

# THE ECONOMICS OF THE MARRIAGE CONTRACT: THEORIES AND EVIDENCE<sup>\*</sup>

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## Abstract

We analyze the role of the marriage contract. We first formalize three prominent hypotheses on why people marry: marriage provides an exogenous payoff to married partners, it serves as a commitment device and it serves as a signaling device. In each theory we analyze how a reduction in the cost of divorce affects the propensity to divorce for couples at any given duration of marriage. We then bring these alternative views of the marriage contract to bear on the data using individual marriage and divorce certificate data from the US. We exploit variation in the timing of the adoption of unilateral divorce law across states to proxy a one-off and permanent reduction in divorce costs. The results suggest the dominant reason why individuals enter marriage contracts is that they serve as a commitment device.

Keywords: marriage contract, divorce cost, selection effect, incentive effect

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## I. INTRODUCTION

Marriage markets have changed dramatically since Becker's (1973, 1974) seminal theory of marriage. Foremost among these developments in both the US and Western Europe have been the large changes in divorce rates, the decline in marriage, and the general weakening of the traditional family structure. In this paper we argue that in order to understand the cause and effect of these changes, it is necessary to establish the reasons why individuals decide to marry in the first place.

In Becker's original work, and the enormous body of literature it inspired, two individuals marry when there is a positive surplus from their union relative to the two remaining single. Such gains may arise from specialization in home and market production, economies of scale, the provision of insurance, and risk sharing, among others.

The motivation for this paper derives from noting that these explanations relate to why two individuals prefer to 'be together' rather than remain single. They offer less insight on why individuals prefer to *marry* and enter a marriage contract rather than cohabit. In this paper we take a contractual view of marriage and directly address the question of what is the role of the marriage contract? To answer this, we formalize three prominent hypotheses on why people marry, rather than cohabit, and analyze the predictions that each underlying theory of marriage has on marriage market outcomes. We then bring these alternative models of marriage to the data and present evidence to empirically distinguish between them.

We first develop three stylized dynamic models to formalize the main functions of the marriage contract that have been discussed in the law and economics literature (for an overview see Dnes and Rowthorn 2002). We follow this literature in viewing marriage as a contract that makes it more costly for the partners to exit their relationship than if they were cohabiting. Underlying this view is the belief that bargaining over a divorce does not fit into the paradigm of costless Coasian bargaining. Instead, a variety of transaction costs are likely to impose inefficiencies on most, if not all, divorce negotiations. Transaction costs may, for instance, arise because of liquidity constraints or asymmetric information about the value that each partner places on continuing the marriage. The fees paid to divorce lawyers and legally imposed restrictions, such as mandatory separation

requirements, are other examples of transactions costs that are pertinent in divorce negotiations. These costs do not arise, or are at least severely mitigated, when cohabiting couples break up.<sup>1</sup>

The costs of entering marriage contracts are therefore the same in all the models – marriage always increases the costs of exiting a relationship. The benefits, however, differ. In the first model, the benefit of marriage is simply an exogenously given payoff that captures the extra utility couples derive from following social custom (Cohen 1987, 2002). In the second model, marriage acts as a commitment device that fosters cooperation and/or induces partners to make relationship specific investments (Brinig and Crafton 1994; Scott 1990, 2002; Wydick 2004). In the third model, the marriage contract serves as a signaling device that can be used by one partner to credibly signal his or her ‘true’ love (Bishop 1984; Rowthorn 2002; Trebilcock 1999).

The comparative static we focus on is how a fall in divorce costs affects the divorce propensity – the likelihood of divorce in any given year of marriage, conditional on the marriage having remained intact up until that year. In all the models, a change in divorce costs affects the divorce propensity through two channels. First, lower divorce costs affect the incentive of existing married couples to divorce. We label this the ‘incentive effect’ of divorce costs. Second, lower divorce costs affect the composition of those couples that choose to marry in the first place. We label this the ‘selection effect’ of divorce costs.

All the models have the same intuitive prediction that the incentive effect varies by the time spent living under the lower divorce costs. In particular, as divorce costs fall – (i) the divorce propensity is higher in the first few years spent living under lower divorce costs, so that badly matched married couples break up earlier; (ii) as badly matched couples break up earlier, the divorce propensity is lower for couples that have been married under lower divorce costs for many years. Hence, the incentive effect is negative in the first few years after the fall in divorce costs – so that lower divorce costs increase the divorce propensity – and it is positive in later years.

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<sup>1</sup>As discussed in detail in the next section, the view that divorce involves transaction costs is widespread in the law and economics literature and among legal practitioners. This view is also reflected in the current public debate about divorce law reform in New York. For instance, in her 2006 State of the Judiciary address, the Chief Justice of New York stated that, “Divorce takes too long and costs much too much – too much money, too much agony, too hard on the children,” Kaye (2006) and *The New York Times* (2006). In the economics literature, Peters (1986) and Friedberg and Stern (2004) present evidence of such transactions costs being considerable.

Unlike the incentive effect, predictions on the selection effect of divorce costs differ depending on the underlying theory of marriage. When marriage serves as a commitment device, a reduction in divorce costs can induce couples of relatively low match quality to no longer marry. As the marginal couple that marries is of higher match quality, this increases the average quality of married couples which, in turn, reduces the divorce propensity at all marital durations. In such a commitment model of marriage, the selection effect can therefore be positive, namely a *decrease* in divorce costs leads to a *decrease* in the divorce propensity, all else equal.

In contrast, the selection effect is negative when the primary purpose of marriage is to serve as a signaling device or to bestow exogenous benefits on couples. In these models a reduction in divorce costs mitigates the costs of marriage but does not affect its benefits. As a result, couples of relatively low match quality, who do not get married when divorce costs are high, now prefer to marry when divorce costs are low. This reduces the average match quality of married couples which, in turn, leads to an increase in the divorce propensity at all marital durations. Both of these theories of marriage therefore predict that lower divorce costs reduce the match quality of the marginal and average marriage, and hence should raise the divorce propensity, all else equal.

We then take these predictions on the incentive and selection effects of lower divorce costs to the data. The aims of the empirical analysis are to, first explore whether the theoretical predictions on the incentive effect of lower divorce costs on the divorce propensity – which recall are the same in all underlying models of marriage – are actually borne out in the data. Second, we present evidence on the selection effect of lower divorce costs on the divorce propensity. This sheds light on which theory best matches the observed patterns in divorce propensities.

Our empirical analysis exploits individual marriage and divorce certificate data for the US. This is a rich data source that has not previously been exploited in the economics literature in such a disaggregated way. We construct duration-state-year of divorce specific divorce propensities for all marriages that occurred in 33 states after 1968 and divorced before 1995.

To measure a large and permanent reduction in divorce costs we exploit cross state variation in the timing of moves from mutual consent to unilateral divorce law. This is perhaps the single most

important divorce law reform in the US in the past generation. Between 1968 and 1977 the majority of states passed such laws, moving from a fault based regime in which the dissolution of marriage required the mutual consent of both spouses, to one in which either spouse could unilaterally file for divorce and no-fault had to be proved. It has long been argued in the law and economics literature that these reforms significantly reduced the costs of exiting marriage (Bishop 1984; Brinig and Crafton 1994; Trebilcock 1999; Rowthorn 2002; Scott 1990, 2002).

The view that mutual consent, or fault based, divorce involves significant transaction costs is also commonplace within the legal profession. In New York, which has fault based divorce law, the recent report of the Matrimonial Commission (2006) written by a panel of 32 leading practitioners of family law in the state, states that,

“The Commission finds that New York’s fault-based divorce system has a direct impact on the manner in which, and the speed with which, matrimonial matters proceed. Substantial evidence, derived from the public hearings held by the Commission and the professional experience of the Commission members, leads us to conclude that fault allegations and fault trials add significantly to the cost, delay and trauma of matrimonial litigation and are, in many cases, used by litigants to achieve a tactical advantage in matrimonial litigation.”

Given the disaggregated nature of our data, we identify the incentive and selection effects of lower divorce costs by exploiting the variation in divorce propensities in marriages of different durations but within the *same* state and year of divorce. Hence we are able to condition on unobserved state specific trends – such as changes in social attitudes or labor market characteristics – that may drive both the adoption of unilateral divorce and marriage market outcomes. This identification strategy allows us to address a key econometric concern that has plagued earlier studies on the effects of the liberalization of divorce laws on various marriage market outcomes.

On the incentive effect, our main results are as follows. First, we find evidence of an incentive effect on the divorce propensity of lower divorce costs, as proxied by the introduction of unilateral divorce laws. Second, this incentive effect varies according to how long the couple have been married for under unilateral divorce. Married couples that only live under unilateral divorce for a few years are more likely to divorce, and those that live for more years under unilateral divorce are less likely

to divorce, all else equal. In other words, the incentive effect is at first negative and then positive. This evidence is in line with the predictions of all the theories of marriage.

On the selection effect, we find evidence of a positive selection effect on the divorce propensity of lower divorce costs. Namely, those couples that marry *after* unilateral divorce is in place and hence when divorce costs are lower, are significantly *less* likely to divorce during marriage, other things equal. This result holds conditioning on the incentive effects of lower divorce costs already discussed, and conditioning on state specific trends in divorce propensities. The result suggests that reducing divorce costs leads to the marginal newly married couple to be, in some sense, ‘better matched’ than those previously married. This positive selection effect is only consistent with the commitment model of marriage. While we do not doubt that there are elements of all these hypotheses at play in the marriage market, the evidence suggests the *dominant* role of the marriage contract is to act as a commitment device.

The contributions of the paper are threefold. First, we develop and empirically test between three models of the role of marital contracts.

Second, our results help explain some puzzling findings in the earlier literature estimating the effect of unilateral divorce on the aggregate divorce rate. For example Gruber (2004) and Wolfers (forthcoming) both find the effects of unilateral divorce on aggregate divorce rates disappear around a decade after its introduction. Here we make precise why this is so. As the marriage contract serves primarily as a commitment device, when divorce costs fall, only couples with higher match quality remain willing to marry. This reduces the divorce rate in the long run as these better matched couples form a greater share of all married couples in steady state. Indeed the last 20 years has been the longest period of sustained decline in divorce in America since records began in 1860.

Third, our results speak directly to the public policy debate on the design of efficient divorce laws. The reform of these laws is a controversial policy issue that has received widespread public attention.<sup>2</sup> Our findings give support to those who argue that divorce costs can be ‘too low’ and

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<sup>2</sup>See for example the discussion in Waite and Gallagher (2000) on the divergent views across interest groups on how divorce laws should be designed.

that when they are too low, the very purpose of the marriage contract is undermined.

The paper is organized as follows. Section II discusses the related theoretical and empirical literature. Section III formalizes in turn three functions of the marriage contract. Section IV discusses unilateral divorce law, and describes our data and empirical method. Section V presents the main results and robustness checks. Section VI concludes. All proofs are in Appendix A.

## II. RELATED LITERATURE

Becker's (1973, 1974) seminal work inspired a vast literature on the economics of marriage (for overviews of the literature see, for instance, Bergstrom 1997; Ermisch 2003; Weiss 1997). In general however, this literature sheds more light on why couples prefer to be together rather than single, than on why couples enter marital contracts per se. However, economists have recently started to address the choice between marriage and cohabitation. For example, Brien, Lillard, and Stern (2006) estimate a structural model of the marriage market in which couples learn their match quality over time. They assume that, for exogenous reasons, the utility flows during relationships and the costs of dissolving them are different under marriage and cohabitation.

Wickelgren (2005) studies the effect of the change from mutual consent divorce to unilateral divorce on spouses' investment incentives. Similar to our argument, he shows that divorce reform can affect divorce rates both directly and indirectly by changing selection into marriage. Since he focuses on bargaining over the marital surplus but largely abstracts from the choice between marriage and cohabitation, while we largely abstract from bargaining and focus on the choice between marriage and cohabitation, his study can be viewed as complementary to this paper.

Wydick (2004) develops a model that is closely related to our commitment model. He also argues that marriage makes it more costly for couples to break up and shows that in a repeated game setting marriage can foster cooperation. Also in line with our analysis, he finds that low match quality couples prefer cohabitation while higher quality couples prefer marriage. He does not, however, analyze the effects of lower divorce costs on selection into marriage. Chiappori, Igiyun, and Weiss (2005) integrate a model of marital bargaining into a marriage market framework to analyze the

effects of changes in laws on the division of property in divorce. They also emphasize these legal changes have different effects on existing married couples compared to newly matched couples.

In contrast to the economics literature, the contractual choice between marriage and cohabitation has been at the center of much attention in the field of law and economics (Dnes and Rowthorn 2002). This literature emphasizes the higher exit costs of marriage relative to cohabitation and has identified three main functions of the marriage contract: (i) couples derive utility from following social custom (Cohen 1987, 2002), (ii) marriage serves as a commitment device that fosters cooperation and investments (Brinig and Crafton 1994; Scott 1990, 2002), and, (iii) it serves as a signaling device (Bishop 1984; Trebilcock 1999; Rowthorn 2002). Moreover, it is widely argued in this literature that the move from mutual to unilateral divorce has lowered the costs of divorce and that this has undermined some of the functions of the marriage contract.

Turning to the empirical literature, a number of papers have studied the effects of this legal change on marriage and divorce rates and provide suggestive evidence for the existence of incentive and selection effects. Rasul (2005) uses state level panel data to present evidence of a causal relationship between the adoption of unilateral divorce law and declines in marriage rates. This suggests couples are aware of divorce laws when they marry, which is a necessary condition for any selection effect to be present. Moreover, the fact that marriage rates have declined with the introduction of unilateral divorce, hints at lower divorce costs leading to *positive* selection into marriage, consistent with marriage serving predominantly as a commitment device.<sup>3</sup>

Trends in divorce rates are also informative. The doubling of divorce rates between 1965 and 1980 has been well documented. Less noted has been the decline in divorce rates since the mid 1980s. Indeed, the past 15 years have witnessed the longest sustained decline in divorce rates since records began. There has also been a convergence in divorce rates between states with and without unilateral divorce law. Using state level data from 1968 to 1988, Friedberg (1998) finds the introduction of unilateral divorce led to significantly higher divorce rates. Wolfers (forthcoming) extends Friedberg's sample to 2000, and reports the effects of unilateral divorce disappear around

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<sup>3</sup>Of course many other factors have also changed over time. For example Goldin and Katz (2002) show how the diffusion of the contraceptive pill has affected marriage incentives for women.

a decade after its introduction. Gruber (2004) reports similar results using census data.

Our analysis highlights that divorce rates in adopting states actually reflect two effects. First, under unilateral divorce law, divorce is less costly and hence more likely. This *incentive* effect implies divorce rates should be higher in adopting states other things equal. Second, the composition of those that marry changes under unilateral divorce – a *selection* effect. Whether this leads the divorce rate under unilateral divorce to be higher or lower than under mutual consent, depends on the underlying reason why individuals choose to marry. The long run convergence in divorce rates between adopting and non-adopting states, is however suggestive of a *positive* selection effect.<sup>4</sup> As with the evidence from marriage rates, trends in divorce rates are consistent with marriage acting primarily as a commitment device.

While the literature suggests a positive selection effect, this evidence is not conclusive. Our key contributions relate to the fact that the existing literature ignores the effect of divorce laws on the composition of couples that marry. Our empirical method uses information on duration-state-year of divorce propensities to identify both the incentive and selection effects of lower divorce costs. We identify each effect by exploiting variation in divorce propensities in marriages of different durations but within the *same* state and year of divorce. Hence we condition on unobserved state specific trends that may drive both the adoption of unilateral divorce and marriage market outcomes, thus mitigating a key econometric concern in earlier studies. These estimates then map back more precisely to underlying theories of marriage than do estimates obtained from analyzing any aggregate divorce rate series.

### III. THEORY

We formalize the three aforementioned hypotheses on the functions of marriage contracts that have been suggested in the law and economics literature. For each hypothesis, we develop a simple dynamic model that makes precise how a change in divorce costs affect marriage and divorce

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<sup>4</sup>Weiss and Willis (1997) also hint at this possibility using data from the National Study of the High School Class of 1972. Although not their focus, they find that couples married under unilateral divorce are less likely to divorce than those married under mutual consent. Mechoulan (2006) presents similar evidence from CPS data.

behavior.<sup>5</sup> There are three important features of our approach to modeling marriage.

First, we interpret marriage as a contract that makes it more costly for couples to separate if they are married, than if they cohabit.<sup>6</sup> However, marriage contracts not only make separation more costly but also involve a variety of other rights and obligations, such as custodial rights over children (Edlund 2005). We abstract from these other features of marital contracts and follow the lead of the law and economics literatures in focusing on the increased separation costs of marriage. We do so also because the divorce law reform we focus on empirically had a first order effect of reducing these costs of exiting marriage.

Second, and related, we assume the sole effect of divorce law reform was to reduce divorce costs and abstract from other potential effects, such as a loss of ‘prestige’ in getting married that may be due to sociological and psychological factors. We do so because we believe that while divorce law reform clearly reduced the cost of divorce the evidence on such additional effects is much less clear-cut.

Third, we largely abstract from marital bargaining over quasi-rents. We do so to focus attention on the effect of divorce reform on separation costs, an issue which has been largely neglected in the economics of marriage literature and which is likely to be of first order importance. Extending our analysis to allow for bargaining would complicate the analysis without changing the basic insights that we can empirically investigate.<sup>7</sup>

#### *A. Exogenous Benefits of Marriage*

There is a unit mass of men and a unit mass of women. In period  $d = 0$  each man gets matched with one woman and each couple learns the per partner benefit  $b$  that can be realized in their

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<sup>5</sup>The time-constrained reader may skip to Section III.D. where we summarize the predictions of each model.

<sup>6</sup>There are two reasons why separation is more costly for married couples. First, there are state imposed costs, such as minimum separation requirements, that married couples must incur before a divorce is granted. In contrast, cohabiting couples do not incur any such costs. Second, divorce typically involves bargaining and the bargaining process is likely to be costly for a variety of reasons, including the presence of private information. While the break up of a cohabiting couple may also involve costly bargaining, the bargaining costs are limited by the ability of partners to unilaterally terminate the relationship.

<sup>7</sup>Indeed, Wickelgren (2005) develops a model that allows for bargaining and reaches similar conclusions.

relationship.<sup>8</sup> In common with all the models we develop, these benefits  $b$  of being together might arise from any number of sources, including children, or other relationship specific assets.

We assume that  $b$  is drawn from a distribution with c.d.f.  $H(b)$  and support  $[0, \infty)$ . Each couple then decides whether to cohabit or to marry after which time moves on to period  $d = 1$ . At the beginning of  $d = 1$  each partner in a cohabiting couple realizes  $b$  and each partner in a married couple realizes  $b + B$ , where  $B > 0$  is an exogenously given ‘marriage benefit.’ This benefit captures the extra utility that the partners derive from publicly demonstrating their love.

Next, each partner in each couple learns the payoff  $s \in [0, \infty)$  that he or she can realize by returning to the single pool. This outside option  $s$  is couple specific and is randomly drawn from a distribution  $F(s)$ . For simplicity we assume that the payoff  $s$  that can be realized by returning to the single pool is the same for the man and woman in any couple.<sup>9</sup>

After the value of the outside option is realized, each partner decides whether to break up the current relationship and realize the outside option or whether to forgo the outside option and remain in the current relationship.<sup>10</sup> A break up is costless for a cohabiting couple but involves a divorce cost  $\gamma$  per partner if the couple is married. If a couple decides to break up, they realize their outside option, and potentially incur the divorce costs, after which the game ends for them. If, instead, they decide not to break up, time moves on to period  $d = 2$ .

All periods  $d = 2, 3, \dots$  are identical to period  $d = 1$ . All agents discount time at rate  $r \in [0, 1)$ . Finally, we assume that the marriage benefit  $B$  is neither so large that all couples find it optimal to marry, nor so small that no couple finds it optimal to do so. The timing of the game is summarized in Figure 1.

We now turn to the analysis of this model. A couple marries if and only if each partner prefers marriage to cohabitation. At the beginning of any period  $d > 0$ , the per partner payoff from

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<sup>8</sup>Throughout we assume that couples – whether cohabiting or married – consist of one woman and one man. We make this assumption solely for expositional convenience.

<sup>9</sup>A model in which partners in a couple have different realizations of  $b$  and  $s$  gives similar results to those presented. We do not develop this extension here because it considerably lengthens the exposition without adding additional insights.

<sup>10</sup>Note that in this model the two partners in any couple are identical, in the sense that for any action that is taken they always realize the same payoffs. The partners therefore always agree on their marital status and the separation decision. We make this assumption, which could be relaxed, solely to ease exposition.

cohabitation  $V_c$  is implicitly defined by

$$V_c = b + \int_0^{rV_c} rV_c dF(s) + \int_{rV_c}^{\infty} s dF(s). \quad (1)$$

The first term on the RHS is the benefit that each agent realizes by being together with his or her partner. The second term gives the surplus that each partner realizes if the outside option to the relationship is not attractive, namely when  $s \leq rV_c$ . For such a low realization of  $s$ , the partners will not break up and thus will still be cohabiting at the beginning of the next period. Finally, the last term gives the expected surplus that each partner realizes if the outside option is attractive, namely when  $s \geq rV_c$ , so that the relationship breaks up.

Similarly, at the beginning of any period  $d > 0$  the per partner payoff from marriage  $V_m$  is implicitly defined by

$$V_m = b + B + \int_0^{rV_m + \gamma} rV_m dF(s) + \int_{rV_m + \gamma}^{\infty} (s - \gamma) dF(s). \quad (2)$$

To understand when a couple chooses to marry rather than to cohabit, namely when  $V_m \geq V_c$ , we need to compare the benefit of marriage with its cost. In this model, the benefit of marriage is the exogenously given marriage benefit  $B$  and the cost is the higher cost of separation  $\gamma$ .

The key observation is that the cost of marriage is decreasing in the ‘match quality’ of a couple  $b$ . The larger is  $b$ , the less likely it is that a couple will want to separate in the future and thus the less likely it is that the additional costs of separation  $\gamma$  will be incurred. In contrast, the benefit of marriage  $B$  is independent of the match quality of a couple  $b$ . Intuitively, there then exists a unique cut-off level  $\bar{b}$  that separates couples into those that get married and those that cohabit.

**Lemma 1:** *There exists a unique cut-off level  $\bar{b}$  such that couples of match quality  $b \geq \bar{b}$  get married and couples of match quality  $b < \bar{b}$  cohabit.*

We now analyze how a change in divorce costs affects the divorce propensity, which is defined as the proportion of married couples that divorce in year  $d$  of their marriage. Consider first a married couple of match quality  $b$ . At the end of period  $d = 1$  the partners decide whether to break up, and realize  $s - \gamma$ , or remain in the relationship and realize  $rV_m$ . Thus divorce occurs in period  $d = 1$  if and only if  $s - \gamma \geq rV_m$ , which occurs with probability  $1 - F(rV_m + \gamma)$ . The probability of divorce

in the second year of marriage is then  $F(rV_m + \gamma)(1 - F(rV_m + \gamma))$ , namely the probability of not getting divorced in period  $d = 1$  multiplied by the probability of getting divorced in period  $d = 2$  conditional on reaching period  $d = 2$ . Thus, for a given married couple, the probability of getting divorced in year  $d$  is

$$p_d \equiv F(rV_m + \gamma)^{d-1} [1 - F(rV_m + \gamma)]. \quad (3)$$

We use this expression to calculate the expected divorce propensity for the population as a whole. Recall that matched couples marry if and only if  $b \geq \bar{b}$ . Thus the number of marriages is given by  $(1 - H(\bar{b}))$ . The expected number of couples that get divorced in year  $d$  is then given by

$$P_d \equiv \frac{1}{1 - H(\bar{b})} \int_{\bar{b}}^{\infty} p_d dH(b). \quad (4)$$

Consider now the effect of a change in the cost of divorce,  $\gamma$ , on the divorce propensity  $P_d$ ,

$$\frac{dP_d}{d\gamma} = \frac{\partial P_d}{\partial \gamma} + \frac{\partial P_d}{\partial \bar{b}} \frac{\partial \bar{b}}{\partial \gamma}. \quad (5)$$

The first term on the RHS is the *incentive* effect. It captures the effect of a change in  $\gamma$  on  $P_d$  holding constant the set of people who are married. The second term on the RHS is a *selection* effect. A change in  $\gamma$  affects who gets married and that in turn affects the divorce propensity. These two effects are key for our analysis. Before signing them in the next proposition, it is useful to introduce the *cumulative divorce propensity*, which is defined as the proportion of married couples that divorce in *or before* year  $d$  of their marriage and which is denoted by  $P_d^\Sigma = \sum_{t=1}^d P_t$ . The cumulative divorce propensity can be decomposed into a *cumulative incentive effect* and a *cumulative selection effect* by replacing  $P_d$  with  $P_d^\Sigma$  in (5). We can now state the first proposition.

**Proposition 1 (Exogenous Benefit):** *The selection effect is negative. The incentive effect is negative for small  $d$ , and positive for large  $d$ . The cumulative incentive effect is negative.*

The intuition for the selection effect is as follows. Since a fall in  $\gamma$  reduces the cost of marriage without affecting the benefits, it leads to more couples getting married, that is  $\partial \bar{b} / \partial \gamma$  is positive. The additional couples who get married after the fall in the divorce costs are of lower match quality than those couples that would get married if divorce costs remained high.

Thus, other things equal, an increase in the number of people who get married – a fall in  $\bar{b}$  – leads to an increase in the divorce propensity at each duration of marriage  $d$ , so  $\partial P_d / \partial \bar{b}$  is negative. In short, the model captures the intuition that if couples marry primarily to receive exogenous benefits, then a reduction in the cost of marriage should lead to additional, low match quality marriages. These low quality married couples are more likely to divorce in the future. Therefore, the selection effect is negative.

The intuition for the incentive effect is as follows. A reduction in the divorce costs affects the probability of getting divorced in year  $d$  in two opposing ways. On the one hand, such a reduction makes it more likely that a couple gets divorced in period  $d$ , conditional on not divorcing earlier. On the other hand, however, it also increases the probability that the couple divorces before period  $d$ . For small  $d$  the first effect dominates and for large  $d$  the second effect dominates. For intermediate  $d$ , whichever effect dominates is ambiguous and, in particular, depends on the distribution of the outside option,  $F(s)$ . Note, however, that while the sign of the incentive effect depends on marriage duration, the cumulative incentive effect, that is the incentive effect on the propensity to get divorced in or before a given year of marriage, is always negative. Thus, we get the intuitive prediction that, holding constant the composition of those that marry, a reduction in the divorce costs increases the probability of ever getting divorced.

### *B. Marriage as a Commitment Device*

We now consider a model in which marriage acts as a commitment device that fosters cooperation in an infinitely repeated prisoner’s dilemma. For this purpose, we change the previous model in two respects. First, to focus attention on the role of the marriage contract as a commitment device, we abstract from any exogenous benefits from marriage so that  $B = 0$ . Second, we now assume that a partner only realizes the benefit  $b$  if his or her partner ‘cooperates.’ In particular, at the beginning of any period  $d > 0$  the partners simultaneously decide whether to cooperate or not. An agent who cooperates incurs a cost  $c$  and generates a benefit  $b$  for their partner while an agent who does not cooperate does not incur any costs, nor generate any benefits. The remainder of the game is as in

the previous model. The timing of the game is summarized in Figure 2.<sup>11</sup>

We now turn to the analysis of the model. Couples of sufficiently high match quality, namely those for whom  $b > c$ , face a prisoner's dilemma. Their payoffs would be maximized if both partners cooperated but their short term interests might induce each partner not to cooperate. We assume partners play the following trigger strategies: each partner in a couple cooperates in period  $d = 1$ ; in every period  $d > 1$  they cooperate if both partners cooperated in all previous periods; and they do not cooperate if either partner did not cooperate in any previous period.

Consider first the conditions under which cooperation can be sustained by married couples and by cohabiting couples. At the beginning of period  $d > 0$ , the value of being in a married relationship in which partners cooperate is

$$V_m = (b - c) + \int_0^{rV_m + \gamma} rV_m dF(s) + \int_{rV_m + \gamma}^{\infty} (s - \gamma) dF(s) \quad (6)$$

and the value of being in a married but non-cooperating relationship is

$$U_m = \int_0^{rU_m + \gamma} rU_m dF(s) + \int_{rU_m + \gamma}^{\infty} (s - \gamma) dF(s). \quad (7)$$

The interpretation of these equations is similar to that of equation (1). Given the trigger strategies, a married couple can then sustain cooperation if and only if the deviation payoff  $b + U_m$  is less than the non-deviation payoff  $V_m$ , that is if and only if

$$b \leq V_m - U_m. \quad (8)$$

As in the previous model, the only difference between marriage and cohabitation is the existence of divorce costs for married couples. Thus, at the beginning of  $d > 0$ , the value of being in a cohabiting relationship in which partners cooperate is  $V_c \equiv V_m(\gamma = 0)$ , and the value of being in a cohabiting relationship in which partners do not cooperate is  $U_c \equiv U_m(\gamma = 0)$ . We can then state the reneging constraint for cohabiting couples as

$$b \leq V_c - U_c. \quad (9)$$

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<sup>11</sup>This is similar to the model of marital bargaining developed in Lundberg and Pollak (1993). They argue that non-cooperation within marriage is an alternative to either cooperation or divorce.

The next lemma establishes that, while both married and cohabiting couples can sustain cooperation as long as their benefit of being together  $b$  is sufficiently large, it can be sustained ‘more easily’ by married couples.

**Lemma 2:** *There exists a unique  $\bar{b}$  and a unique  $\underline{b}_1 < \bar{b}$  such that cooperation can be sustained in a cohabiting relationship if and only if  $b \geq \bar{b}$ , and it can be sustained in a married relationship if and only if  $b \geq \underline{b}_1$ .*

Note that, by reducing the partners’ expected outside options, marriage reduces both the cooperation *and* the punishment payoffs, that is  $V_m < V_c$  and  $U_m < U_c$ . It is therefore not immediately obvious that marriage facilitates cooperation. Lemma 2 shows, however, that marriage reduces the cooperation payoff by *less* than it reduces the punishment payoff so that it does indeed facilitate cooperation.

We can now turn to the main question of which couples marry and which cohabit. Since, conditional on cooperation, cohabitation is preferred to marriage, that is  $V_c > V_m$ , and, conditional on non-cooperation, cohabitation is also preferred to marriage, that is  $U_c > U_m$ , two necessary conditions for couples to marry are that – (i) cooperation cannot be sustained under cohabitation; and (ii) cooperation can be sustained under marriage.

Thus, couples of very low match quality, namely couples for whom  $b < \underline{b}_1$ , do not marry, and neither do couples of very high match quality, namely couples for whom  $b > \bar{b}$ . Couples of intermediate match quality can sustain cooperation if and only if they are married. Thus, they marry if and only if they realize a higher payoff if they are married and cooperate, than if they cohabit and do not cooperate. Consider then the next lemma.

**Lemma 3:** *There exists a unique  $\underline{b}_2$  such that couples prefer cooperating and being married to not cooperating and cohabiting if and only if  $b \geq \underline{b}_2$ .*

The relative size of  $\underline{b}_1$  and  $\underline{b}_2$  is ambiguous and depends on the parameter values. We can then state the following lemma.

**Lemma 4:** *Couples marry if and only if their match is of intermediate quality, namely if and only if  $b \in [\underline{b}, \bar{b})$ , where  $\underline{b} \equiv \max[\underline{b}_1, \underline{b}_2]$ .*

In this model the divorce propensity is then given by

$$P_d \equiv \frac{1}{H(\bar{b}) - H(\underline{b})} \int_{\underline{b}}^{\bar{b}} d_d(\gamma) dH(b), \quad (10)$$

where  $d_d(\gamma)$  is defined in (3) and gives the divorce probability for a given couple in year  $d$  of their marriage, and  $(H(\bar{b}) - H(\underline{b}))$  is the number of marriages.

To see the effect of a fall in divorce costs on the divorce propensity, consider first how such a fall affects the number of marriages  $(H(\bar{b}) - H(\underline{b}))$ . Changes in the divorce cost do not affect  $\bar{b}$  since they do not influence the ability of unmarried partners to cooperate. They do, however, affect  $\underline{b}$ . Recall that  $\underline{b} = \max[\underline{b}_1, \underline{b}_2]$ , where  $\underline{b}_1$  is the cut-off level of  $b$  above which married couples can sustain cooperation and below which they cannot and  $\underline{b}_2$  is the cut-off level of  $b$  above which couples prefer a cooperating, married relationship to a non-cooperating, cohabiting relationship.

A fall in the divorce costs  $\gamma$  increases  $\underline{b}_1$  and decreases  $\underline{b}_2$ . The intuition for the former is that a reduction in the divorce costs  $\gamma$  makes it harder to sustain cooperation in a married relationship. Thus, with a lower  $\gamma$  only couples of *higher* match quality, that is couples with higher  $b$ 's, can sustain cooperation in a marriage. The intuition for the latter is that a reduction in  $\gamma$  makes it even more attractive to be in a married and cooperating relationship than to be in a cohabiting and non-cooperating relationship. This is the case since a reduction in the divorce costs allows married couples to realize good outside options at lower cost.

Thus, a fall in divorce costs can lead to more marriages (if  $\underline{b}_2 > \underline{b}_1$ ) or less (if  $\underline{b}_1 > \underline{b}_2$ ). If it leads to more marriages, the average match quality of married couples is reduced and if it leads to less marriages, the average match quality of married couples is increased.

We can now turn to the comparative statics. Consider first the marginal effect of a change in divorce costs  $\gamma$  on the divorce propensity,

$$\frac{dP_d}{d\gamma} = \frac{\partial P_d}{\partial \gamma} + \frac{\partial P_d}{\partial \underline{b}} \frac{\partial \underline{b}}{\partial \gamma}. \quad (11)$$

As in the previous model, the change in the divorce propensity can be decomposed into an incentive effect, the first term on the RHS, and a selection effect, the second term on the RHS. Also as in the

previous model, the cumulative divorce propensity  $P_d^\Sigma = \sum_{t=1}^d P_d$  can be similarly decomposed by replacing  $P_d$  with  $P_d^\Sigma$  in the above expression.

**Proposition 2 (Commitment):** *The selection effect is negative if  $b_2 > b_1$  and positive otherwise. The incentive effect is negative for small  $d$ , and positive for large  $d$ . The cumulative incentive effect is negative.*

The selection effect is negative if a fall in the divorce costs leads to more marriages, and since these additional marriages are of relatively low match quality, this leads to an increase in the divorce propensity at each duration of marriage  $d$ , so  $\partial D_d(\gamma, \underline{b})/\partial \bar{b}$  is negative. In contrast, the selection effect is positive if a fall in the divorce costs leads to *less* marriages, and since the couples that no longer get married are of relatively low match quality, this decreases the divorce propensity. The model captures the intuition that a reduction in divorce costs makes marriage a less effective commitment device. As a result, couples of low match quality, who only cooperate if they have access to a strong commitment device, no longer marry. Hence the selection effect can be positive. The intuition behind the incentive and the cumulative incentive effect is as in the previous model.

### *C. Marriage as a Signaling Device*

We now develop a model in which an individual can use marriage proposals to signal private information. For this purpose we change the basic model from Section III.A. in two regards. First, to focus attention on the role of marriage contracts as a signaling device we again abstract from any exogenous marriage benefits, so that  $B = 0$ . Second, we change the set up in period  $d = 0$  so that after a couple has been matched only the man observes the match quality of the couple  $b$  while the woman only knows that it is randomly drawn from a distribution  $H(b)$ .<sup>12</sup>

After having observed  $b$ , the man can either break up, propose cohabitation, or propose marriage. In the case of a proposal the woman can either accept or reject. If she accepts, the couple start a relationship.

We assume that starting a relationship is costly since partners have to invest into getting to

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<sup>12</sup>We refer to the informed party as the man only for expositional convenience.

know each other, and are less effective in searching for alternative partners. We model these costs in a reduced form by assuming that on acceptance of a man's proposal by the woman, she incurs a cost  $c_W$  and the man incurs a cost  $c_M$ . After a proposal is accepted, and the costs of starting a relationship are incurred, time moves on to period  $d = 1$ . If the woman rejects a proposal, or the man does not propose and instead breaks up, the partners realize their randomly drawn outside option  $s \sim F(s)$ . The timing of the game is summarized in Figure 3.

The key difference between men and women in this model is the difference in the cost of starting a relationship. If this difference were very small, there would be no need for men to signal their private information by proposing marriage since women would find it optimal to accept the cohabitation proposal of any man willing to make such a proposal. We therefore assume that  $c_W$  is large enough relative to  $c_M$  so that women do not want to start a relationship with the average man who prefers cohabitation to being single.<sup>13</sup>

We now turn to the analysis of the model. Upon being matched and learning the realization of  $b$ , a man must decide whether to break up, propose cohabitation, or propose marriage. The expected payoff in cohabitation is given by (1) and the expected payoff in marriage is given by (2) for  $B = 0$ . Note that all men prefer cohabitation to marriage, that is  $V_c > V_m$  for all  $b$ , since marriage increases the costs of separation without generating any direct benefits. Note also that while the expected payoff  $E(s)$  that a man receives when he breaks up is independent of  $b$ , the expected payoffs of cohabitation and marriage are increasing in  $b$ . The following lemma follows immediately from these observations.

**Lemma 5:** *There exist two critical values,  $\underline{b}$  and  $\bar{b} > \underline{b}$ , such that a man prefers cohabitation to breaking up if and only if  $b \geq \underline{b}$  and he prefers marriage to breaking up if and only if  $b \geq \bar{b}$ .*

As in any signaling model there exist pooling equilibria. Since those who argue that marriage contracts are used as a signaling device have in mind separating equilibria, we focus on them.<sup>14</sup>

**Lemma 6:** *When the cost of starting a relationship for a woman,  $c_W$ , is sufficiently low, there exists*

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<sup>13</sup>This assumption is stated precisely in Appendix A. The case when this assumption is not satisfied is trivial and economically uninteresting.

<sup>14</sup>The condition under which separating equilibria exist in this model is stated explicitly in Appendix A. Intuitively, for separating equilibria to exist  $c_W$  has to be large enough relative to  $c_M$ .

a separating equilibrium of the following form: any man for whom  $b \in [\bar{b}, \infty)$  proposes marriage and his proposal is accepted and any man for whom  $b \in [0, \bar{b})$  breaks up.

In the separating equilibrium men who learn that the match quality of their match is high, differentiate themselves from those who learn that the match quality is low by proposing marriage. Women understand that only men with high  $b$ 's are willing to get married and agree to marriage as long as their cost of starting a relationship is not too high.

We can now analyze the effect of a fall in divorce costs on the divorce propensity. The divorce propensity is given by (4), where  $p_d(\gamma)$  is defined in (3). As in the previous models, the effect of a change in the divorce costs on the divorce propensity can be decomposed into an incentive and a selection effect,

$$\frac{dP_d}{d\gamma} = \frac{\partial P_d}{\partial \gamma} + \frac{\partial P_d}{\partial \bar{b}} \frac{\partial \bar{b}}{\partial \gamma}. \quad (12)$$

Also as in the previous model, the cumulative divorce propensity  $P_d^\Sigma = \sum_{t=1}^d P_d$  can be similarly decomposed by replacing  $P_d$  with  $P_d^\Sigma$  in the above expression.

**Proposition 3 (Signaling):** *The selection effect is negative. The incentive effect is negative for small  $d$ , and positive for large  $d$ . The cumulative incentive effect is negative.*

The model captures the intuition that if marriage is used as a signaling device, then a reduction in the cost of using this signal should lead to more agents making use of this signal.<sup>15</sup> Since these additional agents were not previously willing to send the signal, they must be of lower match quality than those agents who were willing to send the signal when its cost was high. The selection effect is then negative since a fall in the costs of divorce leads to more marriages ( $\partial \bar{b} / \partial \gamma > 0$ ) and because these additional marriages are of relatively low match quality, this increases the divorce propensity at each duration of marriage  $d$ , so  $\partial p_d / \partial \bar{b}$  is negative. The intuition for the incentive and the cumulative incentive effect is as in the previous models.

#### *D. Summary of Theoretical Predictions*

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<sup>15</sup>Of course, if the cost of the signal becomes too small, it can no longer be used as a credible signaling device. In other words, separating equilibria do not exist if the cost of divorce is too low.

We have formalized three prominent hypotheses on why people enter marriage contracts. In each model, the comparative static we focus on is the effect of divorce costs on the divorce propensity. The analysis highlights that a fall in the divorce costs affects the divorce propensity through an incentive effect – by changing the probability of divorce for a married couple in a given year of marriage; and through a selection effect – by changing the composition of those that marry.

On the incentive effect, all the models have the intuitive prediction that with lower divorce costs – (i) the divorce propensity is higher in the first few years of marriage, so that badly matched couples break up earlier; (ii) because more badly matched couples break up earlier, then conditional on the marriage having survived sufficiently long, the divorce propensity is lower in later years; (iii) the cumulative divorce propensity is higher, independent of the duration of marriage, so that the probability of ever divorcing is higher. In short, all the models predict the incentive effect is positive in the first few years of marriage and negative in later years, and the cumulative incentive effect is always negative.

On the selection effect, if couples get married primarily because it allows them to realize exogenous benefits, then a reduction in the costs of exiting marriage leads to additional, low match quality marriages. Similarly, if marriage serves as a signaling device, then a reduction in the cost of using this signal, induces additional, low match quality agents to make use of it. Hence the exogenous benefit and signaling models predict the selection effect is negative since a *fall* in divorce costs induces additional low match quality couples to get married, who are then *more* likely to divorce. In contrast, the commitment model of marriage allows for the possibility that with lower divorce costs, low match quality couples no longer get married. This is because with lower divorce costs, the strength of marriage as a commitment device is weakened and so only couples of better match quality will want to marry for this purpose. Hence the selection effect can be positive.

The models also make further predictions on the effects of lower divorce costs on marriage and cohabitation rates, and the match quality of the marginal married and cohabiting couple. Due to data and space constraints, we leave using those additional predictions to discriminate between the models of marriage to future research.

## IV. EMPIRICAL ANALYSIS

### *A. Unilateral Divorce Law*

The 1970s were a period of major reform in American divorce laws, foremost of which was the introduction of unilateral divorce law. Between 1968 and 1977 the majority of states passed such legislation, moving from a fault based regime in which the dissolution of marriage required the mutual consent of both spouses, to one in which either spouse could unilaterally file for divorce and no fault had to be proved. Criticism of the mutual consent system stemmed from the view that it reduced the welfare of spouses and led to perjured testimony in collusive divorce proceedings that fostered disrespect towards the law. Legislators were also motivated to improve welfare within families and end the legal convention in which extreme cruelty was almost the only universal ground for divorce (Parkman 1992).<sup>16</sup>

As discussed in Section II, we follow the claims in the law and economics literature and the opinions of legal practitioners, and view unilateral divorce law as reducing divorce costs. The introduction of unilateral divorce therefore corresponds to a one-off and permanent reduction in the costs of exiting marriage,  $\gamma$ , the effects of which have been discussed in the context of each of the three underlying models of marriage. Table 1 reports the year of adoption of unilateral divorce law by state. To allow our results to be directly comparable to the existing literature we follow the same coding as in Friedberg (1998, Table 1).<sup>17</sup>

### *B. Data*

We exploit individual marriage and divorce certificate data from the US for our empirical analysis.

These cover all marriages and divorces in 33 states that have occurred since 1968 and divorced

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<sup>16</sup>However, there remain concerns over the potential simultaneity between the adoption of unilateral divorce law and marriage market outcomes. Our empirical method addresses these concerns directly by controlling for state specific trends in divorce propensities.

<sup>17</sup>The relevant divorce law applying to individuals is normally that in their state of residence. Although individuals can file for divorce in another state, this is subject to them meeting residency requirements. States require a spouse to be resident of the state, often for at least six months and sometimes up to one year, before being eligible to file for divorce there. Currently only three states – Alaska, South Dakota and Washington – have no statutory requirement for resident status. Furthermore, any legal decision regarding property division, alimony, custody and child support is not valid unless the non-resident spouse consents to the jurisdiction of the court. If however a spouse accepts the jurisdiction of a court in another state, the courts of all US states recognize the divorce settlement.

prior to 1995. Therefore marriages of duration between 0 and 27 years are observed in the data.<sup>18</sup> The data covers the universe of marriages and divorces in small states, and a representative sample in larger states. The certificates data include information on the place and years of marriage and divorce, as well as some demographic characteristics of each partner. Table 1 details the years of coverage by state in the certificates data.

The dependent variable in our analysis is the propensity to divorce among the population of couples in state  $s$  that divorce in year  $t$  and that have been married for  $d$  years, which corresponds to  $P_d$  in the theoretical analysis as defined in (4). Empirically this is defined as,

$$p_{dst} = \frac{\text{number of divorces in state } s, \text{ year } t, \text{ of duration } d}{1000 \times \text{number of marriages in state } s \text{ in year } (t - d)}. \quad (13)$$

Our working sample contains 12345 observations of divorce propensities at the duration-state-year level. Of the 33 states covered, 19 adopt unilateral divorce law in some year, and 54.3% of the observations are in adopting states when unilateral divorce is in place.<sup>19</sup>

Theory suggests that lower divorce costs have both an incentive and a selection effect on the divorce propensity. The incentive effect relates to the number of years the couple have been married under the unilateral divorce regime. Consider the cohort of couples that divorce  $d$  years after marriage in state  $s$  in year  $t$ . Suppose further that unilateral divorce was adopted in state  $s$  in year  $T_s$ . There are two cases to consider. First, if these couples married after unilateral divorce was in place, they have been exposed to lower divorce costs for the duration of their marriage,  $d$ . Alternatively, if they married before the divorce law change, they have been exposed to  $t - T_s$  years of unilateral divorce. Hence the number of years these couples have been married under unilateral divorce, and have been exposed to the incentive effect of lower divorce costs is,

$$incentive_{dst} = \min[t - T_s, d]. \quad (14)$$

The selection effect relates to the effect of unilateral divorce on the propensity to divorce through its effect on the composition of those that marry. Theoretically, a change in the law may have an

<sup>18</sup>We define a marriage to be of duration zero years if it lasts less than 12 months.

<sup>19</sup>The average marital duration is 9.23 years, the average year of marriage is 1977 and the average year of divorce is 1986. These figures do not significantly differ between adopting and non-adopting states. The next subsection provides a complete set of descriptive evidence.

immediate effect on the selection into marriage. More realistically, however, it may take time for couples to learn about the magnitude and permanence of changes in divorce costs. Hence for any cohort of divorcing couples, the selection effect relates to the number of years prior to the year of marriage, if any, that unilateral divorce laws were in place, and is therefore given by,

$$selection_{dst} = \max[t - d - T_s, 0]. \quad (15)$$

Within a state-year, the incentive and selection effects vary across cohorts of different marital durations. It is therefore possible to identify the incentive and selection effects separately from state-year specific factors that determine divorce propensities. This is an important part of our identification strategy which we later discuss in more detail. In addition, taking the theoretical framework literally, we also show that our main results are robust to using a simpler dummy variable for the selection effect. This dummy selection effect is therefore set equal to one if  $selection_{dst} > 0$  and is set equal to zero otherwise.

### *C. Descriptives*

Table 2 provides descriptive evidence on – (i) the years couples have been married under unilateral divorce, which corresponds to the incentive effect, and, (ii) the number of years prior to the year of marriage that unilateral divorce law was in place for, which corresponds to the selection effect. We also show the overall variation in the  $incentive_{dst}$  and  $selection_{dst}$  variables defined in (14) and (15), and decompose each into the variation that arises between marriages of the same duration that divorce in different state-years, and the variation we exploit across marriages of different duration within each state-year.

Part (i) of Table 2 shows that among all states the average marriage has lived under unilateral divorce for 4.62 years (Column 1) and this rises to 8.08 years among adopting states (Column 2). Within these states, there is considerable variation in  $incentive_{dst}$  between cohorts divorcing in different state-years. Importantly for our analysis, there remains variation in  $incentive_{dst}$  among divorcing couples within the same state and year.

The next two columns split couples in adopting states into those married before the introduction of unilateral divorce (and so have zero years of selection by definition), and those married after the introduction of unilateral divorce. This shows that the incentive effect of lower divorce costs is identified from those couples in adopting states married before the introduction of unilateral divorce law. This is because among couples married after unilateral divorce is in place,  $incentive_{dst}$  always corresponds to the year of divorce minus the year unilateral divorce was introduced,  $t - T_s$ .

Part (ii) shows that among all states the average marriage formed 3.03 years after the introduction of unilateral divorce (Column 1). This rises to 5.30 years among adopting states (Column 2), and rises further to 8.33 years when we consider the subsample of marriages in adopting states that formed after the introduction of unilateral divorce (Column 4). In each subsample, there is greater variation in  $selection_{dst}$  among marriages of different duration within the same state-year, than between couples of different marital duration.

Part (iii) shows the data dimensions in each of these subsamples. The incentive (selection) effect is identified from 2566 (4491) observations in 92 (166) state-year of divorce cohorts in adopting states, corresponding to 36.4% (63.6%) of all observations from adopting states.

We provide descriptive evidence on the incentive and selection effects of unilateral divorce by comparing divorce propensities – (i) between adopting and non-adopting states (the subsamples in Columns 1 and 2 of Table 2); (ii) in adopting states, between couples married before the introduction of unilateral divorce to those married after (the subsamples in Columns 3 and 4 of Table 2); (iii) in adopting states, between couples that get married between one and four years after the introduction of unilateral divorce, and those married at least five years after.

Figure 4a graphs the divorce propensity by marital duration for adopting and non-adopting states. The divorce propensity at each marital duration is higher in adopting states. The unconditional probability of divorcing in the first 27 years of marriage is .492 in adopting states – almost one in two marriages end in divorce in these states. The figure is lower at .425 in non-adopting states. Differences in these divorce propensities may reflect permanent differences between adopting and non-adopting states, including those unrelated to unilateral divorce law. We address this

empirically by allowing the divorce propensity to differ across adopting and non-adopting states at each marital duration. We also present all of our results exploiting only the variation in divorce propensities within adopting states.

Figure 4b compares divorce propensities for those in adopting states that were married before the introduction of unilateral divorce, to those married after its introduction. Divorce propensities among the former group reflect only an incentive effect, while in the latter group they reflect both incentive and selection effects. The figure shows those married after unilateral divorce was in place are more likely to divorce in the first four years of marriage, but are less likely to subsequently divorce compared to couples married before unilateral divorce was in place.

Two points are of note. First, these differences in the divorce propensities by marital duration are in line with the incentive effect of lower divorce costs predicted by all the theories of marriage. Namely, as divorce costs fall, the divorce propensity rises in early years of marriage and falls in later years. Second, theory suggests that the cumulative incentive effect should be negative – holding selection constant, the probability of ever divorcing should increase as divorce costs fall. However, Figure 4b implies the unconditional probability of divorcing in the first 27 years of marriage is .498 for those married before the introduction of unilateral divorce (and so have zero years of selection), and is actually *slightly lower* at .480 for those married after the introduction of unilateral divorce (and so have positive years of selection). This suggests the reason why the overall probability of ever divorcing falls for the second group is because the selection effect of lower divorce costs they are subject to reduces the divorce propensity. In other words this evidence hints at a *positive* selection effect which can be reconciled with theory if couples predominantly use marriage as a commitment device.

To more closely isolate the selection effect, Figure 4c compares divorce propensities between couples that get married between one and four years after the introduction of unilateral divorce, to those married at least five years after. While both types of couple experience the same incentive effect during marriage, they differ in the years prior to marriage that lower divorce costs have been in place for. We expect the divorce propensity to differ between these couples if it takes

time for individuals in the marriage market to learn the extent of the fall in divorce costs, and change their behavior accordingly. The figure shows that for those couples with more years of selection, the propensity to divorce is *lower* than for those couples with fewer years of selection. The unconditional probability of divorcing in the first 20 years of marriage is .466 for those couples with one to four years of selection, and is .439 for those with at least five years of selection.<sup>20</sup> This again hints at a positive selection effect.

#### *D. Empirical Method*

We first estimate the effect on the divorce propensity of unilateral divorce law being in place per se. This is a natural benchmark to consider and enables our analysis to be compared to the existing literature. We estimate the panel data specification

$$p_{dst} = \delta_d + \alpha_s + \gamma_t + \sum_d \phi_d(\delta_d \times adopt_s) + \beta unilateral_{st} + u_{dst}, \quad (16)$$

where  $\delta_d$ ,  $\alpha_s$ , and  $\gamma_t$  correspond to duration, state and year of divorce fixed effects respectively. The estimated  $\delta_d$  coefficients measure the underlying divorce propensity at each marital duration. These may capture the rate at which individuals learn the true costs and benefits of marriage for example. The pattern of these divorce propensities is not parametrically restricted. State fixed effects capture permanent differences in the level of divorce propensities across states. For example the social stigma associated with divorce may differ permanently across states. The year of divorce fixed effects capture changes in divorce propensities over time that are common to all states and marriages within a given year. For example there may be macroeconomic changes or federal policies that alter the costs and benefits of marriage for all marriages.

One concern, highlighted in Figure 4a, is that the propensity to divorce at a given marital duration  $d$  systematically differs across states. To address this concern we control for a series of interactions between each duration fixed effect and a dummy variable,  $adopt_s$ , which is set equal to one if state  $s$  ever introduces unilateral divorce, and zero otherwise. This captures in a flexible and

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<sup>20</sup>We consider marital durations up to 20 years because for couples with more than 5 years of selection, there is a lower likelihood of observing longer marital durations in the data which records divorces up to 1995.

non-parametric way any permanent differences in divorce propensities by marital duration between non-adopting and adopting states.

The dummy variable  $unilateral_{st}$ , is set equal to one if unilateral divorce law is in place in state  $s$  in year  $t$ , and zero otherwise. The coefficient of interest in the baseline specification in (16) is  $\beta$ , which estimates the effect of lower divorce costs associated with unilateral divorce on the propensity to divorce. This estimate captures both the incentive and selection effects of lower divorce costs. The implied change in the probability of divorcing in or before year  $d$  is then  $\sum_d \widehat{\beta} = d\widehat{\beta}$ , which is related to  $dP_d^\Sigma/d\gamma$  in the theoretical analysis.

The error term  $u_{dst}$  captures unobserved duration-state-year specific determinants of the divorce propensity. The propensity to divorce after  $d$  years of marriage in state  $s$  may not be independent over time. Following Bertrand, Duflo, and Mullainathan (2005), we address this concern by allowing the error terms to be clustered by duration-state throughout.

There are two key differences between our approach and the previous empirical literature. First, the existing literature typically estimates the effect of unilateral divorce being in place in state-year  $st$  on the *aggregate* divorce rate at the state-year level. An econometric concern with this approach is the presence of unobserved state-year factors that simultaneously determine both the adoption of unilateral divorce and aggregate divorce rates. Examples of such unobservables include social attitudes, labor market outcomes, or political preferences. Alternatively states with higher levels of, or rates of growth in divorce rates, may be more likely to adopt unilateral divorce. Such reverse causality between marriage market outcomes and the adoption of unilateral divorce implies that  $\widehat{\beta}$  is likely to be biased upwards.

We address these concerns by exploiting the disaggregated nature of our data. In particular we additionally control for state-year fixed effects in (16). Allowing for such state specific time trends in divorce propensities differences out within state changes over time in social attitudes, labor markets, and political preferences, that may drive the adoption of unilateral divorce law and divorce propensities.

The second difference between our approach and the existing literature is that we exploit the

theoretical insight that lower divorce costs affect divorce propensities through an incentive effect and a selection effect. Hence our preferred specification is,

$$p_{dst} = \delta_d + \alpha_s + \sum_d \phi_d(\delta_d \times adopt_s) + \beta_1 incentive_{dst} + \beta_2 selection_{dst} + v_{st} + u_{dst}, \quad (17)$$

where  $incentive_{dst}$  and  $selection_{dst}$  are defined in (14) and (15), and  $v_{st}$  is a state-year fixed effect. This difference-in-difference-in-difference specification only exploits the variation in divorce propensities across marriages of different duration within a state-year to identify the incentive and selection effects of lower divorce costs.<sup>21</sup>

Theory informs us of the expected signs of the two parameters of interest – (i)  $\beta_1$ , which estimates the incentive effect related to  $\partial P_d / \partial \gamma$  in the theoretical analysis, and, (ii)  $\beta_2$ , which estimates the selection effect related to  $\frac{\partial P_d}{\partial b} \frac{\partial b}{\partial \gamma}$  in the theoretical analysis.

On the selection effect, if couples get married primarily because it allows them to realize exogenous benefits, or if marriage serves as a signaling device, then a reduction in the costs of exiting marriage leads to additional, low match quality marriages. In these cases the selection effect is negative since a *fall* in divorce costs induces additional low match quality couples to get married, who are then *more* likely to divorce. Hence  $\beta_2 > 0$  if either of these hypotheses are true.

In contrast, the commitment model of marriage allows for the possibility that with lower divorce costs, low match quality couples no longer get married. This is because with lower divorce costs, the strength of marriage as a commitment device is weakened and so only couples of better match quality will want to marry for this purpose. Hence the selection effect can be positive. Therefore  $\beta_2 < 0$  if this theory accurately describes individual behavior in the marriage market.<sup>22</sup>

On the incentive effect, all the models developed predict that the incentive effect of lower divorce costs is to raise the divorce propensity in the first few years lived under lower divorce costs, and to lower it in later years. In specification (17) the incentive effect of lower divorce costs  $\beta_1$  is

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<sup>21</sup>With a full set of state-year dummies the effect of unilateral divorce law itself cannot be identified. Note also that our dependent variable – the divorce propensity – is measured relative to the ‘at risk’ population of married couples. In contrast the existing literature has focused on the number of divorces per 1000 of the (adult) population.

<sup>22</sup>If individuals anticipate the lowering of divorce costs, there would be changes in the composition of those that marry under mutual consent divorce laws. This biases any estimated selection effect towards zero. We later present evidence that sheds light on whether individual appear to anticipate the lowering of divorce costs.

constrained to be the same across all marriages and therefore measures the average incentive effect. We relax this restriction in Section V.III. as theory suggests should be done.

Finally, all the models predict the cumulative incentive effect should be negative so that, holding selection constant, a reduction in divorce costs leads to an increase in the probability of ever divorcing. However, note that in (17) any change in the divorce propensity that is common to all marriages in the same state-year is actually differenced out. Hence we cannot use this specification to estimate the probability of ever divorcing. In order to present some evidence on this specific theoretical prediction we therefore estimate the following specification,

$$p_{dst} = \delta_d + \alpha_s + \sum_d \phi_d(\delta_d \times adopt_s) + \beta_1 unilateral_{st} + \beta_2 incentive_{dst} + \beta_3 selection_{dst} + u_{dst}, \quad (18)$$

where the estimated cumulative incentive effect is given by  $\sum_d (\hat{\beta} + \hat{\beta}_1) = d(\hat{\beta} + \hat{\beta}_1)$ . This is likely to provide an upper bound on this effect given potential concerns that states in which divorce propensities are higher are more likely to adopt unilateral divorce. These concerns are mitigated within our preferred specification (17) which we use to provide the main estimates of the incentive and selection effects.

We also check the robustness of our results to some assumptions underlying our identification strategy. First, exploiting the variation in divorce propensities in both adopting and non-adopting states is valid only if non-adopting states provide a true counterfactual of what would have occurred to trends in divorce propensities in adopting states in the absence of unilateral divorce law. While we allow the divorce propensity to vary by duration differentially between adopting and non-adopting states, this may not be sufficiently flexible to capture all the differences between these states.<sup>23</sup> We therefore present all of our results based on two samples – first using all states, and then only exploiting the variation in divorce propensities within adopting states.

A second identifying assumption is that couples do not change location in order to marry and divorce in states on the basis of their divorce law. To assess whether this assumption is valid, we use the fact that between 1972 and 1988 divorce certificate data records both state of marriage

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<sup>23</sup>For example, suppose individuals can devote some costly effort to learn the true benefits of their marriage. They may have different incentives to do this as the cost of divorce changes, introducing systematic differences in divorce propensities between adopting and non-adopting states that may vary by marital duration.

and divorce. In adopting states, 66% of divorces occur in the same state as their marriage. In non-adopting states, the figure is actually slightly higher – 73% of divorces occur in the same state as marriage. There are also no discernible changes over time in these figures, either within adopting or non-adopting states. This suggests those that marry in mutual consent states are not then more likely to want to divorce in a unilateral divorce state.<sup>24</sup>

Finally, in order to benchmark our results against the existing literature we have coded the timing of the introduction of unilateral divorce law as in Friedberg (1998, Table 1). However there remains debate over the precise definition of these moves to unilateral divorce (a thorough discussion of this issue is provided by Zelder 1993). Following Wolfers (forthcoming), we therefore consider the following alternative codings of unilateral divorce – (i) Gruber (2004) codes unilateral divorce laws with no separation requirements, using both primary and secondary sources; (ii) Ellman and Lohr (1998) code when each state adopted either irretrievable breakdown or incompatibility as grounds for divorce. In each re-coding of unilateral divorce law, the estimated incentive and selection effects remain of the same sign, significance, and of comparable magnitudes to those reported in Section V.<sup>25</sup>

## V. RESULTS

The empirical analysis proceeds in three stages. Section V.A. estimates specifications (16) to (18). Section V.B. shows how the incentive and selection effects vary across couples within the same state. Section V.C. sheds light on whether the incentive and selection effects are heterogeneous across states depending on the states’ social and economic characteristics.

### A. *Baseline Estimates*

Table 3 presents our baseline estimates. We first estimate (16) to shed light on the effect of lower divorce costs, as measured by the presence of unilateral divorce, on divorce propensities.<sup>26</sup> Column

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<sup>24</sup>There of course remains measurement error in the dependent variable due to individuals migrating across states during marriage for reasons that are independent of the divorce laws in place. This biases the estimated standard errors upwards.

<sup>25</sup>These results are not presented here in order to save space but are available on request.

<sup>26</sup>Conditioning only on duration fixed effects in (16) explains 66% of the variation in divorce propensities. Conditioning only on state fixed effects explains 13% and year fixed effects explain only 9%.

1 shows that after the introduction of unilateral divorce, the propensity to divorce at any given marital duration increases by 4.08 divorces per 1000 marriages, and that this increase is significantly different from zero. The average divorce propensity across all marriages is 22.1. Hence the implied effect of unilateral divorce is to increase the divorce propensity, averaged across marriages of all durations, by 18.5%. As a point of comparison, we note that Friedberg (1998) estimates that unilateral divorce laws increases the aggregate divorce rate, measured as the number of divorces per 1000 of the population, by 17%.

Column 2 additionally controls for the number of years couples have been married under unilateral divorce and have therefore been exposed to the incentive effect of lower divorce costs, as defined in (14). The result implies that as married couples live an additional year under lower divorce costs, the propensity to divorce falls by .256 per 1000 marriages. This finding is in line with those of Wolfers (forthcoming), where the effects of lower divorce costs are found to diminish over time.

Two further points are of note. First, each of the theories of marriage developed earlier suggests the incentive effect ought to increase the divorce propensity in early years of marriage and reduce it in later years. The results imply that the divorce propensity is indeed higher for those exposed to unilateral divorce for  $4.08/.256 \simeq 16$  years of marriage, and lower for those who have been married under unilateral divorce for longer. Second, all the theories suggest the cumulative incentive effect is positive at any marital duration. These results imply the cumulative incentive effect is  $27 \times (4.08 - .256) = 103.2$ , so the probability of divorce during the first 27 years of marriage increases when unilateral divorce is in place. Relative to a baseline probability of divorce during the first 27 years of marriage in adopting states of .492 (Figure 4a), this corresponds to a 21% increase.

In Column 3 we additionally control for the number of years prior to the year of marriage, if any, that unilateral divorce laws were in place, as defined in (15). This captures the selection effect of unilateral divorce – that operates through its effect on the composition of those that marry – on the propensity to divorce. We find that, conditional on the years of married actually lived under

unilateral divorce, this selection effect significantly reduces the propensity to divorce.<sup>27</sup>

We can map this result back to the models of marriage. While we certainly expect each model to capture some element of marriage market behavior, our evidence suggests the dominant reason why couples enter marriage contracts is that it serves as a commitment device. In such a framework there is a possibility that with lower divorce costs, low match quality couples no longer get married, and only couples of better match quality still prefer to marry. This reduces the divorce propensity in steady state. In contrast if couples get married primarily because it allows them to realize exogenous benefits, or if marriage serves as a signaling device, then a reduction in divorce costs leads to additional, low match quality marriages. If these were the dominant reasons why couples enter marriage contracts, the selection effect should increase the divorce propensity.

Column 4 then estimates the specification in (17) which controls for a complete set of state-year interactions. The result in Column 4 shows that within a state-year, couples that have been living under lower divorce costs for more years have significantly lower divorce propensities. Similarly, couples that were married more years after unilateral divorce laws were first introduced in the state are significantly less likely to divorce. In other words, the selection effect of lower divorce costs is also to reduce divorce propensities. The sign of this selection effect implies that the first order purpose of the marital contract is to serve as a commitment device.<sup>28,29</sup>

The next specification addresses the concern that there are unobserved determinants of divorce propensities that are common to marriages across all states of the same duration and in the same year. We therefore condition on a full set of duration-year fixed effects instead of the state-year fixed effects. In light of the large changes in divorce hazards through the sample, it may be especially

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<sup>27</sup>The  $incentive_{dst}$  and  $selection_{dst}$  variables are not strongly correlated. Their correlation coefficient is .096 in the entire sample and -.342 among adopting states. Comparing Columns 2 and 3 reveals that once the selection effect is conditioned on, the incentive effect of having lived under lower divorce costs increases in absolute magnitude slightly.

<sup>28</sup>The magnitude of the effects in Column 4 are also larger than in the previous specifications. This suggests there exist unobserved factors at the state-year level that increase (decrease) divorce propensities and that are negatively (positively) correlated with the incentive and selection effects. As recognized in the earlier literature, the presence of such unobservables is also likely to lead the previously estimated effect of unilateral divorce law,  $\hat{\beta}$ , to be inconsistent.

<sup>29</sup>We also used information from the certificates data to control for the average age at marriage of women in the cohort of couples divorcing in year  $d$  of marriage that married in state  $s$  in year  $t$ . with such an additional control, the magnitudes and significance of the incentive and selection effects remain similar to those in Column 4. Cohorts of couples in which women married at an older age have lower divorce propensities although this effect is not significant at conventional levels.

important to control for such interactions. We then exploit the variation in divorce propensities across marriages in different states but of the same duration and year of divorce to identify the incentive and selection effects. The direct effect of the presence of unilateral divorce law in state  $s$  and year  $t$  can also then be estimated. The result in Column 5 shows that the incentive and selection effects continue to be negative and significant.

The next specification uses an alternative definition for the selection effect. Taking the theoretical models literally, there ought to be a differential effect on divorce propensities for couples married pre and post changes in unilateral divorce law. In Column 6 we therefore define the selection variable using a dummy variable that is set equal to one if  $selection_{dst} > 0$  and is zero otherwise. The result in Column 6 shows that this cruder specification of the selection effect leaves the results qualitatively unchanged.<sup>30</sup>

Taken together, the evidence suggests lower divorce costs reduce divorce propensities through two channels – an incentive effect of having lived under unilateral divorce during marriage, and a selection effect of having married years after the introduction of unilateral divorce. In relation to the underlying models of marriage, the sign of this selection effect implies the underlying dominant purpose of the marital contract is to serve as a commitment device.

These results help explain some of the earlier findings in the literature estimating the effect of unilateral divorce laws on the aggregate divorce rate. For example Gruber (2004) and Wolfers (forthcoming) both find the effects of unilateral divorce laws on aggregate divorce rates disappear around a decade after its introduction. Here we make precise why this is so. Namely, because the marriage contract serves primarily as a commitment device, when the costs of exiting marriage fall, only higher match quality couples are willing to marry. This reduces the divorce rate in the long run as these better matched couples form a greater share of all married couples in steady state.

Moreover, our theoretical and empirical results are complementary to those in Rasul (2005) on the impact of unilateral divorce law on marriage rates. Using state level panel data from 1960 to 2000, that paper provides evidence that after the adoption of unilateral divorce, marriage rates

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<sup>30</sup>The results in Table 3 are also largely robust to two further types of robustness check – allowing the error terms to be clustered at the state-year level, and estimating the effects exploiting only the variation within adopting states.

– measured either as the number of marriages per 1000 of the adult population or relative to the population of unmarried individuals – fell significantly and permanently in adopting states, consistent with a positive selection effect.

### *B. Dynamic Effects*

In the baseline specification (17) the parameters of interest,  $\beta_1$  and  $\beta_2$ , correspond to the incentive and selection effects respectively, averaged over all marriages. Theory suggests the selection effect is either always positive, or always negative depending on the underlying reason why couples enter marriage contracts. However, all the theories developed provide a more precise prediction on how the incentive effect varies with the years lived under lower divorce costs. In particular, the incentive effect of lower divorce costs ought to increase the propensity to divorce in the first few years after lower divorce costs are in place, and reduce it in later years. To provide more direct evidence that at least one of the theories developed can explain the patterns of divorce propensities, we explore how the sign and magnitude of the incentive effect varies by years lived under unilateral divorce.

We modify the specification of Column 4 in Table 3, to allow the incentive effect of lower divorce costs to vary by the years lived under unilateral divorce, conditional on a full set of state-year fixed effects. We therefore estimate the following panel data specification,

$$p_{dst} = \delta_d + \alpha_s + \sum_d \phi_d(\delta_d \times adopt_s) + \sum_{\tau > 0} \beta_1^\tau incentive_{dst} + \beta_2 selection_{dst} + v_{st} + u_{dst}. \quad (19)$$

From (14), we have that  $\tau = \min[t - T_s, d]$  corresponds to the years lived under unilateral divorce for the cohort of couples that divorce in state  $s$  in year  $t$  of duration  $d$ , if unilateral divorce was introduced in year  $T_s$ . Hence  $\beta_1^\tau$  is the incentive effect of having lived under lower divorce costs for  $\tau$  years. Figure 5a then plots the series of  $\widehat{\beta}_1^\tau$  coefficients for all  $\tau \leq 20$ .<sup>31</sup> The omitted category is the incentive effect in the first year under lower divorce costs. Note that as the incentive effect partly relates to the year in which unilateral divorce was adopted within the state, and there is

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<sup>31</sup>The incentive effect varies between 0 and 20 years in over 95% of the duration-state-year level observations.

variation across states in the timing of adoption, the sequence of  $\widehat{\beta}_1^\tau$  coefficients do not merely reflect a common time trend in divorce propensities.

Reassuringly, the pattern of coefficients in Figure 5a shows that for cohorts of married couples that live under unilateral divorce for up to 10 years, the propensity to divorce increases. However for marriages that experience living under unilateral divorce for more than 10 years, the propensity to divorce falls. The magnitudes of these coefficients are consistent with the earlier regression analysis. There we estimated the incentive effect averaged over all years lived under unilateral divorce. The point estimate from the corresponding specification in Column 4 of Table 3 of -1.19 was an average of these dynamic effects.

Note first that this result is in line with Gruber (2004) and Wolfers (forthcoming) who find the effects of unilateral divorce laws on aggregate divorce rates begin to disappear around a decade after its introduction. Second, the implied cumulative incentive effect,  $\sum_{\tau>0} \widehat{\beta}_1^\tau$ , is .026, so that the implied probability of ever divorcing is higher as divorce costs fall, consistent with the predictions of all the models of marriage developed. As discussed in Section IV.C., this estimate is likely to underestimate the true change in the probability of ever divorcing because in (19) we difference out any common effect of lower divorce costs on all marriages within a state-year.

We are also able to estimate how the magnitude of the selection effect varies with the number of years that lower divorce costs are in place prior to marriage. It is informative to estimate the varying magnitude of this effect for two reasons. First, the theory compares divorce propensities across two steady states with high and low divorce costs. The theory provides no prediction on the transition from one to the other. Second, if individuals anticipate the lowering of divorce costs, there will be changes in the composition of those that marry even under mutual consent divorce. This biases the previously estimated selection effect towards zero.

We then modify the previous dynamic specification in (19) to also allow the selection effect to vary and so estimate the following panel data specification,

$$p_{dst} = \delta_d + \alpha_s + \sum_{\tau>0} \beta_1^\tau incentive_{dst} + \sum_{\lambda>0} \beta_2^\lambda selection_{dst} + v_{st} + u_{dst}. \quad (20)$$

$\lambda = \max[t - d - T_s, 0]$  is the number of years prior to the year of marriage, if any, that unilateral

divorce laws were in place. Hence  $\beta_2^\lambda$  is the selection effect of having married  $\lambda$  years after the introduction of unilateral divorce law. We continue to condition on a full set of state-year fixed effects. Figure 5b then plots the series of  $\widehat{\beta}_2^\lambda$  coefficients for all  $\lambda \leq 15$ .<sup>32</sup>

For couples married up to three years after the introduction of unilateral divorce law, the propensity to divorce increases. For couples married four or more years after unilateral divorce law is adopted, the propensity to divorce falls, other things equal.<sup>33</sup> As we do not observe an immediate fall in divorce propensities with the introduction of unilateral divorce, this pattern of coefficients suggests couples do not anticipate the reduction in divorce costs. Rather, it takes a few years after the introduction of unilateral divorce before the composition of couples that marry starts to adjust such that only couples of higher match quality continue to marry, eventually causing the divorce propensity to fall.

This can either imply the commitment motive for marriage has become much stronger over time, and in particular has begun to be the dominant reason why couples chose to marry a few years after the introduction of unilateral divorce. This would be the case if for example the divorce law regime in place shapes how the population views the underlying purpose of marriage. An alternative interpretation of the data is that it takes time for individuals to learn how and to what extent divorce costs have fallen and to change their marriage market behavior accordingly. Disentangling these hypotheses is something we leave for future research.

### *C. Heterogeneous Effects*

We now step outside the bounds of the theoretical analysis and investigate other sources of variation that may lead the incentive and selection effects of lower divorce costs to be heterogeneous across married couples. This helps add weight to a causal interpretation of the incentive and selection effects previously estimated, and highlights directions for further research.

#### 1. Labor Market Characteristics

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<sup>32</sup>The selection effect varies between 0 and 15 years in over 95% of the duration-state-year level observations.

<sup>33</sup>The magnitudes of these coefficients are consistent with the earlier regression analysis. There we estimated the selection effect averaged over all married couples. The point estimate from the corresponding specification in Column 4 of Table 3 of -1.05 was an average of these dynamic effects.

The first source of heterogeneity relates to the labor market characteristics under which the couple live. Some of these characteristics, such as the female labor force participation rate and ratio of female to male earnings, reasonably proxy the relative bargaining power of women in the marriage market, and hence the share of the marriage surplus that accrues to each partner. If there is assortative matching in the marriage market, and the surplus from marriage differs across couples depending on their labor market opportunities, then there should be variation in how sensitive couples are, on the margin, to a reduction in the costs of exiting marriage. On the selection margin, a reduction in the costs of exiting marriage may reduce the incentives for spouses to invest into marital specific capital, or change the allocation of resources within marriage. Anticipating this, the marginal couple that chooses to marry may differ, hence changing the selection effect of lower divorce costs.<sup>34</sup>

We construct the labor market variables from the Current Population Survey at the state-year level.<sup>35</sup> As these labor market variables are defined at the state-year level, we drop the state-year fixed effects from specification (17) and instead control for the particular labor market characteristic  $X_{st}$ , and an interaction between each characteristic and the incentive and selection effects. Hence we estimate the following panel data specification,

$$p_{dst} = \delta_d + \alpha_s + \gamma_t + \sum_d \phi_d(\delta_d \times adopt_s) + \beta_1 incentive_{dst} + \beta_{11}(X_{st} \times incentive_{dst}) \quad (21) \\ + \beta_2 selection_{dst} + \beta_{22}(X_{st} \times selection_{dst}) + \omega X_{st} + u_{dst}.$$

We estimate this among all states and among adopting states only. The parameters of interest are the interactions between the incentive and selection effects and each labor market characteristic,  $\beta_{11}$  and  $\beta_{22}$ . All labor market characteristics are defined in terms of their deviation from their mean. Hence the incentive and selection effects,  $\beta_1$  and  $\beta_2$ , are evaluated at the mean of the labor market variables. The results are reported in Table 4.

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<sup>34</sup>Evidence that the introduction of unilateral divorce changes the allocation of resources within marriage has been found in the context of labor supply (Gray 1998; Chiappori, Fortin, and Lacroix 2002), and domestic violence (Stevenson and Wolfers 2006). Stevenson (2005) reports that divorce laws also have significant effects on marriage-specific investment, such as home ownership, children, and specialization in market versus non-market production.

<sup>35</sup>Details on the construction of each variable are provided in the Appendix B.

Columns 1 and 2 show that among all states the incentive effect of lower divorce costs is significantly higher (less negative) when the relative bargaining power of women increases, as measured by higher female labor force participation rates, or a higher ratio of female to male earnings. In contrast the selection effect is significantly lower (more negative) when female bargaining power increases. The results in Columns 3 and 4 show a similar pattern when we exploit only the variation in divorce propensities among adopting states.

The heterogeneous incentive effects suggest that as the bargaining power of women increases, couples become less likely to divorce having lived under unilateral divorce an additional year. This may capture the fact that there is positive assortative matching in marriage markets so that women with valuable outside options in the labor market tend to marry men with similarly high valued outside options. If the marriage surplus from these relationships is higher, then, on the margin, these couples are expected to be less sensitive to changes in the costs of exiting marriage.

On the selection effect, the results suggest that having been married an additional year after the introduction of unilateral divorce, significantly reduces the divorce propensity and this effect is stronger when women have more bargaining power. This implies the use of the marriage contract as a commitment device is relatively stronger when women have more bargaining power, other things equal. These implications clearly deserve further research.<sup>36</sup>

## 2. Social Characteristics

We now explore whether the incentive and selection effects differ with the social characteristics in the state in which a given couple live. We exploit two measures of these characteristics. First, we use the percentage of the state population that is Catholic. This may be indicative of higher social costs of divorce, and hence in such states the incentive and selection effects arising from the introduction of unilateral divorce laws may be mitigated.<sup>37</sup>

Our second approach uses information on the permissiveness of divorce laws, based on an index

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<sup>36</sup>We have also estimated these specifications including state-year fixed effects. The sign and significance of the results are largely unchanged when we do this, although as expected, the magnitudes of the coefficients change.

<sup>37</sup>Catholics have lower divorce rates than non-Catholics (Bumpass and Sweet 1972; Freiden 1974), and a higher age at marriage (Michael and Tuma 1985; Mosher, Williams, and Johnson 1992).

constructed by Broël-Plateris (1961). This index is calculated from responses to a questionnaire administered to 68 family law experts in each state. It is designed to reflect whether states have systematically different standards of evidence and perjury in divorce cases. As such, it serves as a proxy for judicial attitudes and social norms towards divorce in the early 1960s, pre-dating the introduction of unilateral divorce. The index varies cross sectionally across states and runs from 0 (least permissive) to 100 (most permissive). The incentive and selection effects of lower divorce costs should be lower in more permissive states because in those states, the interpretation and practice of the law is such that divorce costs are lower to begin with.<sup>38</sup>

For each social characteristic, we estimate a specification similar to that in (21), both among all states and then among adopting states only. The parameters of interest are the interactions between the incentive and selection effects and each social characteristic. All characteristics are defined in terms of their deviation from their mean. Hence the incentive and selection effects are evaluated at the mean of the social variables. The results are reported in Table 5.

Column 1 shows that among all states, where the share of the population that is Catholic is higher than average, the incentive effect of having lived an additional year under unilateral divorce law is significantly higher (less negative), all else equal. At the same time, the selection effect of having been married an additional year after the introduction of unilateral divorce law is significantly lower (more negative), all else equal. Column 3 shows that the sign, significance, and magnitude of these heterogeneous effects are similar among the subset of adopting states.

The incentive effect result implies that where there is a greater share of Catholics among the population, married couples are less affected by a reduction in divorce costs as proxied by unilateral divorce law. Presumably this is because in these states the social costs of divorce remain relatively high irrespective of the legal regime governing divorce. The selection effect result suggests that where a greater share of the population is Catholic, the commitment motive for entering the marriage contract is relatively stronger, perhaps because the underlying reasons for entering marriage contracts are different for Catholics than non-Catholics.

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<sup>38</sup>Further details of this index are reported in Stetson and Wright (1975). They find a positive correlation between this index and actual divorce laws in place, as well as with divorce rates themselves.

On the permissiveness of divorce laws, the result in Column 2 shows that in states in which divorce laws are more permissive to begin with, the incentive effect of having lived an additional year under unilateral divorce law is significantly lower (more negative), all else equal. At the same time, the selection effect of having been married an additional year after the introduction of unilateral divorce law is significantly higher (less negative), all else equal. Column 4 confirms these findings among the subset of adopting states. This suggests that in states with pre-existing liberal attitudes towards divorce, the commitment motive for entering the marriage contract may be relatively weaker.

## VI. CONCLUSION

Marriage contracts are among the most prevalent forms of contract in human society, yet economists know relatively little about why people decide to marry and enter such contracts. The vast literature on the economics of marriage that followed Gary Becker's seminal contribution, has focused on the gains from 'being together' relative to being single. This literature provides fewer insights on why couples choose to marry rather than cohabit. In contrast, this paper focuses directly on the reasons why individuals agree to sign marriage contracts.

We have formalized three models of marriage contract that have been discussed informally in the law and economics literature. We then provide empirical evidence to identify which model can best be reconciled with data from the US marriage market. Our findings suggest that the dominant role of the marriage contract is to act as a commitment device.

Our results speak directly to the current policy debate on if and how divorce laws should be reformed (see, for instance, Kaye 2006; Matrimonial Commission 2006; *The New York Times* 2006). When marriage serves as a commitment device, a reform that reduces the cost of divorce, such as the move to unilateral divorce, can undermine the purpose of the marriage contract. Indeed, it can easily be shown that in the commitment model divorce costs can be 'too low' and that, in such a case, a reform that *increases* divorce costs would lead to higher marriage rates and lower divorce rates. In this context it is interesting to note that survey evidence suggests large segments of the

population support higher divorce costs and believe that such a reform would “save the institution of marriage.”<sup>39</sup>

Absent such a reform, couples should search for alternative commitment devices when they believe that marriage no longer provides enough commitment power. The demand for ‘covenant marriages,’ which are licensing procedures that are specifically designed to make marital break ups more costly, suggests that some couples do indeed seek more effective commitment devices. Covenant marriage bills have already been enacted by state legislatures in Arizona, Arkansas and Louisiana and have been discussed in many other states (see *The Economist* 1997; *The Washington Post* 1998).

Our results also relate to the debate on gay marriage, and suggest that by not allowing homosexuals to marry, current marriage laws destabilize relationships between homosexuals and thus impose an economic cost on them. Currently such efficiency considerations are largely absent from the policy debate on gay marriage which focuses on moral and fairness concerns (see *The Economist* 2004).

Throughout our analysis we have assumed that the sole effect of divorce law reform was to reduce the costs of getting divorced and have abstracted from other potential effects, such as a reduction in the “prestige” associated with getting married. We have done so since these other effects are less well understood and likely to be of second-order importance relative to the reduction in divorce costs themselves. It should be noted, however, that each model could be extended to incorporate such additional effects whereby the benefits of marriage are also partly endogenously determined by divorce costs. We leave the analysis of such alternative models and their empirical predictions for future work.

Another natural extension of our analysis would be to integrate a model of marital bargaining into the theoretical framework. This would make precise how the outside options of spouses in marital bargaining influence the sign and magnitude of the incentive and selection effects of divorce

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<sup>39</sup>Between 1974 and 2002, the *General Social Survey* has asked a representative sample of American adults, “Should divorce in this country be easier or more difficult to obtain than it is now?” Every survey shows a majority or plurality of Americans think divorce should be made “more difficult.” See also *The Washington Post* (2004).

costs.<sup>40</sup> It would also provide an empirical framework in which to further explore the potential heterogeneous effects of unilateral divorce laws across different married couples, and to analyze the effects of other legal reforms, such as those begun in the mid 1980s on the division of marital assets and allocation of child custody.

Finally, in analyzing marriage as a commitment device, we have focused on its role in facilitating cooperation in a repeated setting. It is evident, however, that there are also other ways in which marriage can serve as a commitment device.<sup>41</sup> Since any model in which marriage serves as a commitment device would be consistent with a positive selection effect, our results do not allow us to distinguish between such models of commitment. We leave this task for future work.

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<sup>40</sup>See for instance Wickelgren (2005). Similar to our argument, he shows that divorce reform can affect divorce rates both directly and indirectly by changing selection into marriage.

<sup>41</sup>For example, Scott (2002) suggests that agents with hyperbolic preferences who anticipate that they will not be able to resist the temptation of an affair in the future, but also know that such an affair hurts them in the long run, may want to marry to ‘tie their hands.’

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## APPENDIX A

This Appendix provides proofs of the lemmas and propositions in the main text and provides additional information on the models developed in Section III.

**Proof of Lemma 1:** Implicitly differentiating (1) and (2) gives

$$\frac{dV_c}{db} = \frac{1}{1 - rF(rV_c)} > 0 \text{ and } \frac{dV_m}{db} = \frac{1}{1 - rF(rV_m + \gamma)} > 0.$$

Thus, the values of cohabitation and of marriage are both increasing in the match quality of a couple,  $b$ . Observe also that  $dV_c/db < dV_m/db$  if  $V_c = V_m$ . Finally, recall that we assume that  $B$  is small enough so that some couples find it optimal not to marry. It then follows that there exists a unique  $\bar{b}$  such that  $V_m \geq V_c$  if  $b \geq \bar{b}$  and  $V_m < V_c$  otherwise. ■

**Proof of Proposition 1:** Using (1) and (2) and implicitly differentiating gives

$$\frac{d\bar{b}}{d\gamma} = \frac{(1 - F(rV + \gamma))(1 - rF(rV))}{r(F(rV + \gamma) - F(rV))} > 0,$$

where  $V = V_m = V_c$ . Next, differentiating (4) gives

$$\frac{\partial P_d}{\partial \bar{b}} = \frac{h(\bar{b})}{1 - H(\bar{b})} [P_d - p_d(\bar{b})] < 0,$$

where  $p_d(\bar{b})$  is  $p_d$  evaluated for  $b = \bar{b}$ . Since  $d\bar{b}/d\gamma > 0$  and  $dP_d/d\bar{b} < 0$  it follows that the selection effect is negative. Next, differentiating (4) gives

$$\frac{\partial P_d}{\partial \gamma} = \frac{1 - r}{1 - H(\bar{b})} \int_{\bar{b}}^{\infty} \frac{F(\cdot)^{d-2} f(\cdot)}{1 - rF(\cdot)} [(d-1)(1 - F(\cdot)) - F(\cdot)] dH(b). \quad (\text{A1})$$

Note that this expression is negative for  $d = 1$ . Thus there exists a  $\underline{d} > 1$  such that  $\partial P_d/\partial \gamma < 0$  if  $d < \underline{d}$ . Next note that  $F(rV_m + \gamma) < 1$  for all  $b$ . It follows that for large enough  $d$  the term in squared brackets in the above expression is positive for all  $b$ . This, in turn, implies that there exists a  $\bar{d} \geq \underline{d}$  such that  $\partial P_d/\partial \gamma > 0$  if  $d \geq \bar{d}$ . Finally, it follows from (A1) that the cumulative incentive effect is given by

$$\frac{\partial P_d^\Sigma}{\partial \gamma} = \sum_{t=1}^d \frac{\partial P_t}{\partial \gamma} = -\frac{1 - r}{1 - H(\bar{b})} \int_{\bar{b}}^{\infty} d \frac{F(\cdot)^{d-1} f(\cdot)}{1 - rF(\cdot)} dH(b) < 0. \quad \blacksquare$$

**Proof of Lemma 2:** Consider first the reneging constraint (8). Note that the constraint is strictly satisfied for  $b = c$  since in this case the RHS is equal to zero. Note also that the LHS increases in  $b$  at rate 1 and the RHS increases in  $b$  at rate  $1/[1 - rF(rV_m + \gamma)] > 1$ . Thus there exists a unique  $\underline{b}_1$  such that (8) is satisfied if and only if  $b \geq \underline{b}_1$ .

Consider next the reneging constraint (9). Note that the constraint is strictly satisfied for  $b = c$  since in this case the RHS is equal to zero. Note also that the LHS increases in  $b$  at rate 1 and the RHS increases in  $b$  at rate  $1/[1 - rF(rV_c)] > 1$ . Thus there exists a unique  $\bar{b}$  such that (9) is satisfied if and only if  $b \geq \bar{b}$ .

To establish that  $\bar{b} > \underline{b}_1$  we need to show that  $V_m - U_m > V_c - U_c$ . To see that this is indeed the case, note first that  $V_m - U_m = V_c - U_c$  if  $\gamma = 0$ . Note next that

$$\frac{dV_m}{d\gamma} = -\frac{1 - F(rV_m + \gamma)}{1 - F(rV_m + \gamma)} > -\frac{1 - F(rU_m + \gamma)}{1 - F(rU_m + \gamma)} = \frac{dU_m}{d\gamma},$$

where the expressions for  $dV_m/d\gamma$  and  $dU_m/d\gamma$  are obtained by implicitly differentiating (6) and (7). Thus,  $V_m - U_m > V_c - U_c$  for any  $\gamma > 0$ . ■

**Proof of Lemma 3:** The payoff from cooperating and being married is given by  $V_m$  and the payoff from not cooperating and cohabiting is given by  $U_c$ . Note that  $V_m < U_c$  for  $b = c$  and that  $V_m$  is increasing in  $b$  while  $U_c$  is independent of  $b$ . Thus there exists a unique  $\underline{b}_2$  such that  $V_m \geq U_c$  if and only if  $b \geq \underline{b}_2$ . ■

**Proof of Lemma 4:** This lemma follows immediately from the discussion in the text. ■

**Proof of Proposition 2:** Consider first  $\underline{b}_1$ , which is the unique  $b$  that solves (8) with equality. Recall from the proof of Lemma 2 that the LHS increases in  $b$  at rate 1 and the RHS increases in  $b$  at rate  $1/[1 - rF(rV_m + \gamma)] > 1$ . Recall also from that proof that the RHS is increasing in  $\gamma$ . This implies that  $d\underline{b}_1/d\gamma < 0$ . Consider next  $\underline{b}_2$ , which is the unique  $b$  that solves  $V_m = U_c$ . By implicitly differentiating we get

$$\frac{d\underline{b}_2}{d\gamma} = (1 - F(rV_m + \gamma)) > 0.$$

Finally, differentiating (10) gives

$$\frac{dP_d}{d\underline{b}} = \frac{h(\underline{b})}{H(\bar{b}) - H(\underline{b})} [P_d - p_d(\underline{b})] < 0,$$

where  $p_d(\underline{b})$  is  $p_d$  evaluated for  $b = \underline{b}$ . It follows that the selection effect is negative if  $\underline{b}_2 > \underline{b}_1$  and positive otherwise. Next, differentiating (10) gives

$$\frac{\partial P_d}{\partial \gamma} = \frac{1-r}{H(\bar{b}) - H(\underline{b})} \int_{\underline{b}}^{\infty} \frac{F(\cdot)^{d-2} f(\cdot)}{1-rF(\cdot)} [(d-1)(1-F(\cdot)) - F(\cdot)] dH(b). \quad (\text{A2})$$

Note that this expression is negative for  $d = 1$ . Thus there exists a  $\underline{d} > 1$  such that  $\partial P_d / \partial \gamma < 0$  if  $d < \underline{d}$ . Next note that  $F(rV_m + \gamma) < 1$  for all  $b$ . It follows that for large enough  $d$  the term in squared brackets in the above expression is positive for all  $b$ . This, in turn, implies that there exists a  $\bar{d} \geq \underline{d}$  such that  $\partial P_d / \partial \gamma > 0$  if  $d \geq \bar{d}$ . Finally, it follows from (A2) that the cumulative incentive effect is given by

$$\frac{\partial P_d^\Sigma}{\partial \gamma} = \sum_{t=1}^d \frac{\partial P_t}{\partial \gamma} = -\frac{1-r}{H(\bar{b}) - H(\underline{b})} \int_{\underline{b}}^{\infty} d \frac{F(\cdot)^{d-1} f(\cdot)}{(1-rF(\cdot))} dH(b) < 0. \quad \blacksquare$$

**Proof of Lemma 5:** A man prefers cohabitation to breaking up if and only if  $V_c - c_M \geq E(s)$ . Note that this inequality is not satisfied for  $b = 0$  and that the LHS is increasing in  $b$  while the RHS is not. Thus there exists a  $\underline{b}$  such that a man prefers cohabitation to breaking up if and only if  $b \geq \underline{b}$ .

A man prefers marriage to breaking up if and only if  $V_m - c_M \geq E(s)$ . Note that this inequality is not satisfied for  $b = 0$  and that the LHS is increasing in  $b$  while the RHS is not. Thus there exists a  $\bar{b}$  such that a man prefers marriage to breaking up if and only if  $b \geq \bar{b}$ . Finally,  $\bar{b} > \underline{b}$  since  $V_c > V_m$ .  $\blacksquare$

In Section III.C. we informally stated the assumption that ‘ $c_W$  is large enough relative to  $c_M$  so that women do not want to start a relationship with the average man who prefers cohabitation to being single.’ We have now introduced the notation that allows us to state this assumption formally. In particular, we assume that

$$\int_{\underline{b}}^{\infty} V_c dH(b) / (1 - H(\underline{b})) - c_W < E(s). \quad (\text{A3})$$

Note this inequality is satisfied for  $c_W$  large enough but is not satisfied for  $c_W = c_M$ .

**Proof of Lemma 6:** Suppose that women believe that men propose marriage if and only if  $b \geq \bar{b}$ , that they propose cohabitation if and only if  $\underline{b} \leq b < \bar{b}$ , and that they break up otherwise. Then it

is optimal for them to accept a marriage proposal if and only if

$$\int_{\bar{b}}^{\infty} V_m dH(b)/(1 - H(\bar{b})) - c_W \geq E(s). \quad (\text{A4})$$

Note that this condition is satisfied if  $c_W$  is ‘not too large.’ Next, given assumption (A3) and their beliefs, it is optimal for them to turn down any cohabitation proposal. Given these strategies it is optimal for men to propose marriage if and only if  $b \geq \bar{b}$  and to break up otherwise. Finally, given these strategies for men and women, the beliefs assumed at the beginning of the proof are consistent. ■

**Proof of Proposition 3:** Using (1) and (2) and implicitly differentiating gives

$$\frac{d\bar{b}}{d\gamma} = \frac{(1 - F(rV + \gamma))(1 - rF(rV))}{r(F(rV + \gamma) - F(rV))} > 0,$$

where  $V = V_m = V_c$ . Next, differentiating (4) gives

$$\frac{dP_d}{d\bar{b}} = \frac{h(\bar{b})}{1 - H(\bar{b})} [P_d - p_d(\bar{b})] < 0,$$

where  $p_d(\bar{b})$  is  $p_d$  evaluated for  $b = \bar{b}$ . Since  $\partial\bar{b}/\partial\gamma$  and  $\partial P_d/\partial\bar{b} < 0$  it follows that the selection effect is negative. Next, differentiating (4) gives

$$\frac{\partial P_d}{\partial\gamma} = \frac{1 - r}{1 - H(\bar{b})} \int_{\bar{b}}^{\infty} \frac{F(\cdot)^{d-2} f(\cdot)}{1 - rF(\cdot)} [(d - 1)(1 - F(\cdot)) - F(\cdot)] dH(b). \quad (\text{A5})$$

Note that this expression is negative for  $d = 1$ . Thus there exists a  $\underline{d} > 1$  such that  $\partial P_d/\partial\gamma < 0$  if  $d < \underline{d}$ . Next note that  $F(rV_m + \gamma) < 1$  for all  $b$ . It follows that for large enough  $d$  the term in squared brackets in the above expression is positive for all  $b$ . This, in turn, implies that there exists a  $\bar{d} \geq \underline{d}$  such that  $\partial P_d/\partial\gamma < 0$  if  $d \geq \bar{d}$ . Finally, it follows from (A5) that the cumulative incentive effect is given by

$$\frac{\partial P_d^\Sigma}{\partial\gamma} = \sum_{t=1}^d \frac{\partial P_t}{\partial\gamma} = -\frac{1 - r}{1 - H(\bar{b})} \int_{\bar{b}}^{\infty} d \frac{F(\cdot)^{d-1} f(\cdot)}{(1 - rF(\cdot))} dH(b) < 0. \quad \blacksquare$$

## APPENDIX B

Marriage and divorce certificate data were obtained from the National Vital Statistics System of the National Center for Health Statistics, for all years between 1968 to 1995.<sup>42</sup> Marriage certificates data includes date of marriage, state residency, education, previous marital status, number of marriages, and ages of bride and groom. This covers around 44 states, depending on the exact year. Divorce certificates data includes marital duration, number of children under 18, month and year of marriage, number of marriages, age, race, state residency of husband and wife, and the allocation of child custody is recorded after 1989. Divorce certificates data covers 26 states in 1968, 28 in 1969-70, 30 in 1971-77, 28 in 1978, 31 in 1979-80, 32 in 1981-85, and 33 after 1986. Marriages or divorces of members of the Armed forces or other US nationals that occur outside of the United States are excluded. We construct marital duration-state-year specific divorce propensities for the following states – AK, AL, CA, CT, DC, DE, GA, HI, IA, ID, IL, KS, KY, MA, MD, MI, MO, MT, NE, NH, NY, OH, OR, PA, RI, SC, SD, TN, UT, VA, VT, WI, and WY.

The March rounds of the Current Population Survey (CPS) are used to construct the state level labor market variables using the CPS weights. From 1968 to 1972 the following states are identified – CA, DC, FL, GA, IL, IN, KY, LA, MD, MO, NJ, NY, OH, OR, PA, TN and WV. From 1973 to 1976 CA, CT, DC, FL, IL, IN, MA, NC, NJ, NY, OH and PA are identified. After 1976, state level aggregates can be constructed for 43 states. Labor market characteristics are based on the following definition of participation in the labor force – the individual must be aged between 16 and 64 (60 for women), in full-time employment, not in school, and have worked for at least one week.

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<sup>42</sup>These are also downloadable from <http://www.nber.org/data/marrdivo.html> (accessed 8th May 2004).

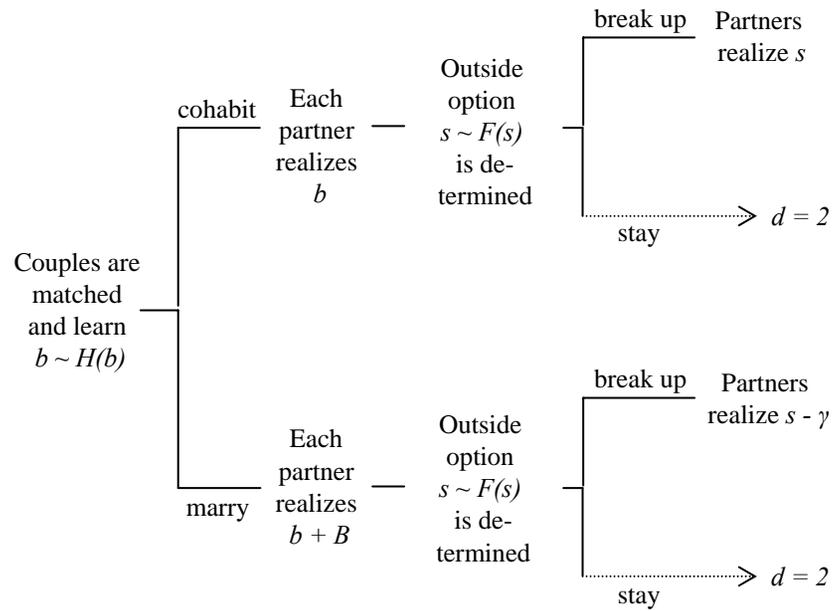


Figure 1: Timing of the Exogenous Benefits Model

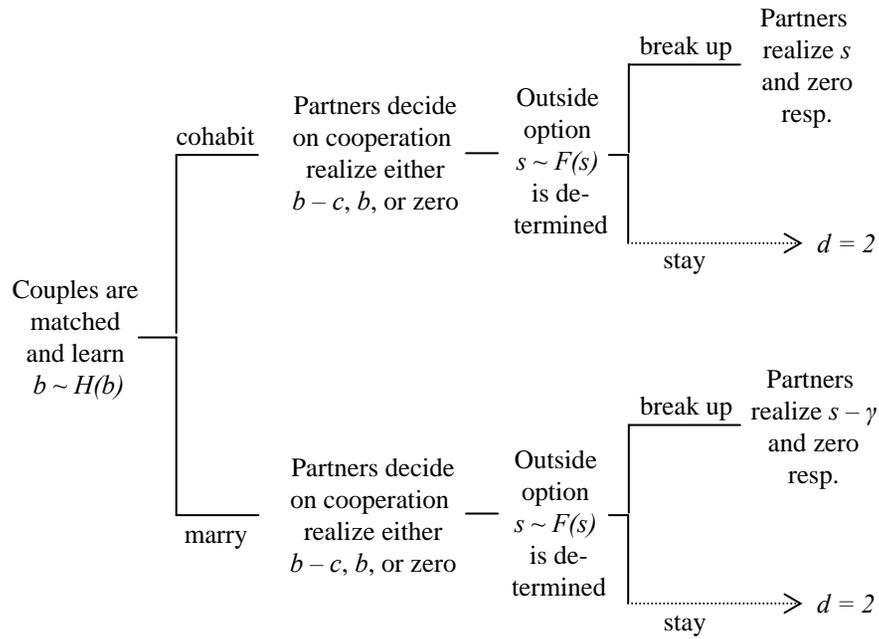


Figure 2: Timing of the Commitment Model

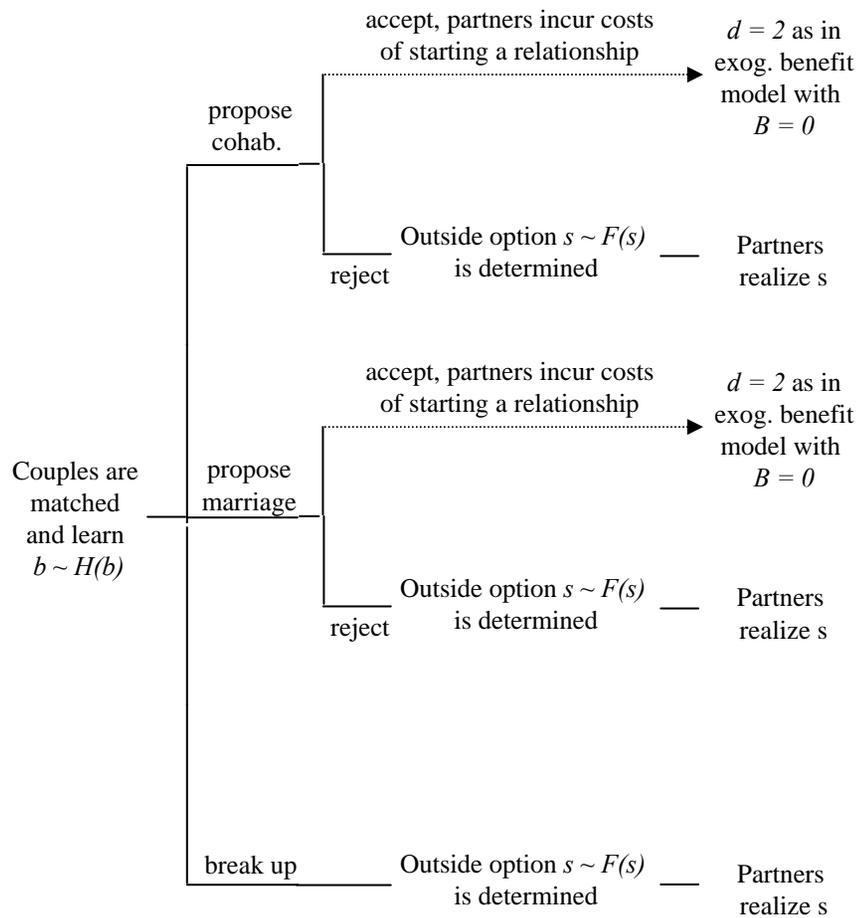
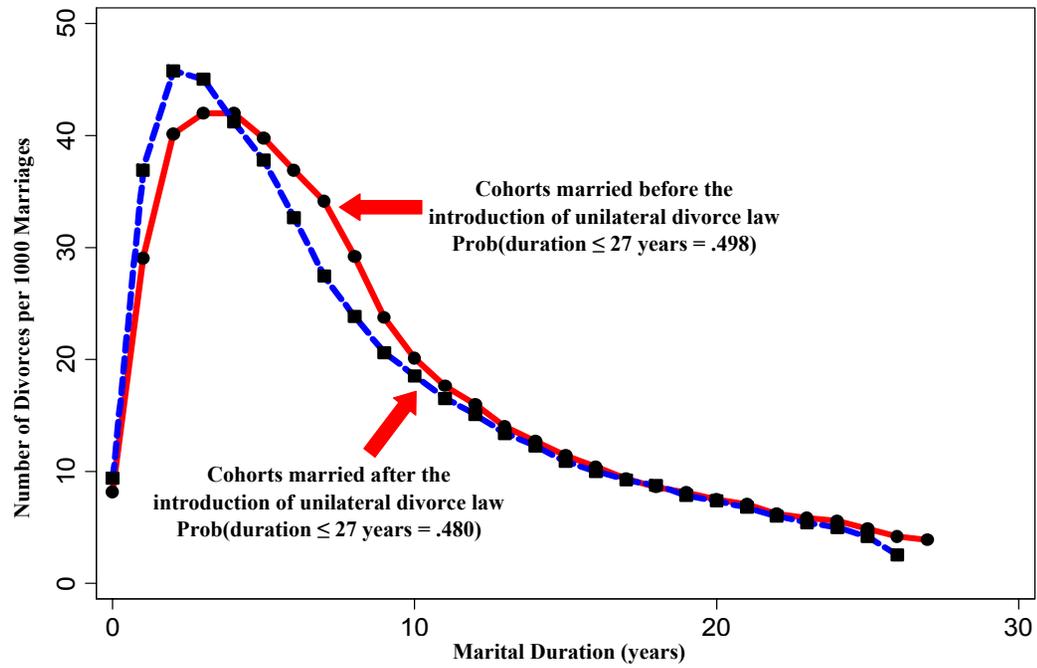
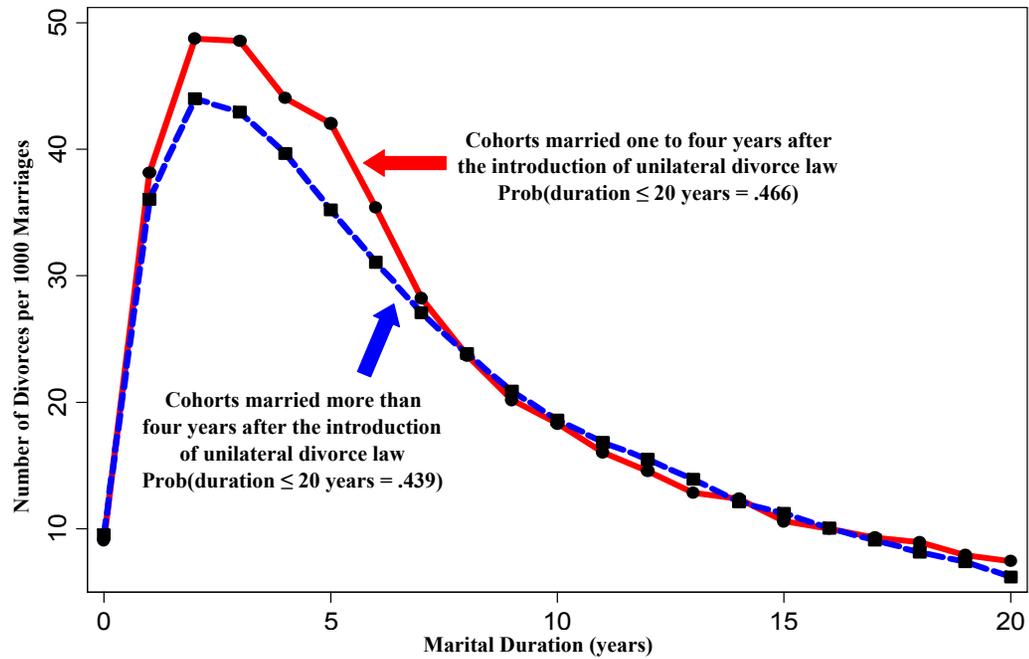


Figure 3: Timing of the Signaling Model



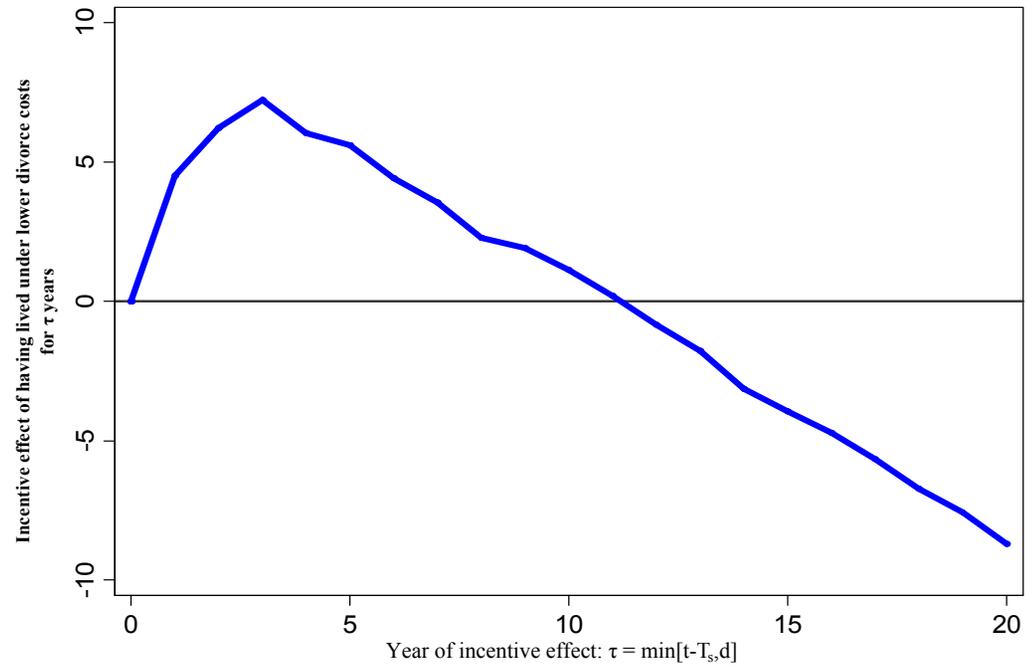
**Figure 4b: Divorce Hazards by Year of Marriage, Adopting States**

Notes: These divorce hazards are constructed from marriage and divorce certificate data for marriages that took place in or after 1968, and divorced in or before 1995. Each duration-state-year observation is weighted by the state population that year to form a duration specific divorce propensity.



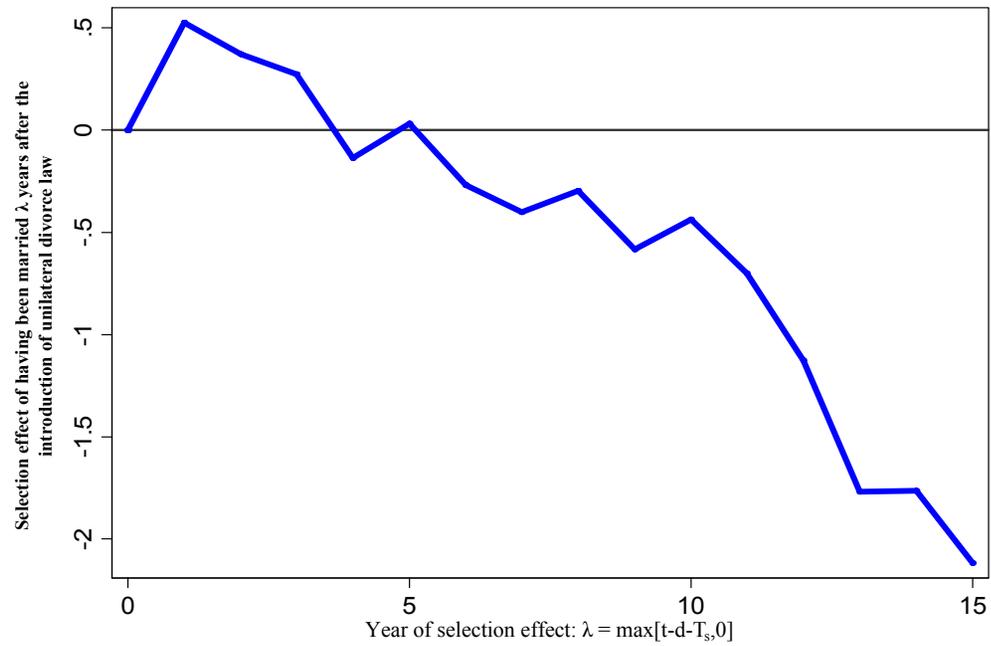
**Figure 4c: Divorce Hazards by Years of Selection, Adopting States**

**Notes:** These divorce hazards are constructed from marriage and divorce certificate data for marriages that took place in or after 1968, and divorced in or before 1995. Each duration-state-year observation is weighted by the state population that year to form a duration specific divorce propensity



**Figure 5a: Dynamic Incentive Effect**

**Notes:** Figure 5a shows how the incentive effect varies by the number of years married under unilateral divorce, given by  $\tau = \min[t-T_s, d]$ , where  $t$  is the year of divorce,  $T_s$  is the year unilateral divorce was introduced in state  $s$ , and  $d$  is the duration of marriage.



**Figure 5b: Dynamic Selection Effect**

**Notes:** Figure 5b shows how the selection effect varies by the number of years prior to marriage that unilateral divorce was in place for, given by  $\lambda = \max[t-d-T_s, 0]$ .

**Table 1: Divorce Laws and Data Coverage**

	<u>Year of Introduction of Unilateral Divorce Law</u>	<u>Coverage in Marriage and Divorce Certificates Data</u>		<u>Year of Introduction of Unilateral Divorce Law</u>	<u>Coverage in Marriage and Divorce Certificates Data</u>
Alabama	1971	1968-95	Missouri	-	1968-95
Alaska	1968	1968-95	Montana	1975	1968-95
Arizona	1973		Nebraska	1972	1968-95
Arkansas	-		Nevada	1973	
California	1970	1968-77	New Hampshire	1971	1979-95
Colorado	1971		New Jersey	-	
Connecticut	1973	1968-95	New Mexico	1973	
Delaware	-	1981-95	New York	-	1969-95
District of Columbia	-	1986-95	North Carolina	-	
Florida	1971		North Dakota	1971	
Georgia	1973	1968-95	Ohio	-	1968-95
Hawaii	1973	1968-95	Oklahoma	1968	
Idaho	1971	1968-95	Oregon	1973	1968-95
Illinois	-	1968-95	Pennsylvania	-	1968-95
Indiana	1973		Rhode Island	1976	1968-95
Iowa	1970	1968-95	South Carolina	-	1971-95
Kansas	1969	1968-95	South Dakota	1985	1968-95
Kentucky	1972	1969-95	Tennessee	-	1968-95
Louisiana	-		Texas	1974	
Maine	1973		Utah	-	1968-95
Maryland	-	1968-95	Vermont	-	1968-95
Massachusetts	1975	1979-95	Virginia	-	1968-95
Michigan	1972	1968-95	Washington	1973	
Minnesota	1974		West Virginia	-	
Mississippi	-		Wisconsin	-	1968-95
			Wyoming	1977	1968-95

**Notes:** The coding for unilateral divorce follows that in Friedberg (1998, Table 1). She codes unilateral divorce as when divorce requires the consent of only one spouse and is granted on grounds of irretrievable breakdown, irreconcilable differences, and/or incompatibility, using mostly secondary sources. Marriage and divorce certificate data were obtained from the National Vital Statistics System of the National Center for Health Statistics.

**Table 2: Descriptive Evidence on the Incentive and Selection Effects**

**(i) Years Lived Under Unilateral Divorce Law (Incentive Effect)**

	(1) All States	(2) Adopting States	(3) Adopting States, Married Before Unilateral Divorce Introduced	(4) Adopting States, Married After Unilateral Divorce Introduced
<b>Mean</b>	4.62	8.08	9.16	7.46
<b>Standard Deviation (Overall)</b>	6.20	6.26	7.14	5.61
<b>Standard Deviation (Between)</b>	3.98	6.93	7.29	7.94
<b>Standard Deviation (Within)</b>	5.23	2.26	2.99	0

**(ii) Years Married After Unilateral Divorce Law Introduced (Selection Effect)**

	(1) All States	(2) Adopting States	(3) Adopting States, Married Before Unilateral Divorce Introduced	(4) Adopting States, Married After Unilateral Divorce Introduced
<b>Mean</b>	3.03	5.30	0	8.33
<b>Standard Deviation (Overall)</b>	5.25	6.01	0	5.61
<b>Standard Deviation (Between)</b>	1.81	3.15	0	3.47
<b>Standard Deviation (Within)</b>	4.98	5.28	0	4.92

**(iii) Dimensions of the Data**

	(1) All States	(2) Adopting States	(3) Adopting States, Married Before Unilateral Divorce Introduced	(4) Adopting States, Married After Unilateral Divorce Introduced
<b>Number of Observations (duration-state-year)</b>	12345	7057	2566	4491
<b>Marital Durations Observed</b>	0 to 27	0 to 27	0 to 27	0 to 26
<b>Number of State-Year Cohorts</b>	441	252	92	166

**Notes:** These are constructed from marriage and divorce certificate data, for 33 states, for marriages that took place in or after 1968, and divorced in or before 1995. The incentive effect is the number of years married under unilateral divorce, given by  $\tau = \min[t - T_s, d]$ , where  $t$  is the year of divorce,  $T_s$  is the year unilateral divorce was introduced in state  $s$ , and  $d$  is the duration of marriage. The selection effect is the number of years prior to marriage that unilateral divorce was in place for, given by  $\lambda = \max[t - d - T_s, 0]$ . We report the mean and overall variation in the incentive and selection effects, and decompose each into the variation that arises between marriages that divorce in different state-years, and the variation across marriages of different duration within the same state-year.

**Table 3: The Impact of Unilateral Divorce on Divorce Propensities**

**Dependent variable: (number of divorces in state s, year t, of duration d)/(1000 x number of marriages in state s in year t-d)**

**Standard errors in parentheses, clustered by state-duration**

	(1) Unilateral	(2) Incentive Effect	(3) Incentive and Selection Effects	(4) State-year Fixed Effects	(5) Duration-year Fixed Effects	(6) Dummy Selection Effect
<b>Unilateral Divorce Law</b>	4.08** (1.07)	4.12** (1.08)	4.49** (1.04)		4.43** (1.03)	4.34** (1.04)
<b>Incentive Effect</b>		-.256** (.099)	-.299** (.099)	-1.19** (.297)	-.401** (.113)	-.338** (.117)
<b>Selection Effect</b>			-.162** (.039)	-1.05** (.267)	-.142** (.039)	
<b>Any Years of Selection (yes=1)</b>						-.674* (.297)
<b>Duration x year fixed effects</b>	No	No	No	No	Yes	Yes
<b>State x year fixed effects</b>	No	No	No	Yes	No	No
<b>Adjusted R-squared</b>	.8247	.8252	.8260	.8566	.8255	.8249
<b>Number of Observations</b>	12345	12345	12345	12345	12345	12345

**Notes:** \*\* denotes significance at 1%, \* at 5%, and † at 10%. Standard errors are clustered by state-duration. All specifications control for duration, state and year fixed effects, and a series of interactions between whether the state ever adopts unilateral divorce and the duration fixed effects. The sample covers 33 states and is based on divorces that have taken place since 1968 and prior to 1995.

**Table 4: Interactions with Labor Market Characteristics**

**Dependent variable: (number of divorces in state s, year t, of duration d)/(1000 x number of marriages in state s in year t-d)**

**Standard errors in parentheses, allowing for clustering by state-duration**

	<u>All States</u>		<u>Adopting States</u>	
	<b>(1) Labor Force Participation</b>	<b>(2) Earnings Ratio</b>	<b>(3) Labor Force Participation</b>	<b>(4) Earnings Ratio</b>
<b>Incentive Effect</b>	-0.385** (.100)	-0.336** (.094)	-1.90** (.242)	-2.07** (.244)
<b>Interaction with -</b>				
<b>Female labor force participation rate</b>	1.84** (.435)		1.57** (.618)	
<b>Ratio of female to male earnings</b>		1.12** (.407)		1.73** (.554)
<b>Selection Effect</b>	.062 (.052)	.082 <sup>+</sup> (.048)	-1.49** (.188)	-1.69** (.191)
<b>Interaction with -</b>				
<b>Female labor force participation rate</b>	-2.70** (.448)		-2.89** (.519)	
<b>Ratio of female to male earnings</b>		-3.16** (.430)		-2.62** (.538)
<b>Duration x adopting state interactions</b>	Yes	Yes	No	No
<b>Adjusted R-squared</b>	.8418	.8397	.8545	.8515
<b>Number of Observations</b>	11482	11428	6471	6471

**Notes:** \*\* denotes significance at 1%, \* at 5%, and <sup>+</sup> at 10%. Standard errors are clustered by state-duration. All specifications control for duration, state and year fixed effects, and Columns 1 and 2 also include a series of interactions between whether the state ever adopts unilateral divorce and the duration fixed effects. The sample in Columns 1 and 2 covers 33 states. The sample in Columns 3 and 4 covers 19 states that adopted unilateral divorce law at some point. All Columns are based on divorces that have taken place since 1968 and prior to 1995. All interaction terms are in deviation from means. The March rounds of the Current Population Survey (CPS) are used to construct the labor market variables at the state-year level using the CPS weights. Both labor market characteristic variables are measured in terms of their deviation from their overall mean.

**Table 5: Interactions With Social Characteristics**

**Dependent variable: (number of divorces in state s, year t, of duration d)/(1000 x number of marriages in state s in year t-d)**

**Standard errors in parentheses, allowing for clustering by state-duration**

	<u>All States</u>		<u>Adopting States</u>	
	(1) Catholic	(2) Permissiveness	(3) Catholic	(4) Permissiveness
<b>Incentive Effect</b>	- .139 (.103)	-.090 (.100)	-.909** (.309)	-.898** (.305)
<b>Interaction with -</b>				
<b>Percentage Catholic</b>	2.60** (.330)		2.54** (.328)	
<b>Permissiveness Index</b>		-.018** (.002)		-.018** (.002)
<b>Selection Effect</b>	-.172** (.039)	-.105** (.039)	-1.02** (.241)	-.996** (.241)
<b>Interaction with -</b>				
<b>Percentage Catholic</b>	-1.26** (.203)		-1.34** (.204)	
<b>Permissiveness Index</b>		.008** (.001)		.008** (.001)
<b>Duration x adopting state interactions</b>	Yes	Yes	No	No
<b>Adjusted R-squared</b>	.8471	.8467	.8684	.8695
<b>Number of Observations</b>	12113	11576	7057	6288

**Notes:** \*\* denotes significance at 1%, \* at 5%, and + at 10%. Standard errors are clustered by state-duration. All specifications control for duration, state and year fixed effects, and Columns 1 and 2 also include a series of interactions between whether the state ever adopts unilateral divorce and the duration fixed effects. The sample in Columns 1 and 2 covers 33 states. The sample in Columns 3 and 4 covers 19 states that adopted unilateral divorce law at some point. All Columns are based on divorces that have taken place since 1968 and prior to 1995. All interactions terms are defined in deviation from mean. The measure of the permissiveness of the divorce laws in place is based on an index constructed by Broël-Plateris (1961). This index is calculated from responses to a questionnaire administered to 68 experts in family law in each state. It is designed to reflect whether states have systematically different standards of evidence and perjury in divorce cases. The index runs from 0 (least permissive) to 100 (most permissive). Both social characteristic variables are measured in terms of their deviation from their overall mean.