Does Divorce Law Matter?

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Abstract

In this paper we derive an explicit model of negotiations between spouses when unconstrained transfers are possible only in case of separation. We show that inefficient separation may occur in equilibrium even under consensual divorce law. This provides theoretical support for the view that changes in social norms rather than in legislation may be responsible for increasing divorce rates.

Keywords: Bargaining, divorce, non transferability

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1 Introduction

The transition from a "fault" to a "no-fault" divorce[1] is often blamed for increases in divorce rates. For example, the divorce legislation that began in most US states around 1970 has been followed over the last thirty years by a large increase in divorce rates. However, the causal relation between marriage laws and marital separation is far from clear, and the empirical evidence is not conclusive.[2] In this paper we develop a theoretical model to study this issue, and we uncover some interesting and unexpected effects of marriage law. Our approach is based on the idea that the extent to which marital assets (and thus utility) are transferable between partners is a crucial determinant of divorce behaviour.

Assuming full transferability, the economic analysis of marriage breakdown has traditionally been carried out in the shadow of the Coase theorem. In their seminal paper Becker et al. (1977) argue that

> "If all compensations between spouses are feasible and costless then separation takes place when combined wealth from divorce is higher than from marriage."

Thus, within such a framework separation is always efficient, in the sense that it maximises joint welfare. Divorce law may only affect the distribution of the gains from

[1]While the law distinguishes between "fault" and "no-fault" divorce, the relevant economic categories are consensual versus non-consensual. The two concepts are not exactly equivalent. In what follows we will abstract from such differences.

[2]Peters (1986, 1992), Johnson and Skinner (1986), Weiss and Willis (1995) and Gray (1998) find that changes in divorce legislation did not significantly affect marital stability. On the other hand, Allen (1992), Zelder (1993) and Johnson and Skinner (1986) reach the opposite conclusion. Though Friedberg (1998) has convincingly argued that the result in Peters (1986) may be biased downward due to the omission of state-specific time trends which are positively correlated with changes in legislation, Gray (1998) is immune to such a critique in so far as he uses differences between two years to eliminate (linear) time-trends.

staying together or separate, but not the probability of marriage breakdown, *provided that* all transfers are feasible *both* within the marriage *and* in case of separation, and barring other transaction costs.

Although the full-transferability case is a crucial benchmark, it is often argued that there are important elements of non-transferability within the marriage, as a large component of consumption when married is joint. This is the case, for example, with children and the services of some owned assets, such as the family home. Conversely, once the marriage is dissolved, such items become transferable through the usual solutions to convert indivisible common property into a divisible commodity, such as monetization by sale, rotation (time-sharing) or randomization. If transfers are constrained within the marriage the rate of marriage breakdown is inefficiently high under unilateral divorce as, even if separation reduces joint wealth, it is possible that the spouse who would like the relationship to continue may be unable to compensate the one who prefers to walk out. Zelder (1993) has argued that in such a case consensual divorce, by forbidding unilateral termination, obliges the spouse who wants to separate to compensate the other partner to obtain her agreement on termination and restores efficiency of separation.

We derive an explicit model of negotiations between spouses when (1) transfers can be made only in case of separation, and (2) separation can only be consensual. Disposal of a couple's jointly-enjoyed assets is the only possible way to transfer utility. Such assets can be liquidated and thus rendered transferable only through separation. Our model is meant to capture a situation in which a large part of the joint surplus from a happy marriage is generated by activities (loving, caring, etc.) that are not verifiable in courts. The surplus from such activities is generated only if both spouses agree to it[3]. If the couple reaches an agreement we say that they enjoy a "cooperative" marriage. Alternatively, the couple can agree to divorce and split the transferable assets. To stake the odds in favour of the view that divorce law has real effects we follow Zelder (1993) and assume that transaction costs are so high that the marital surplus is non-transferable. Negotiations take place according to a variant of Rubinstein (1982) bargaining game. In each round one of the spouses can propose either the marital agreement or divorce and a division of the transferable assets. A protracted disagreement does not lead to dissolution of the marriage, but prevents the parties from enjoying both the surplus from a cooperative marriage and the surplus from divorce. Perpetual disagreement within the marriage, then, is worse than either agreement or divorce.

We show that under consensual divorce an efficient marriage does not necessarily survive in equilibrium. There are two possible equilibria. In one, the efficient survival is guaranteed. In the other, inefficient separation takes place. As under unilateral divorce, in such equilibrium the spouse who gains from divorce is able to obtain it even if it makes the other partner strictly worse off. Even more strikingly, it is possible that in the latter equilibrium it is the partner who would have preferred a cooperative continuation to unilateral separation that bribes the other spouse to obtain termination. The multiplicity stems from the fact that either spouse can credibly threaten to lock the other spouse in a non-cooperative marriage, unless his/her preferred outcome is agreed upon. This threat

[3]This differs from Zelder (1993) and most of the literature that effectively assume that consensual divorce legislation is equivalent to specific performance remedies in contract law. We argue that specific performance is a meaningless concept when it comes to marriage. Though under consensual divorce courts can enforce survival of the marriage they cannot enforce a happy marriage (specific performance). A spouse that wants to divorce can disrupt the marriage (e.g. being rude, cold or worse) in order to force the partner to agree to separate.

is instead empty under unilateral divorce, since in that case the partner who benefits from separation can walk out. A fuller intuition together with some empirical evidence in support of the predictions of our model are given in the example in section 2.

From a positive point of view, our result implies that even if the "no-fault" revolution did cause the observed increase in the rate of marriage breakdown, there is no reason to expect that going back to fault divorce would bring the divorce rate down. It is well possible that the change in social norms that has brought forward the no-fault revolution may imply that the inefficient equilibrium prevails under consensual divorce.

From a normative perspective our result suggests that, even without full transferability within the marriage, the only sure way to affect the separation decision is not by reintroducing fault divorce but by altering the returns to divorce. This is clearly problematic in so far as third parties cannot observe the spouses gains and losses from separation.

A number of papers are related to this work. Lundberg and Pollack (1993) first pointed out that disagreement *within* the marriage is one possible alternative to cooperation. They endogenize disagreement payoffs in the axiomatic Nash bargaining solution as a the outcome of a disagreement game within the marriage and show how, differently from the divorce threat models of Manser and Brown (1980) and McElroy and Horney (1981), policies that transfer resources towards one or the other spouse may have distributional implications for existing marriages. Their model assumes full transferability and does not explicitly consider the possibility of divorce. We go one step further by considering the case in which divorce is a relevant alternative to disagreement within the marriage as it yields a higher joint payoff than a noncooperative marriage.

The focus on negotiations distinguishes our approach from others which also high-light the importance of joint consumption within the marriage, such as Zelder (1993) and Chiappori and Weiss (2001). As noted above, Zelder (1993) first suggested that non-transferability implies inefficient separation under at-will, but not under consensual divorce. He exploits this prediction to test the efficient separation hypothesis. Chiappori and Weiss (2001), on the other hand, study the efficiency of the decentralized equilibrium when the matching market is characterized by search frictions. Peters (1986) was the first to analyse divorce decisions in the presence of transaction costs, the latter taking the form of asymmetric information about each partner's respective payoffs. Applying the analysis of Hall and Lazear (1984) and Hashimoto and Yu (1980) to marriage, she argued that a non-renegotiated, fixed wage contract might minimize inefficient separation. This kind of approach though is open to the criticism that suppression of renegotiation is neither necessarily efficient nor enforceable in a situation, such as marriage, where explicit wage contracts are not observed and where all kinds of possible strategic behaviour are possible. Also, such a framework implies that the parties should want to avoid negotiation altogether, not only over the terms of continuation. This is inconsistent with the fact that negotiation over the terms of termination is exactly what divorce lawyers devote a lot of time to.

Clark (1999) criticises the Coase-based view that "divorce laws do no matter." He, too, models negotiations within the marriage as a problem of reaching an agreement within two sets of possible payoff combinations: those associated with the surplus from staying married and the surplus from divorcing, respectively. He argues that if the efficient frontiers associated with the two sets of payoffs intersect, divorce law does in fact matter and that consensual divorce law eliminates all separations that are not Pareto improving.

Unlike our paper, he does not use an explicit model of negotiations and assumes that dissolution laws determine which of the two bargaining sets can be vetoed by one of the two parties. Our result shows that his conclusions apply to just one of two possible equilibria under consensual divorce.

2 An example

Consider a married couple, Anthony and Betty. They are faced with the alternative choices of whether to continue together or separate and enjoy their outside opportunities[4]. Be u_A^s and u_B^s respectively Anthony's and Betty's utility in case either of them could file for unilateral divorce. Assuming linear utilities, this corresponds to a point on the linear frontier **ab** in figure 1, say point U. While the payoff pair u_A^s and u_B^s captures the payoff consequences of divorce, which depend both on outside opportunities and courts' decisions on compensation, the crucial and invariant feature of *no-fault* divorce is that it establishes the right to unilaterally walk out of the relationship. That is, with the exception of the reallocation of common property and children, it allows whichever haggling may take place over the terms of divorce to be conducted under either spouse's preferred circumstances, e.g. while cohabiting with a new partner. For simplicity, let us assume that the joint utility from separation is freely transferable (e.g. it is associated with both Anthony and Betty finding two new partners with "deep pockets").

[Figure 1 here]

[4]The two are not completely exclusive options. Yet, in practice, under fault divorce betraying one's spouse is not only ground for divorce, but is also likely to affect negatively the divorce outcome for the spouse at fault.

Under *fault* (consensual) divorce, instead, haggling over separation cannot be conducted under either partner's preferred circumstances. The partner's consent must be obtained in order to be able to enjoy outside opportunities without this hinging negatively on the divorce outcome. That is, haggling over the outcome has to take place, *within* the marriage. In such circumstances the equilibrium divorce agreement would give each partner a payoff equal to some share of the joint surplus $u_A^s + u_B^s$. For simplicity assume each spouse receives half of the joint payoff from separation in case of consensual divorce (point C in figure 1).

Consider now the alternative choice of cooperating in the marriage. Under our maintained assumption that utility is non-transferable within the marriage, the couple's payoff from a cooperative marriage is a utility pair (u_A^m, u_B^m), a point P_i in figure 1. Crucially we assume that the surplus associated with the pair (u_A^m, u_B^m) can be obtained only if both spouses agree. This assumption distinguishes our paper from the vast literature epitomized by Zelder (1993) that assumes that under consensual divorce each spouse can unilaterally impose the cooperative outcome (u_A^m, u_B^m). Instead we assume that in case of perpetual disagreement the parties obtain the normalized payoff pair corresponding to point O. Table 1 reports the equilibrium outcomes and the associated payoffs for three representative realizations of the marriage utility pair under unilateral and under consensual divorce. The second column lists the outcome under unilateral divorce which is independent from any assumption about disagreement payoffs. The third column reports our model's predicted outcome under consensual divorce. This can be compared with the predictions of Zelder (1993) and the associated literature in the fourth column.

	Unilateral	Consensual - this paper	Consensual - Zelder (1993)
P_1	eff. div. $U \equiv (u_A^s, u_B^s)$	eff. div. $C \equiv \left(\frac{u_A^s+u_B^s}{2}, \frac{u_A^s+u_B^s}{2}\right)$	eff. div. $Z \equiv (u_A^m, u_A^s + u_B^s - u_A^m)$
P_2	eff. marr. $P_2 \equiv (u_A^m, u_B^m)$	eff. marr. $P_2 \equiv (u_A^m, u_B^m)$	eff. marr. $P_2 \equiv (u_A^m, u_B^m)$
P_3	ineff. div. $U \equiv (u_A^s, u_B^s)$	eff. marr. $P_3 \equiv (u_A^m, u_B^m)$ ineff. div. $C \equiv \left(\frac{u_A^s+u_B^s}{2}, \frac{u_A^s+u_B^s}{2}\right)$	eff. marr. $P_3 \equiv (u_A^m, u_B^m)$

Table 1: Comparison of equilibrium outcomes under unilateral and consensual divorce.

Consider a point P_1 such that the utility pair associated with the marriage lies strictly inside area aOb and separation is efficient. Given that all points within the triangle aOb are feasible and P_1 is inefficient, the parties separate under either consensual or unilateral divorce. Consensual divorce just alters the distribution of the payoff from separation. According to Zelder (1993) the party who would lose from unilateral separation, Betty in the specific case[5], is compensated until she is indifferent between accepting and refusing separation (i.e. point Z in figure 1). Compare this with the predictions of our model in the third column. Since Anthony can credibly threaten not to cooperate, Betty cannot induce him to fully compensate her. Instead, she will receive a payoff $(u_A^s + u_B^s)/2$ (i.e. point C in figure 1) which is strictly lower than her payoff in a cooperative marriage.

Let us now see what happens instead when continuation of the marriage is efficient. There are two possible cases to consider. In the first case, the payoff pair associated with a cooperative marriage gives both spouses a higher utility than they would obtain in case of separation. This corresponds to a point like P_2 to the north-east of both points C and U in figure 1. As the third row of table 1 reports the common prediction is that the marriage survives efficiently independently from legislation. In the second

[5] Since her utility would correspond to the horizontal coordinate of point U under unilateral divorce, rather than of P_1 under marriage.

case, a cooperative marriage does not Pareto dominate separation. This is the class of cases for which divorce law may, a priori, make a difference. Consider for example a point like P_3 such that Betty prefers continuation of the marriage to separation while Anthony's ordering is the opposite. Under unilateral divorce Anthony would be free to (inefficiently) terminate the relationship. Zelder (1993) predicts that efficient survival of the marriage is the only equilibrium under consensual divorce.[6] According to our model, instead, there are two possible equilibria. In one equilibrium divorce law does matter and as in Zelder (1993) the marriage efficiently survives under consensual divorce. In the second equilibrium, though, legislation does not affect the outcome and the marriage ends inefficiently as it would under unilateral divorce.

The intuition for the multiplicity of equilibria is the following. If no agreement is reached the spouses are worse off than if they either separate or agree to a cooperative marriage. Either equilibrium is supported by Anthony or Betty refusing to agree on anything but their preferred outcome. Given the loss of surplus during disagreement the other spouse's best response is to give in. The logic sustaining this multiplicity is the usual one: at an equilibrium beliefs are endogenously determined, as well as strategies. If the common beliefs of the partners are that, say, Anthony will not give in, it will be rational for Betty to give in, and conversely. Which of the beliefs, and therefore which of the two equilibria prevails, cannot be determined within the model and may depend on the prevailing social norms.[7]

[6] Indeed, this would be the only equilibrium if utility were transferable within the marriage too.

[7] For analogy, think of a static Battle of the Sexes game. In that case, too, there are two equilibria which are both preferred to 'disagreement', but the players have opposite preferences over those equilibria. Both equilibria are sustained by a specific set of beliefs over the action played by the opponent.

To consider the effect of divorce legislation on the divorce rate assume that the respective payoffs from a cooperative marriage normalized by the joint payoff from separation are random variables with a given joint distribution. Under unilateral divorce the probability of marriage survival is $\Pr\{u_A^m \geq u_A^s, u_B^m \geq u_B^s\}$, the probability that both spouses are better off in a cooperative marriage. To isolate the pure allocational effect of the institutional set up, assume $u_A^s = u_B^s = (u_A^s + u_B^s)/2$, so that payoffs in case of separation are the same under both unilateral and consensual divorce. The probability of marriage survival under unilateral divorce is simply the probability mass associated with the area to the north-east of point C in figure 1. If the couple separates, the partition of the joint payoff is the same - point C - under fault and no-fault divorce. Suppose the inefficient equilibrium prevails in case of consensual divorce. Then the probability of marriage survival - the probability that for given joint payoff from separation, the utility pair associated with the marriage lies to the north-east of C - is the same as under unilateral divorce.

This result indicates that studies of the effect of changes in divorce legislation on divorce rates may shed little light on whether separations maximizes joint wealth or not. Furthermore, it also implies that divorce legislation, though not court rulings on spouse compensation, may have little effect on divorce rates. Even under consensual divorce, divorce rates may be inefficiently high if social norms are such that the inefficient equilibrium prevails.

In general, since the conditions under which haggling over separation takes place are different between unilateral and consensual divorce, the distribution of the joint return from separation is also different. To this effect, suppose that the partition of the joint payoff from separation is given by U' in figure 1 in case of unilateral divorce, while it is still given by C in the case of consensual divorce. Now a marriage yielding the utility pair P_3, to the north-east of U', would have efficiently survived under unilateral divorce. On the other hand, the result above implies that under fault divorce there exists an equilibrium in which the same marriage is inefficiently terminated. Furthermore, in such a case not only would Betty have preferred the marriage to go through, but she is worse off than if separation had been unilateral. In other words, she is forced to make some concession rather than being compensated. The intuition for this is that Anthony can refrain from cooperating in the marriage. Under such conditions Betty is willing to pay in order to go free and pursue her life.[8]

The intuition that consensual divorce may actually damage rather than benefit the spouse that does *not* want to initiate the separation may appear surprising, yet it is easily understood once one realizes that the party that wants divorce may effectively hold up the other spouse by threatening not to cooperate in the marriage. This result also distinguishes the prediction of our model from all other models of marital separation that treat a cooperative marriage as an option that can be unilaterally exercised. Those models predict that, under consensual divorce, it is always the spouse who wants to initiate divorce that transfers resources (relative to the unilateral separation outcome) to the other partner. Our model predicts that instead the spouse who wants to divorce may be able to extract a payment (on top of any unilateral divorce settlement) from the other partner.

[8]In the inefficient consensual divorce equilibrium, the probability of marriage survival $\Pr\{u_A^m \geq (u_B^s + u_B^s)/2, u_B^m \geq (u_B^s + u_B^s)/2\}$ may be higher or lower than its counterpart $\Pr\{u_A^m \geq u_A^s, u_B^m \geq u_B^s\}$ under unilateral divorce. This depends on the joint distribution of the individual gains from marriage which determines the probability mass to the north-east of U and C respectively.

In order to test the above prediction one would need a dataset of divorce cases under consensual divorce legislation which contained information on divorce settlements, which spouse initiated divorce procedures and the respective payoffs if the parties could walk out unilaterally. Though such a dataset does not exist there are a number of cases for which such information could in principle be recovered. Such cases involve Jewish women who have been divorced in civil courts (or abandoned) by their husbands, but have not been given a religious divorce.[9] According to Jewish law only the husband can legally terminate the marriage by giving the wife a bill of divorce: a *get*. A wife has to accept such a document for the divorce to be valid. In this sense, Jewish divorce is consensual. Yet, the consequences of either spouse's not consenting to divorce are very different. A woman who has not obtained a *get* cannot have a relationship with another man without committing adultery and any child born out of a new relationship is considered illegitimate and cannot marry another Jew. A husband who remarries without his former wife consenting to divorce is not guilty of adultery but of polygamy (a rabbinic not a Biblical prohibition). The children born from the union with a free Jewish woman are legitimate Jews. The fact that a husband divorces his wife in a civil court indicates that he is better off outside the relationship. Furthermore, the settlement established by the civil courts is effectively the unilateral divorce payoff pair. If consensual divorce benefitted the spouse who did not initiate divorce one would not expect the plaintiff in a civil divorce case to extract any payment in excess of the court settlement. Yet, it is not uncommon for husbands to divorce their wives in civil courts and refuse a *get* as a bargaining ploy to extract financial concessions or child custody. The Jewish Chronicle 2 June 2000 reports that

[9]There are also cases of Jewish men not being able to convince their wives to consent to a religious divorce. The plight of "chained" wives (agunot) is much more common though.

some husbands demand sums ranging between £10,000 and £30,000 in return for a *get*. That this is more than a theoretical possibility is also confirmed by the 1983 amendment to the New York Domestic Relations Law which is often referred to as the "New York *Get* Law." Such amendment denies a plaintiff the right to civil divorce until s/he has taken all steps within his power to remove barrier's to the defendant's remarriage. A bill along similar lines is currently under discussion in the English House of Commons.[10]

3 The model

Anthony and Betty are married, and jointly enjoy their (commonly owned) assets, which we call "the house." Let the total market value of the house be equal to $h > 0$. We assume that the utility for each spouse from the (perpetual) joint consumption of the house is equal to $\frac{h}{2}$ (asymmetries between spouses in this respect are not crucial for our main argument[11]). The couple is currently arguing about a major issue. If agreement can be obtained, the relationship generates *additional* utility for each, depending on the fondness they have for each other. Denote these utilities u_i^m for spouse $i \in \{A, B\}$, so that the total utility for a spouse from a happy marriage is $U_i^m = \frac{h}{2} + u_i^m$. We introduce transaction costs by assuming that utility is not transferable within the marriage. Until agreement is reached, each spouse still benefits from the jointly owned house, but at the same time relinquishes the gratification of a happy marriage. Failure to reconcile marital disagreements can lead to divorce, and the consequent need to agree on a division of the assets. Once sold, the proceeds from the house are fully transferable between spouses.

[10] See House of Common Hansard Debates for 31 January 2001.

[11] The services from the house are a public good for the dwellers. Then if the services are worth x to each dweller, the market value of the house - total willingness to pay for it - is $2x$ under the assumption that congestion kicks in if more than two people inhabit it.

Moreover, in case of divorce each spouse i will enjoy some - non-monetizable - utility $u_i^s > 0$ from being single. So the maximum theoretical total utility for a spouse from divorce is $h + u_i^s$. However, divorce can only be obtained (and the jointly owned house sold) after an agreement on the division of the proceeds of the house.

Each partner can guarantee $\frac{h}{2}$ for himself or herself by always refusing to consent to divorce. On the other hand if divorce is agreed upon, each spouse's utility cannot be less than u_i^s. The set of feasible and individually rational agreements in case of divorce is then

$$D = \left\{ x \in \mathcal{R}^2 | \max \left\{ \frac{h}{2}, u_i^s \right\} \leq x_i \leq h + u_i^s \text{ for } i = A, B \right\}$$

The set D is non-empty given that $u_i^s > 0$ for all i. We will restrict our attention to the case $h/2 > u_i^s$ for all i, which guarantees that the disagreement point is interior to the bargaining set.[12] Otherwise, essentially the same analysis would still go through, but there would be some corner solutions in the bargaining game.[13] A possible bargaining set is depicted in Figure 2.

[Figure 2 here]

In the figure the bargaining set corresponds to the vertically hatched $\alpha\beta\gamma$ triangular area. Point α corresponds to the situation where Anthony obtains the entire value of the house (h) under divorce (in which case he also enjoys his utility from being single, u_A^s), while Betty is left with just the utility from being single, u_B^s. The symmetric situation corresponds to point γ. However, the set of individually rational agreements D corre-

[12]In Appendix A, we derive the bargaining set for the general case.

[13]As shown in Rubinstein (1982), even if this assumption does not hold, the alternating offer bargaining game has a unique subgame perfect equilibrium outcome. Manzini and Mariotti (2001) extend this result to the case with non-linear utility frontier.

sponds to the subset **dbb'** of the bargaining set (the cross-hatched area): since perpetual haggling over divorce proceedings (i.e. disagreement) results in perpetual consumption of half of the house, disagreement in bargaining corresponds to the pair of utilities denoted by point **d** in figure 2.

To simplify notation it is convenient to treat the disagreement point $d \equiv \left(\frac{h}{2}, \frac{h}{2}\right)$ as the origin. With this normalisation and under our assumption that $h/2 > u_i^s$ the total surplus in case of separation is $u_A^s + u_B^s$ (i.e. the length of the two sides **db** and **db'** of the set of individually rational agreements). For convenience we denote this surplus in case of separation by z, and by y the total surplus from marriage, i.e. $z = u_A^s + u_B^s$ and $y = \left(U_A^m - \frac{h}{2}\right) + \left(U_B^m - \frac{h}{2}\right) = u_A^m + u_B^m$.

The structure of the relationship game is depicted in figure 3 and can be described at follows. There is a potentially unbounded number of periods indexed by $n = 0, 1, \ldots$ over which Anthony (A) and Betty (B) alternate in proposing either to stay married or to divorce. Whenever spouses disagree, their utility comes solely from the enjoyment of the commonly owned assets. In case the proposal to stay married is accepted, the game ends with each agent i obtaining the fixed amount u_i^m. Proposing divorce entails offering some share (x_i, say) of the assets to the other spouse i. The responder can either accept, ending the game; or reject. In this case play moves to the next period after a delay Δ.

In the next period, the previous responder can either propose to stay married or divorce, and so on. Perpetual disagreement (i.e. haggling over divorce) results in each spouse receiving half of the assets. The parties discount the future at the common instantaneous exponential rate r. Hence, agent i's utility from an agreement yielding x in round n is given by $u_i(x, n) = \delta^n x$, where $\delta = e^{-r\Delta}$. We assume that Betty starts first.

[Figure 3 here]

4 Results

In what follows we derive the equilibrium under consensual divorce. The equilibrium concept we shall rely upon is that of subgame perfect equilibrium (s.p.e.). We show that both marriage equilibria (i.e., equilibria where Anthony and Betty stay together happily) and divorce equilibria can obtain.

Divorce equilibria can be distinguished into two main categories, depending on how divorce arrangements are arrived at. In one case, the two spouses simply ignore the benefits of marriage in their divorce proceedings, and the surplus from separation is divided according to the standard Rubinstein shares. In this class of equilibria both agents always propose divorce. We call these *plain divorce* (**pd**) equilibria. These equilibria obviously occur when $y < z$, as noted in section 2, but more strikingly they can also obtain when $y > z$.

On the other hand, there are equilibria where one of the two spouses favours marriage over divorce. Here the party that stands to lose more from not being married is "compensated" in divorce: instead of getting the Rubinstein share, s/he gets the (discounted) value of the utility in marriage. We call equilibria in this class *compensating divorce* (**cd**) equilibria.

The marriage equilibria can also be distinguished along similar lines according to the equilibrium strategies that support the decision to remain married, i.e. *plain marriage* (**pm**) when both spouses prefer to propose marriage to divorce, and *bossy marriage* (**bm**) when the responder would propose to divorce if s/he got a chance (i.e. if s/he were the first proposer).

Below we formalise these results. The following proposition establishes conditions under which agreement on a divorce settlement is an equilibrium.

Proposition 1 (Divorce equilibria) *If and only if either*

(pd.i) $u_i^m \leq \frac{\delta}{1+\delta}z$ *and* $u_j^m \geq \frac{\delta}{1+\delta}z$, *or*

(pd.ii) $u_i^m, u_j^m \in \left[\frac{\delta}{1+\delta}z, \frac{1}{1+\delta}z\right]$, $i, j = A, B$, *or*

(pd.iii) $u_i^m \leq \frac{\delta}{1+\delta}z$ *for all* i,

then there exists an s.p.e. where Anthony and Betty agree immediately on a divorce settlement which yields $\frac{1}{1+\delta}z$ *to Betty and* $\frac{\delta}{1+\delta}z$ *to Anthony. Moreover, if and only if*

(cd) $z - \delta u_A^m > u_B^m$, $\delta(z - \delta u_A^m) < u_B^m$ *and* $u_A^m > \frac{1}{1+\delta}z$

then there exists an s.p.e. where Anthony and Betty agree immediately on a divorce settlement which yields $z - \delta u_A^m$ *to Betty and* δu_A^m *to Anthony.*

Proof: See Appendix B.[14]

Proposition 1 characterizes two types of divorce equilibria. In equilibria of the first type (**pd**) both parties propose and accept to share the joint payoff from separation according to Rubinstein's partition. Equilibria of the second type (**cd**) are supported by the first proposer - Betty - always proposing to divorce and Anthony always proposing to cooperate in the marriage. Since delay is costly, when responding Betty is better off

[14]Note that the conditions for the **(cd)** equilibrium require that δ be 'sufficiently' small. This point is discussed in the appendix.

accepting to cooperate than rejecting and proposing in the next round. Hence, when first proposing she has to offer Anthony the discounted utility from a cooperative marriage that he would obtain by rejecting the current offer.

The next proposition characterizes the equilibria where Anthony and Betty cooperate within the marriage.

Proposition 2 (Marriage equilibria) *If and only if either*

(pm) $z - \delta u_i^m < u_j^m,\ i, j = A, B,$ *or*

(bm) $z - \delta u_B^m > u_A^m,\ \delta \left(z - \delta u_B^m\right) < u_A^m$ *and* $u_B^m > \frac{1}{1+\delta} z$

there exists an s.p.e. where Anthony and Betty agree immediately on staying married.

Proof: See Appendix B.[15]

As for proposition 1, there are two classes of marriage equilibria. In equilibria of the type (**pm**) both parties propose and accept cooperation within the marriage. Equilibria of the second type (**bm**), instead, are characterized by the first proposer - Betty - offering to cooperate within the marriage and Anthony accepting. Yet, if Anthony were to propose he would offer Betty the discounted value of her utility from a cooperative marriage in exchange for her agreement to divorce.

As we show in the appendix, propositions 1 and 2 fully characterize *all stationary* subgame perfect equilibria of the game. The various parameter configurations corresponding to the equilibria of propositions 1 and 2 are depicted in Figure 4. The axes measure agents' payoffs, both in case of divorce and if staying married. The line **zz** is the locus of possible

[15]Note that the conditions for the **(bm)** equilibrium require that δ be 'sufficiently' small. This point is discussed in the appendix.

partitions of the divorce surplus, z. On the same quadrant we can also represent various points corresponding to the marriage surplus u^m, with coordinates u_A^m and u_B^m. The other lines are needed to determine the various configurations of parameters that satisfy the various (inequality) conditions introduced in the statement of Propositions 1 and 2. The position of u^m determines the equilibrium outcome. So for instance if point u^m were to fall into the square region delimited by $u_i^m < \frac{\delta}{1+\delta}z$ for $i = A, B$, from proposition 1 we see that **pd.iii** would be the corresponding stationary equilibrium. Regarding marriage equilibria, not surprisingly given free transferability in case of separation, there are no marriage equilibria when separation is efficient; i.e. when the utility pair associated with a cooperative marriage lies to the left of the line **zz** $(u_A^m + u_B^m = y < z)$. It is easy to verify that in cases where $u_A^m + u_B^m = y < z$, only plain divorce equilibria can obtain. The crucial and novel result, though, is that there is a whole range of parameter configurations - when the utility pair from the marriage falls in the area contained between the **zz** line and the broken line **ebfg** - in which *separation is an equilibrium despite being inefficient.* Figure 4 also shows that there is a range of parameter values such that both divorce and marriage equilibria coexist, despite the fact that continuation of the marriage maximizes joint wealth. This is the case when the utility pair from a cooperative marriage falls in the overlap areas in the checkered triangles **fgh** and **rst**.

It is important to underline that transaction costs - namely the value of the discount factor - are crucial in determining whether or not the equilibrium configuration **bm** and the symmetric **cd** may arise. Recall that in these equilibria one agent prefers marriage over divorce in subgames in which she is the proposer, whereas the converse holds for the other spouse. In order for a divorce settlement to be accepted, there must be enough resources such that for the responder divorce is at least as attractive as marriage (which otherwise the dissatisfied spouse could propose in the next period), while at the same the party who prefers divorce finds it still worthwhile. Since such equilibria exist only when $y > z$, it must be that the cost of haggling over a divorce settlement (embodied in the discount factor) is high enough to make up for this shortfall in resources. Consequently, if transaction costs are sufficiently low (i.e. the discount factor is sufficiently high), marriage becomes irresistibly attractive for at least one of the two spouses, so that for this party it is never optimal to accept divorce. In terms of Figure 4, the greater δ, the closer point **b** moves towards point **a**, as the graphs of $u_i^m = z - \delta u_j^m$ pivot inwards toward the **zz** line while at the same time the graphs of $u_i^m = \delta \left(z - \delta u_j^m \right)$ rotate clockwise, also closing towards **zz**. In the limit as $\delta \to 1$ the two points (and the four graphs) collapse onto the line **zz**, and there is no point u^m that can satisfy all the optimality requirements for these equilibria.

[**Figure 4 here**]

Both the extent to which marriage and divorce equilibria coexist and inefficient separation is a possible equilibrium depend on the size of transaction costs captured by the discount factor. The mechanism at play becomes more evident in the benchmark limit case in which δ converges to one. For δ arbitrarily close to one, it follows from proposition 2 that it is an equilibrium for the parties to agree to cooperate in the marriage if and only if $y > z$. In particular, in the limit $y > z$ implies that **pm** is always an equilibrium. On the other hand, proposition 1 implies that unless both parties are better off in a cooperative marriage - the pair u_A^m, u_B^m lies to the north east of point C in figure 1 - the outcome **pd.i** in which the spouses agree to separate and share joint utility according to the Rubinsteinian shares is also an equilibrium. As discussed in section 2, unless both spouses are better off cooperating in the marriage, both efficient separation and inefficient continuation are possible equilibria when $y > z$ and divorce has to be consensual.

As anticipated in section 2, if the ruling social convention implies that the inefficient equilibrium prevails separation takes place whenever one spouse prefers it to a cooperative marriage. In such equilibrium the outcome is identical to that under unilateral divorce. It is different only if under unilateral divorce the parties shares of the joint payoff from separation differ from those under consensual divorce.

As is standard in this type of literature[16], the coexistence of two subgame perfect equilibria guarantees the existence of a continuum of equilibrium outcomes, all involving divorce. These are completely characterized in the following proposition.

Proposition 3 *Let $y > z$, and assume $u_A^m \in \left(\delta\left(z - \delta u_B^m\right), \frac{\delta}{1+\delta} z\right)$ and $u_B^m \geq \frac{1}{1+\delta} z$. Then all divorce settlements with $x^* \in \left[\frac{1}{1+\delta} z, z - u_A^m\right]$ can be supported in a divorce equilibrium with immediate agreement on $(x^*, z - x^*)$.*

Proof: See Appendix B.

Note that one can construct multiple equilibria, all involving divorce, even when δ converges to one.

Remark 4 *Other divorce equilibria corresponding to the symmetric parameter configurations of proposition 3 can be derived inverting all the subscripts for Anthony and Betty's payoffs if happily married.*

[16]See e.g. Muthoo (1999).

5 Comparative statics

It is interesting to investigate the effects that alternative law provisions, changes in the value of the assets and in the utility from being single may have on the configuration of equilibria. These changes could take place exogenously (e.g. a change in preferences, a change in legislation), or be the effect of a spouse's "investment" decision. For instance, Anthony could invest in plastic surgery, and thus become more attractive to the opposite sex if single, thereby pushing his utility outside marriage upwards. Obviously these changes may affect the types of equilibria which can occur (see figure 4), as well as trigger "switches" between types of equilibria. Here for ease of exposition we only consider the effects of parameter changes within each equilibrium type. The following sections analyse these effects more in detail.

5.1 Being single

Some aspects of the legal environment might affect specifically the spouses' utility level outside the marriage. For instance, changes to child allowance will change the utility of being single for the partner with child custody.[17] In this respect, such a change in the legal environment will produce consequences similar to investments which are specific to one's own state as single. The crucial question here is to what extent the "benefitted" partner will actually be able, in the course of marital bargaining, to appropriate the putative gains, if at all. In other words, if the husband always gets the child in case of divorce and child benefits are increased, does this mean that the husband will get a better deal (in

[17]For simplicity we do not incorporate in the model an analysis of custody as integral to divorce proceedings. This might be justified, for example, by social norms that assign children to one specific spouse.

utility terms) in the equilibrium outcome? And if so, how much better?

In general, the consequence of changes in u_i^s for a spouse is simply to move the bargaining set, *not* the disagreement point, which depends on the utility from the assets, and is therefore fixed[18]. We consider changes in u_i^s such that u_i^s remains below $\frac{h}{2}$, as in section 4. In particular, an *increase* in u_i^s for a spouse "pushes" the bargaining set upwards or to the right, so that the effect is simply to increase the overall surplus available in the case of separation, $u_A^s + u_B^s$. Consequently, assuming the type of equilibrium prevailing does not change, it is easy to see that there are three possible comparative statics effects:

- In marriage equilibria equilibrium payoffs are unaltered.
- In plain divorce equilibria, both spouses benefit from the increase in the surplus from separation.
- In the compensating divorce equilibrium the first mover is able to appropriate the entire increase in surplus, while the responder's payoff remains unchanged (since u_i^m is unchanged).

A naive intuition would perhaps suggest that investing to improve one's opportunities when single, or a change in legislation favourable to one of the spouses (e.g. changes in child allowance) should strengthen the bargaining position in marriage. To the contrary, we have shown that in the equilibrium regime where marriage is not the outcome, the spouse whose utility as single has *not* increased will be able to appropriate at least some of the enhanced opportunities of the partner: such enhanced opportunities simply add to

[18]This highlights the fact that for large enough changes in u_i^s the set of individually rational agreements changes in a non trivial way. For such a case a normalisation of h is not without loss of generality. We expand on this point further in Appendix 1.

the overall stake which is being negotiated.[19]

5.2 Assets

Consider now the effect of a change in the value of the house. In this case both the disagreement point and the size of the bargaining set (and of the individually rational subset) change. For instance, in case of a reduction of the house value the set of individually rational allocations would shrink: the possibility of transfers has diminished. An interesting implication of this fact is that coeteris paribus one would expect to observe fewer consensual separations in households which are poorer in term of assets, relative to the wealthier ones.

If the value of the assets falls enough (shifting the disagreement point to the south west of the point (u_B^s, u_A^s), all the allocations in the bargaining set become individually rational. In this case if plain divorce equilibria survive, they may imply an asymmetric division of the surplus from separation $(u_B^s + u_A^s)$ - in which one of the partners gets more than half of the surplus - even for δ tending to one. On the contrary, in the case we have considered in section 4 the disagreement point and the bargaining set are symmetric, so that in the limit as δ approaches one, the spouses share the surplus from separation equally.

Changes in alimony rules can be thought as imposing a constraint on the transferability of the assets. Imagine for example that we move from a situation in which the husband

[19]This is in line with the predictions of Lundberg and Pollak's (1993) "separate sphere" model of bargaining within the marriage. There too disagreement within the marriage is the relevant threat point. They show that only total resources and not the allocation of property rights on them affects equilibrium payoffs in equilibria in which "... positive supplementary transfers are made between husband and wife." This is also the case here under our maintained assumption that changes in utilities when single are no so large as to lead to a divorce equilibrium with no transfers.

pays no alimony to one where he is forced to pay alimony. This can be represented in our model as imposing an upper bound of $u^s_A + h - a$ on the husband's maximum utility from divorce, where a measures the present discounted value of future alimony payments. Similarly, the lower bound on the wife's utility from divorce is $u^s_B + a$. Note that neither the disagreement point nor the total surplus available for negotiations are affected. Provided that a is not so large as to make $u^s_A + h - a$ smaller than the husband's equilibrium payoff in case of divorce in the absence of alimony, changes in alimony rules will have no effect on equilibrium payoffs.[20]

We deduce therefore that in a divorce equilibrium a small change in alimony rules will have no impact on the utility levels in equilibrium: whatever the husband is forced to give in alimony, he will get back in the bargaining over the assets. On more careful reflection this is not so counterintutitive: if it was optimal for the wife to accept, say, 50% of the house to get a divorce when anticipating receiving no alimony, in the same equilibrium it will be optimal for her to accept 50% of the house minus the value to her of the alimony.

6 Concluding remarks

Our results can be understood in the light of the property-rights theory of the firm (Grossman and Hart (1986) and Hart and Moore (1990)). Under unilateral divorce, each partner has residual control rights on his/her participation in the marriage. While it is uncontroversial that the option to divorce can be unilaterally exercised under at-will divorce, it is not the case that under consensual divorce the spouse that wants the marriage to continue has control over the other spouse's cooperation. In other words, he or she has the

[20]This parallels the classic result in Landes (1978).

power to veto marriage termination but not the right to a cooperative marriage (which is obviously non-contractible). Residual control rights are left unallocated under consensual divorce.[21] So the outcome is determined by bargaining. While this has no effect on the separation decision if utility is transferable at the same rate both inside the marriage and in case of separation, it has fundamental implications in all other cases. The marriage survives if it strongly Pareto dominates the agreement on divorce. If this is not the case, the two equilibria in which the marriage efficiently survives and inefficiently terminates are not Pareto ranked. The spouses are, in a sense, playing a battle of the sexes. One can argue that which of the two equilibria prevails is a matter of social convention.

The above suggests that our framework can be extended to the theory of investment in general productive relationships - we leave this issue open for further research.

[21]Halonen (2002) shows that in a repeated relationship the failure to allocate residual control rights may be optimal if the elasticity of investment with respect to marginal returns is low.

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Appendix A: The bargaining set

Here we display the bargaining set for the general case when $h/2 \gtreqless u_i^s$ for $i = A, B$.

When the bargaining set D is non-empty, the maximum utility (as measured from the origin O) from a feasible divorce agreement for spouse i which is compatible with individual rationality for the other spouse is

$$t_i^+ = \max\left\{x_i \in \mathcal{R} | (x_i, x_j) \in D \text{ for some } x_j\right\} = u_i^s + \frac{h}{2} + \min\left\{\frac{h}{2}, u_j^s\right\}$$

In fact, in case of separation spouse i can never extract from the partner j more than j's share of the house: but if j's utility of being single is lower than the value of half the house, then i can extract at most a share of the house equivalent to u_j^s (otherwise j would not rationally consent to divorce).

Although the maximum feasible utilities differ between the spouses (unless $u_i^s = u_j^s$), note that in the case considered in the main body of the paper - $h/2 > u_i^s$ - the individual rationality constraint equalises the maxima, with

$$t_i^+ = t^+ = \frac{h}{2} + u_i^s + u_j^s$$

This is not the case in general. We illustrate one such example in Figure 5, where for one agent (Anthony) the utility from being single exceeds the utility from being unhappily married, i.e. $u_A^s > \frac{h}{2}$, while $u_B^s < \frac{h}{2}$. Then it is easy to see that $t_A^+ = \frac{h}{2} + u_A^s + u_B^s$, whereas for Betty $t_B^+ = h + u_B^s < t_A^+$. Note that now a convenient reparameterisation would be the one translating the origin from point O to point $O' \equiv \left(\frac{h}{2}, u_A^s\right)$.

[Figure 5 here]

Appendix B: Proofs

Proof of propositions 1 and 2.

Supporting strategies are described in Table 2, where we adopt the convention that the first entry of a given partition refers to the share of the proposing agent. Checking that each profile is an s.p.e. is straightforward thus omitted.

The equilibrium partitions in Table 2 can be derived as follows. Let P_i^j, $i, j = A, B$ be the equilibrium payoff for player i in subgames where player j either offers to stay married or proposes a divorce settlement (subgames of type G^j). Furthermore, let r_i^j, $i, j = A, B$, denote the equilibrium payoff to player i in subgames starting with the decision of player j whether to accept staying married or propose a divorce settlement in the next period (subgames of type H^j). Assume that there is immediate agreement. Then the following system of equation must be satisfied in a stationary equilibrium:

$$P_B^B = \max\left\{z - \delta P_A^A, r_B^A\right\} \tag{1}$$

$$r_B^B = \max\left\{\delta P_B^B, u_B^m\right\} \tag{2}$$

$$P_A^A = \max\left\{z - \delta P_B^B, r_A^B\right\} \tag{3}$$

$$r_A^A = \max\left\{\delta P_A^A, u_A^m\right\} \tag{4}$$

The first two equations refer to subgames of type G^B and H^B, respectively, whereas the last two equations refer to subgames of type $G^A$and H^A, respectively. Depending on parameter values, the unique solution to the above system defines the equilibrium outcomes of Table 2. The solution depends on the direction of each of four sets of inequalities:

$$z - \delta P_A^A \gtreqless r_B^A \tag{a}$$

$$z - \delta P_B^B \gtreqless r_A^B \tag{b}$$

$$\delta P_A^A \gtreqless u_A^m \tag{c}$$

$$\delta P_B^B \gtreqless u_B^m \tag{d}$$

In what follows we use the suffix .1 whenever the L.H.S. is greater than the R.H.S., and the suffix .2 when the opposite is true. So for instance b.2 is a shorthand for $z-\delta P_B^B < r_A^B$. This generates sixteen possible sets of inequalities, several of which generate inadmissible parameter values, leaving only seven valid inequalities, each corresponding to one of the stationary equilibria described in propositions 1 and 2, as we show below. We start by distinguishing four main cases as obtained by the various combinations of the inequalities sub a and b. The direction of the two remaining inequalities determine four possible subcases for each of the main cases.

As a preliminary, note that $z - \delta P_j^j > r_i^j$ implies that in subgames of type G^i agent i prefers to propose the equilibrium divorce settlement (which yields $z - \delta P_j^j$) rather than propose marriage (which yields r_i^j). The opposite is true if the direction of the inequality is reversed. Similarly, $\delta P_i^i > u_i^m$ implies that in subgames of type H^i agent i prefers to accept marriage rather than obtain the continuation payoff in a subgame of type G^i in the next round. Analysing all admissible configurations of the parameters is straightforward though tedious. We limit ourselves to the first case. The remaining three are available from the authors upon request.[22]

Case 1

$$z - \delta P_A^A > r_B^A \text{ and } z - \delta P_B^B > r_A^B \tag{5}$$

In this case in subgames of type G^i both agents achieve a higher payoff by proposing a divorce settlement rather than by pursuing marriage. Consequently equations 1 and 3 collapse to those characterising a standard bilateral monopoly bargaining over a surplus of size z, which results in the equilibrium partition which gives $\frac{1}{1+\delta}z$ to the proposer and $\frac{\delta}{1+\delta}z$ to the responder, so that $P_B^B = P_B^B = \frac{1}{1+\delta}z$. In this case the equilibrium outcome is therefore always going to be of the "plain divorce" type. The direction of inequalities sub c and d is going to determine the equilibrium strategies off the equilibrium path, as shown below.

Subcase 1.1

$$\delta P_A^A > u_A^m \text{ and } \delta P_B^B > u_B^m \tag{6}$$

In subgames of type H^i both agents prefer to get the proposer's payoff in the next round rather than ending the game with the marriage payoff. This implies that the payoff in

[22]Once this part of the proof is completed, showing that no delayed stationary equilibria can exist is routine, thus omitted. See for instance chapter 3 in Muthoo (1999).

subgames H^i is δP_i^i to agent i (who rejects marriage and proposes the equilibrium plain divorce settlement in subgame G^i in the following round); and $\delta P_j^i = \delta \left(z - P_i^i\right)$ to player j, so that $r_j^i = \delta \left(z - P_i^i\right)$. So, the equilibrium strategy profile is the one described under **(pd.iii)** in table 2.

Subcase 1.2

$$\delta P_A^A < u_A^m \text{ and } \delta P_B^B > u_B^m \tag{7}$$

Now in subgames H^i it is only one of the agents (Betty) who prefers divorce to marriage in subgames of type H^B. In this subgames it is optimal for her to reject marriage and propose the bilateral monopoly divorce settlement, whereas in subgames of type H^A Anthony prefers accepting marriage to his continuation payoff in the following round. This readily implies that $r_B^A = u_B^m$: if Betty where to propose marriage, triggering a subgame of type H^A, Anthony would accept (obtaining a payoff $r_A^A = u_A^m$). On the other hand, subgames of type H^B are as in subcase 1.1 above. This tallies with the strategy profile **(pd.i)** in Table 2 with $i = B$ and $j = A$.

Subcase 1.3

$$\delta P_A^A > u_A^m \text{ and } \delta P_B^B < u_B^m \tag{8}$$

This is symmetric to subcase 1.2 above, obviously with the strategies for Anthony and Betty reversed. Equilibrium strategies corresponds to those for equilibrium **(pd.i)** in Table 2 with $i = A$ and $j = B$.

Subcase 1.4

$$\delta P_A^A < u_A^m \text{ and } \delta P_B^B < u_B^m \tag{9}$$

In subgames of type H^i both agents prefer marriage to the continuation payoff in the following round (while anyway in subgames of type G^i it is still the case that both agents prefer to propose the equilibrium divorce settlement - immediately - rather than propose marriage). This explains the optimality of the equilibrium strategy profile **(pd.ii)** in Table 2. ■

Proof of proposition 3.

Supporting strategies are as follows: Along the equilibrium path Betty proposes the divorce settlement of proposition 3, which Anthony accepts. Both agents punish deviations by reverting to the "worst" equilibrium for the deviator, that is strategies supporting equilibrium **bm** if Anthony deviates, and strategies supporting **pd.i** if Betty deviates. Checking that these strategies are an equilibrium is straightforward, thus omitted. We just sketch what deters deviations on the equilibrium path. Consider Betty first. If she put forward a different agreement from the equilibrium one, Anthony, given his strategy, would reject and counteroffer the plain divorce equilibrium partition, which Betty would accept, obtaining a payoff of $\frac{\delta}{1+\delta}z$ in the following round, which at the time of the deviation is worth $\frac{\delta^2}{1+\delta}z < \frac{1}{1+\delta}z \leq x^*$. Turning now to Anthony, if he rejected Betty's equilibrium offer, in the next round he could either propose to stay married, or propose a divorce settlement. In the former case, Betty would accept, yielding Anthony a payoff of u_A^m, worth $\delta u_A^m < u_A^m \leq z - x^*$, so that such deviations would not be profitable. If instead Anthony were to propose a divorce settlement, it would have to be the one corresponding to the strategies for the **bm** equilibrium, yielding at the time of the deviation a payoff in present discounted value equal to $\delta\left(z - \delta u_B^m\right) < u_A^m \leq z - x^*$. ■

	Marriage		Divorce			
	(bm)*	(pm)	(pd.i)	(pd.ii)	(pd.iii)	(cd)*
player i:						
in divorce proposes	$\left(z-\delta u_j^m, \delta u_j^m\right)$	$\left(z-\delta u_j^m, \delta u_j^m\right)$	$\left(\frac{1}{1+\delta}z, \frac{\delta}{1+\delta}z\right)$	$\left(\frac{1}{1+\delta}z, \frac{\delta}{1+\delta}z\right)$	$\left(\frac{1}{1+\delta}z, \frac{\delta}{1+\delta}z\right)$	$\left(z-\delta u_j^m, \delta u_j^m\right)$
in divorce accepts	$x \geq \delta u_i^m$	$x \geq \delta u_i^m$	$x \geq \frac{\delta}{1+\delta}z$	$x \geq \frac{\delta}{1+\delta}z$	$x \geq \frac{\delta}{1+\delta}z$	$x \geq \delta u_i^m$
proposes to stay together	always	always	never	never	never	never
accepts to stay together	always	always	never	always	never	always
player j:						
in divorce proposes	$(z-\delta u_i^m, \delta u_i^m)$	$(z-\delta u_i^m, \delta u_i^m)$	$\left(\frac{1}{1+\delta}z, \frac{\delta}{1+\delta}z\right)$	$\left(\frac{1}{1+\delta}z, \frac{\delta}{1+\delta}z\right)$	$\left(\frac{1}{1+\delta}z, \frac{\delta}{1+\delta}z\right)$	$(z-\delta u_i^m, \delta u_i^m)$
in divorce accepts	$x \geq \delta u_j^m$	$x \geq \delta u_j^m$	$x \geq \frac{\delta}{1+\delta}z$	$x \geq \frac{\delta}{1+\delta}z$	$x \geq \frac{\delta}{1+\delta}z$	$x \geq \delta u_j^m$
proposes to stay together	never	always	never	never	never	always
accepts to stay together	always	always	always	always	never	always

*: assumes $i = B$, $j = A$.

Table 2: The equilibria of Proposition 1