The Value of Commitment: Marriage Choice in the Presence of Costly Divorce

Yurko, Anna

State University - Higher School of Economics (Moscow)

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Abstract

Two individuals may choose to enter a coresidential relationship, which may or may not include joint property ownership and raising children. In addition to that, individuals may decide to formalize this contractual relationship by holding a marriage ceremony. The literature on coresidential relationships typically assumes that the formal marriage contract offers additional tangible benefits to the couple. However, this assumption is not obvious, and these potential benefits (or costs) may vary greatly across societies and time. What remains invariant, however, is the typically higher costs of terminating a relationship that has been "sealed" by marriage.

The goal of this paper is to develop a simple dynamic model that can explain the existence of marriage contract. The model assumes that the only difference between marriage and non-marital cohabitation is the higher contract termination cost associated with marriage, and that the agents are free to enter either type of relationship contract. The quality of the match evolves randomly and independently over time, and every period each of the paired agents makes his or her decision on whether to stay in the given relationship or terminate it and seek another one based on the current match quality and expectations about the future. The relationship survives only if both agents choose to not terminate it. The unilateral decision to end a relationship by one agent may impose a negative externality on her partner, if he still would prefer to maintain it. The main finding is that when break-up costs are sufficiently high, choosing a marriage contract that provides even higher termination cost may reduce the expected break-up externality and result in greater welfare.

Keywords: family economics, marriage, cohabitation, externalities
JEL classification: D62, D91, J12

1 Introduction

Over the past half a century, the developed world has observed a dramatic decline in legal marriage rates, combined with an even more dramatic increase in divorce rates.[1] At the same time, an alternative relationship form to legal marriage, cohabitation, has become vastly more popular. Exact cohabitation rates are more difficult to measure; however, survey numbers show a tenfold increase for the US from 1970 to 2006.[2] These trends suggest a decline in relative benefits from legal marriage versus cohabitation.

The twentieth century has seen the body of laws governing family relationships in the majority of developed countries shifting its focus from protecting marriage to protecting rights of individuals.[3] This shift reflects the socio-economic and technological changes that have made it possible to construct more flexible relationship contracts.[4] Currently, Sweden leads the way with its most neutral legal approach to family forms, and the highest cohabitation rate of 28% of all couples in 2005. For comparison, the average cohabitation rate for the US and Europe is around 9%.[5] As cohabiting couples get increasingly similar treatment in the eyes of the law, and the legal benefits to being married get smaller, will the institution of marriage disappear? This paper's answer is negative. As long as it is more difficult to terminate the legal marriage than to break up a cohabiting union, marriage remains the most committed relationship option, and people who value commitment prefer it even in the absence of additional benefits.

The goal of this paper is to provide an explanation and a modeling framework for

[1] According to OECD (2005) report, the average number of marriages per 1,000 residents in the twenty seven OECD countries has experienced a 36% decline, from around 8 in 1970 to slightly above 5 in 2001. The average number of divorces per 1,000 residents for this group of countries has increased by 90% over the same time period, from slightly above 1 to more than 2. The exact numbers vary across countries, but the overall trends remain roughly similar.

[2] Olson and Olson-Sigg (2007) report this statistic using the US Census Bureau data.

[3] See, for example, Weitzman, Lenore J. (1974).

[4] Smith (2004) argues that prior to the invention of effective contraception methods and reliable paternity testing technology, the primary function of legal marriage was to mitigate the hazards of sexual opportunism, by endowing the man with control rights over his wife's sexuality. His paper also gives a good and brief overview of the marriage literature.

[5] These numbers are from USA Today (Jul 18, 2005) and UNECE Gender Statistics.

the choice of legal marriage over cohabitation in the absence of additional benefits from marriage. Previous literature on cohabitation versus marriage has assumed that marriage provides additional benefits to the agent, in order to induce her to choose this option (Brien, Lillard, and Stern (2006)). This assumption is not obvious, however. But if marriage does not offer additional benefits, why would couples choose it over cohabitation? The analysis in this paper suggests that in the presence of substantial break-up costs, either emotional, social, or financial, the higher termination costs associated with marriage can actually result in greater lifetime utility for the agent contemplating marriage versus cohabitation.[6] Marriage is the most committed type of relationship because it is the costliest one to dissolve, and the commitment is valuable.

The intuition is as follows. Any relationship survives if and only if both partners chose to maintain it. If one person enjoys the relationship and prefers to stay in it, she would only be able to do so if her partner also prefers not to terminate it. If he is no longer happy in the relationship and chooses to end it, his decision imposes a negative externality on her. When the break-up is painful and costly, this externality may be quite large. Higher costs of terminating a legal marriage may induce her partner to change his mind and preserve the relationship, eliminating the break-up costs they both would have had to pay otherwise. If break-up costs are sufficiently large, and as long as there is a chance that he may eventually become happy again in this relationship, additional termination costs from the marriage option result in higher welfare even when agents end up staying in less than satisfactory relationships for prolonged periods of time.

This paper does not aspire to explain all aspects, costs and benefits included,

[6]The adoption of no-fault divorce laws by the majority of developed countries has reduced the costs of terminating a legal marriage. Friedberg (1998) shows that the adaption of the no-fault divorce law has contributed to the increase in the divorce rates across states for the US. However, the costs of terminating a marriage are still perceived to be significantly higher than those of breaking-up a cohabiting relationship. See Crouch et al. (2005) for a summary of divorce procedures in different states in the US and countries in Europe, including the length of time it takes for a couple to obtain the no-fault divorce with and without partner's consent.

of different family structures. However, it may provide an additional insight into the establishment of the marriage institution. If many individuals would prefer a relationship with higher termination costs, the society is bound to come up with a way of providing this option. The incentive to do so is even stronger if there is a general consensus that break-up imposes costs not only on the adult parties to the relationship contract, but also on their children.

The next section presents a very simple model without the marriage option. The goal is to use the simplest setting to study how break-up costs affect decisions and values of agents when they are single and when they are in a relationship. Section III adds the marriage option to the model, and finds the lowest divorce cost for each value of the break-up cost, such that a single agent would weakly prefer to marry the next good partner she meets to cohabiting with him. The model is also solved for the divorce cost that would give a single agent the highest expected lifetime utility. Section IV concludes.

2 Basic Model and Analysis

This section introduces the basic framework for the analysis. The model presented here does not even have a marriage option in it. The purpose is to study how the break-up cost affects the decisions and values of agents when they are single or in a relationship.

2.1 Model

The agents are identical (no differences for men and women) and infinitely lived. In every period, each agent can be Single or Paired. Denote the value of being single by S, and the value of being paired by R.

There are two sources of uncertainty in the model:

1. Single agents get matched in every period. With probability μ_g they draw a good match, and with probability $(1-\mu_g)$ they get a bad one. A good match gives utility u_g to the agent and her match partner in the current period. A bad match gives utility u_b to both of them, where $u_b < u_g$. Note that the agents may choose to remain single, which gives them utility 0 in the current period (normalization).

2. Paired agents experience a shock to the quality of their match in every period. When they choose to get matched, they start out with the same match quality, which is the utility from their match. However, after this initial period their match qualities evolve independently according to transition probability matrix

$$\Pi = \begin{bmatrix} \pi_{gg} & \pi_{gb} \\ \pi_{bg} & \pi_{bb} \end{bmatrix}.$$

Timing

For Single Agents:

- Arrive in period t.
- Draw a match quality shock u_q, where 'q' stands for 'g' or 'b'.
- Choose whether to stay single, or be paired.
- "Consume" the option of choice.

The current period utility from being single is normalized to 0, the utility from being paired is equal to match quality u_q.

For Paired Agents:

- Arrive in period t.
- Shocks to match satisfaction are realized for both partners.

- Simultaneously make decisions to stay together or break up. Possible outcomes:

  1. Both partners are satisfied with the match and decide to stay paired.

  2. Only one of the partners is satisfied, the other would be better off splitting. They split.

  3. Both want to split.

"Mixing" is also possible. For example, one partner is in a good state, the other one is in a bad one. The first partner wants to stay together, the second one is indifferent and would split with probability 0.5. That means they would stay together with probability 0.5.

- "Consume" the option of choice.

Value functions

For single agents, the decision vector $\Gamma = \begin{bmatrix} \gamma_g & \gamma_b \end{bmatrix}$ solves

$$S(q) = \max\left\{\beta\ ES,\ u_q + \beta\ E_{q',q'_-/q} R\left(q', q'_-\right)\right\},$$

where q is the agent's current match quality, q_- is her partner's, and primes denote next period values. If the agent chooses to stay single, $\gamma_q = 0$. It is equal to 1 otherwise.

Denote by $\Phi = \begin{bmatrix} \phi_{gg} & \phi_{gb} & \phi_{bg} & \phi_{bb} \end{bmatrix}$ the decision vector for paired agents in every state (a state is current match qualities for the agent and her partner). In every state (q, q_-), ϕ_{qq_-} is the probability (decision) of staying together.

Then, for paired agents,

$$R(q, q_-) = \max_{\phi_{qq_-}} \left\{\phi_{qq_-}\phi_{q_-q}\left[u_q + \beta\ E_{q',q'_-/q,q_-} R\left(q', q'_-\right)\right] + \left(1 - \phi_{qq_-}\phi_{q_-q}\right)\left[-c + \beta\ ES\right]\right\},$$

where c is the break-up cost.

Equilibrium

The agents solve their decision problems independently, taking as given the partner's action. In a symmetric equilibrium, the agents make the same state-dependent decisions.

2.2 Results

Here the decisions and value function have been calculated for the following parameter values:

$u_g = 5$
$u_b = -2$
$\pi_{gg} = \pi_{bb} = 0.98$
$\mu_g = 0.05$
$\beta = 0.99$

Note that the shocks to match quality are quite persistent. The break-up cost is allowed to vary from 0 to 150.

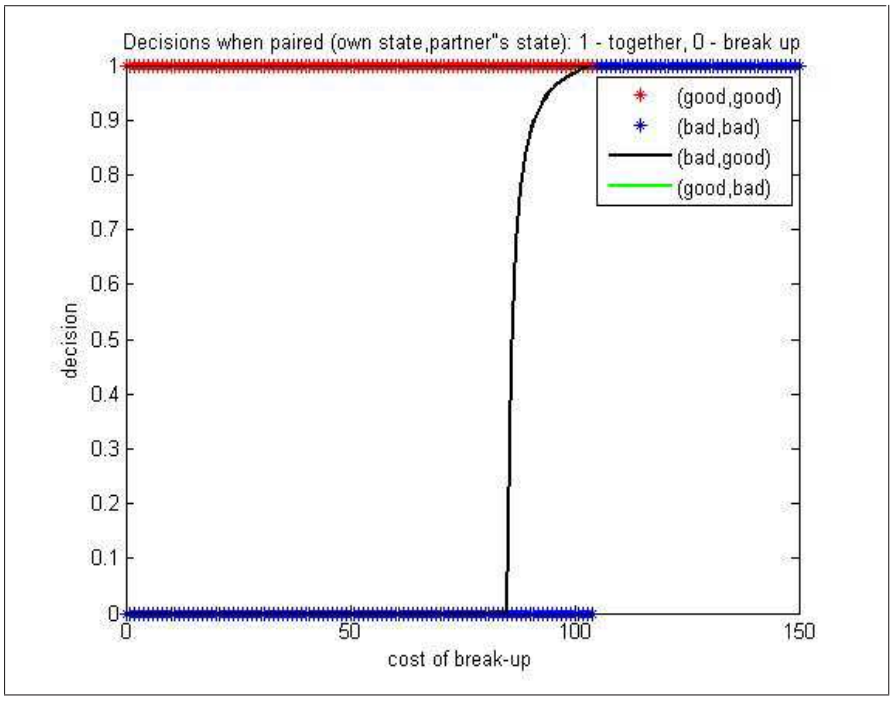
Decisions

For single agents the decisions turn out to be independent of break-up cost for these parameter values. The agent always chooses to get paired when the initial match quality is good ($\gamma_g = 1$), and remain single if the match quality draw is bad ($\gamma_b = 0$).

For paired agents the decisions are plotted in Figure 1 below. When the break-up cost is 85 or below, the agents wish to stay together if their own match quality is good, and chose to break up otherwise ($\phi_{gg} = \phi_{gb} = 1$, $\phi_{bg} = \phi_{bb} = 0$). Thus, the match survives only if both agents are in a good state. Higher break-up cost makes the agent

in a bad state not so positive about breaking up when her partner is in a good state ($\phi_{gg} = \phi_{gb} = 1$, $0 < \phi_{bg} < 1$, $\phi_{bb} = 0$). Increasing c makes the agent in (bad,good) state less likely to break up, and the match more likely to survive. The agents break up for sure only if both of them are unhappy with the match. Finally, when cost of break-up is 105 or higher, the agents never break up ($\phi_{gg} = \phi_{gb} = \phi_{bg} = \phi_{bb} = 1$).

Figure 1: Decisions of paired agents

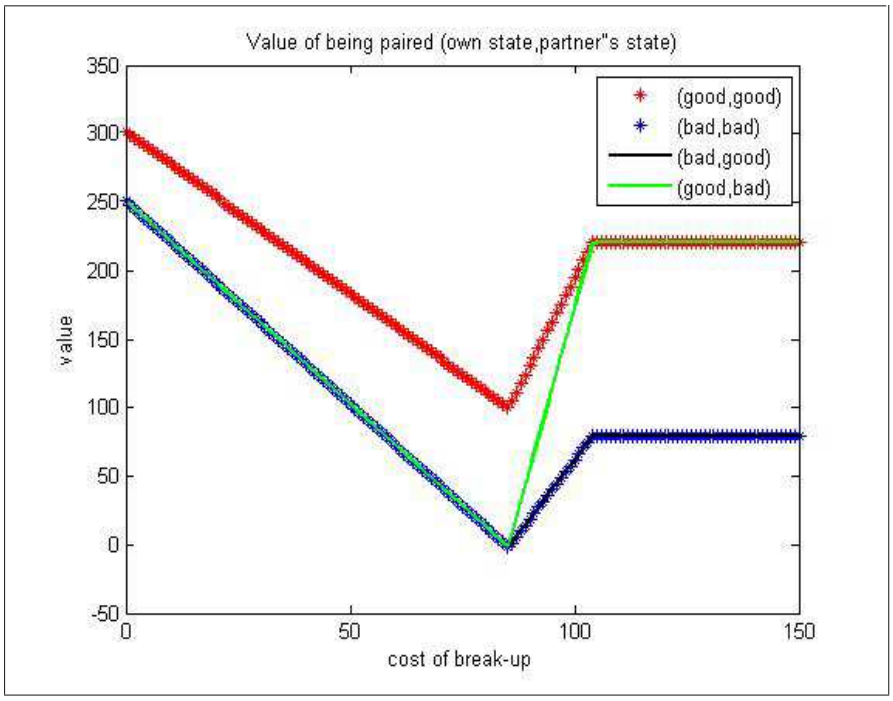


Value functions

How do these decisions affect value functions?

Figure 2 plots the value functions for a pared agent. For paired agent in states (bad,good) and (bad,bad) the values are always equal, and lower than the values in other states.

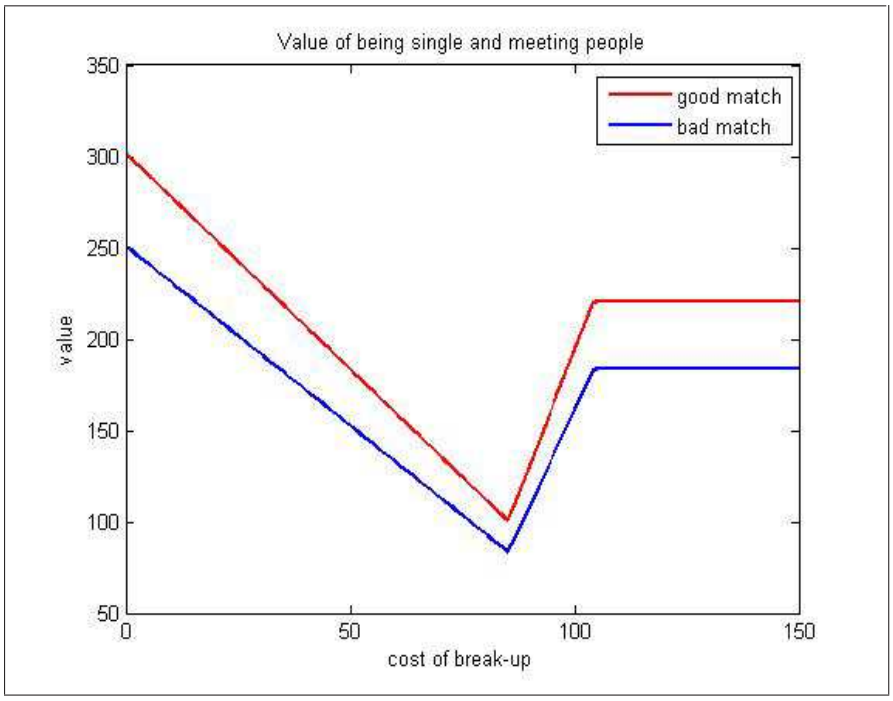
Figure 2: Value functions of paired agent



If cost of break-up is 85 or below, for agent in state (good,bad) the value is the same as that in states (bad,good) and (bad,bad), since the relationship would always end in break-up in all of these three states. When cost of break-up is higher, the agent in (good,bad) is more likely to get to keep the match, and her value increases. That causes the values in other states to increase as well. Finally, when $c \geq 105$, no one ever breaks up and bears the cost of it.

Figure 3 plots the value functions of single agent in each state. It reflects the changes in R as function of the cost.

Figure 3: Value functions of single agent



Thus, if the cost or terminating a relationship is above a certain value, increasing this cost may be beneficial for agents in all states. And that could be the role of marriage contract. This finding is robust as long as $\pi_{bb} \neq 1$, that is, as long as there is a chance for a bad relationship to become a good one again.

3 Marriage versus Cohabitation

3.1 Model

This section adds the option of marriage to the previous setting, by allowing the single agent to decide between one of the three options: stay single and wait for a better match, enter a cohabiting relationship with the given partner, or get married.[7] The

[7]Cohabiting partners may also be allowed to change their relationship type to marriage. In fact, in the real world, many marriages start as cohabitations. In the current model, however, agents that have cohabited do not have any additional incentives to marry relative to the newly matched agents. Thus, it is sufficient to only offer this option to the single agents.

value functions associated with these options are denoted respectively by S, R, and M. The single agent's decision problem is

$$S(q) = \max\left\{\beta\ ES,\ \left[u_q + \beta\ E_{q',q'_-/q} M\left(q', q'_-\right)\right],\ \left[u_q + \beta\ E_{q',q'_-/q} R\left(q', q'_-\right)\right]\right\}$$

Now, the decision to stay single is denoted by $\gamma_q = 0$, the decision to get married is $\gamma_q = 1$, and the decision to cohabit is $\gamma_q = 2$.

The problem for a cohabiting agent is the same as before. The agent chooses an optimal state-dependent decision vector $\Phi = \left[\begin{array}{cccc} \phi_{gg} & \phi_{gb} & \phi_{bg} & \phi_{bb} \end{array}\right]$ so as to maximize her expected discounted lifetime utility:

$$R(q, q_-) = \max_{\phi_{qq_-}}\left\{\phi_{qq_-}\phi_{q_-q}\left[u_q + \beta\ E_{q',q'_-/q,q_-} R\left(q', q'_-\right)\right] + \left(1 - \phi_{qq_-}\phi_{q_-q}\right)\left[-c + \beta\ ES\right]\right\},$$

where c is the break-up cost.

The problem for the married agent is similar, with the exception that she has to pay an additional cost d if the marriage is terminated. Denote by $\Psi = \left[\begin{array}{cccc} \varphi_{gg} & \varphi_{gb} & \varphi_{bg} & \varphi_{bb} \end{array}\right]$ the married agent's decision vector, which she chooses to solve

$$M(q, q_-) = \max_{\varphi_{qq_-}}\left\{\varphi_{qq_-}\varphi_{q_-q}\left[u_q + \beta\ E_{q',q'_-/q,q_-} M\left(q', q'_-\right)\right] + \left(1 - \varphi_{qq_-}\varphi_{q_-q}\right)\left[-\left(c + d\right) + \beta\ ES\right]\right\}.$$

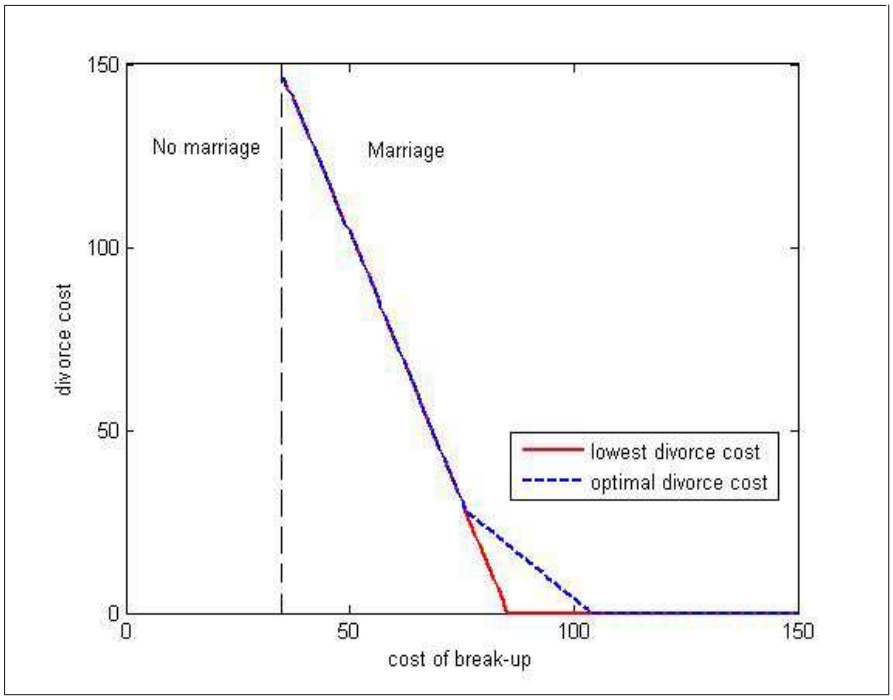
The first task is for each value of the break-up cost c, to find the lowest value for the divorce cost $\underline{d}$, such that a single agent would weakly prefer to marry in some state ($\gamma_q = 1$ for some q). The second task is for each value of the break-up cost c, to find the divorce cost d^* that gives the highest expected lifetime utility to the single agent. The next subsection presents these results for the same base parameter values, and compares the values from this model to the ones from the model with no

marriage option.

3.2 Results

The single agent always chooses to remain single if the initial match quality draw is bad ($\gamma_b = 0$), and to get married or cohabit if the match quality is good ($\gamma_g = 1$ or $\gamma_g = 2$). Figure 4 shows, for each value of the break-up cost, the lowest divorce cost $\underline{d}$ such that the single agent would prefer to marry in the good state. It also depicts the optimal divorce cost d^*. For each value of the break-up cost, the optimal divorce cost d^* gives the highest expected value to the single agent.

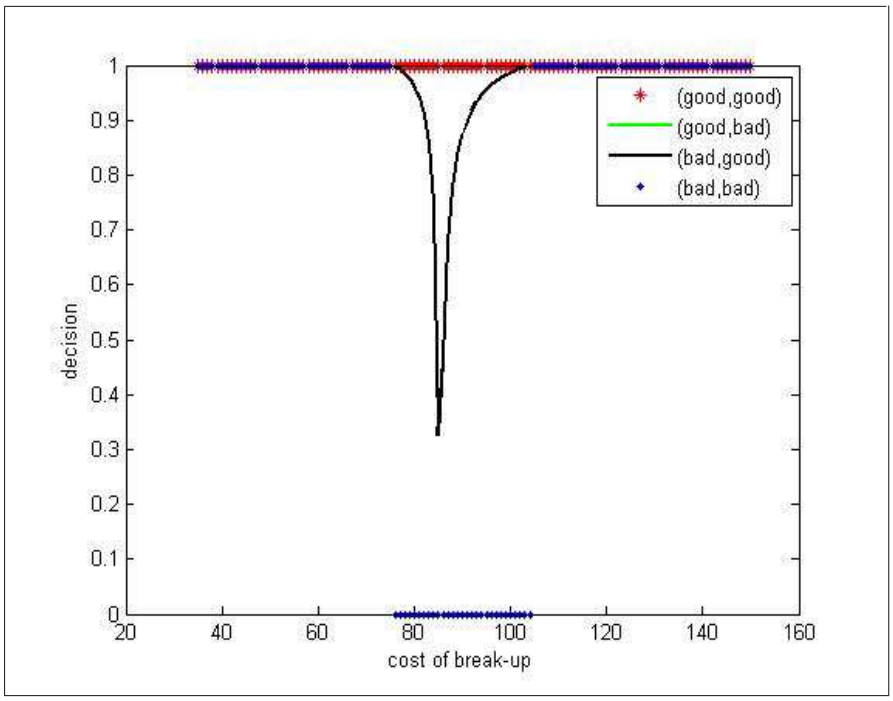
Figure 4: Lowest divorce cost $\underline{d}$ and optimal divorce cost d^*



When the break-up cost is 34 and below, there does not exist a divorce cost such that the single agent would choose to get married. When breaking-up is relatively easy, the agents would always prefer to break-up if the relationship turns bad, and start a search for a new one. For the break-up costs higher than 34, but below 76, the

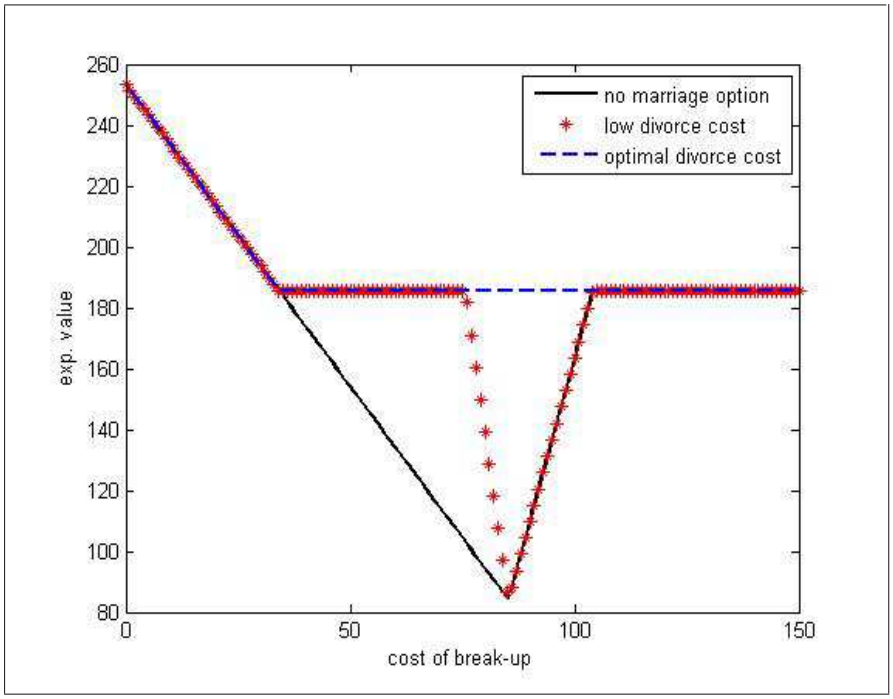
single agent with a good initial match quality would prefer marriage over cohabitation only if the higher cost of divorce would completely eliminate the break-up externality. As Figure 5 shows, when the break-up cost values are in this range, the married agent would never choose to terminate his or her marriage. As the break-up cost increases to 76 and above, the value of cohabitation declines, and it takes less to induce the single agent to marry. For $76 \leq c \leq 104$, the married agent in the state (bad,bad) would always choose to terminate the marriage, and would be indifferent between preserving the relationship and terminating it in the (bad,good) state. When the value of c is below 86, the agent mixes between staying married and getting a divorce, with a probability of staying married decreasing in c. The declining expected value for the single agent in the range of $c \in [76, 85]$, when $\underline{d}$ is just high enough to induce her to marry, shows that as the break-up cost increases, it takes less and less of negative externality elimination to induce her to get married (See Figure 6). The trend is reversed, however, when c increases even further. That is because for values of the break-up cost this high, the cohabiting agent would not terminate her relationship for sure when it goes bad, either. Finally, when the break-up cost is 105 or higher, additional termination costs of divorce are no longer necessary to induce the married agent to stay in the relationship no matter what. The break-up costs are already so high that the agent would never choose to end the relationship.

Figure 5: State-dependent decisions of married agents with $\underline{d}$



It turns out that when the break-up cost is above 34, the "best" divorce cost is the one that makes the married agents unwilling to terminate their marriage in any state. The lowest value for such a divorce cost d^*, for each given value of the break-up cost c, is shown in Figure 4. With this divorce cost married agents never choose to divorce, so $\varphi_{qq_-} = 1$ for any state q. Figure 6 shows the highest expected value of the single agent that can be thus accomplished for each value of the break-up cost.

Figure 6: Expected values of single agents when marriage is not an option, when the cost of divorce is $\underline{d}$, and when the cost of divorce is d^*



4 Summary and Plans for Future Work

This paper demonstrated that a relationship contract with higher termination costs may be preferred even in the absence of additional benefits. If both partners suffer dissolution costs, and it takes the decision of only one of them to terminate either type of relationship, additional divorce costs in marriage help eliminate the negative externality imposed on the partner who would still prefer to preserve the relationship. Moreover, if break-up costs are high, additional termination costs make the break-up and suffering those costs less likely, an outcome that even the less than happy party to the contract may prefer, as long as there is a chance for improvement in the relationship quality.

Parameter robustness tests show that as long as $\pi_{bb} \neq 1$, that is, there is a

chance for improvement in current relationship quality, however small, legal marriage contract will be preferred by agents with sufficiently high break-up costs. This key result is robust to changes in other parameters.

An interesting extension would involve introducing asymmetries in break-up costs and distributions of match qualities. Also, the current distributions and processes for match qualities are very simplistic and limited, and the current "good" and "bad" match qualities may be replaced with a continuous set. This would allow to study self-selection of match-quality types of single agents into marriage or cohabitation, and how these decisions depend on break-up costs and divorce costs.

The model also assumes that the transition probability for match qualities is time invariant. A more plausible assumption would allow the agents to learn about the relationship quality, making the possibility of both negative and positive shocks less likely with the amount of time spent in the relationship.[8] This assumption, however, would make the model more complicated, while leaving the key result unaltered. As long as there is a chance that the relationship may go bad for at least one of the partners, giving him or her the incentive to terminate it, higher dissolution costs in marriage make the relationship more likely to survive, saving both partners the break-up costs. When these costs are sufficiently high, agents contemplating marriage versus cohabitation would still prefer the more committed marriage option.

Introducing time spent in the relationship would make it possible to study the transition from cohabitation into marriage. It is a well known fact that nowadays many marriages start as cohabitations. There is also evidence that marriages preceded by cohabitations have a higher risk of divorce.[9] A modification of the model with break-up costs rising with time spent in the relationship would result in some agents not choosing marriage from the start, but converting their cohabitations into marriages later on. A wider range of match qualities would make self-selection pos-

[8]The model in Brien, Lillard, and Stern (2006) has this assumption, along with the finite time horizon.

[9]See Brien, Lillard, and Stern (2006) for the summary of empirical evidence on marriages and cohabitations.

sible as well, helping to account for the latter observation. However, the main goal of the current project is to study the reasons for choosing legal marriage when the cohabitation option with equal benefits and lower termination costs is also available. For this purpose the simple model introduced here is sufficient.

REFERENCES

1. Bernhardt, Eva (2004), "Cohabitation or marriage? Preferred living arrangements in Sweden." Austrian Institute for Family Studies publication, 04/2004.

2. Brien, Michael J., Lee A. Lillard, and Steven Stern (2006), "Cohabitation, Marriage, and Divorce in a Model of Match Quality", International Economic Review, 47(2), pp. 451-494.

3. Crouch, John, Monika Scotville, Richard Beaulieu, Ashley Sharpe, Kristen Thrine, Scott Dukat, and Sarah Williams (2005) "Divorce Rates and Laws: USA & Europe", http://www.divorcereform.org/compare.html

4. Friedberg, Leora (1998), "Did Unilateral Divorce Raise Divorce Rates? Evidence from Panel Data", American Economic Review, 88(3), pp. 608-628.

5. OECD (2005), Society at a Glance: OECD Social Indicators, 2005 Edition.

6. Olson, David H. and Amy Olson-Sigg (2007), "Overview of Cohabitation Research", PREPARE/ENRICH Life Innovations, Inc. (Use US Census Bureau data)

7. Smith, Ian (2004), "The Foundations of Marriage: Are They Crumbling?", International Journal of Social Economics, 31(5/6), pp. 487-500.

8. United Nations Economic Commission for Europe (UNECE), Statistical Database, Gender Statistics (http://w3.unece.org/pxweb/Dialog/Default.asp).

9. USA Today, Jul 18, 2005, "Sweden's 'marriage lite' gets closer examination ; 28% cohabitation rate is more than triple USA's."