Sin City

Pieter A. Gautier, Free University Amsterdam
Michael Svarer, University of Aarhus
Coen N. Teulings, University of Amsterdam

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Abstract

In this paper we test with a unique Danish data set what the effects of various forms of commitments on marriage duration is. Besides considering the usual suspects like the effects of: being married as opposed to cohabiting, having young and older kids, and home ownership, we also consider the effects of voluntary decreasing the arrival rate of potential new partners. This has to our knowledge not been studied before. In Gautier et al. (2005) we argue that the city serves as a marriage market. The basic idea is that the rate at which singles meet potential partners is higher in the city either because of a size-of-the-market effect or because cities are more densely populated. Therefore, singles (in particular the most attractive ones) will exploit this and move to the city. Those predictions are confirmed by the data. Here, we argue that the same observation can justify that a transition from the city to the countryside can be used as a credible commitment device for couples. By moving to the countryside, the number of outside offers decreases and hence the value of search, while married, decreases as well.

1 Introduction

Specific investments in relation-specific capital like buying a house and raising children increase the value of a relationship. The willingness to invest depends crucially on the expected returns. If one expects that the relationship will end soon, specific investments will not be undertaken. Lack of investment on the other hand might enhance the dissolution process. Burdett et al. (2004) show that the separation rate can be inefficiently high because if one of the partners is likely to continue searching while being married, this by itself stimulates the other partner to continue search as well. Even good marriages could break up for this reason. If both partners could increase commitment by specific investments this increases the stability of the relationship and benefits both. In this paper we test with a unique Danish data set what the effects of various forms of commitments on marriage duration is. Besides considering the usual suspects like the effects of: being married as opposed to cohabiting, having young and older kids, and home ownership, we also consider the effects of voluntary decreasing the arrival rate of potential new partners. This has to our knowledge not been studied before. In Gautier et al. (2005) we argue that the city serves as a marriage market. The basic idea is that the rate at which singles meet potential partners is higher in the city either because of a size-of-the-market effect or because cities are more densely populated. Therefore, singles (in particular the most attractive ones) will exploit this and move to the city. Those predictions are confirmed by the data. Here, we argue that the same observation can justify that a transition from the city to the countryside can be used as a credible commitment device for couples. By moving to the countryside, the number of outside offers decreases and hence the value of search, while married, decreases as well. This is consistent with the finding in Gautier et al. (2005) that couples have a larger probability to leave the city, even those who never have kids.

To sum up, if a marriage is sufficiently good, partners are more likely to invest in relation specific capital and therefore the divorce rate should be decreasing in the amount of relation specific capital. The effect of each of the commitment investments is therefore a combination of a sorting effect and a pure commitment effect. We are unable to decompose the total effect in those two factors. However, if we find that investments in commitment capital decrease the divorce hazard, we can conclude that those investments have a commitment component otherwise there would be no reason for the good marriages

to invest more in it in the first place.

If the various forms of commitment investments are complements we expect home ownership to be higher in rural areas and among couples with kids. Our data reveal that this is indeed the case.

We find that all our commitment variables increase marriage duration and that couples who at the time of marriage are located in Copenhagen (which is by far the largest Danish city with around 600,000 inhabitants out of total population of 5,400,000) have a lower divorce risk if they move to the countryside. We perform several robustness checks and find that when we expand the definition of city to include smaller cities the effect becomes weaker. This result clearly makes sense. The gain of moving from a city to a less populated area is only realized if the change in the contact rate is sufficiently large. We also find that among couples who married in the countryside, those who move to the city divorce faster.

Masters (2005) suggests a different form of commitment. If the outcome of the aging process is a random variable this can potentially destabilize marriages if for one of the partners this outcome is more favorable than for the other. Masters (2005) shows that for sufficiently large frictions there exists an equilibrium where the more attractive partner voluntarily becomes less attractive (i.e. by increasing weight) in order to stabilize the relationship. The advantage of moving to a rural area is that it does not destroys value. Cornelius (2003) also studies divorces in a model where good and bad marriage partners form matches and decide whether or not to continue search but in her model, good marriages never dissolve. Finally, Chiappori et al. (2005) considers a marriage market with transferable utility. Since there is continuous renegotiation possible, inefficient separations do not occur and there are therefore less incentives to invest in commitment.

The paper is organized as follows, our theoretical framework is Burdett et al. (2004) which we discuss in section 2 and which can easily be extended to study the effect of commitment investments. In section 3 we discuss the data and in section 4 we present our empirical results. Section 5 concludes.

2 Theoretical background

Point of departure is the separations model of Burdett et al. (2004). First we briefly discuss this model and the possible equilibria and then we discuss how various forms of commitment may help to select the most favorable equilibria. In the simplest version of the separations model, agents are ex ante identical and meet other agents at rate α while exogenous separations occur at rate σ. The quality of a marriage is a random variable that can take two values. With probability π, a potential marriage is good (G) and with probability $(1-\pi)$, the marriage is bad (B). In order to enter a new relationship, agents must leave their old partners. Agents can be in three possible states: N_G (good marriage), N_B (bad marriage), and N_S (single) where $N_G + N_B + N_S = 1$ and the payoff of each state N_i is V_i. Let P_B and P_G be the probabilities of accepting respectively a good and a bad marriage and let S_B and S_G be indicator variables which equal one when agents search in respectively good and bad marriages and zero if they do not search. The cost of "searching on the job" are equal to K. P_i and S_i are chosen in equilibrium. Specifically, all agents choose p_i and s_i but since we only consider symmetric equilibria, $p_i = P_i$ and $s_i = S_i$. Burdett et al. (2004) show that depending on the parameter variables, five types of symmetric pure strategy equilibria exist. The conditions can be calculated straightforwardly by checking every possible strategy profile. Rather then repeating this exercise we qualitatively state what those conditions are and refer for the exact expressions to their paper.

1. Type D (degenerate), $P_B = P_G = 0$ (if utility of single > utility of marriage)

2. Type C (choosy), $P_B = 0, P_G = 1, S_G = 0$ (if utility of a good marriage is sufficiently high and utility of a bad marriage is sufficiently low)

3. Type F (faithful), $P_B = 1, P_G = 1, S_G = S_B = 0$ (if utility of both the good and bad marriages are sufficiently high and the payoffs of search on the job are sufficiently low)

4. Type U (unfaithful), $P_B = 1, P_G = 1, S_G = 0, S_B = 1$ (if utility of both the good and bad marriages are sufficiently high and the payoffs of search on the job are sufficiently high)

5. Type P (perverse), $P_B = 1, P_G = 1, S_G = 1, S_B = 0$ (if utility of both the good and bad marriages are sufficiently high but their difference is sufficiently small and the payoffs of search on-the-job are sufficiently high).

There is no equilibrium where everybody continues searching (all S_i and P_i are 1) because if $S_B = 1$ good marriages will never separate because a good marriage strictly dominates a bad marriage. The P equilibrium is one of "self-fulfilling beliefs". I.e. if there is not a big difference between good and bad marriages, then if everybody beliefs that their partner searches in G-marriages this becomes an equilibrium. Even if good marriages are slightly better, this common belief equilibrium can survive. It is easy to see that the P- equilibrium is never efficient. Burdett et al. show that under certain parameter configurations, the U equilibrium is efficient. If this is the case, the market will also select this equilibrium. Under alternative configurations, the F equilibrium is the most efficient one but in that case, the market may still select the inefficient U equilibrium. Finally, if search cost, K are sufficiently high, equilibria U and P no longer exist. Note that this can be welfare improving for the agents.

2.1 Commitment

Next, we allow for investments that agents can make to reduce the divorce rate. For the configurations where the F equilibrium is most efficient but where also the U and the P equilibria exist, agents have incentives to engage in such investments. Broadly speaking, there are two ways this can be done. First, agents can invest in relation specific capital: investments that have a higher value inside than outside the relationship. Relationship specific capital increases the value of the relationship, V_G, relative to the value of the other states, V_B and V_N. Examples of relation-specific capital include home ownership (see e.g. Sullivan (1995)) and having kids [1] (see e.g. Becker et al. (1977) and Svarer & Verner (2004)), both of which are more valuable within the relationship than outside the relationship and consequently increase the cost of divorce. In addition the act of getting formally married rather than cohabiting constitutes increased commitment. The sociological literature (see. e.g. Bennett et al. (1988) and Forste (2002)) suggest that

[1] Note that we allow kids to decrease V_G, but we assume that they reduce the value of the other states even more.

lack of permanence and commitment between partners are primary features distinguishing cohabitation from marriage[2].

An alternative form of commitment that, to our knowledge, has not been studied before is that agents can choose to reduce α and or increase K by moving to a less efficient search market like a rural area. This could also increases the set of parameter configurations for which the faithful, F, equilibrium occurs and can eliminate the perverse equilibrium.

To see this, consider two types of markets, cities (C) and rural areas (R) where the contact rate is higher in the city than in a rural area: $\alpha_C > \alpha_R$. In that case, equilibria U and P may exist in the city but if α_R is sufficiently small, they will not exist in rural areas. Gautier et al. (2005) argued and gave evidence that singles move to the city to benefit from more efficient search and that married couples leave the city. In that paper we ruled out search while being married. Our argument was that couples no longer benefit from more efficient search but they do pay a cost of living premium when living in the city and they therefore have strong incentives to move to the countryside. If we do allow for on-the-job search we see that there is a second potentially important reason for couples to move to rural areas namely to eliminate inefficient equilibria U and P.

If there are only exogenous reasons for couples to stay in the city, irrespective of their marriage quality, i.e. labor market considerations, strong preferences for theatres etc. then we could identify the pure city effect in the divorce hazard. However, given that $\alpha_C > \alpha_R$, good marriages are, conditional on their preferences for the city amenities, more likely to leave the city than bad marriages because they are willing to pay a higher price in order to avoid a divorce. Therefore, a lower divorce rate in rural areas is evidence for $\alpha_C > \alpha_R$ but cannot be used to estimate α_C and α_R because it is a combination of a quality-of-marrriage-effect and a low α_R. This also holds for the other relation specific investments. As far as they are done to stabilize the marriage, good marriages will only invest more in relation specific capital than bad marriages if they actually do stabilize the marriage. In the next section, we test how marriage durations respond to the various

[2]Premarital cohabitation is widely used in Denmark (as well as in the other Scandinavian countries). In the current data set around 78% of the couples who marry lived together before marriage. The occurance of cohabitation is also raising substantially in other countries. In the U.S. the number of cohabiting couples has increased from 1.1 million in 1977 to 4.9 million in 1997 (see e.g. Svarer (2004) for more details on the development in cohabitation in the Western world).

forms of commitment that we discussed in this section.

The idea presented here bears close resemblance to the investment model in psychology. Rusbult (1980) test a version of the investment model of romantic relationship with commitment. Basically, the investment model argues that their are close bonds between investment in relationships, the value of the relationship, outside alternatives, and commitment to the relationship. Rusbult (1980) performs an experimental study of the model and finds that indeed more attractive alternatives reduce individuals commitment and also willingness to invest in their current relationship.

Also sociologists have contributed in this area. In South & Lloyd (1995) it is analysed how the features of social context might influence marital dissolution. Specifically, they test how the quantity and quality of spousal alternatives in the local marriage market affect divorce rates. Their findings show that the association between the sex ratio of employed females compared to employed males is U-shaped. That is, divorce risk is higher in areas where the sex ratio is more skeewed. This suggests that divorce risks are higher where either the wifes or the husbands experience an abundance of spousal alternatives.

3 Data and empirical model

The data that we use to test the main implications of the model come from IDA (Integrated Database for Labour Market Research) created by Statistics Denmark. The information comes from various administrative registers that are merged in Statistics Denmark. The IDA sample used here contains (among other things) information on marriage market conditions for a randomly drawn sub-sample of all individuals born between January 1, 1955 and January 1, 1965. The individuals are followed from 1980 to 1995. The data set enables us to identify individual transitions between different states on the marriage market on an annual basis. In addition we have information about current geographical location. This implies that we observe an individual's mobility pattern on an annual basis. If the individual enters a relationship we also observe the personal characteristics of the partner.

We divide Denmark into two regions: cities and rural areas. We use different definitions for the two regions. First, we only include Copenhagen, the most dense area in Denmark

which hosts 12.7 % of the population in 1995, in the city category and the rest of Denmark is considered as rural area. In subsequent analysis we expand the city category to include other cities as well. The main explanatory variable in our analysis is thus an indicator variable that takes the value 1 if the individual is currently living in the city.

Individuals can occupy one of three states in the marriage market: single, cohabiting, or married. Cohabitation as either a prelude to or a substitute of marriage is very common in Denmark (see e.g. Svarer, 2004). There are some qualifications to this definition of marriage. Some of the couples - presumably a small minority - that are registered as cohabiting are simply sharing a housing unit, and do not live together as a married couple.

3.1 Explanatory variables

Our main variable of interest is the city dummy. In addition, we also include three other commitment variables in the analysis. First, we distinguish between couples who are formally married or not by the indicator variable, *marriage*. Second, we consider the housing status of the couple in the sense that we discriminate between *home owners* and those who do not own their own housing unit. Finally, we have an indicator variable, *children 0-6*, for the presence of children between 0 and 6 years old in the household. We report descriptive statistics for these and the additional explanatory variables in Table 2. In Table 1 we present the association measure gamma[3] for the four commitment variables.

Table 1: Association measure (Gamma) of the commitment variables

	City	Married	Kids 0-6 years old	Home owner
City	1	-0.57*	-0.48*	-0.71*
Married		1	0.57*	0.47*
Kids 0-6 yrs old			1	0.34*

Note: * denotes significant different from 0 at the 5% level

As Table 1 shows, the association between the four commitment variables suggest they are strong complements. As Drewianka (2005) argues, this is not surprising since each

[3]Gamma is calculated as $\frac{P-Q}{P+Q}$, where P is the number of pairs of the two indicator variables that take the same value (1 and 1 or -1 and -1) whereas Q is the number of pairs that takes opposing values (-1 and 1 or 1 and -1).

of these features increases the relative value of a relationship, it stimulates additional commitment investments.

In addition to the commitment variables we also include a number of additional explanatory variables in the subsequent analysis like dummies for educational attainment. The reference category is no education beyond primary school. Since some individuals may still be studying, we observe the current education at the time of observation. The educational variables are therefore also allowed to be time-varying. Next, we have information about gross income. Gross income is measured in 1980 prices and includes both labour and non labour income as well as received unemployment insurance benefits. We also include variables measuring the age of the individuals in the couple as well as their age difference. The variable, *sickness*, is an indicator variable taking the value 1 if the individual receives sickness benefits during the year. As a general rule sickness benefits are received if a person has a spell of illness for more than 13 weeks. Each individual's degree of unemployment during the year is defined as the number of hours of unemployment divided by the number of potential supplied working hours.

Table 2: Descriptive Statistics (at the beginning of relationship)

	Mean	Std. dev.
Commitment variables		
City	1	
City (measured on last observation)	0.61	
Married	0.13	
Home owner	0.15	
Kids. 0-6 years old	0.06	
Kids. 7-17 years old	0.04	
Male's education		
Vocational	0.16	
Short	0.03	
Medium	0.05	
Long	0.09	
Same level of education	0.70	
Male more educated	0.15	
Income (in dkk 1980 level)		
Female income	64,975	39,435
Male income	85,482	62,555
Age		
Female between 15-20	0.24	
Female between 21-25	0.19	
Female between 26-30	0.06	
Male between 15-20	0.19	
Male between 21-25	0.17	
Male between 26-30	0.09	
Female more than 4 years older	0.08	
Male more than 4 years older	0.25	
Sickness and unemployment		
Sickness, female	0.08	
Sickness, male	0.08	
Unemployment degree, female	0.09	0.20
Unemployment degree, male	0.09	0.21
Number of observations	3292	

3.2 Empirical Model

In order to investigate the effect of the explanatory variables on the divorce risk we estimate a duration model where the random variable is the time spent in a given relationship. The duration model is specified as a mixed proportional hazard model. That is, it is a product of a function of time spend in the relationship (the baseline hazard), a function of observed time-varying characteristics, x, and a function of unobserved characteristics,

v;

$$ht|x_t, v) = \lambda(t) \cdot \varphi(x_t, v), \tag{1}$$

where $\lambda(t)$ is the baseline hazard and $\varphi(x_t, v)$ is the scaling function specified as $exp(x_t'\beta + v)$.

Since we only observe the transitions on the marriage market on a yearly basis, we specify a model for grouped duration data (see e.g. Kiefer (1990)). The marriage duration T is observed to lie in one of K intervals, with the k'th interval being $(t_{k-1}; t_k]$ and the convention $t_0 = 0$ for $k = 1, ..., 15$. The probability that the duration T for an individual with explanatory variables x_t is greater than t_k given that the duration is greater than t_{k-1} is given by:

$$\begin{aligned} P(T > t_k | T > t_{k-1}, x_k, v) &= \exp\left[-\int_{t_{k-1}}^{t_k} h(t|x_t, v)dt\right] \\ &= \exp\left[-\exp\left[x_k\beta + v\right] \cdot \Lambda_k\right] \end{aligned} \tag{2}$$

where $\Lambda_{i,k} = \int_{t_{k-1}}^{t_k} \lambda_i(t)dt$. The interval-specific survivor expression (2) is henceforth denoted α_k. The probability of observing an exit out of marriage in interval k, conditional on survival until $T > t_{k-1}$, is consequently $1 - \alpha_k$. If we do not specify a functional form for the baseline hazard, the $\Lambda_{i,k}$s are just parameters to be estimated.

The individual contribution to the likelihood function is then

$$\mathcal{L} = \int (1 - \alpha_k)^j \alpha_k^{1-j} \prod_{l=1}^{k-1} \alpha_l g(v) dv, \tag{3}$$

where $g(v)$ is the probability density function of the unobservables and where $j = 1$ if the marriage is not right censored and 0 otherwise. Uncompleted durations therefore only contribute with the survivor probabilities. $g(v)$ is assumed to follow a discrete distribution with two points of support.

4 Results

Since the probability that a relationship is good may depend on whether the agents met in a city (where agents are more choosy because of the higher contact rate α_C) or in a rural area, we report the results separately for the subset of relationships that were formed in the city and those that were formed in the rural areas.

The variables of interest are the commitment variables: being married, whether one owns a house, having young kids, and having older kids. The latter distinction is important because the cost of divorce is larger for young kids. Of particular interest in this study is the indicator variable that denotes whether the couple is currently living in the city or in the countryside. In Table 1 we do not consider time varying effects in this variable while in Table 2, we do. In addition to this variable we also condition on the usual suspects in the divorce literature (see e.g. Svarer (2004)). We only report the coefficients for the commitment variables here (see Table 8 in appendix for the full set of results for the full model).

Table 3: Hazard model for relationships formed in the city[4]

	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
City	0.4895*	*0.0677*	0.3855*	*0.0679*	0.3592*	*0.0683*	0.3197*	*0.0689*
Married			-1.1376*	*0.0808*	-1.0969*	*0.0820*	-1.0947*	*0.0822*
Kids 0-6 yrs old					-0.2523*	*0.0596*	-0.2455*	*0.0598*
Kids 7-17 yrs old					0.0211	*0.0809*	0.0155	*0.0810*
Home owner							-0.1764	*0.0711*
# observations	3292		3292		3292		3292	
Log likelihood	-4533.57		-4389.66		-4379.60		-4377.90	

Note: * denotes significant different from 0 at the 5% level

Table 3 shows that the variables that increase the relative value of the relationship indeed decrease the divorce hazard significantly. As the commitment variables are positively correlated we include them sequentially to show the effect on the coefficient on the city dummy. As more and more commitment variables are included the relative importance of living in the city diminishes. The effect is, however, still positive and both economically and statistically significant after the inclusion of formal marriage, children and home ownership.

The coefficients are a combination of a pure commitment effect and a selection effect, namely that the good marriages are more likely to make those investments. Note however that the analysis in the previous section shows that the good marriages will only invest

[4]In addition we condition on a number of other explanatory variables - see Table 8 in appendix for the full set of results.

more in relation-specific capital than bad marriages if this relation specific capital increases the parameter set for which the faithful equilibrium exists. We cannot say whether the main reason why couples move to rural areas is in order to reduce α and or increase K but this is irrelevant because both effects have the same effect on the stability of the relationship.

The effect of the other commitment variables coincides with previous research on divorce. Böheim & Ermisch (2001) also find that formally married couples are less likely to divorce than their cohabitating counterparts. Weiss & Willis (1997) and Peters (1986) among others find that children (especially when they are young) are associated with lower dissolution risk. Sullivan (1995) and Jalovaara (2001) are examples of papers that find that home owners are less likely to divorce. We have on the other hand not been able to locate any previous work that explores the effect of moving from more populated areas to lesser populated on the dissolution risk. Although the fact that the divorce risk is lower in rural areas has also been observed by Peters (1986) and Jalovaara (2001).

As argued before, the effects we find are a combination between a pure commitment effect and a composition effect caused by the fact that good marriages invest more in relation specific capital. To dissentangle both effects requires strong assumptions. We could for example apply the timing-of event model by Abbring and van den Berg (2003, a). The intuition behind this approach, formulated in terms of the present analysis, is that by exploiting the time spell that elapses from partnership formation to a potential move out of the city one could address the endogeniety issue by simultaneously modelling the two processes: moving from the city and dissolution. By selection on unobservable arguments we are able to capture the causal effect of mobility. A crucial assumption underlying identification is an assumption of no anticipation. That is, there has to be some kind of randomness associated with the precise timing of the move. If one is willing to accept that leaving the city depends to some extent on other factors (i.e. the labor market) then we can apply their method. As an alternative to estimating the full specified econometric model Abbring & van den Berg (2003, b) suggest a graphical test to detect treatment effects in duration models. Basically the test looks at the timing of a given treatment (here a move from Copenhagen) for a subset of individuals with a given length of the duration variable (here relationship duration). Abbring and van den Berg (2003, b) argue that by investigating the hazard rate of the treatment it is possible to detect causal

dependencies. An application of the procedure can be found in Abbring et al. (2005). Here the effect of unemployment insurance sanctions of welfare recipients on the transition rate from unemployment to employment is considered. The graphical test shows that the hazard of sanctions increases prior to the date at which the unemployed find a job. This suggest a clear causal effect of sanctions on job finding rates. In our application we look at the hazard rate of moving from Copenhagen to a smaller city for subsets of couples with different relationship durations.

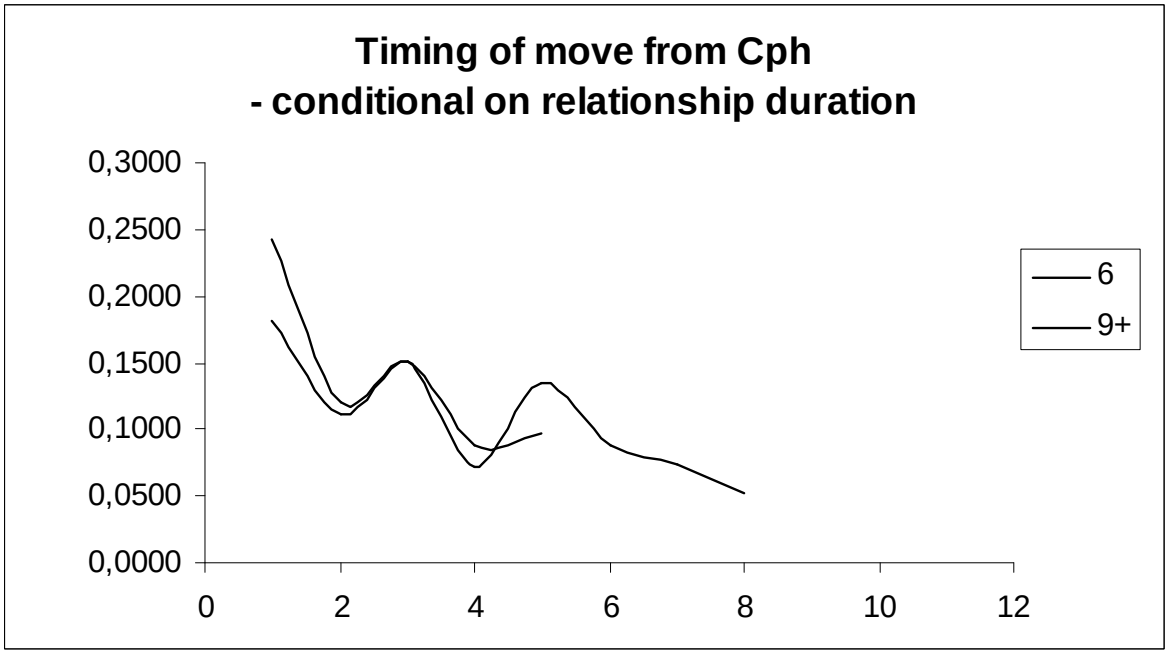

Figure 1: Graphical test of the effect of moving from Copenhagen on the dissolution risk for < 6 yrs and ≥ 9 yrs marriages.

Figure 1 shows that the mobility hazard kicks off at a high level and then drops (with some minor deviations) as the relationship spell develops. Interpreted in the spirit of Abbring & van den Berg (2003,b) this suggest that mobility and dissolution risk is indeed negatively correlated.

In Table 5 we consider the divorce hazard of individuals who got married in the countryside.

Table 5: results for relationships formed outside the city[5]

	Coeff.	S.E.
City	0.2521*	*0.0576*
Home owner	-0.3216*	*0.0291*
Kids 0-6 yrs old	-0.2112*	*0.0250*
Kids 7-17 yrs old	0.1944*	*0.0322*
Married	-1.1354*	*0.0391*
# observations	16646	
Log likelihood	-21979	

Note: * denotes significant different from 0 at the 5% level

Here it is the couples who move to the city that face higher divorce risks. This confirms that there is some kind of association between living in the city and stability of marriages.

5 Robustness

5.1 Interaction of commitment variables

In Table 6 we include cross-terms of the commitment variables.

[5]In addition we condition on a number of other explanatory variables - see Table 8 in appendix for the full set of results.

Table 6: Hazard model for relationships formed in the city[6]

	Coeff.	S.E.
City	0.2822*	*0.0952*
Home owner	-0.4354*	*0.1359*
Kids 0-6 yrs old	-0.4495*	*0.1191*
Kids 7-17 yrs old	0.0211	*0.0813*
Married	-1.0565*	*0.1716*
Cross terms		
City*married	-0.2296	*0.1668*
City*home owner	0.3193*	*0.1426*
City*kids 0-6 years old	-0.0023	*0.1187*
Married*kids 0-6 years old	0.3722*	*0.1172*
Married*home owner	-0.2255	*0.1751*
Kids* home owner	0.2643*	*0.1268*
# observations	3292	
Log likelihood	-898.30	
LR test (H_0 : no cross terms), df=6:	5.12	

Note: * denotes significant different from 0 at the 5% level

In general the likelihood ratio test of the model with interaction terms is rejected against a model without (see Table 3) since the critical value of the χ^2-distribution with 6 degrees of freedom is 12.59 at the 5% level. Also, the results do not suggest that there is much more economic information obtained by allowing for interaction effects.

5.2 City size

We found that married couples who remain in the city are more likely to divorce than the ones who decided to move to the countryside. This is consistent with the commitment hypothesis. The result is strongest for larger cities. When we include more and smaller cities in the city definition we see that the positive effect diminishes. This result is

[6]In addition we condition on a number of other explanatory variables - see table 8 in appendix for the full set of explanatory variables.

consistent with the commitment hypothesis since in order for the commitment to work the decline in outside offers has to be substantial.

Table 7: Hazard model for relationships formed in the city[7]

	Copenhagen		+ Aarhus		+ Odense	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
City	0.3197*	*0.0689*	0.2536*	*0.0601*	0.2392*	*0.0563*
Married	-1.0947*	*0.0822*	-1.1573*	*0.0715*	-1.1339*	*0.0648*
Kids 0-6 yrs old	-0.2455*	*0.0598*	-0.2478*	*0.0502*	-0.2507*	*0.0453*
Kids 7-17 yrs old	0.0155	*0.0810*	0.1066	*0.0685*	0.1149	*0.0598*
Home owner	-0.1764	*0.0711*	-0.2196*	*0.0589*	-0.2517*	*0.0573*
# observations	3292		4636		5521	
Log likelihood	-4377.90		-6061.77		-7243.33	

Note: * denotes significant different from 0 at the 5% level

6 Concluding remarks

In this paper we show that moving to less populated areas reduce risk of divorce. This pattern is consistent with a search model with efficient and less efficient search markets. In addition we confirm that commitment is self-inforcing. An important issues that remians to be tackled is whether more succesfull couples are more likely to leave the city and consequently that the effect we attribute to commitment is driven by other processes. Future research could benefit from data that enables a good test of the hypothesis.

References

[1] Abbring, J. & G. van den Berg (2003, a). "The Non-Parametric Identification of Treatment Effects in Duration Models", *Econometrica, 71, 1491-1517.*

[7] In addition we condition on a number of other explanatory variables - see Table 8 in appendix for the full set of results.

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6.1 Appendix

Table 8: Full set of results for Table 3

	Coeff.	S. E.
Commitment variables		
City	0.3197	*0.0689*
Married	-1.0947	*0.0822*
Home owner	-0.1764	*0.0711*
Kids. 0-6 years old	-0.2455	*0.0598*
Kids. 7-17 years old	0.0155	*0.0810*
Male's education		
Vocational	-0.2071	*0.1000*
Short	-0.1521	*0.1841*
Medium	-0.2113	*0.1461*
Long	-0.2223	*0.1173*
Male more educated	-0.0290	*0.0765*
Same level of education	-0.0805	*0.0696*
Income		
Female income	-0.2446	*0.0788*
Male income	-0.2184	*0.0554*
Age		
Female between 15-20	0.1235	*0.1545*
Female between 21-25	0.1455	*0.1245*
Female between 26-30	-0.0670	*0.1192*
Male between 15-20	0.3150	*0.1609*
Male between 21-25	-0.0315	*0.1318*
Male between 26-30	-0.0497	*0.1201*
Female more than 4 years older	0.3633	*0.1187*
Male more than 4 years older	0.3438	*0.0760*
Sickness and unemployment		
Sickness, female	0.1115	*0.0776*
Sickness, male	-0.0734	*0.0911*
Unemployment degree, female	0.2034	*0.1152*
Unemployment degree, male	0.4578	*0.1117*
Number of observations	3292	
Log-likelihood	-4377.90	