assets. Table 1 reports the average and median characteristics of this sample. Households assets average almost 70,000 and income averages approximately 38,000, both in real 1990 dollars. Asset holdings peak when women are 64 at a mean level of 127,000 real 1990 dollars. Seventeen percent of the pooled sample holds zero or negative total assets at a point in time.

Both the NLSW and the PSID record the marital status of survey responders. Nevertheless, it is difficult to observe divorces precisely, since households may fall out of the sample when divorce occurs. In the NLSW survey, 824 divorces are recorded in the sample of 5,131 (15%). The divorce hazard is 1.9% per year. Data on divorces on the PSID is also limited. The PSID does not collect information on former members of a household who drop out because of divorce, unless they were part of the initial 1968 cohort of surveyed families. In

²¹In the NLS-MW assets are recorded in 1967, 1971, 1972, 1977, 1982, 1987, 1989, 1995, 1997, 1999. For NLS-YW, assets are available on for survey years 1968, 1971-1973, 1978, 1983, 1988, 1993, 1995, 1997, 1999.

the PSID subsample that I consider, 884 divorces are recorded (22%).

4.3 Variation in divorce laws

I analyze the impact of the introduction of unilateral divorce and of equitable distribution on the intertemporal behavior of U.S. households, using data from both the NLSW and the PSID. I exploit in divorce laws across states and over time, as summarized in Table 15. Unilateral divorce was introduced at different points in time in thirty-three states between 1967 and 1992. In the same period, as is illustrated in Section 2, all twenty-seven states that had a title-based property division system adopted equitable distribution.

The sources of quasi-experimental variation that I use are the introduction of unilateral divorce in different pre-existing property regimes (generally, community property and title-based regimes) and the adoption of equitable distribution in states with different legal grounds for divorce (mutual consent and unilateral divorce).

Table 16 in the Appendix F presents the number of observations that provide the quasi-experimental variation in the NLSW (assets) and the PSID (participation). Variation in divorce laws is concentrated in the following groups:

- a) Introduction of unilateral divorce
 - 1) in title-based regimes (398 households in the NLSW, 290 households in the PSID).
 - 2) in community property regimes (653 households in the NLSW, 573 households in the PSID).
- b) Introduction of equitable distribution
 - 1) in mutual consent states (1,149 households in the NLSW, 1,701 households in the PSID).
 - 2) in unilateral divorce states (206 households in the NLSW, 249 households in the PSID).
- c) Introduction of both equitable distribution and unilateral divorce in the same year (233 households in the NLSW, 178 households in the PSID).²²

Other legal changes affected very few households. A small group of households experienced the transition into unilateral divorce as equitable distributions states (12 households in the NLSW and 87 households in the PSID): unilateral divorce usually preceded property division reforms. Finally, only a few households adopted community property during the

²²This group includes those states in which the two legal reforms occurred in two subsequent years.

sample period, since Wisconsin was the only state that changed from an equitable distribution system to a community property regime in 1986. Such observations are insufficient to provide accurate data for such a quasi-experiment; thus, they will not be used for causal interpretation.

In the next subsection, I analyze the impact of this policy variation on the accumulation of assets and the labor force participation of women.

4.4 Regression analysis

The dynamic model described in Section (3) does not provide a closed-form solution. Nevertheless, it provides a framework to interpret the effects of divorce laws reforms on the endogenous variables of the model, such as wealth accumulation or female labor supply, which I examine below.

4.4.1 Household wealth

To examine the impact of divorce laws on couples' accumulation of assets, I estimate the following equation, where i denotes household, t denotes year and s the state of residence:

$$\begin{aligned} assets_{i,s,t} = & \beta_1 Unilateral_{s,t} + \beta_2 (Unilateral \cdot Com.Prop_{s,t}) \\ & + \beta_3 (Unilateral \cdot Eq.Distr_{s,t}) + \beta_4 Eq.Distr_{s,t} + \beta_5 Com.Prop_{s,t} \\ & + \gamma' Z_{i,t} + \delta_t + f_i + c_s + \epsilon_{i,s,t}. \end{aligned} \tag{5}$$

The dependent variable *assets* represents the total net assets of married couples, reported in real 1990 dollars. Assets are measured in levels, to include households with net debt (negative assets).²³ The vector Z contains a set of controls for spouses' age, years since marriage and family structure; δ_t denote year fixed effects; c_s state fixed effects and f_i household fixed effects.

Because I restrict the sample to couples married before the reforms, it is important to control for life-cycle effects and for the duration of the marriage. Such controls avoid mechanically attributing to divorce laws the impact of this feature of the sample; namely, that couples are included in the sample at different stages of their life-cycle depending on the timing of the reforms. When information about the duration of marriage (*Years married*) is not available, I use the year of birth, the wife's education, the number of children, the household income and the wife's race to predict the year of marriage (*Imputed years married*).

²³Because this analysis is conducted on a sample of married samples, I consider the possibility that the results may be driven by non-random attrition due to diverse characteristics of divorcing couples across legal regimes. I use Inverse Probability Weighting to ensure that this is not the case (Appendix D.2)

I consider a vector of property division and grounds for divorce regimes. The excluded category is a title-based mutual consent system. What do these reduced form coefficients tell us about the forces influencing household behavior in this model? I summarize such forces, the mapping from the structural model to the reduced-form estimates, in Table 2. Coefficient β_1 associated with the dependent variable *Unilateral* captures the effect of unilateral divorce with respect to mutual consent divorce in title-based states.²⁴ According to the model, the channels through which unilateral divorce affects household saving behavior in title-based states are common to *all property regimes*. In fact, β_1 captures the effect that is due to consumption smoothing against the increased risk of losing the marriage surplus (economies of scale) and the effect due to the possibility of re-bargaining on the divorce outside option based on spouses' labor income.

Coefficients β_2 (*Uni · Com.Prop.*) and β_3 (*Uni · Eq.Distr.*) capture the *additional* effect of unilateral divorce in community property and equitable distribution states beyond the effect described by β_1 (see Table 2). Thus, these coefficients capture the impact of unilateral divorce in states where courts divide assets disregarding the title to the property, beyond the impact that is observed in title-based states. This effect corresponds to three mechanisms in the model. First, it captures the effect due to the change in individual returns on assets that occurs when unilateral divorce is introduced in these property division regimes. Second, it also captures the effect due to household renegotiation when spouses' outside options in divorce are affected by property division laws. Third, if one spouse has a high preference for marriage, it may be optimal for the household to lower the outside option of the spouse who prefers divorce by dissaving and thus by increasing the commitment to the marriage, especially if the spouse with high ξ^j has also a large weight. It is impossible to separately

²⁴Consider the equation that compares the impact of all the possible combinations of divorce laws on outcome y :

$$\begin{aligned}
y_{i,t} = & \alpha_0 + \alpha_1 (Mutual_{s,t} \cdot Title_{s,t}) + \alpha_2 (Mutual_{s,t} \cdot Com.Prop_{s,t}) + \alpha_3 (Mutual_{s,t} \cdot Eq.Distr_{s,t}) \\
& + \alpha_4 (Unilateral_{s,t} \cdot Title_{s,t}) + \alpha_5 (Unilateral_{s,t} \cdot Com.Prop_{s,t}) + \alpha_6 (Unilateral_{s,t} \cdot Eq.Distr_{s,t}) \\
& + \gamma' Z_{i,t} + \delta_t + f_i + \epsilon_{i,t}.
\end{aligned}$$

The coefficients of this equation are not all identified as the six divorce law combinations are collinear. The equation can be rewritten as Equation (5), where β_1 represents the difference between mutual consent and unilateral divorce in a title regime (thus $\alpha_4 - \alpha_1$); β_4 is the difference between equitable distribution and title-based states again in mutual consent ($\alpha_3 - \alpha_1$) and β_5 represents the difference between community property and title-based mutual states in mutual consent ($\alpha_2 - \alpha_1$). The coefficient β_2 represents the difference between the effect of the introduction of unilateral divorce in a community property state and in a title-based state: $\beta_2 = (\alpha_5 - \alpha_2) - (\alpha_4 - \alpha_1)$. Similarly, for equitable distribution,

$$\beta_3 = (\alpha_6 - \alpha_3) - (\alpha_4 - \alpha_1) = (\alpha_6 - \alpha_4) - (\alpha_3 - \alpha_1);$$

thus, it also captures the *difference* between the effect of the introduction of equitable distribution in unilateral divorce states and in mutual consent states. The excluded category is thus *Mutual · Title*, which is identified by the fixed-effects with the constant term α_0 .

identify the magnitude of these channels.

Furthermore, in the model the difference between β_3 and β_2 captures the effect of uncertainty in the allocation of assets upon divorce, since in equitable distribution states judges have more discretion in the allocation of property.

Table 2: **Interpretation of Coefficients**

Coefficient	Channels from the model
β_1	Smoothing of economies of scale, renegotiation on income
β_2	Income effect, substitution effect, renegotiation on divorce assets
β_3	β_2 +Uncertainty
β_4	Income effect and substitution effect with divorce transfers
β_5	<i>No quasi-experimental variation</i>

Coefficient β_4 (*Eq.Distr.*) measures the average difference in wealth due to the introduction of equitable distribution in title-based states in mutual consent regimes. The introduction of equitable distribution in unilateral divorce states is also captured by the sum of coefficients β_3 and β_4 . What is statistically significant, however, is the *difference* between the introduction of equitable distribution in unilateral divorce and mutual consent divorce (β_3). In the model, such difference is due to the interaction between equitable distribution with the possibility of renegotiation and the risk that the secondary earner obtains divorce without the consent of the primary earner. This phenomenon leads to a strong income effect from of the primary earner. In the model, the introduction of equitable distribution has three principal effects on households: it affects spouses' returns on saving, it may change their outside option in addition to introducing uncertainty about the division of assets. These effects are captured by the coefficients of Equation (5), though it is impossible to identify them separately using data from quasi-experiments.

Finally, coefficient β_5 (*Com.Prop.*) measures the average difference in assets between title-based and community property states in mutual consent regimes. Since it is identified by the few households that moved from a title-based state to a community property state between 1967 and 1971 in the NLSW dataset and by no quasi-experimental variation, β_5 has no plausible causal interpretation.²⁵

Table 3 reports the results of the estimation of Equation (5) using fixed-effect OLS regressions for different specifications. Column 3 includes age dummies for the wife, children dummies, year fixed-effects, individual fixed effects state fixed effects and a polynomial in

²⁵As explained above, changes in the state of residence are not measured after 1971. Furthermore, only Wisconsin introduced community property in this sample, in 1986, following the introduction of unilateral divorce.

the years of marriage. Column 2 controls for a polynomial in the husband's age, which is missing for some households. Column 6 includes the imputed measure of years of marriage for those couples that have a missing value in the *Years married* variable.

The coefficient β_1 , which represents the effect of unilateral divorce in title property states, is equal to -5,853 (Column 1) and is not statistically significant. This finding suggests that the pure consumption smoothing effect driven by the introduction of unilateral divorce may not have had a relevant impact on household saving behavior.

In contrast, coefficients β_2 and β_3 are equal to 17,535 and 15,199 real dollars (corresponding to 25% and 22% of average assets) and are statistically significant at the 5% level, suggesting that the *additional effect* of unilateral divorce in equitable distribution and community property states is relevant. The average increase in household assets in community property states and equitable distribution states when unilateral divorce is introduced ($\beta_1 + \beta_2$ and $\beta_1 + \beta_3$) is equal to 11,682 real dollars and 9,346 real dollars respectively, about 16% and 13% of average wealth. The effects of the transition from title-based regimes to equitable distribution (β_4) is equal to -14,687 real dollars but is generally not statistically significant.

Similar results are found from estimating Equation (5) using median regressions (without individual fixed effects), as shown in Appendix D.3. However, the coefficients estimated using median regression are substantially smaller than those obtained from the OLS, suggesting that wealthy households may have a large impact on the OLS coefficients.

The finding that unilateral divorce introduced in community property states encourages household savings more strongly than in title-based states may be interpreted in multiple ways within the model. Two are the candidate explanations, which depend on the distribution of power within the household. If women (secondary earners) had low weight in household decision-making, equitable distribution and community property favored them in a divorce with respect to the marriage allocation. In that case, the increase in asset accumulation is due to the presence of an income effect for the primary earner (i.e. the husband) in the household. Moreover, the introduction of unilateral divorce may have altered the initial distribution of power in the household and thus generated additional savings in favor of the secondary earner. The second, less plausible interpretation is that the equal division of assets grants less money to the secondary earner if she has as much bargaining power as the primary earner. Thus, the household increases asset accumulation to ensure that the secondary earner can smooth the marginal utility of her consumption.

Therefore, to interpret this finding, we first have to know the distribution of power within the household. In Section 5, I will estimate the husbands' Pareto weight, exploiting the results of this section and those of the response of the labor supply of women to divorce law reforms, illustrated in the next section.

Table 3: **Household assets: household fixed effects regressions**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	assets	assets	assets	assets	assets	assets
Unilateral (β_1)	-5,853 (6,788)	-6,375 (6,996)	-3,300 (7,279)	-5,556 (6,839)	-5,959 (6,737)	-5,132 (6,779)
Uni*Com.Pr. (β_2)	17,535 (8,556)	17,192 (8,398)	20,167 (8,626)	17,458 (8,678)	18,118 (8,612)	17,033 (8,248)
Uni*Eq.Distr. (β_3)	15,199 (7,474)	16,149 (7,115)	15,951 (6,602)	14,278 (8,014)	14,573 (7,927)	16,450 (6,528)
Eq.Distr. (β_4)	-14,687 (8,876)	-15,777 (8,794)	-17,576 (10,732)	-14,083 (9,226)	-13,898 (9,166)	-16,359 (9,127)
Com.Pr. (β_5)	14,387 (14,699)	15,854 (14,561)	-192,407 (64,348)	-30,743 (30,922)	13,944 (14,520)	-166,165 (54,886)
P-val $\beta_1 + \beta_2 = 0$	0.034	0.046	0.001	0.039	0.034	0.018
P-val $\beta_1 + \beta_3 = 0$	0.265	0.223	0.142	0.337	0.333	0.164
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Wife age dummies	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	No	No	Yes	Yes	No	No
Polyn in husband age (2 dg.)	No	Yes	No	No	No	No
Children dummies	Yes	Yes	Yes	No	No	Yes
Polyn yrs. married (5 dg.)	No	No	Yes	No	No	No
Imputed polyn yrs. married	No	No	No	No	No	Yes
Observations	15,399	14,896	12,022	15,399	15,399	15,063
Individual fixed effects	4,538	4,363	3,516	4,538	4,538	4,502

Standard errors in parentheses,
clustered at the state level

Note: Data from the NLS of Young and Mature Women. Sample of couples married before legal reforms. Dependent variable is real total family net assets. Excluded category for divorce laws: title-based mutual consent regime.

4.4.2 Female employment

As discussed in Section 3, female employment is another variable that is likely to be affected by divorce laws. To analyze the impact of the legal regime on the female labor supply, I estimate the following equation using linear fixed effects probability models and

random-effects logit regressions:

$$\begin{aligned}
 P(\text{employment}_{i,s,t}) = & \rho_1 \text{Unilateral} + \rho_2 (\text{Unilateral} \cdot \text{Com.Prop.}_{s,t}) \\
 & + \rho_3 (\text{Unilateral} \cdot \text{Eq.Distr.}_{s,t}) + \rho_4 \text{Eq.Distr.}_{s,t} + \rho_5 \text{Com.Prop.}_{s,t} \\
 & + \gamma' Z_{i,t} + \delta_t + f_i + s_s,
 \end{aligned} \tag{6}$$

where *employment* is a variable that takes value 1 if the woman is employed and 0 otherwise. This equation is analogous to Equation (5). Table 4 summarizes the theoretical forces that would affect the employment of women when divorce laws change.

Table 4: **Interpretation of Coefficients**

Coefficient	Channels from the model
ρ_1	Self-insurance by accumulation of human capital; Renegotiation on income and preference shocks
ρ_2	Additional self-insurance by accumulation of human capital; Renegotiation based on divorce assets
ρ_3	$\beta_2 + \text{Uncertainty}$
ρ_4	Insurance provided by divorce assets
ρ_5	<i>No quasi-experimental variation</i>

The estimation of Equation (6) suggests that unilateral divorce generally has a slightly negative, but statistically insignificant, effect on female employment. However, in community property states women employment declines by 5.8 percentage points when unilateral divorce is introduced; the effect is statistically significant at the 1% level (Table 5). This finding is robust to controlling for the number of children in the household (Columns 1, 2, 5, 6 and 7), for the time elapsed since marriage (Columns 2, 5, 7 and 10) and for state fixed effects (Columns 2, 3, 5, 7 and 10).

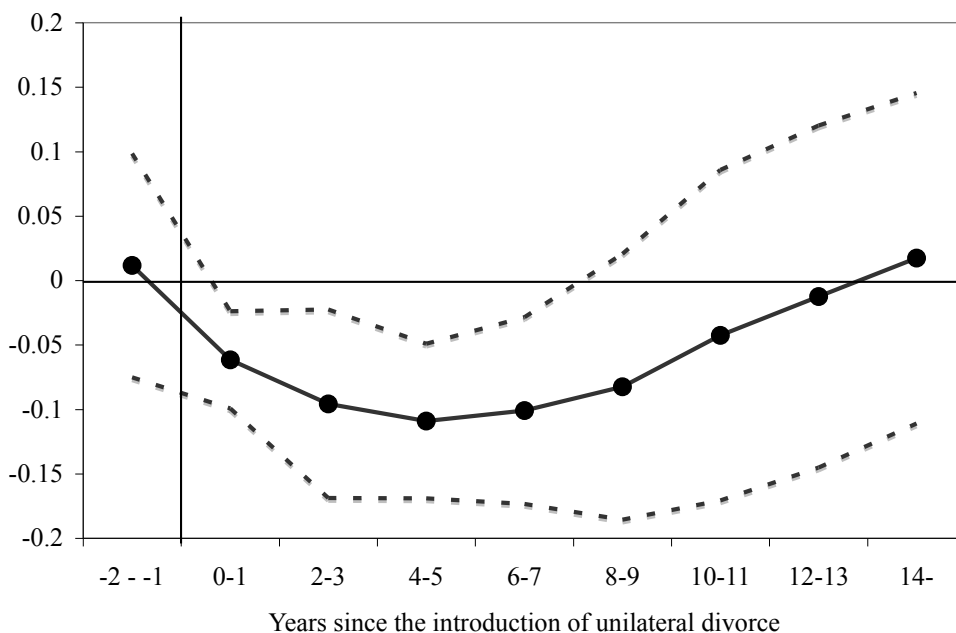
Table 5 also reports the results of estimating Equation (6) using random-effects logit. This estimation method leads to results similar to OLS, but shows that unilateral divorce may have a positive and statistically significant effect in lowering female employment in equitable distribution states as well.

I examine community property states and estimate the dynamic effect of the introduction

of unilateral divorce controlling for linear and quadratic pre-existing trends:

$$\begin{aligned}
 employment_{i,t} = & a_{-1}I\{1 \text{ year before unilateral divorce}\}_{s,t} \\
 & + \sum_{\tau=0(2)}^{14+} a_{\tau}I\{\tau \text{ or } \tau + 1 \text{ years since unilateral divorce}\}_{s,t} \\
 & + \gamma'Z_{i,t} + \delta_t + f_i + c_s + c_s \cdot t + c_s \cdot t^2 + \epsilon_{i,t}
 \end{aligned}$$

Figure 1: **Dynamic response of female employment to the introduction of unilateral divorce in community property states**



Note: Data from PSID. Sample of couples married before legal reforms. Controls Z are age dummies, number of children dummies and a 5-th degree polynomial in years married.

As indicated in Figure (1), community property states experience a sudden reduction in female employment immediately after the introduction of unilateral divorce, whereas the coefficient for the year before the reform is positive and is statistically insignificant.

Gray (1998) also found that the introduction of unilateral divorce had a differential effect on the labor supply of women, depending on the underlying property distribution, but comes to different conclusions, suggesting that women with more power in their household may be working *more*. His results have been questioned by Stevenson (2007). While Gray finds that unilateral divorce increases female participation in community property states, Stevenson concludes that property division regimes do not affect female labor participation, which always increases with unilateral divorce. My approach in this section differs significantly from previous work on various dimensions. First, I only examine the effect on couples

married *before* legal reforms, excluding any potential effect that divorce laws may have on household formation. Second, I use an updated classification of divorce law reforms: both samples in Gray (1998) and Stevenson (2007) refer to 17 states that were title-based for the entire duration of the panel, whereas I include the transitions of all these states into equitable distribution regimes. Gray's analysis ends in 1980, the year in which many large states, including Pennsylvania and New York, transitioned into the new equitable distribution regime. Third, this exercise uses yearly data, which allows identifying a temporary drop in female employment which would be difficult to detect using decennial data as in the previous studies.

My findings suggest that unilateral divorce may have increased women's bargaining power in those states in which courts were awarding them 50% of the assets in divorce. This supports the hypothesis that women's power was low enough that an equal division rule *improved* their condition, thus granting them more bargaining power in the family through a better divorce outside option compared to the initial marriage allocation. Moreover, the additional assets awarded by courts reduced women's need for accumulation of human capital as self-insurance against the risk of loss of consumption in the event of a divorce. The decrease in female labor supply with unilateral divorce in community property states will be an identifying moment of my structural estimation exercise.

An analysis of hours worked by men lead to results with an opposite sign to what observed in the labor supply of women: men slightly increase their labor supply when unilateral divorce is introduced in community property states (Appendix D.1). This finding provides additional evidence that supports the hypothesis that the introduction of unilateral divorce in community property states resulted in a transfer of bargaining power from husbands to wives.

Table 5: **Employment of Ever-Married Women: Linear Probability Model (LP) and Random-effect Logit Regressions (REL)**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	empl.	empl.	empl.	empl.	empl.	empl.	empl.	empl.	empl.	empl.
	LP	LP	LP	LP	LP	REL	REL	REL	REL	REL
Unilateral (ρ_1)	-0.031 (0.033)	-0.039 (0.040)	-0.038 (0.038)	-0.031 (0.034)	-0.045 (0.037)	-0.153 (0.108)	-0.200 (0.155)	-0.177 (0.136)	-0.154 (0.108)	-0.233 (0.142)
Uni.Com.Prop. (ρ_2)	-0.010 (0.036)	-0.014 (0.040)	-0.020 (0.041)	-0.008 (0.037)	-0.013 (0.039)	0.032 (0.145)	-0.206 (0.198)	-0.264 (0.170)	0.040 (0.144)	-0.199 (0.176)
Uni*Eq.Distr. (ρ_3)	0.004 (0.037)	-0.019 (0.045)	-0.001 (0.039)	0.002 (0.038)	-0.009 (0.040)	-0.030 (0.106)	-0.155 (0.120)	-0.072 (0.108)	-0.045 (0.105)	-0.101 (0.115)
Eq.Distr. (ρ_4)	-0.004 (0.016)	0.001 (0.018)	-0.004 (0.015)	-0.003 (0.015)	0.001 (0.017)	0.018 (0.050)	0.034 (0.056)	-0.010 (0.051)	0.015 (0.050)	0.045 (0.054)
Com.Prop. (ρ_5)	0.024 (0.022)	0.124 (0.052)	0.140 (0.045)	0.021 (0.024)	0.129 (0.0514)	0.134 (0.112)	1.091 (1.192)	1.456 (1.193)	0.108 (0.112)	1.370 (1.177)
P-value $\rho_1 + \rho_2 = 0$	0.024	0.000	0.002	0.035	0.001	0.260	0.006	0.000	0.288	0.001
P-value $\rho_1 + \rho_3 = 0$	0.309	0.123	0.262	0.272	0.134	0.022	0.006	0.030	0.012	0.006
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effect	No	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes
Children dummies	Yes	Yes	No	No	Yes	Yes	Yes	No	No	Yes
Polyn yrs. married (5 dg.)	No	Yes	No	No	No	No	Yes	No	No	No
Polyn imputed yrs. marr.	No	No	No	No	Yes	No	No	No	No	Yes
Observations	52,223	42,844	52,223	52,223	48,696	52,223	42,844	52,223	52,223	48,696
Individual effects	3,858	2,688	3,858	3,858	3,824	3,858	2,688	3,858	3,858	3,824

Standard errors in parentheses, clustered at the state level (col. 1-5)

Note: Data from the PSID. Sample of couples married before legal reforms and divorced or separated women. Dependent variable is female employment status. Excluded category for divorce laws: title-based mutual consent regime.

These results are compatible with those found in Chiappori *et al.* (2002), who estimate the labor supply for a cross-section of couples in the PSID: in their sample, the female labor supply is lower in community property states than in non-community property states. Similarly, Kapan (2009) reports a decrease in the women’s labor supply in England and Wales following a 2000 House of Lords decision that entitled women to a larger share of household assets upon divorce. The quasi-experiment that I examine is different, since I observe both the introduction of unilateral divorce in community property or title-based states and the introduction of equitable distribution in mutual consent or unilateral divorce states.

5 Structural estimation

Divorce law reforms were found to have two main effects on the outcomes analyzed in the Section 4. The presence of both equitable distribution or community property *and* unilateral divorce is associated with 19% more assets and 5.5 percentage points lower female employment than with mutual consent divorce. However, the same changes are not observed when unilateral divorce was introduced in title-based states. These findings cannot be explained by changes in differential sorting in or out of marriage or by the presence of pre-existing trends, as shown in Appendix D.

To interpret these results and compute their welfare effects, I estimate the key structural parameters of this model, including:

- a) the Pareto weight of the husband θ ;
- b) the variance of the shocks to the taste for marriage σ_ϵ^2 ;
- c) the utility cost of working ψ .

In a first stage, I estimate the parameters of the income process using moments of spouses’ joint income distribution from the PSID. I will account for the selection of women into the workforce using as variables excluded from the wage equation the same variables that operate in the structural model, namely the divorce laws, which are exogenous to offered wages in this model. These parameters are the variance of each spouse’s permanent income shocks $\sigma_{\zeta^j}^2$ for $j = H, W$, the covariance of such shocks $\sigma_{\zeta^H \zeta^W}$, the returns to labor market experience for each spouses λ_0^j and λ_1^j , the depreciation rate of non-participation for women δ and the offer wage gender gap at the beginning of the career. Although it would be ideal to estimate the income process parameters together with the other structural parameters, this two-step procedure makes the estimation computationally more tractable (as in Gourinchas and Parker 2002 and in De Nardi, French and Jones 2010).

Following the estimation of the labor income parameters, I select a set of exogenous parameters as described in Table 7, to simulate the model and estimate the remaining parameters $\sigma_\epsilon^2, \psi, \theta$.

5.1 Estimation of spouses' income processes

The estimation of spouses' income processes will allow the model to account for spouses' wage differential, its evolution over the life cycle and for spouses' incentives to share income risk. I first estimate the parameters of the income process using spouses' income data from the PSID.²⁶ Identification of such parameters is described in detail in Appendix E. I estimate the income process parameters for men on the sample of all married men. I estimate the parameters of women income process based only on a sample of working women, using divorce laws as variables excluded from wage equation and included in the participation equation, which corrects for the selection of women in the labor force.

I estimate the parameters using non-linear least squares (Table 6). Four facts are noteworthy about this exercise. First of all, the estimated offer wage gender ratio at age 23 is 81% (that is, women earn on average 81% of men's income when they enter the labor market). Second, the rate of income growth for men is initially more rapid than the growth rate for women: about 9.7% per year (at the beginning of their career, but decreasing with age) for men and 6.5% for those women who always participate. However, the wage gap first grows and then shrinks over the life-cycle, due to a lower λ_1 for men. This finding might reflect the fact that women suffer a wage penalty when they have children (Miller, 2009), which generates a wage gender gap that initially increases over the life cycle and then decreases when the reproductive cycle ends. Third, based on these estimated variances, the income of men is more variable than that of women. These results are easily explained by the lower wage risk of sectors that are more likely to employ women (e.g. health and education and public sector jobs) versus sectors with larger proportion of men (e.g. construction, agriculture, finance). Finally, the estimates reveal a *positive*, but low, correlation of shocks to the permanent wage of the husband and the wife (about 15%).

My estimate for the returns to labor market experience for women λ_0^W is larger than others reported in the literature (Eckstein and Wolpin 1989, Attanasio *et al* 2008); however, the profile of the wages of women is more concave (λ_1^W is smaller than in the literature). Such estimates imply that the average yearly return to experience over 30 years of career is 3.4%, compared to 2.7% in Attanasio *et al.* (2008). However, my estimates lie between those of Attanasio *et al.* (2009) and of Olivetti (2006). Olivetti estimates the returns to a year of full-time work in a 3% to 5% range. The estimate for the depreciation rate δ

²⁶See Meghir and Pistaferri (2004) and Low, Meghir and Pistaferri (2010) for examples of the estimation of men's income process parameters.

is roughly comparable to the 7.4% calibrated in Attanasio *et al.* (2008). The values for the variance of income shocks for men are larger than those reported the literature (Low, Meghir and Pistaferri 2010), but they are estimated using data that features a large degree of heterogeneity that the model does not otherwise reflect, such as heterogeneity in the state of residence or in educational attainment.

Table 6: **Parameters of the income process**

Parameter	Symbol	Estimate	Std. error
W's returns to experience (constant)	λ_0^W	0.065	(0.045)
W's returns to experience (age)	λ_1^W	-0.002	(0.000)
W's human capital depreciation	δ	0.064	(0.021)
H's returns to experience (constant)	λ_0^H	0.097	(0.009)
H's returns to experience (age)	λ_1^H	-0.004	(0.0003)
Initial offer wage gender gap	$\frac{y_1^W}{y_1^H}$	0.805	(0.068)
Variance of W's income shock	$\sigma_{\zeta^W}^2$	0.023	(0.019)
Variance of H's income shock	$\sigma_{\zeta^H}^2$	0.067	(0.017)
Covariance of H's and W's income shocks	$\sigma_{\zeta^H \zeta^W}$	0.006	(0.002)

Note: Standard errors for parameters λ_0^W , λ_1^W , λ_0^H and λ_1^H computed by maximum-likelihood. Standard errors for parameters $\sigma_{\zeta^H}^2$, $\sigma_{\zeta^W}^2$, $\sigma_{\zeta^H \zeta^W}$ and δ (are estimated in two-stages) computed by bootstrap to account for first-stage estimation errors.

5.2 Estimation method: indirect inference

I use indirect inference (Gourieroux *et al.* 1993) to estimate the key parameters of the model, exploiting the variation provided by the divorce law reforms as the source of identification. Indirect inference estimates the structural parameters using an *auxiliary model*. The estimation of the auxiliary model will deliver a vector of auxiliary coefficients $\hat{\phi}$.

I solve the dynamic model under mutual consent divorce for vectors of possible values of structural parameters $\Pi = (\sigma_\epsilon^2 \psi \theta)'$, given initial values of the state variables and the realization of the income and taste shocks.

I draw the shocks $\{\epsilon_{i,t}^j, \zeta_{i,t}^j\}_{t=1, \dots, T-R}^{i=1, \dots, I}$ and obtain the vector of states $\{\xi_{i,t}^j, y_{i,t}^j\}_{t=1, \dots, T-R}^{i=1, \dots, I}$ for $I = 10,000$ households, for spouses $j = H, W$ and for $T - R = 14$ periods and use the policy functions to obtain the simulated patterns for household assets, female labor participation and marital status before retirement.²⁷

²⁷I focus on the pre-retirement period for two reasons. First, because my estimates in Section 4 are based on a sample of non-retired people. Second, since attrition for death in my sample is higher after age 65 and it is not taken into account by the model, excluding retired people minimizes the relevance of attrition.

I then simulate the introduction of unilateral divorce at various stages of the life cycle that match the patterns observed in the data. I simulate the post-reform behavior of household assets, female labor participation and divorce. The underlying assumption is that in the U.S. spouses do not change state in response to or in anticipation of divorce law reforms. This hypothesis appears especially plausible if one considers that most states in the U.S. have long residency requirements before spouses can divorce in the state where they live.

I estimate the same auxiliary model on the simulated data and obtain a vector of coefficients $\phi_{sim}(\Pi)$. The optimal choice of $\hat{\Pi}$ minimizes the difference between auxiliary parameters estimated on the actual data and auxiliary parameters estimated on the simulated data.

Thus, I choose $\hat{\Pi} = (\hat{\sigma}_\epsilon^2 \quad \hat{\psi} \quad \hat{\theta})'$ such that:

$$\hat{\Pi} = \text{Argmin}_{\Pi} (\hat{\phi} - \phi_{sim}(\Pi))G^{-1}(\hat{\phi} - \phi_{sim}(\Pi))' \quad (7)$$

where G is a weighting matrix.²⁸

As auxiliary model, I use a difference-in-differences estimator for the introduction of unilateral divorce in states at different points in time. To facilitate the computational burden, I estimate the parameters on the sample living in community property states, and use the other regimes for post-estimation validation.

The auxiliary parameters are $\{\phi_1, \phi_2, \phi_3, \phi_4\}$ from the model below.

1) Household asset response to unilateral divorce

$$\begin{aligned} assets_{i,s,t} &= \beta Unilateral_{s,t} + \gamma' Z_{i,t} + \delta_t + f_i + v_{1,i,s,t} \\ \phi_1 &= \frac{\beta}{\text{average assets}} \end{aligned} \quad (8)$$

2) FLP response to unilateral divorce

$$\begin{aligned} employment_{i,s,t} &= \rho Unilateral_{s,t} + \gamma' Z_{i,t} + \delta_t + f_i + v_{2,i,s,t} \\ \phi_2 &= \rho \end{aligned} \quad (9)$$

3) Female employment rate at baseline

$$employment_{i,s,t} = \phi_3 + v_{3,i,s,t} \quad (10)$$

²⁸I set the weighting matrix to be equal to the variance-covariance matrix of the estimated parameters of the auxiliary model: $\hat{G} = \text{Var}[\hat{\phi}]$.

4) Divorce rate at baseline

$$ever\ divorced_{i,s} = \phi_4 + v_{4,i,s} \quad (11)$$

Equations (8) and (9) are analogous to the reduced-form Equations (5) and (6) from Section 4, estimated on the subsample of households living in community property states.²⁹ They are meant to capture the response of household asset accumulation and of female employment to the introduction of unilateral divorce. As we will see, Equations (10) and (11) provide a straightforward identification for the utility cost of working and the risk of divorce respectively.

The goal is to find the appropriate values of σ_e^2 , ψ and θ that match the following facts from the data about community property states:

- a) the relative change in household assets when unilateral divorce is introduced (19%);
- b) the response of female participation when unilateral divorce is introduced (5.5 percentage points);
- c) the average female participation rate in mutual consent regimes of the pooled sample of women between 23 and 64 (51%);
- d) the average divorce rate in mutual consent regimes of the pooled sample of couples where women are between 23 and 64 (21%).

I estimate Equations (8-11) on the PSID and NLSW data, controlling for state fixed-effects and year fixed-effects. To simulate the model, I first need to determine a set of exogenous parameters, in addition to the parameters of the income process.

5.3 Exogenous parameters

Table 7 presents the pre-set parameters of the model. To simplify computations, I set each period to correspond to 3 years of life. Spouses have the same life cycle: they are 23

²⁹For example, the asset equation

$$assets_{i,t} = \beta_1 Unilateral_{s,t} + \beta_2 (Unilateral \cdot Com.Prop_{s,t}) + \beta_3 (Unilateral \cdot Eq.Distr_{s,t}) + \beta_4 Eq.Distr_{s,t} + \beta_5 Com.Prop_{s,t} + \gamma' Z_{i,t} + \delta_t + f_i + \epsilon_{i,t}$$

when $Com.Prop_s = 1$ becomes

$$assets_{i,t} = \beta Unilateral_{s,t} + \gamma' Z_{i,t} + \delta_t + f_i + v_{i,t}$$

years old at time 1; they retire at 62 at time 14 and die with certainty at the end of time 18, at age 77.

I calibrate the economies of scale parameter ρ to match the McClements scale, according to which a single individual spends 61% the amount of a childless couple to achieve the same level of consumption. Such a scale represents an intermediate value for the magnitude of economies of scale in the family estimated in the literature (Fernandez-Villaverde and Krueger 2007). This calibration leads to a parameter value of $\rho = 1.4023$.³⁰ The McClements scale is also used to calculate the consumption of the children as a fraction of their parents' consumption.³¹

Parameters from the utility function and from spouses' income profiles are from Attanasio *et al.* (2008). The relative risk aversion γ is set to 1.5. I set the market rate of return on assets r to 0.03 and the discount factor β to 0.98.

I use data from the National Longitudinal Survey of Young and Mature Women (described in subsection 4.1) to calibrate the number of children (two) and the age at childbearing (average age in the data is 26 and 29) and use CEX data for childcare expenditure following Attanasio *et al.* (2008).

Table 7: Exogenous parameters of the model

Parameter	Value	Reference
Initial age	23	
Years in each period	3	
Age at death	82	
Retirement age	65	
Economies of scale in couple (ρ)	1.4023	McClements scale
Economies of scale for children ($e(k)$)		McClements scale
RRA (γ)	1.5	Attanasio <i>et al.</i> (2008)
Market returns on assets (r)	0.03	
Discount factor (β)	0.98	Attanasio <i>et al.</i> (2008)
Retirement income	1992 Soc.Sec. rules	Casanova (2009)
W's age at childbearing	26 and 29	NLSW
Childcare costs (g^k)		CEX

³⁰Based on to the McClements scale, $0.61z = c^j$. Under the assumption that spouses have identical consumption levels, the household inverse production function becomes $z = 2^{\frac{1}{\rho}} c^j$. Thus $\rho = \frac{\log(2)}{\log(\frac{1}{0.61})} = 1.4023$. I also consider robustness checks with alternative values for the household economies of scale indicated in Fernandez-Villaverde and Krueger (2007).

³¹A couple with a child aged 0-1 consumes 109% of the consumption of a childless couple. The additional fraction is 18% for each child between 2 and 4 years, 21% between 5 and 7 years, 23% between and 8 and 10, 25% between 11 and 12, 27% between 13 and 15 and 38% between 16 and 18 years.

5.4 Identification

The choice of the auxiliary parameters allows a rather transparent identification of the structural parameters of the model, as described below. The parameters are identified by the combination of *all* the auxiliary parameters. However, for some parameters, the theoretical link between the structural model and the auxiliary model is particularly strong.

5.4.1 The utility cost of working parameter ψ

The primary role of the utility cost of participation (ψ) in the model is determining a woman's labor market participation decision. That is, *ceteris paribus* a woman is more likely to participate in the labor market the lower her utility cost of working. Thus, the average female employment rate the parameter of the auxiliary model that provides crucial identification for the structural parameter ψ (Figure 2 panel a).

5.4.2 The variance of the preference shock parameter σ_ϵ^2

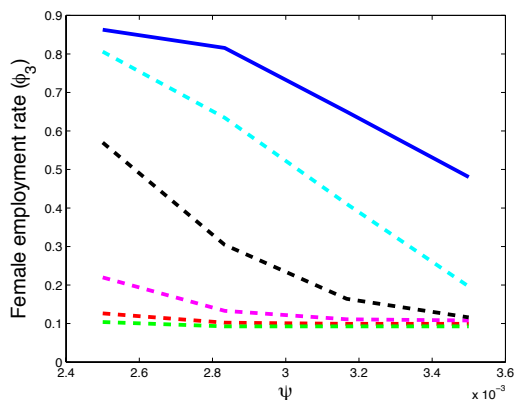
Similarly, the variance of the preference shock parameter (σ_ϵ^2) influences the likelihood of divorce. For low values of σ_ϵ^2 , divorce is an unlikely phenomenon, since few spouses would receive negative shocks ξ^j sufficiently high to counteract the positive effect of marriage that derives from the economies of scale. As σ_ϵ^2 increases, the likelihood that a spouse would prefer divorce increases. Therefore, identification of parameters σ_ϵ^2 stems from the average divorce rate in mutual consent states (Figure 2 Panel b).

5.4.3 The husbands' Pareto weight θ

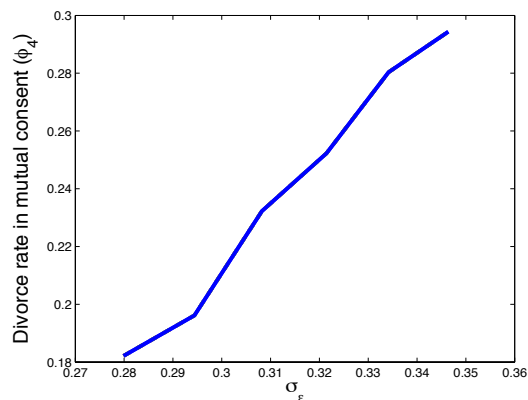
The parameter θ is crucial in this model, since it determines spouses' sharing rule of resources within marriage and their incentives to work and to save in response to divorce law reforms. Here, the response of spouses' behavior to changes in such laws provides crucial identification for the parameter θ . Specifically, the estimated response of female labor participation to the introduction of unilateral divorce is decreasing in the bargaining power of men for values of θ that are sufficiently large, namely at least larger than $\frac{1}{2}$. If the wife's Pareto weight is not significantly smaller than the Pareto weight of the husband, the introduction of unilateral divorce in community property has little effect on the her labor supply; such an effect would be positive, in that case, because women may want to accumulate human capital in case divorce occurs. On the contrary, for values of θ sufficiently larger than $\frac{1}{2}$ (i.e. when the husband has more decision power) the participation of women drops following the introduction of unilateral divorce. This phenomenon is explained by a transfer of resources (consumption of both good and leisure) from the husband to the wife, driven by the introduction of unilateral divorce: renegotiation is driven by the divorce

outside option, which favors women with respect to their share of resources in marriage. Thus, it follows that the estimated value of θ will need to be sufficiently larger than $\frac{1}{2}$ to match an auxiliary parameter $\phi_2 = -5.5$ percentage points (Figure 2, Panel c).

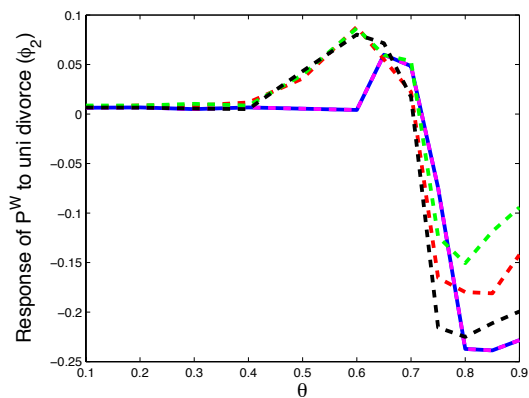
Figure 2: **Identification of the parameters**



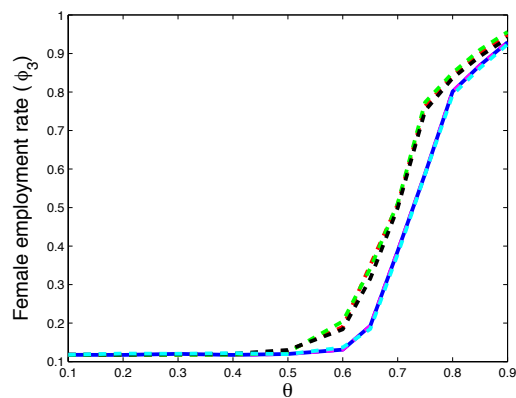
(a) Disutility from participation



(b) Stand. dev. of marriage preference shocks



(c) Husband's Pareto weight



(d) Husband's bargaining weight

Note: Relationship between the parameters of the structural model and the parameters of the auxiliary model are obtained from simulations. The solid line represents the relationship once all other structural parameters are fixed at the optimum. Dotted lines represent the relationships for random values of the other structural parameters.

5.5 Results

Table 8 illustrates the solution to Problem (7).

Table 8: **Estimated parameters**

Parameter	Symbol	Estimate	Std. error
Variance of preference shocks	σ_ϵ^2	0.0914	0.0018
Disutility from labor mkt participation	ψ	0.0033	0.0036
Husbands' Pareto weight	θ	0.75	0.13

The structural estimation exercise indicates that, when unilateral divorce was introduced in the sample, women's weight in household decision was a third of their husband's weight. The estimated disutility of working is equal to 0.0033 and the estimated variance of preference shocks is equal to 0.0914. This corresponds to a baseline participation rate of 59%, which decreases by 7.4 percentage points after the introduction of unilateral divorce (Table 9). The increase in assets after the reform is equal to 25% in the simulations. Finally, the baseline divorce probability in the estimation is equal to 22%.

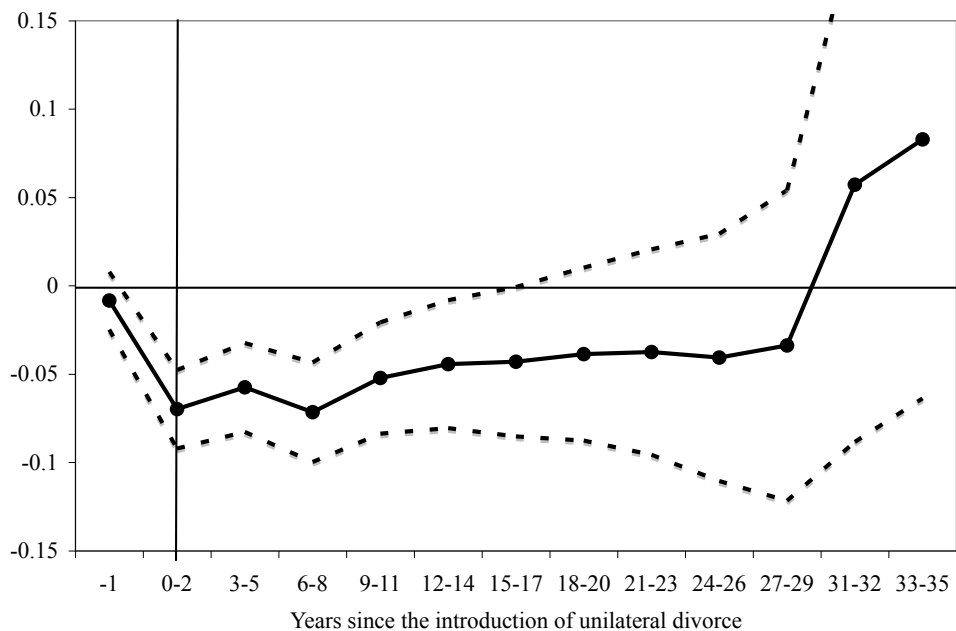
Table 9: **Target and simulated moments**

Moment	Target	Simulated
Effect of uni. divorce on savings in CP	19%	25%
Effect of uni. divorce on participation in CP	-5.5 pcpt	-7.4 pcpt
Baseline participation rate in CP	51%	59%
Baseline divorce probability in CP	21%	22%

The simulations also replicate other facts in the data that are not directly targeted in the estimation. For instance, the overall divorce probability within the first 25 years of divorce for a first marriage is equal to 54% for this time period, according to the National Center for Health Statistics (Bramlett *et al.* 2002). In the simulation, such probability is equal to 53%.

Moreover, the probability of employment of women in the simulations also exhibits a sharp drop following the introduction of unilateral divorce (Figure 3) as we observe in the data (Figure 1). Both in the model and in the data, the effect of the reforms is no longer statistically significant after a few periods. Such pattern is faster in the data (after 13 years) than in the model (after 18 years) and it may be explained by the fact that a large stock of women had binding participation constraints when unilateral divorce was introduced. Thus, they experienced a rapid renegotiation in their favor and a decrease in their employment. After that, subsequent renegotiations and especially retirement may have blurred the initial effect, as suggested by the model.

Figure 3: **Simulated dynamic response of female employment to the introduction of unilateral divorce in community property states**



6 Welfare and counterfactual analysis

Having estimated the structural model, and in particular the intra-household allocation parameters, I can now analyze household welfare and behavior in various economics and legal scenarios.

6.1 The welfare effect of divorce laws

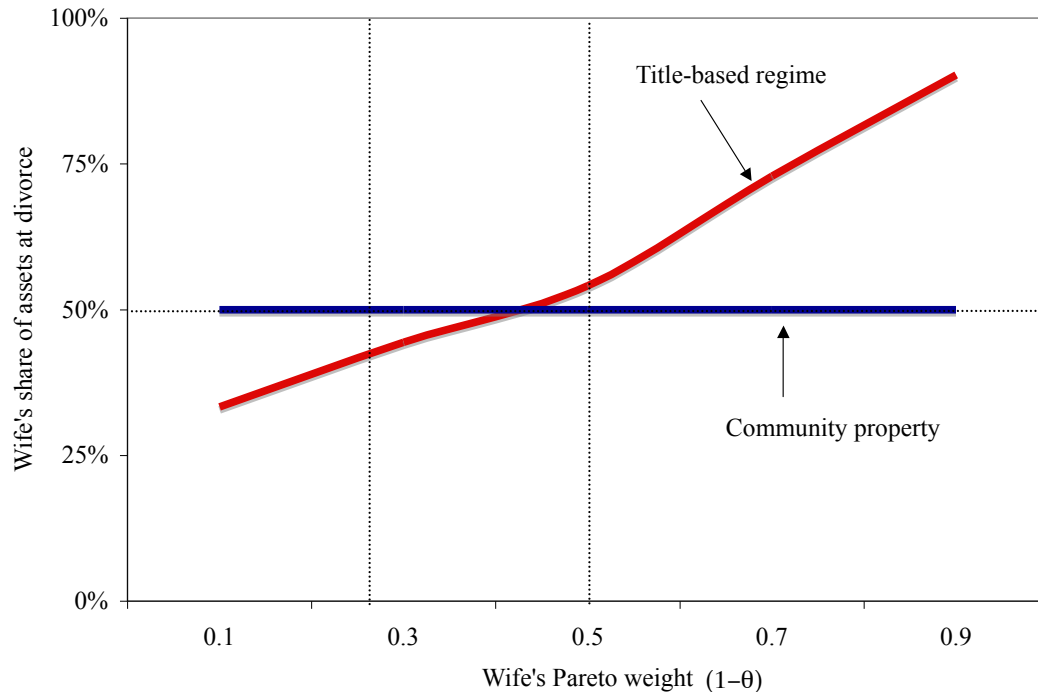
Both the introduction of equitable distribution and of unilateral divorce had an effect on the welfare of secondary earners. The former changed the allocation of resources at divorce, the latter changed the allocation in marriage.

6.1.1 Equal division of assets and the allocation of assets at divorce

I use the estimated structural parameters to compare the effect of community property and equitable distribution on the resources awarded to women in divorce with respect to a title-based regime. This exercise suggests that common property is beneficial to women in divorce, compared to title-based division: with $\theta = 0.75$, women in divorce obtain on average about 35% more assets in a community property regime than in a title-based regime. On the contrary, men receive an average of 15% fewer assets in a divorce in a community property

state than under a title-based regime. This finding is true for all values of θ that are sufficiently high to make the amount of assets in the name of the husband larger than 50% (figure 4). For $\theta = 0.75$, the consumption equivalent of living in a community property state for a woman who just got married (time 1) as opposed to living in a title-based state is equal to 13% of consumption.

Figure 4: **Allocation of assets at divorce by legal regime and husbands' Pareto weight**



6.1.2 Unilateral divorce

The introduction of unilateral divorce *increased* wives' share of resources within the marriage by 4.8 percentage points in community property states, which corresponds to a 8% increase in consumption equivalent. While this change may appear low, it is substantial for those households that did renegotiate, which were only those where one spouse was indifferent between marriage and divorce. This increase in women's share of marital consumption is driven by the fact that in community property state women with low Pareto weight are awarded more resources than they consume in marriage, which contributes to making the divorce option more attractive to them, as well as a viable outside option to marriage.

Interestingly, simulations suggests that fixing the intra-household allocation parameters in a unilateral divorce, as is often assumed in the literature, makes it impossible, at least

within the context of this model, to reproduce the negative response of female employment to the introduction of unilateral divorce that has been documented in the data. However, the model of intra-household allocation with limited commitment (e.g. Ligon 2002, Mazzocco 2007) appears to capture the patterns observed in the data.

6.1.3 Additional evidence and discussion of the welfare effects on women

Other studies support the hypothesis that unilateral divorce may have improved the position of women in their marriage in community property states. For example, unilateral divorce led to a decrease in domestic violence and in the suicide rate among women (Stevenson and Wolfers, 2006). Replicating such an analysis by including a vector of property division law and its interaction with unilateral divorce suggests that these results are uniquely observed in community property states, and, to a lesser extent, in equitable distribution states, but not in title-based states.³² Studies that use state-level data are often unable to separately identify whether the effect of unilateral divorce was due to a change in the behavior of married couples or to a compositional effect, such as a higher likelihood of divorce among couples where women were the subject of domestic violence or were in an generally unfavorable position. My model allows to separately identify these channels, since both selection and renegotiation are modeled, and to show that sorting into divorce is not the only driver of changes in household behavior.

Divorce filing rates provide additional support to the hypothesis that unilateral divorce may have been on average more favorable to women than to men. Women are historically more likely than men to file for divorce in the United States (in about two-thirds of the cases), and have become even more likely to file in the presence of no-fault divorce laws, which are often associated with unilateral divorce (Brinig and Allen 2000).

6.2 Counterfactual experiments

The welfare analysis exercise above suggests that, when women have a low Pareto weight in their household planning problem, the equal division of assets benefits them in a divorce, because they receive more assets. Furthermore, if unilateral divorce is in force, women can exercise the threat of divorce with the additional assets they would obtain in a community

³²I use the same data as in Stevenson and Wolfers 2006 (suicide rate data from *National Center for Health Statistics* and domestic violence data from *Physical Violence in American Families* of 1976 and 1985) and merge with the property division laws described of Appendix table 15 to replicate the specifications in Stevenson's and Wolfer's study and including an interaction between unilateral divorce and property division laws and level effect of property division laws. The results on the female suicide rates are only significant in community property states, those on domestic violence both in community property and equitable distribution states. A lower suicide rate associated with equal division of property has also been found in a study using Canadian data (Adam *et al.* 2003).

property to increase their bargaining power and consume a larger share of household resources during the marriage.

The results of the structural estimation suggest that when unilateral divorce was introduced in the community property states in my sample period, the Pareto weight of women was very low. This leads us to conclude that community property or equitable distribution and unilateral divorce were making women better off when unilateral divorce was introduced.

However, not all women may have such a Pareto weight in their household planning problem. Specifically, it may be argued that new cohorts of women married after these reforms may have higher bargaining power in their households, for example due to the rapid growth of the wages of women in the 1980s and 1990s, both in terms of the gender wage gap (Machado 2009) and of improvements in women’s education and “attachment” to their profession (Goldin 2006). For instance, Knowles (2007) finds that $\theta = 0.66$ in 1970, assuming that the bargaining weight in marriage is the one that equates the gains from the marriage of husband and wife. Accounting for the raise in the wages of women in the subsequent decades, he finds that $\theta = 0.59$ for the 1990s.

In this section, I analyze the welfare effects of removing the default community property in favor of an alternate sharing rule α (share of household assets attributed to the husband in a divorce) that is not necessarily equal to $\frac{1}{2}$. The choice of divorce settlement depends on the Pareto weights at the time of marriage. I also relax the assumption that the offer wage of men and women at age 23 differs, setting the initial offer wage equal, but I still let women experience a gap in the returns to experience with respect to men, as a consequence of a motherhood wage penalty (Miller 2009).

In another counterfactual experiment, I quantify the welfare gains of eliminating uncertainty on the distribution of assets, thus transitioning from an equitable distribution to community property regime.

6.2.1 Choosing a division rule at the time of marriage

In this section, I analyze the welfare implications of allowing couples to choose a division rule α other than $\frac{1}{2}$, which is the one imposed by current community property laws. In particular, I ask what value of α a household would choose at marriage, given the initial distribution of power θ . I solve the problem of the couple in a unilateral divorce regime (since it is the most common regime in the United States) for a discrete vector of values of α and values of θ . I then calculate the division rule α^* that the household would choose, given the initial distribution of power θ at different stages of the marriage. We can interpret α^* at time 1 as the sharing rule that spouses would choose if they could write a prenuptial agreement *without* transaction costs or stigma, and with certainty about its enforcement. Such a division rule solves

$$\text{Argmax}_{\alpha} \quad \theta V_1^{HM}(\alpha, \theta) + (1 - \theta) V_1^{WM}(\alpha, \theta)$$

for a household that gets married at time 1.

I compute the welfare gains from being able to choose α different from $\frac{1}{2}$ as a share Δ of additional consumption that a spouse receives from time 1 to time T to be indifferent between α^* and community property.³³

Table 10: **Choice of division rule**

θ	0.1	0.25	0.5	0.75	0.9
Husband' share of assets α^*	0	0	0.05	0.25	0.45
Welfare gain from avoiding CP	14%	10%	3%	1%	0.01%

Note: Property division rule chose by the household at time of marriage 0. For values of θ that are less or equal to 0.4, the household would prefer to award all of family resources to the non-working wife. Welfare gain from selecting α^* instead of $\alpha = \frac{1}{2}$ expressed as a percentage of additional consumption. In a household where husband and wife have the same weight ($\theta = 0.5$), the welfare gain for the *household* choosing the optimal sharing rule (which in this case gives almost all household assets to the wife) with respect to the community property case of $\alpha = 0.5$ is equivalent to 3% of additional consumption.

Table (10) describes the relationship between the bargaining power of the husband and the optimal property division rule for a grid of values of α . Note that in a household in which men and women are equally weighted in household decision ($\theta = \frac{1}{2}$), intra-household bargaining would lead to choosing a division rule that is *different* from $\frac{1}{2}$ and substantially favors the wife. In a household in which husband and wife have the same weight ($\theta = 0.5$), the welfare gain for the *household* of choosing the optimal sharing rule (which in this case gives almost all household assets to the wife) with respect to the community property case of $\alpha = 0.5$ is equivalent to 4% of additional consumption.

This exercise highlights again the fact that women are favored by the equal division of assets only when they have little bargaining power in their household. Women who are as empowered as their husband but suffer a wage gap with respect to their husband, for example after the birth of children, may be better able to self-insure the marginal utility of their consumption by signing prenuptial agreements. Alternatively, such women would benefit from an individual separate property rights system, which is widespread in several European countries such as Italy, France and Switzerland.³⁴

³³ Δ is computed from:

$$\sum_{t=1}^T \beta^{t-1} u^j((1 + \Delta) \cdot c) - \sum_{t=1}^T \beta^{t-1} u^j(c) = \theta [V_1^H(\alpha^*) - V_1^H(\alpha = \frac{1}{2})] + (1 - \theta) [V_1^W(\alpha^*) - V_1^W(\alpha = \frac{1}{2})].$$

³⁴In Italy, 54% of all couples that were married in 2003 had opted out of the default community property

6.2.2 Eliminating uncertainty about the division of assets

An implication of the presence of uncertainty in the division of assets is that it negatively affects the welfare of risk-averse households. I quantify such welfare loss by comparing the community property regime to an equitable distribution regime where spouses are uncertain about the division of assets, but expect that it would be divided equally. In this example, α^{ED} is uniformly distributed on the interval $[\frac{1}{2}, \frac{2}{3}]$; thus, I allow the two distributions of assets to have the same expected value, but different variance.

I compute the welfare gains that households derive from an elimination of uncertainty in a household where $\theta = 0.5$.³⁵ Such gains are smaller than those deriving from the choice of α , but are still sizable. Assuming that at the time of marriage couples have no assets, eliminating uncertainty in the division of assets is equivalent to giving couples up to 1.5% additional consumption every year, depending on the initial realization of the preference shock. For couples that have relatively high risk of divorce (about 70%) the benefit of certainty in the division of assets is higher (1.89% additional consumption), whereas for those with very positive initial realization of the ξ s, the difference between $V_1(ED)$ and $V_1(CP)$ tends to zero. The benefits of eliminating uncertainty slowly increase in the wealth of the couple. For instance, if at the time of marriage a couple owns 100,000 dollars, the benefits of eliminating uncertainty for couples at high risk of divorce increases up to 1.91%.

These quantitative results depend on the spouses' perceptions about the distribution of α^{ED} . The uniform distribution for α^{ED} assumption represents a high degree of uncertainty, whereas distributions that place higher probability on realizations around $\alpha = \frac{1}{2}$ would lead to even smaller welfare gains from community property.

7 Conclusion

In this paper, I show that spouses' individual property rights have a significant effect on couples' intertemporal behavior during marriage: divorce laws that govern the decision to divorce and the division of property influence both the couples' accumulation of assets and the labor supply of married women.

I use data from the NLSW and the PSID to estimate household responses to divorce

regime and had chosen a title-based system (ISTAT 2006).

³⁵The utility gain is represented by Δ in the following equation:

$$\sum_{t=1}^T \beta^{t-1} u((1 + \Delta) \cdot c) - \sum_{t=1}^T \beta^{t-1} u(c) = V_1(CP) - V_1(ED) \quad \text{for } \tau = 1, \dots, T - R,$$

where $V_1(CP)$ and $V_1(ED)$ are computed for various realization of the preference shocks and at the expected value of the income realizations.

law reforms that occurred in the 1960s, 1970s and 1980s. My regression results suggest that introducing unilateral divorce in states where assets are divided equally is associated with over 20% more assets accumulated compared to when unilateral divorce is introduced in title-based regimes (in which the title of ownership is the only criterion for asset distribution in a divorce settlement). In addition, the labor force participation of women exhibited a sharp but temporary drop, by over 5 percentage points, following the introduction of unilateral divorce.

To interpret these findings and examine the welfare implications of these laws, I build a stochastic dynamic model that incorporates features of the U.S. divorce system. I use the responses obtained from survey data to estimate the key parameters of the model at the time of divorce law reforms, by indirect inference. The structural estimation indicates that women had a lower weight in the household decision function than their husbands when these reforms were enacted. Their weight increased due to the introduction of unilateral divorce and the possibility of renegotiating the intra-household allocation based on the divorce threat-points, when assets are divided equally in divorce. This finding explains why we observe a decline in wives' employment after the introduction of unilateral divorce. Moreover, the increase in the accumulation of assets in community property states is consistent with the presence of an income effect for men, who saved to self-insure against the loss of half of their assets to their wives in case of divorce.

My counterfactual exercise suggests that an equal division of assets only benefits women who have little bargaining power, such as the women in my sample, who married before the divorce law reforms that I examine. However, as women gain equality in their marriage, well-defined property rights in marriage allow them to be better insured against a drop in consumption at divorce, whenever they experience a wage gap or have a longer life horizon than their partners. Despite its centrality in intra-household analysis, we know little about how consumption is allocated in marriage or where the decision power in marriage stands. The role of women in the economy has changed radically in the past decades (Goldin 2002), but how that has affected their position in marriage is still an open question.

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Appendix A

Timing of the property division law reforms and state characteristics

Although a large body of economic literature has documented and exploited the exogenous nature of the introduction of unilateral divorce (among others, Gruber 2004, Stevenson 2007, Gray 1998), no research has shown how the timing of introduction of equitable distribution may be correlated with state-level characteristics and state-level trends. Specifically, I examine here how the timing of the changes relates to the share of women employed in the labor market.

I use data from the *Integrated Public Use Microdata Series* and look at pre-reforms level and changes of female employment from the 1950 and 1960 U.S. censuses. I also examine the correlation between the timing of the reform and the wives' income share of household total income in 1960. None of these variables exhibit a correlation with the timing of the reform (Figure 5).³⁶

³⁶I regress:

$(\text{year of reform-1967})_s = \alpha + \beta \text{Female employment rate in 1960}_s + \epsilon_{1s}$,
the coefficient for β is -8.79 (p-value 0.640) while $\hat{\alpha} = 14.12$ (p-value 0.031).

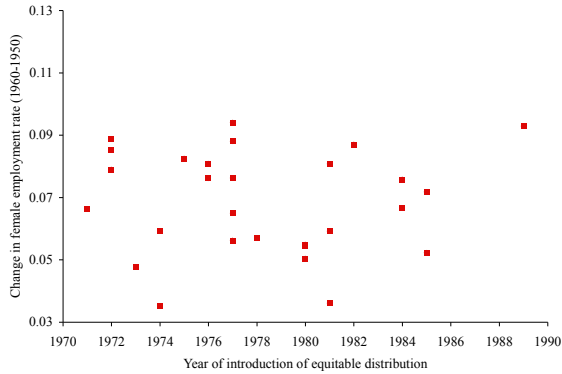
I also regress

$(\text{year of reform-1967})_s = \gamma + \delta(\text{Female employment rate in 1960-Female employment rate in 1950})_s + \epsilon_{2s}$,
the coefficient for δ is -1.417 (p-value 0.979) while $\hat{\gamma} = 11.311$ (p-value 0.007).

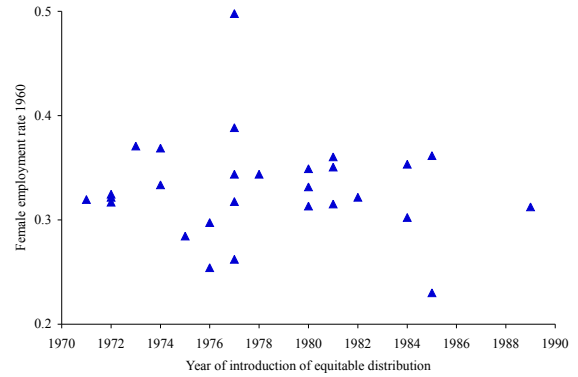
Finally, from

$(\text{year of reform-1967})_s = \zeta + \eta(\text{Share of wives' income in 1960})_s + \epsilon_{3s}$,
the coefficient for η is -26.67 (p-value 0.515) while $\hat{\zeta} = 7.555$ (p-value 0.190).

Figure 5: **Timing of the introduction of equitable distribution and state characteristics**



(a) Changes in female employment rate (1960-50)



(b) Female employment rate in 1960

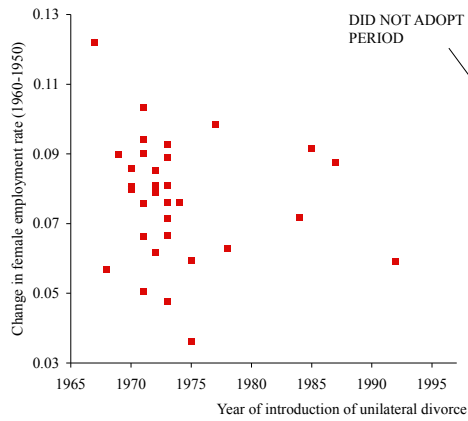


(c) Share of wives' income in total household income in 1960

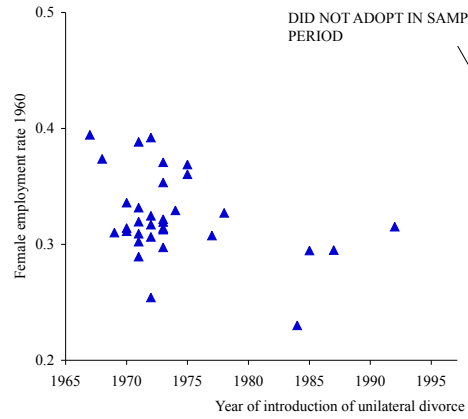
Note: Data from IPUMS, 1% sample of 1950 and 1960 U.S. Censuses (IPUMS data from Ruggles 2010).

For comparison, Figure 6 represents the same values for the introduction of unilateral divorce.

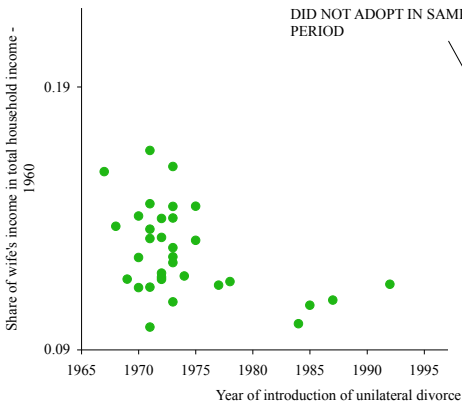
Figure 6: **Timing of the introduction of unilateral divorce and state characteristics**



(a) Changes in female employment rate (1960-50)



(b) Female employment rate in 1960



(c) Share of wives' income in total household income in 1960

Note: Data from IPUMS, 1% sample of 1950 and 1960 U.S. Censuses (IPUMS data from Ruggles 2010).

Appendix B

Solution algorithm of the household planning problem

B.1 Mutual consent divorce

I describe the problem of the couple in the last period T , when spouses are retired. The couple solves:

$$\begin{aligned} \max_{c_T^H, c_T^W, A_{T+1}^H, A_{T+1}^W} \quad & \theta u(c_T^H; \xi_T^H) + (1 - \theta) u(c_T^W; \xi_T^W) \\ \text{s.t.} \quad & \text{budget constraint in marriage} \\ & A_{T+1}^j \geq 0 \quad j = H, W. \end{aligned}$$

Define $V_T^{jM}(\omega_T) = u(c_T^{*j}; \xi_T^j)$ at the optimal values of c_T and A_{T+1} (where $A_{T+1}^j = 0$) given the solution of the Pareto problem for state variables ω_T . There are three possible cases:

1. if $V_T^{jM}(\omega_T) \geq V_T^{jD}(\omega_T)$ for both $j = H, W$, then $V_T^j(\omega_T) = V_T^{jM}(\omega_T)$ and the couple remains married.
2. if $V_T^{jM}(\omega_T) < V_T^{jD}(\omega_T)$ for both $j = H, W$, then $V_T^j = V_T^{jD}(\omega_T)$ and the couple divorces.
3. $V_T^{jM}(\omega_T) < V_T^{jD}(\omega_T)$ and $V_T^{jM}(\omega_T) \geq V_T^{jD}(\omega_T)$

In the third case, the allocation of assets shifts. The spouse who wants to divorce (j) can persuade the other by offering her (him) a larger fraction of the household assets than that dictated by the law. I will call this share $\kappa \in [0, 1]$. Assume the spouse who wants to remain married is the husband; then, the household finds $\kappa_T \in [0, 1]$ where the husband's share of assets becomes $\kappa_T(A_T^H + A_T^W)$ such that: $V_T^{HD}(\omega_T, \kappa_T) = V_T^{HM}(\omega_T)$.

After this reallocation, consider the following two possible cases:

1. if $V_T^{WM}(\omega_T, \kappa_T) < V_T^{WD}$, then $V_T^j = V_T^{jD}$ and the couple divorces.
2. if $V_T^{WM}(\omega_T, \kappa_T) \geq V_T^{WD}$, then $V_T^j = V_T^{jM}(\omega_T, \kappa_T)$ and the couple remains married.

Once the continuation values have been defined, for an arbitrary period t the allocation in marriage can be found by solving the problem below:

$$\begin{aligned} \max_{c_t^H, c_t^W, P_t^H, P_t^W, A_{t+1}^H, A_{t+1}^W} \quad & \theta [u(c_t^H, P_t^H; \xi_t^H) + \beta E[V_{t+1}^H(\omega_{t+1}|\omega_t)]] \\ & + (1 - \theta) [u(c_t^W, P_t^W; \xi_t^W) + \beta E[V_{t+1}^W(\omega_{t+1}|\omega_t)]] \\ \text{s.t.} \quad & \text{budget constraint in marriage} \end{aligned}$$

In case of discordant preferences for divorce, the reallocation of assets in favor of the spouse who want to remain married is analogous to the one in the last period.

B.2 Unilateral divorce

The solution to the unilateral divorce case follows the one to a risk-sharing problem with lack of commitment, with divorce on the equilibrium path (Mazzocco *et al.* 2007). First, I will characterize the solution of the last period.

a) **First step** Define $V_T^{jM}(\omega_t) = u(c_T^{*j}, P_T^{*j}; \xi_T^j)$ at the optimal values of c_T , P_T^j and A_{T+1}^j for $j = H, W$ as the solution to the problem below, for state variables ω_T :

$$\begin{aligned} \max_{c_T^H, c_T^W, A_{T+1}^H, A_{T+1}^W} \quad & (\theta + M_T^H) u(c_T^H; \xi_T^H) + (1 - \theta + M_T^W) u(c_T^W; \xi_T^W) \\ \text{s.t.} \quad & \text{budget constraint in marriage} \\ & A_{T+1}^j \geq 0 \quad j = H, W. \end{aligned}$$

b) **Second step** Consider the following three possible cases:

1. if $V_T^{jM}(\omega_T) \geq V_T^{jD}(\omega_T)$ for both $j = H, W$, then $V_T^j(\omega_T) = V_T^{jM}(\omega_T)$ and the couple remains married.
2. if $V_T^{jM}(\omega_T) < V_T^{jD}(\omega_T)$ for both $j = H, W$, then $V_T^j = V_T^{jD}(\omega_T)$ and the couple divorces.
3. $V_T^{jM}(\omega_T) < V_T^{jD}(\omega_T)$ and $V_T^{jM}(\omega_T) \geq V_T^{jD}(\omega_T)$

In case **3**, the allocation shifts. Assume the spouse who wants to divorce is the husband; then, I find μ_T^H such that solving:

$$\begin{aligned} \max_{c_T^H, c_T^W, A_{T+1}^H, A_{T+1}^W} \quad & (\theta + M_T^H + \mu_T^H) u(c_T^H; \xi_T^H) + (1 - \theta + M_T^W) u(c_T^W; \xi_T^W) \\ \text{s.t.} \quad & \text{budget constraint} \\ & A_{T+1}^j \geq 0 \quad j = H, W. \end{aligned}$$

leads to $V_T^{HM}(\omega_T, \mu_T^H) = V_T^{HD}(\omega_T)$.

c) **Third step** Consider the following two possible cases, which depends on how the other spouse responds to the reallocation:

1. if $V_T^{WM}(\omega_T, \mu_T^H) \geq V_T^{WD}$, then $V_T^j = V_T^{jM}(\omega_T, \mu_T^H)$ for $j = H, W$: the couple remains married.
2. if $V_T^{WM}(\omega_T, \mu_T^H) < V_T^{WD}$, then $V_T^j = V_T^{jD}$ for $j = H, W$: the couple divorces.

Let us now consider the problem in an arbitrary period t with state variables ω_t . Once the continuation values have been defined, the problem for an arbitrary period t can be characterized as below.

a) **First step** Define $V_t^{jM}(\omega_t) = u(c_t^{*j}, P_t^{*j}; \xi_t^j)$ at the optimal values of c_t , P_t^j and A_{t+1}^j for $j = H, W$ as the solution to the problem below, for state variables ω_t .

$$\begin{aligned} \max_{c_t^H, c_t^W, P_t^H, P_t^W, A_{t+1}^H, A_{t+1}^W} \quad & (\theta + M_t^H) [u(c_t^H, P_t^H; \xi_t^H) + \beta E[V_{t+1}^H(\omega_{t+1}|\omega_t)]] \\ & + (1 - \theta + M_t^W) [u(c_t^W, P_t^W; \xi_t^W) + \beta E[V_{t+1}^W(\omega_{t+1}|\omega_t)]] \end{aligned}$$

s.t. budget constraint

b) **Second step** Consider the following three possible cases:

1. if $V_t^{jM}(\omega_t) \geq V_t^{jD}(\omega_t)$ for both $j = H, W$, then $V_t^j(\omega_t) = V_t^{jM}(\omega_t)$ and the couple remains married.
2. if $V_t^{jM}(\omega_t) < V_t^{jD}(\omega_t)$ for both $j = H, W$, then $V_t^j = V_t^{jD}(\omega_t)$ and the couple divorces.
3. $V_t^{jM}(\omega_t) < V_t^{jD}(\omega_t)$ and $V_t^{jM}(\omega_t) \geq V_t^{jD}(\omega_t)$

In case **3**, the allocation shifts. Assume the spouse who wants to divorce is the husband; then, I find μ_t^H such that solving:

$$\begin{aligned} \max_{c_t^H, c_t^W, P_t^H, P_t^W, A_t^H, A_t^W} \quad & (\theta + M_t^H + \mu_t^H) [u(c_t^H, P_t^H; \xi_t^H) + \beta E[V_{t+1}^H(\omega_{t+1}|\omega_t)]] \\ & + (1 - \theta + M_t^W) [u(c_t^W, P_t^W; \xi_t^W) + \beta E[V_{t+1}^W(\omega_{t+1}|\omega_t)]] \end{aligned}$$

s.t. budget constraints in marriage

leads to $V_t^{HM}(\omega_t, \mu_t^H) = V_t^{HD}(\omega_t)$.³⁷

c) **Third step** Consider the following two possible cases:

1. if $V_t^{WM}(\omega_t, \mu_t^H) \geq V_t^{WD}$, then $V_t^j = V_t^{jM}(\omega_t, \mu_t^H)$ and the couple remains married.
2. if $V_t^{WM}(\omega_t, \mu_t^H) < V_t^{WD}$, then $V_t^j = V_t^{jD}$ and the couple divorces.

³⁷Then, the first step in the subsequent period can be represented as:

$$\begin{aligned} \max \quad & (\theta + M_t^H + \mu_t) [u(c_{t+1}^H, P_{t+1}^H; \xi_{t+1}^H) + \beta E[V_{t+2}^H(\omega_{t+2}|\omega_t)]] \\ & + (1 - \theta + M_{t+1}^W) [u(c_{t+1}^W, P_{t+1}^W; \xi_{t+1}^W) + \beta E[V_{t+2}^W(\omega_{t+2}|\omega_t)]] \\ \text{s.t.} \quad & \text{budget constraint} \end{aligned}$$

Therefore, $M_{t+1}^H = M_t^H + \mu_t$.

Appendix C

Divorce laws and divorce probability

A large body of research has examined whether the introduction of unilateral divorce has affected the divorce rate in the United States (recently, Friedberg 1998 and Wolfers 2007). The exercise proposed here is substantially different, since I only focus on those couples that were already married at the time of the reform.

I estimate the linear probability models:

$$divorce_{i,s,t} = a \cdot Unilateral_{s,t} + \gamma' Z_{i,t} + \delta_t + f_i + \epsilon_{i,s,t} \quad (12)$$

$$divorce_{i,s,t} = \sum_{\tau=1(2)}^{15+} a_{\tau} I\{\text{Years since unilateral divorce are } \tau \text{ or } \tau + 1\}_{s,t} + \gamma' Z_{i,t} + \delta_t + f_i + \epsilon_{i,s,t} \quad (13)$$

$$divorce_{i,s,t} = \sum_{\tau=1(2)}^{15+} a_{\tau} I\{\text{Years since unilateral divorce are } \tau \text{ or } \tau + 1\}_{s,t} + \gamma' Z_{i,t} + \delta_t + f_i + c_s + c_s \cdot t + c_s \cdot t^2 + \epsilon_{i,s,t} \quad (14)$$

where $Z_{i,t}$ is a vector of control variables; f_i represents an individual fixed effects; c_s a state fixed effect (and therefore $c_s \cdot t$ a state-specific linear time trend) and δ_t a year fixed effects. The control variable are spouses' age dummies, years since marriage and number of children. I estimate Equations (12), (13) and (14) on both the PSID and the NLSW sample. The regression results suggest that a positive and statistically significant effect is observed among these households (Table 11), whereas there is no difference in the effect of this reform between different property division rules. The point estimates are surprisingly large (suggesting an increase in the risk of divorce between 30% and 100%), but are imprecise. The small number of divorces observed in these datasets makes the identification of a precise effect difficult. However, these findings seem to support the hypothesis that unilateral divorce may have raised the likelihood of divorce for the sample that I analyze in this paper. The timing of this impact is concentrated in the first 10 - 11 years since the reforms (Figure 7), in line with Wolfer's findings on aggregate divorce rates.

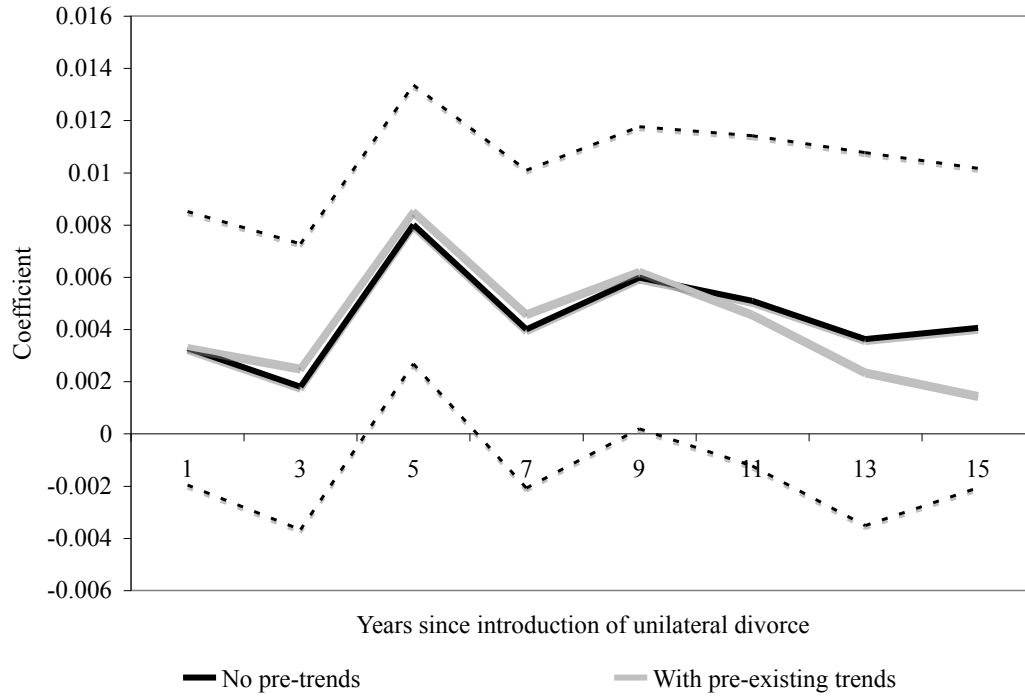
Table 11: Probability of divorce for couples married before the reforms: Linear Probability model

VARIABLES	(1) PSID divorce	(2) PSID divorce	(3) PSID divorce	(4) PSID divorce	(5) NLSW divorce	(6) NLSW divorce	(7) NLSW divorce	(8) NLSW divorce
Unilateral	0.004 (0.002)	0.004 (0.002)	0.002 (0.001)	0.006 (0.005)	0.010 (0.004)	0.010 (0.004)	0.010 (0.003)	0.010 (0.003)
Uni*Eq.Distr.				-0.004 (0.004)				-0.008 (0.004)
Uni*Com.Prop.				0.005 (0.006)				0.006 (0.005)
Eq.Distr.				0.001 (0.001)				-0.001 (0.004)
Com.Prop.				-0.010 (0.004)				0.049 (0.043)
Children		-0.005 (0.001)				-0.006 (0.001)		
Wife's age dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Polyn in yrs. since marriage	No	No	Yes	No	No	No	Yes	No
Observations	53,699	53,699	48,685	53,699	46,684	46,684	36,425	46,684
Household fixed effects	4,691	4,691	3,933	4,691	5,131	5,131	4,089	5,131

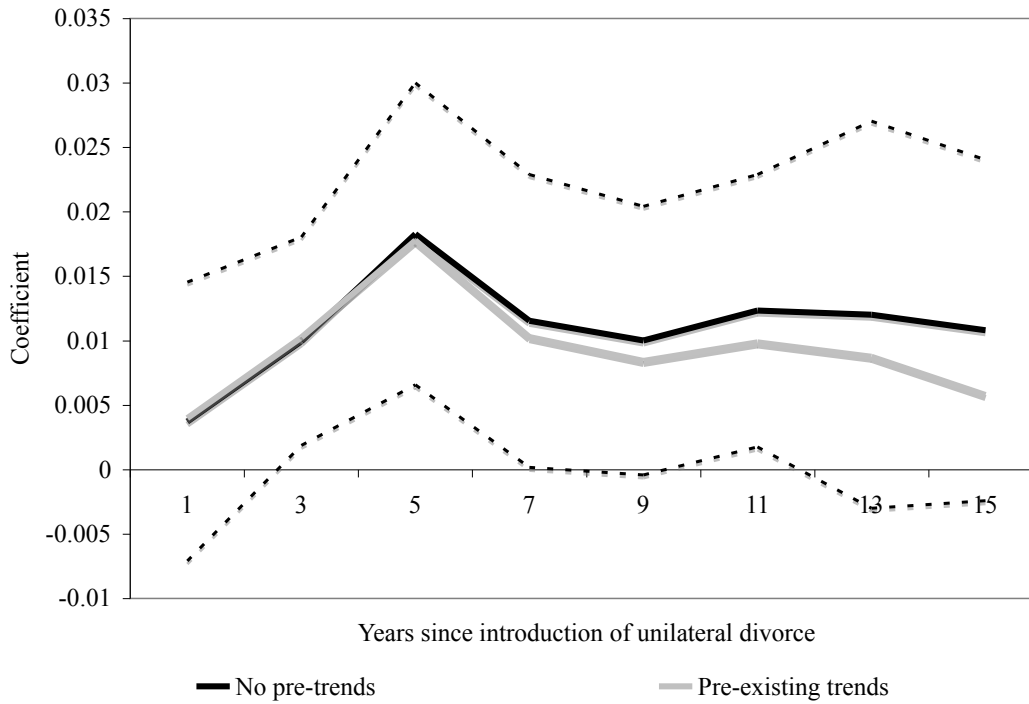
Standard errors in parentheses, clustered at the state level

Note: Data from the NLS of Young and Mature Women and the PSID. Sample of couples married before legal reforms. Dependent variable is divorce status conditional on being married in the previous period.

Figure 7: Dynamic response of divorces to the introduction of unilateral divorce



(a) Data from PSID



(b) Data from NLSW

Note: Plots of coefficients a_τ of Equations (13-14). Sample of couples married before the reforms.

Appendix D

Additional evidence on household behavior and robustness checks

D.1 Analysis of men's hours of work

While the model does not consider the labor supply of men, a shift in household bargaining parameters in favor of women may lead to additional male labor supply (Chiappori *et al.* 2002). I test this prediction by examining the labor supply of men in the PSID. I regress

$$\begin{aligned} hours\ worked_{i,t} = & b_1(Uni \cdot Title_{s,t}) + b_2(Uni \cdot Com.Prop_{s,t}) + b_3(Uni \cdot Eq.Distr_{s,t}) \\ & + b_4Eq.Distr_{s,t} + b_5Com.Prop_{s,t} + \gamma'Z_{i,t} + \delta_t + f_i + \epsilon_{i,t}. \end{aligned}$$

The results suggest that in community property states, when unilateral divorce is introduced, the labor supply of men increased by up to 90 hours per year (Table 12, column 1). The average number of hours worked by a man in a year in this sample is 2,027 and the increase with unilateral divorce and community property is thus approximately 4%.

Table 12: **Hours worked by men: household fixed effects regressions**

VARIABLES	(1) hours of work	(2) hours of work	(3) hours of work	(4) hours of work
Unilateral	-41.33 (34.99)	-14.94 (37.70)	-42.80 (35.28)	-16.73 (38.03)
Uni*Com.Pr.	139.3*** (39.40)	96.75** (36.54)	137.1*** (39.28)	94.33** (36.26)
Uni*Eq.Distr.	43.41 (39.86)	45.70 (42.10)	43.02 (39.91)	45.12 (42.15)
Eq.Distr.	-4.849 (22.20)	2.144 (22.11)	-4.872 (22.06)	1.990 (22.01)
Com.Prop.	-67.69* (38.63)	-32.63 (37.72)	-64.34* (37.76)	-27.18 (37.04)
Year fixed effects	Yes	Yes	Yes	Yes
Husband's age dummies	Yes	Yes	Yes	Yes
State fixed effects	No	Yes	No	Yes
Children fixed effects	No	No	Yes	Yes
Observations	57,312	57,312	57,312	57,312
Individual fixed effects	5,237	5,237	5,237	5,237

Standard errors in parentheses,
clustered at the state level

Note: Data from the PSID. Sample of couples married before legal reforms. Dependent variable is annual hours worked by married, divorced or separated men. Excluded category for divorce laws: title-based mutual consent regime.

D.2. Attrition in the asset data

The household assets equation is estimated based on a sample of married couples. This fact may generate the concern that non-random attrition, due to the different likelihood of divorce across divorce laws, may be driving the results. For instance, if in community property states couples with fewer assets were more likely to get divorced and thus to fall out of the sample than in title-based regimes, the average level of asset would be higher in community property because of this selection mechanism. I use Inverse Probability Weighting (IPW, Wooldridge 2002) to account for the differential non-random attrition of couples from the sample due to divorce. This method weights observations to counteract the effect of non-random attrition on the composition of the sample.

In this case, the exclusion restriction for this method requires that attrition does not depend on the regressors of Equation (3), that will be called x , conditional on a vector of variables u , which may contain lagged values of x :

$$P(\text{attrition}_{i,t} = 0 | \text{assets}_{i,t}, x_{i,t}, u_{i,t}) = P(\text{attrition}_{i,t} = 0 | u_{i,t})$$

where $x_{i,t}$ represents the right hand side variable in the *asset* regression and the vector $u_{i,t}$ can contain lagged values of *assets* and of x . That is, variables from time t do not provide additional information about the likelihood of attrition once conditioned on variables at time $t - 1, t - 2, \dots, 1$.

Under this assumption, Equation (5) can be consistently estimated in the presence of non-random attrition.

First, I construct the weights:

$$w_{i,t}(u) = \frac{1}{P(\text{attrition}_{i,t} = 0 | u)} = \frac{1}{\prod_{\tau=2}^t P_{\tau}(\text{attrition}_{i,\tau} = 0 | u, \text{attrition}_{i,\tau-1} = 0)}$$

where u are household characteristics at time $t - 1$ (assets, income, age) that influence the fact that the couple would be divorce at time t .

I then estimate Equation (5) by weighted least squares (WLS).³⁸

Because of the computational burden required by estimating fixed-effect regressions with

³⁸WLS minimizes

$$\min_{\alpha, \gamma, f.e.} \sum_{i=1}^N \sum_{t=1}^T \mathbf{1}\{\text{attrition}_{i,t} = 0\} w_{i,t}(u) (\text{assets}_{i,t} - \alpha_1 \text{Unilateral}_{s,t} - \alpha_2 (\text{Unilateral} \cdot \text{Com.Prop}_{s,t}) - \alpha_3 (\text{Unilateral} \cdot \text{Eq.Distr}_{s,t}) - \alpha_4 \text{Eq.Distr}_{s,t} - \alpha_5 \text{Com.Prop}_{s,t} + \gamma' Z_{i,t} + \delta_t + f_i)^2$$

Table 13: **Household assets fixed effects regressions - IPW**

VARIABLES	assets IPW
Unilateral	-7,425 (9287)
Uni*Com.Prop.	21,474** (9962)
Uni*Eq.Distr	17,857* (10662)
Eq. Distr	-19,883 10,860
Com.Prop.	12,341 (16984)
Age dummies	Yes
Year fixed effects	Yes
Observations	9,250
Individual fixed effects	2,828
Robust standard errors in parentheses clustered at state level without correction for the 1st stage	

Note: Data from the NLS of Young and Mature Women. Sample of couples married before legal reforms. Dependent variable is real total family net assets. Excluded category for divorce laws: title-based mutual consent regime.

time-varying probability weights, this exercise does not include bootstrapped standard errors that account for first-stage estimation. Ignoring the first stage in the computation of the standard errors leads to a *conservative* estimate of the variance-covariance matrix: adjusting for the first stage would lead to smaller standard errors (Wooldridge 2002).

D.3. Quantile regressions

Household wealth exhibits a very skewed distribution. The 25th percentile is equal to 4,025 real 1990 real dollars, the median to 32,658 real dollars and the 75th percentile to 79,891 real dollars. I replicate the analysis using quantile regressions that are robust to the skewness in the distribution of the dependent variable and describes the behavior of households at various quantiles. The median regression (Table 14) confirms my earlier findings on the effect of unilateral divorce although less precise.

Table 14: **Household Assets: median regressions**

VARIABLES	(1)	(2)	(3)	(4)
	assets	assets	assets	assets
	q(0.5)	q(0.5)	q(0.5)	q(0.5)
Unilateral	2,116	935	-673	1,759
	(2,515)	(2,553)	(2,431)	(2,393)
Uni*Com.Pr.	6,208	5,360	7,103	3,191
	(3,171)	(3,224)	(3,066)	(3,019)
Uni*Eq.Distr.	3,022	4,714	7,735	2,881
	(2,704)	(2,749)	(2,644)	(2,575)
Eq.Distr.	-674	-1,467	-4,988	-914
	(1,551)	(1,595)	(1,588)	(1,475)
Com.Pr.	-7,575	5,761	-26,609	-7,695
	(15,153)	(22,894)	(26,539)	(21,494)
P-value $\beta_1 + \beta_2 = 0$	0.001	0.008	0.004	0.023
P-value $\beta_1 + \beta_3 = 0$	0.025	0.010	0.001	0.023
Year fixed effects	Yes	Yes	Yes	Yes
Wife age dummies	Yes	Yes	Yes	Yes
State fixed effects	Yes	Yes	Yes	Yes
Polyn in husband age (2 dg.)	No	Yes	No	No
Children dummies	Yes	Yes	Yes	No
Polyn yrs. married (5 dg.)	No	No	Yes	No
Observations	15,399	14,896	12,022	15,399
	Standard errors in parentheses			

Note: Data from the NLS of Young and Mature Women. Sample of couples married before legal reforms. Dependent variable is real total family net assets. Excluded category for divorce laws: title-based mutual consent regime.

D.4. Time effects and pre-existing trends

Assets accumulation decisions may take time to respond to legal changes. A lagged response may occur if these changes are not immediately salient to households. Moreover, the asset level may take a few years to reach the new optimal level, as consumption smoothly adjusts to allow for more or less savings. Finally, assets response in the post-treatment period may be confounded with pre-existing trends in asset accumulation across states.

To analyze the dynamic effect of the introduction of unilateral divorce and of equitable distribution controlling for pre-existing trends in different regimes, I separately examine quasi-experiments (a) and (b) described in Subsection 4.3 and introduce linear and quadratic state-specific time trends and a time trend interacted with the reforms that is object of

analysis:

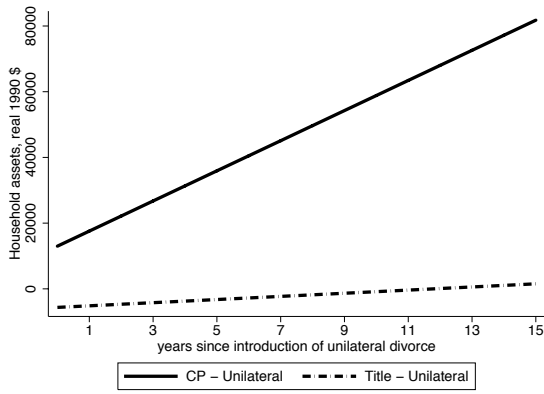
$$\begin{aligned}
assets_{i,s,t} &= \beta_1 Unilateral_{s,t} + \beta_2 (Uni \cdot Com.Prop_{s,t}) + \beta_3 (Uni \cdot Eq.Distr_{s,t}) & (15) \\
&+ \mu_1 (Uni \cdot Time_{s,t}) + \mu_2 (Uni \cdot Com.Prop \cdot Time_{s,t}) \\
&+ \beta_4 Eq.Distr_{s,t} + \beta_5 Com.Prop_{s,t} + c_s \cdot t + c_s \cdot t^2 \\
&+ \gamma' Z_{i,t} + \delta_t + f_i + c_s + \epsilon_{i,s,t}.
\end{aligned}$$

$$\begin{aligned}
assets_{i,s,t} &= \beta_1 Unilateral_{s,t} + \beta_2 (Uni \cdot Com.Prop_{s,t}) + \beta_3 (Uni \cdot Eq.Distr_{s,t}) & (16) \\
&+ \nu_1 (Eq.Distr \cdot Time_{s,t}) + \nu_2 (Eq.Distr \cdot Unilateral \cdot Time_{s,t}) \\
&+ \beta_4 Eq.Distr_{s,t} + \beta_5 Com.Prop_{s,t} + c_s \cdot t + c_s \cdot t^2 \\
&+ \gamma' Z_{i,t} + \delta_t + f_i + c_s + \epsilon_{i,s,t}.
\end{aligned}$$

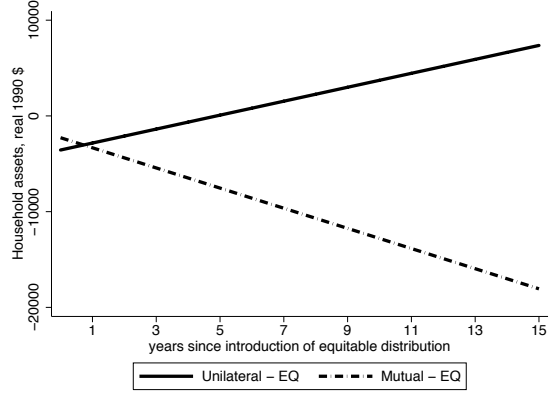
Equations (15) and (16) allow controlling for pre-existing time trends for all states when estimating the trend of states that have introduced unilateral divorce (μ_1, μ_2 , by property division regime) and equitable distribution (ν_1, ν_2 , by grounds for divorce).

Figure (8) represents the trends of household assets since the introduction of unilateral divorce by property division regimes and since the introduction of equitable distribution by ground for divorce regime. Controlling for pre-existing trends still preserves the positive and statistically significant growth of assets in community property and equitable distribution states, whereas title-based regimes exhibit a much smaller positive trend, not statistically different from zero.

Figure 8: Dynamic effect of introduction of unilateral divorce, controlling for pre-existing time trends



(a) Introduction of unilateral divorce



(b) Introduction of equitable distribution

Note: Data from NLSW. Sample of couples married before legal reforms. Dependent variable is real total family net assets. The figures plot $\beta_1 + \mu_1 \cdot t$ (title-based) and $\beta_1 + \beta_2 + (\mu_1 + \mu_2) \cdot t$ from Equation (15) and $\beta_4 + \nu_1 \cdot t$ (mutual based) and $\beta_4 + \beta_3 + (\nu_1 + \nu_2) \cdot t$.

Appendix E

Identification of spouses' income process parameters

E.1 Men's income process

Parameters λ_0^H and λ_1^H that represent men's income gains from experience are estimated using the PSID income dataset under the assumption that all men participate and that there is no selection bias in this sample:

$$\Delta \ln(y_t^H) = \lambda_0^H + \lambda_1^H \cdot t + \Delta u_t$$

Define unexplained growth of log-earnings as (Blundell *et al* 2008):

$$\Delta u_t^j = z_{t-1}^j + \zeta_t^j - z_{t-1}^j + \epsilon_t^j - \epsilon_{t-1}^j = \zeta_t^j + \epsilon_t^j - \epsilon_{t-1}^j \quad (17)$$

for $j=H,W$.

The variance of the husband's permanent income shocks is identified by the moment

$$E[\Delta u_t^H (\Delta u_t^H + \Delta u_{t-1}^H + \Delta u_{t+1}^H)] = \sigma_\zeta^{2H}.$$

E.2 Women's income process and spouses' income correlation

Identification of the income process parameters for women requires controlling for the selection of women into employment. In fact, while in the model all men participate in the labor market, we cannot observe earnings for those women who don't work. Assume that a wife participates in the labor market (P_t^W) if

$$Z_t' \delta + M_t' \gamma + \eta_t > 0,$$

where M_t are exogenous variables excluded from the earnings equation (divorce laws) and Z_t are variables in the earning equations (in this model age and past employment).

Assume that the income shocks of husbands and wives are correlated. Then, income shocks and participation shocks in each period are distributed as a multivariate normal which is uncorrelated across periods of time:

$$\begin{pmatrix} \zeta_t^H \\ \zeta_t^W \\ \eta_t \end{pmatrix} \text{ is distributed } MVN \left(\mathbf{0}, \begin{pmatrix} \sigma_{\zeta^H}^2 & & \\ \sigma_{\zeta^H \zeta^W} & \sigma_{\zeta^W}^2 & \\ \sigma_{\zeta^H \eta} & \sigma_{\zeta^W \eta} & 1 \end{pmatrix} \right)$$

Define $\alpha_t = -Z_t' \delta - M_t' \gamma$. Identifying the wife's income process parameters requires a

two-stage procedure. In the first stage, I estimate the probability of female participation in the labor market as

$$P(P^W = 1) = P(\eta_t > -Z_t'\delta - M_t'\gamma) = P(\eta_t > \alpha_t)$$

using a probit. Then, since:

$$\begin{aligned} E[\Delta \log y_t^W | P_t^W = 1, P_{t-1}^W = 1] &= \lambda_0^W + \lambda_1^W \cdot t + E(\Delta u_t^W | P_t^W = 1, P_{t-1}^W = 1) \\ &= \lambda_0^W + \lambda_1^W \cdot t + \sigma_{\Delta u \eta} \left[\frac{\phi(\alpha_t)}{1 - \Phi(\alpha_t)} + \frac{\phi(\alpha_{t-1})}{1 - \Phi(\alpha_{t-1})} \right] \end{aligned} \quad (18)$$

I estimate the inverse Mills ratio $\frac{\phi(\alpha_t)}{1 - \Phi(\alpha_t)}$ from the entire sample of wives and then insert it in the earnings equation to obtain the correct residuals that account for the unobservables that influence both participation and earnings.

The parameters of the income process are the solutions to the system:

$$E[\Delta u_t^W | P_t^W = 1, P_{t-1}^W = 1] = E[\zeta_t^W | \eta_t > \alpha_t] = \sigma_{\zeta^W \eta} \frac{\phi(\alpha_t)}{1 - \Phi(\alpha_t)} \quad (19)$$

$$\begin{aligned} E[\Delta u_t^W (\Delta u_t^W + \Delta u_{t-1}^W + \Delta u_{t+1}^W) | P_t^W = 1, P_{t-1}^W = 1, P_{t+1}^W = 1, P_{t-2}^W = 1] \\ = E[\zeta_t^{2W} | \eta_t > \alpha_t] = \sigma_{\zeta^W}^2 + \sigma_{\zeta^W \eta}^2 \frac{\phi(\alpha_t)}{1 - \Phi(\alpha_t)} \alpha_t \end{aligned} \quad (20)$$

$$E[\Delta u_t^H | P_t^W = 1, P_{t-1}^W = 1] = E[\zeta_t^H | \eta_t > \alpha_t] = \sigma_{\zeta^H \eta} \frac{\phi(\alpha_t)}{1 - \Phi(\alpha_t)} \quad (21)$$

$$\begin{aligned} E[\Delta u_t^W \Delta u_t^H | P_t^W = 1, P_{t-1}^W = 1] &= E[\zeta_t^W \zeta_t^H | \eta_t > \alpha_t] \\ &= \sigma_{\zeta^H \zeta^W} + \sigma_{\zeta^H \eta} \sigma_{\zeta^W \eta} \frac{\phi(\alpha_t)}{1 - \Phi(\alpha_t)} \alpha_t \end{aligned} \quad (22)$$

Finally, the parameter δ is identified by:

$$\begin{aligned} E[\log y_t^W - \log y_{t-2}^W | P_t^W = 1, P_{t-2}^W = 1] \\ = \lambda_0^W + \lambda_1^W \cdot (t-1) + [\lambda_0^W + \lambda_1^W \cdot t] \cdot I(P_{t-1}^W = 1) + \delta \cdot I(P_{t-1}^W = 0) \\ + E(\Delta^2 u_t^W | P_t^W = 1, P_{t-2}^W = 1), \end{aligned} \quad (23)$$

where

$$\begin{aligned} E(\Delta^2 u_t^W | P_t^W = 1, P_{t-2}^W = 1) \\ = E(\Delta^2 u_t^W | \eta_t > \alpha_t, \eta_{t-2} > \alpha_{t-2}) = \sigma_{\Delta^2 u \eta} \left[\frac{\phi(\alpha_t)}{1 - \Phi(\alpha_t)} + \frac{\phi(\alpha_{t-2})}{1 - \Phi(\alpha_{t-2})} \right]. \end{aligned}$$

Thus, identification of the depreciation parameter thus comes from the gap in earnings between a woman who worked without interruptions for three years and a woman who did not participate in the intermediate year. This equation accounts for the selection into work in periods t and $t - 2$ but not for the endogeneity of the decision to not participate in period $t - 1$. As robustness check, I verify that the estimates obtained for λ_0^W and λ_1^W from Equation (23) are similar to those from (18). The endogeneity bias does not seem to significantly influence the estimates.

Appendix F

Tables

Table 15: **Divorce law reforms in the sample period**

State	Unilateral divorce	Equitable distribution
Alabama	1971	1984
Alaska	pre-1967	pre-1967
Arizona	1973	community property
Arkansas	no	1977
California	1970	community property
Colorado	1972	1972
Connecticut	1973	1973
Delaware	1968	pre-1967
District of Columbia	no	1977
Florida	1971	1980
Georgia	1973	1984
Hawaii	1972	pre-1967
Idaho	1971	community property
Illinois	no	1977
Indiana	1973	pre-1967
Iowa	1970	pre-1967
Kansas	1969	pre-1967
Kentucky	1972	1976
Louisiana	no	community property
Maine	1973	1972
Maryland	no	1978
Massachusetts	1975	1974
Michigan	1972	pre-1967
Minnesota	1974	pre-1967
Mississippi	no	1989
Missouri	no	1977
Montana	1973	1976
Nebraska	1972	1972

Table 15: **Divorce law reforms in the sample period (continued)**

State	Unilateral divorce (Gruber 2004)	Equitable distribution (FLQ)
Nevada	1967	community property
New Hampshire	1971	1977
New Jersey	no	1974
New Mexico	pre-1967	community property
New York	no	1980
North Carolina	no	1981
North Dakota	1971	pre-1967
Ohio	1992	1981
Oklahoma	pre-1967	1975
Oregon	1971	1971
Pennsylvania	no	1980
Rhode Island	1975	1981
South Carolina	no	1985
South Dakota	1985	pre-1967
Tennessee	no	pre-1967
Texas	1970	community property
Utah	1987	pre-1967
Vermont	no	pre-1967
Virginia	no	1982
Washington	1973	community property
West Virginia	1984	1985
Wisconsin	1978	community property (1986)
Wyoming	1977	pre-1967

Note: Data from FLQ 1977-2005, Rasul (2003), Gruber (2004), Golden (1983), Davis (1983) and state-level sources.

Table 16: Variation in the NLSW and PSID data

Before		After			After		
		Title	Mutual Consent Eq.Distr.	Com.Prop.	Title	Unilateral Eq.Distr.	Com.Prop.
Mutual	Title	-	NLSW: 1,149 hh, 2,658 obs. PSID: 1,701 hh, 15,383 obs.		NLSW: 398 hh, 814 obs. PSID: 290 hh, 1,710 obs.	NLSW: 233 hh, 651 obs. PSID: 178 hh 2,162 obs.	
	Eq.Distr.		-			NLSW: 12 hh, 28 obs. PSID: 87 hh 628 obs.	
	Com.Pr.			-			NLSW: 653 hh, 2,213 obs. PSID: 573 hh 7,004 obs.
Unilateral	Title				-	NLSW: 206 hh, 465 obs. PSID: 249 hh 2,146 obs.	
	Eq.Distr.					-	NLSW: 0 hh, 0 obs. PSID: 5 hh 19 obs.
	Com.Prop.						-

Note: Reform data from FLQ 1977-2005, Rasul (2003), Gruber (2004), Golden (1983), Davis (1983) and state-level sources. Household data from the PSID (1968-1993), the NLS of Young Women (1968-1999) and the NLS of Mature Women (1967-1999).