# Does community context have important bearings on the divorce rate?

## A Fixed-Effects Study of Twenty Norwegian First-Marriage Cohorts

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# Does community context have important bearings on the divorce rate?

## A Fixed-Effects Study of Twenty Norwegian First-Marriage Cohorts

**Abstract**

Decisions to divorce could be affected by a number of characteristics of the local community. Community characteristics may be barriers to divorce (e.g. strong social control) or increase the attractiveness of divorcing (e.g. through access to a good remarriage market), but our knowledge of such influences is sparse. This study examines the impact of several community-level factors that may influence a couple's risk of divorce: Socioeconomic conditions, the local marriage market, and the normative climate. Discrete-time hazard models with community-level fixed effects are estimated using a register-based data set of all Norwegian first marriages contracted 1980-2000 that includes longitudinal information on both the community and the couple level. Results show that higher average education, an unbalanced marriage market, and population density drive divorce rates down but that economic conditions do not matter as far as divorce risk is concerned. Estimates obtained from regular models are markedly different from those obtained with the fixed-effects approach.

(150 words)

## INTRODUCTION

We know that a couple's risk of divorce is influenced by a large number of characteristics of the two spouses and their marriage (White 1990), but it is not improbable that the likelihood of divorce is also affected by factors at the community level. In fact, most theoretical arguments invoke characteristics of the local community as a determinant of divorce in some form or another. Our knowledge of such factors, however, is very sparse. Community effects have been found for a wide range of socio-demographic phenomena, such as marriage formation (Lichter, LeClere and McLaughlin 1991; Lloyd and South 1996; South and Crowder 1999), and fertility (Kravdal 2002; Sucoff and Upchurch 1998), but there is only a handful of contributions that have touched upon the potential importance of the community context for marital dissolution patterns (South 2001; South and Lloyd 1995; South, Trent and Shen 2001; Udry 1983). In addition, these few divorce studies have been based on data sets that are quite small or have included few community variables that display less temporal variation.

In this paper we provide a broader analysis of the potential impact of community characteristics on divorce risk, over and beyond that of conventional couple-level determinants of marital dissolution. We will review and clarify theoretical arguments of the effect of community characteristics on divorce risk, and empirically assess effects of several characteristics of the local community that taps into aspects such as local economic conditions, the normative climate, and the marriage market. We use discrete-time hazard models and a very rich register-based data set that cover all first marriages contracted in Norway from 1980 to 1999 linked with annual measurements of characteristics of all Norwegian municipalities over the period 1980-2002. With such detailed data on both the couples and their communities, we can include fixed-effects at the county or municipality

level that provide control for time-invariant unobserved community factors. Such fixed-effects have not been included in any of the earlier studies of community effects on divorce.

## PATHWAYS FROM CONTEXTUAL FACTORS TO COUPLES' DIVORCE RISK

We review several arguments on how features of the local community may affect divorce risk. These arguments are all laid out within the general economic-demographic theory of union formation and dissolution. The general idea of this framework is that spouses try to maximize their expected utility. Prior to marriage, all individuals search a pool of potential mates in order to locate their optimal match. This optimal match is the partner with whom a relationship is believed to yield the highest utility. The utility from the union, often referred to as the gain from marriage, is dependent on both his and her characteristics. The gain from marriage is distributed between the two spouses through negotiations. Due to the arrival of new information or unexpected events, the utility from the union can change over time. When the expected utility decreases below the utility from being single, or the individual encounters an alternative mate with whom a union is more attractive than the current union, a break-up will be considered. Dissolution will take place in those cases where the alternative situation, including the perceived costs of dissolving the current union, is expected to yield higher utility over time. The costs of dissolving the current union can be both social and economic.

An important complicating aspect of this theory is that when one spouse's expected utility from remaining married is so low that a divorce would take place, the partner can negotiate the distribution of the gain from marriage in such a way that the spouse facing a more favorable situation would remain in the marriage (Becker, Landes and Michael 1977, pp. 1144). The prerequisite for this to happen is of course that the partner does not have to give up so much of the share of the gain from marriage that his or her utility also is lower than the expected utility of being single or (potentially) remarried. Although this facet is a crux of

the classic analysis of marital instability (Becker et al. 1977), it is some times ignored in empirical studies of divorce and is particularly relevant for risk factors where the husband's and wife's measurements are inversely related.

*Arguments related to the marriage market*

The likelihood of divorcing is dependent on how easy it is, or is perceived to be, for potential divorcees to find a new partner. This idea is part of the macro-structural opportunity theory of marital dissolution, where the general idea is that a person's chances of meeting a new partner and leaving the current one is contingent on basic social structures, such as the degree of sex segregation in workplaces or the sex composition of populations (South et al. 2001). There might be differences among communities in how easy it is to locate a sufficiently good match, which in terms of the economic-demographic framework are equivalent to the search costs of finding a (new) partner. If the search costs are relatively low in the community, then unhappy spouses should be relatively more willing to divorce and undertake a search for a new partner. One of the findings that are replicated numerous times in the literature, although the evidence in total is mixed, is the higher risk of urbanites compared to couples living in rural areas (Bracher et al. 1993; Kalmijn and Poortman 2006; Lyngstad 2006). Social control is less in larger communities, so the anonymity offered by an urban environment might for example reduce the perceived risk of initiating extramarital affairs or ease any stigma associated with being divorced. Another reason why community size should matter is that high population density and good communications to urban centers to some extent reduces the costs associated with finding a new partner, as the pool of persons in the local area in which a (future) divorcee could search for a new partner is larger. On this background we would also argue that *divorce risk increases with the population density of the community*. However, such effects of place of residence have earlier been obtained without much regard to other

community-related factors, focusing exclusively on regional or on urban/rural differentials in divorce risk. It might well be that these effects are spurious, for example due to a lower concentration of religious individuals in cities. Evidently, a more critical test of this hypothesis is needed.

Characteristics of the local marriage market other than sheer volume might also play a role for divorce risk. It has been suggested that the *relative supply* of spousal alternatives affects the risk of marital dissolution. If for example the husband has more options than his wife for a potential remarriage, he would be more inclined to divorce than her (South et al. 2001; Udry 1983). If a spouse faces a marriage market with numerous alternative partners, or just perceives the likelihood of a remarriage with a new partner as good, the couple's risk of divorce increases. A frequently cited contribution on the importance of spousal alternatives for divorce is the study by South and Lloyd (1995). They estimated the effect of local spousal alternatives, measured by the ratio of available men to available women, on the divorce rate, net of individual-level and some macro-level variables. Their results were that couples living in areas with gender imbalances had a higher propensity to divorce. This line of reasoning might also overstate the disruptive effect of an abundant supply of alternative partners for one of the spouses. They write that "it only takes one tempted, motivated partner to dissolve a marriage", but it is not made explicitly clear in their arguments *why* relative partner supply is supposed to only cause a stronger temptation to divorce for the spouse that experiences a relatively good market, and not an opposite effect that makes the other spouse more willing to make concessions in order to keep the marriage in a good condition (or in theoretical terms: letting the partner get a larger share of the gain from marriage). When measured through sex ratios, a good market for one spouse must trivially imply a bad market for the other spouse, and the net effect is in total indeterminate.

Moreover, it is not trivial to numerically measure the spouses' relative supply of potential partners, and several critical remarks can be made on the definition of spousal alternatives that has been used in earlier studies. For example, a fixed age group is often used to calculate the sex ratio. This means that if spouses age beyond, for example the age of 40, they still are assumed to consider only people in their 20s as potential partners. This is obviously a limitation of the earlier definitions. In our analysis, we will use a slightly more refined and time-varying definition than used in the earlier studies. Of course, in the age of Internet dating services and other means of communication between potential partners, the age-specific sex composition and population density in the local area are not the *only* possible indicators of the availability of alternative partners and costs of finding new partner. Still, social interaction does for the most part take place in communities, and most people meet their partner in settings such as workplaces and schools (South et al. 2001). Given the indeterminate nature of the relationship between marriage market conditions and divorce risk pointed to above, we will not give a specific hypothesis but nevertheless include a slightly refined measure of spousal alternatives in our model.

*Economic conditions in the community might affect divorce rates*

The socioeconomic structure of the community might also affect divorce rates through several mechanisms. One study found that an effect of neighborhood socioeconomic disadvantage could be fully explained by the spouses' own incomes (South 2001). However, no other community-level variables were included and the sample was small and thus included only a miniscule number of divorces.

Couples where the husband is unemployed face higher risks of marital dissolution than couples where the husband have employment, potentially due to increased marital tension because the husband cannot fill the traditional provider-role (Hansen 2005). Aggregate

unemployment in the community might also affect divorce risk through other mechanisms. In a classic "Marienthal" study of community effects of unemployment, it was shown how high unemployment does not only have negative consequences for the unemployed individuals, but also is linked with a retreat from public life, a general attitude of fatalism, lower political interest, and the dissolving of social networks (Jahoda, Lazarsfeld and Zeisel 1933). These phenomena, which could be conceptualized as depreciation of social capital in the community (Astone et al. 1999), would affect not only the unemployed but also the larger community and thus also married couples with an average or good economic foundation. We would therefore expect that a high unemployment rate leads to higher divorce rates, when the spouses' incomes are controlled for.

Similar arguments can be made about how the average income level in the community can affect divorce rates. Theoretical treatments of the potential impact on family structure from living in disadvantaged neighborhoods have suggested that a low general commitment to the family might arise in such areas. Poor areas often display high rates of problem behavior (such as drug abuse), a general attitude of pessimism, lack of investments in infrastructure, and so on. In studies of community effects on health and crime-related outcomes, people who live in economically deprived areas do worse than others all else equal.

However, it is also possible that the economic consequences of divorce might be more severe in affluent communities through e.g. higher prices for housing and other services such as childcare. This could make potential divorcees think twice about leaving their partners, since should the relationship end, at least one of the spouses must find new housing and neither will benefit from the economies of scale of a joint household. If the community is relatively affluent, the residents might also hold higher standards of consumption compared to the standards of people in poorer communities. Economic research has shown that individual income aspirations increase with average income in the community, net of the individuals'

own income (Stutzer 2004). Couples living in high-income areas, possibly holding comparatively higher standards of consumption, might give more weight to negative economic consequences of divorce in evaluations of their current and future situations. Thus, it is difficult to predict a net effect of average income in the community on the divorce rate.

*The multiple roles of aggregate education*

To fully understand the role aggregate education can play it is useful first to extend the reasoning behind the negative effect spouses' own educational attainments have on divorce risk: Education has several components of which one is the generally better economic prospects of individuals with a higher education level. This component is related to the couple's divorce risk through the actual and potential earnings of the wife and the husband (Becker et al. 1977). Another component is thought to be of a non-economic nature and negatively correlated with divorce, when the economic component is controlled for (Lyngstad 2004). Some of the proposed reasons for the advantage in divorce rates enjoyed by highly educated couples are that they might be better at solving marital conflicts, better at estimating the potentially harmful consequences of divorce, or that they are more interesting partners by for example having more knowledge.

In parallel to how individual education has multiple components affecting divorce risk differently, the average level of schooling in the community can affect the divorce rate through both economic and non-economic mechanisms. Arguments for why the average level of education in the community, or its stock of human capital, should matter for divorce follows along the lines of the arguments for economic variables given above. A community with a high level of knowledge and skills might be better to live in for people regardless of their own investments in education, for example through a higher number of high-paying jobs on offer giving people a more optimistic economic outlook than in communities with lower

human capital stocks. According to this idea, a high number of people with long educations in the community should be negatively correlated with divorce risk. Once the economic circumstances in the community are perfectly controlled for, however, this factor should not be relevant. In most empirical analyses the economic controls will not be perfect and effects of aggregate education might therefore pick up this component.

There are several possible non-economic mechanisms linking education with divorce. It is conceivable that a couple with a troubled marriage is more likely to remain married if they are surrounded by couples who do relatively more long-term planning, do not underestimate the consequences of divorce, and have generally have good skills for marital problem-solving. Couples who display such behaviors might serve as role-models or provide information on how to handle marital conflict that otherwise would have generated more strain on the spouses' relationship with divorce as a possible outcome.

Finally, an individual's social context, where day-to-day interaction takes place, can be viewed as his or her "normative climate". Through social control, the approval or disapproval of one's behavior by other people in the community, the normative climate would influence people's marital behavior. An increasing average level of education and widening distribution of education in society is suggested to be an engine driving society towards more secularism, emphasis on personal freedom, and self-realization (Inglehart 1990, 1997). In this line of reasoning, a high proportion of people with higher education in the community might be indicative of a normative climate that is more liberal than communities with a lower proportion of such persons. Moreover, highly educated persons have at least in the past tended to be more accepting of behaviors such as divorcing with young children in the household and same-sex marriages. However, in the United States an education crossover in attitudes towards divorce has recently been demonstrated (Martin and Parashar 2006). For the recent period, there is at least in the U.S. a negative relation between education and acceptance of

divorce for women. If such a development has been taking place also in northern European countries, we could expect that areas with a high proportion of highly educated people represent environments that are less accepting of divorce than others. Couples in such areas would, in order to divorce, require a larger discrepancy between the utility from their current marriage and the expected utility from being single or remarried, and thus have a lower divorce rate.

*Christianity and divorce*

Support for Christian ideas and values are very likely to affect family behaviors such as divorce. The most obvious effect is of course the influence on decisions to get married, have children, or divorce on individuals that adhere to these ideas themselves. Religious persons will make choices in line with Christian teachings, and hence have a lower rate of divorce. For example, religious participation and adherence to traditional beliefs and practices have historically been higher in the western and southern regions of Norway than in the rest of the country. The same regions also display more traditional demographic behavior, with lower rates of cohabitation and out-of-wedlock fertility. We expect the level of religiousness in a community to be negatively associated with divorce rates in this community.

*Potential imitation effects*

A nearly trivial argument, also related to social control and the normative climate, is the potential importance of social diffusion of divorce: If divorce is common in the local community, and thus many people have recently divorced or are divorcing, social control is likely to be weaker than it is in communities where divorces are uncommon. Moreover, if many other couples in the area have divorced, their experiences may serve as examples for others with unsatisfactory marriages and provide information on how to handle the divorce

process. It might seem intuitive to model such "imitation effects" by including aggregate measures of the dependent variable in the model, and this approach was taken in a model of divorce in Swedish workplaces (Åberg 2003). However, this type of modeling can produce biased results for other contextual variables (Kravdal 2003). We will thus ignore this aspect in our analysis.

## DATA AND METHODS

### *Data*

The data were obtained from Norwegian administrative registers. A system of universal ID numbers in Norway facilitates linking of data. First, basic demographic data on marriages are generated from time series of individuals' marital status. Then data from various registers are used to add time series of individual-level characteristics of the spouses to the data set. Finally, data on the community context is linked to the couple data. Administrative register data allow us to avoid problems with high panel attrition and non-response rates that often plague sample surveys. Moreover, most surveys have too small samples to do detailed studies of divorce risk patterns.

The final data set includes all Norwegian first marriages contracted from 1980 to 1999. The couples are followed until the end of 2002. Time series of educational attainment and activity, annual income, and municipality of residence are available for both of the two spouses during the whole period (although there is a gap for educational attainment and activity for the years 1983 and 1984). In addition, there are fertility histories for each spouse with information on every child born to the spouse (also if the child is born outside if the current marriage). Municipality of residence defines the couple's local community. As the data include an annual measurement of the spouses' municipality of residence, we can follow the couple even when they move between municipalities.

The community-level variables are taken partly from the Norwegian Social Science Data Services' Municipality Database, and partly aggregated up from register-based individual-level data files. This implies that we have annual measurements of all but one of the community-level variables. The final variable, support for Christian political parties, is measured at four-year intervals.

*Statistical model*

Discrete-time hazard models are estimated (Allison 1995). This method implies that each marriage record in the data set is split up into a number of observations of marriage-years. A couple observed for ten years would thus contribute ten marriage-years to the data set. If a divorce takes place in year *t*, then the dependent variable is set to one for the corresponding marriage-year, otherwise it is zero. After divorce, out-migration, or any spousal death, the marriage is censored. Other time units than calendar years could be used, but an annual step is reasonable and practical in this analysis. Only the marriage-years that have valid information on municipality of residence are included in the analysis. The marriage-years are spread out over 434 communities, which in turn are clustered in 19 counties, and are input to a logistic regression model for the analysis.

When data are organized in hierarchical structures, multilevel methods should be employed as ignoring such structures may lead to incorrect conclusions (Goldstein 2003). There are several possible ways of accommodating the hierarchical data structure. We take the powerful fixed-effects approach where a large set of dummy variables is included in the model. Each dummy variable represents a cluster, and captures the time-constant features of this cluster of marriage-years. We include fixed-effects at the county or the municipality level in the estimation. This approach requires all the included community variables to be time-

variant, but it has the important advantage that the unobserved factors captured by the fixed-effects dummies can be correlated with the observed community factors.

Another option, often called random effects models, is to include an unobserved variable (i.e. a residual), with an assumed distribution, that takes identical values for all observations in the same cluster. This approach requires that the unobservable variable is uncorrelated with the included macro-level variables, an assumption which is not often met. Moreover, when one has a large number of observations in each cluster, successful estimation of random effects models can be technically problematic. For example, the software package aML fails to properly estimate models with this data set, as some large clusters (such as Oslo, the capital municipality and other urban municipalities) contain so many observations that the likelihood function underflows to zero [1].

*Couple-level variables*

All couple-level variables are measured for both spouses. Marriage duration, marriage cohort, educational attainment, educational activity, the couple's annual incomes, their parity and age of their youngest child, and spouses' family structure are all measured by categorical variables. *Annual income* is measured in inflation-adjusted Norwegian Kroner. Only labor income is included in this measure, so capital incomes or public transfers are not counted as income. A different categorization is used for men and women because of women's generally lower labor income due to much part-time work or spells of maternity leave. *Educational attainment* is grouped in four levels: primary, secondary, college level, postgraduate level. As no homogamy effects have been found in other Scandinavian studies (Jalovaara 2003; Lyngstad 2004), no interaction or combination effect is included. The variables are time-varying and updated annually (with exception of 1983 and 1984). *Educational activity* is measured by a time-varying dummy variable. Educational activity might lead to low labor

incomes, but also to access to a large pool of potential partners. For some spouses, it might also represent a preparation for single life in the case of divorce as an investment in more human capital can alleviate economic problems after divorce. *Parity and age of youngest child* is grouped into ten categories, with childless as the baseline. For parities one, two, and three or more, there are three categories of ages: child is less than one year, from one to six years old, and seven years or older. The variables measuring *spouses' family structures* are categorized as follows: Intact family, non-intact family due to parental death, non-intact family due to divorce. Indeterminate cases constitute a separate category. In addition to these control variables, period effects are captured by a set of one-year dummy variables

*Community-level variables*

All community-level variables are computed for each municipality. In the county-level fixed-effect models, there will be several municipalities, all with potentially different measurements of the community-level variables.

*Population density* is included as a continuous variable. Clearly, using only population density is a crude measure for capturing the urban/rural dimensions as some communities might have large unsettled areas driving the population density down whereas the population in reality is concentrated in a few larger, high-density settlements. However, any classification would potentially contain equally important sources of bias. With the chosen definition, we also benefit from having an essentially time-varying variable that can be included in fixed-effect models.

*Marriage market conditions* are measured by the deviation from the sex ratio of the local population in two specific age ranges. South and Lloyd (1995) measured the supply of alternative partners by the sex ratio of individuals in ages 20-30. This measure was used for all couples at all marital durations. However, it is likely that, as individuals age, their

preferred age of an alternative partner also increases. Assuming that spouses in e.g. their 40s are more likely to perceive as alternatives persons of their own age rather than persons in their 20s, we will include only persons that are of about the same age as the spouses themselves. As it is commonplace that the husband is slightly older than the wife, we also stagger the age ranges slightly in order to take age norms into account. The husband's alternatives are defined as women in an age range of somewhat younger than him up to just older than him (-10 to +5). The wife's alternatives are defined as men in an age range slightly younger than her up to somewhat older than her (from -5 to +10). Although all assumptions about age preferences will be arbitrary to some extent, we assume that ignoring age norms and preferences for partners would constitute a graver error. South and Lloyd (1995) required persons to be single to present a suitable alternative. We assume that in a highly dynamic family system with high levels of union disruption even *married* individuals may be considered alternative partners. We will thus use the sex ratio of *all* individuals, regardless of marital status, in the two age ranges as our measure of spousal alternatives. The partner supply might affect men and women differently, as several other characteristics do (Kalmijn and Poortman 2006). In accordance with South and Lloyd (1995), we allow for a curvilinear relationship between spousal alternatives and divorce risk.

*The proportion voting for Christian parties* measures the level of support for Christian ideas and values. The variable is constructed using the results from the last parliamentary election, which are held every four years in Norway. The average level of support is 12.1 per cent. The standard deviation is 6.72. This is the only variable that is excluded due to the restriction of having only time-variant community-level variables in fixed-effects models. The reason is that it is only measured every fourth year. Ideally, we would use a measure of religious participation in churches or congregations, but this is not available. An alternative would be to use a moving average time-series of electoral support for the Christian parties,

but the time period is too short for this approach. *Average labor income* in the municipality is measured in 1000s of inflation-adjusted NOK with 1980 as the baseline year. As only labor income of persons aged 16-66 is included, pensions and capital income does not contribute to the average. The mean value of this variable is 66.3, and it has a standard deviation of 12.9. *The unemployment rate* is only measured for men, and defined as the proportion of registered unemployed men to the number of men aged 16-67 in the municipality. The mean value is 2.53 per cent, with a standard deviation of 1.51. *Aggregate education* is defined as the proportion of persons with *some* tertiary education in a given calendar year. All individuals in the municipality who are older than 19 years of age are included in the denominator. The mean value is 19.73 per cent, with a standard deviation of 8.1. Table 1 lists distributions, calculated on the basis of *all* marriage-year observations, of all couple-level variables.

TABLE 1 ABOUT HERE

**RESULTS AND DISCUSSION**

Three models are estimated. All models include all couple-level variables, duration of marriage, and period effects. In the first model, all community-level variables are included and no fixed-effects are included at either level. In the second model, we introduce fixed-effects at the county level (i.e. dummy variables for each county). Apart from the capital Oslo, which is both a county and a municipality, every county includes a cluster of municipalities. Model 3 includes fixed-effects at the municipality level. In both fixed-effects models, all community-level variables must be time-variant to be properly estimated. Table 2 shows all parameter estimates and associated standard errors from all models.

TABLE 2 ABOUT HERE

*Results for community-level variables (model 1)*

From model 1, which does not include any fixed-effect controls, we find strong and measurable influences from the included community variables on couples' risk of divorce in Norway: The level of support for Christian parties reduces divorce risk, and the proportion of highly educated people in the community and a high unemployment rate for men drives divorce risk up.

Contrary to what has been found in earlier studies, an imbalanced remarriage market does not increase divorce risk. According to this model large deviations in the sex ratio are associated with lower risks of divorce, and particularly so if the remarriage market favors men, i.e. if there are few men per woman in the appropriate age groups. As argued above, the effect of this variable is theoretically indeterminate. It is clear from these results that it is not the effect of a "tempted spouse" with a good outlook for remarriage that dominates the effect in Norway, but rather the opposite effect where divorce risk declines in situations where one of the spouses face a very favorable and the other spouse face a very unfavorable pool of potential partners.

*Results from model 2 (county fixed-effects)*

When county-level fixed effects are included in model 2, the estimates change substantially. Model 2 differs from model 1 in that the effect of the Christian vote is slightly reduced, but still important and statistically significant. A problem arises with accurate interpreting of this result, as we do not have couple-level religiosity included in the model. In a community with strong beliefs and support for Christian ideas, it is of course more likely that the married couples living in this community are also practitioners of such beliefs.

Aggregate education does still have a small positive effect on the divorce rate, but is no longer significant. The same goes for the male unemployment rate, which is reduced in size and not measurably different from zero. The effect of imbalanced marriage markets is similar to what we found in model 1. Although the parameter estimates change slightly, and the curve has a slightly different minimum, the effect is essentially the same.

Two community effects turn up in model 2 that were absent in model 1: Both population density and average income have significant positive effects on divorce risk, although population density seems to play a very minor role in the large picture. The effect of income is not trivial, however. A change of one standard deviation in average income leads to nearly a 10 % higher odds of divorce for couples living in the richer municipalities.

*Results from model 3 (community fixed-effects)*

Model 3 includes community-level fixed-effects and provides the most accurate control for unobserved time-constant factors at the community-level. Again, the parameters for the sex ratio of alternative partners are significant and of approximately the same magnitude as in the other models.

When municipality-level fixed-effects are included, aggregate education again shows up as a significant predictor of divorce. However, in this model the estimate is negative and quite strong. This lends support to two of the theoretical ideas presented above. One mechanism is a parallel to Becker's ideas on how the non-economic component of education affects divorce: Divorce rates are reduced for couples living in communities with high levels of aggregate education because the spouses' social networks might contain people with more knowledge and skills. These factors can in turn be relevant for solving marital problems, increasing the spouses' awareness of negative consequences of divorce, and make the spouses consider their marriage in a long-term rather than in short-term perspective in the face of a

relationship crisis. It could also be that a normative mechanism is in play. The educational crossover effect that Martin and Parashar (2006) point to in an analysis of educational gradients in attitudes towards divorce may also manifest itself at the level of the community: When there are many highly educated people around, and these people hold restrictive attitudes towards divorce, it will take more for unhappy spouses to leave their partners. However, any economic factors that are not captured by the community's unemployment rate and average income might also play some role.

When one compares the magnitude of the estimates for community effects from model 3 and the corresponding estimates of couple-level variables, it can be tempting to conclude that community effects are not that important for divorce decisions. Such temptations should be resisted. The change in relative odds of divorce from a shift in average education and population density by one standard deviation lies around ¾ of the reference community (with mean values on the community effects). These effects are comparable with commonly found effects of variables at the individual level. Effects of imbalanced marriage markets are generally small, although at extreme sex ratios the relative odds of divorce starts to decline rapidly. The curvilinear relationship reaches its maximum at a sex ratio of 108. In models 1 and 2 the corresponding figures were 103 and 104.

*Fixed-effects estimates*

Ranked by size, the fixed-effects estimates from model 3 show a very familiar pattern (estimates not shown in tables): It is the southwestern region that generally displays the lowest divorce risk, net of all included community-factors. Rural areas in the southeast and central regions, however, do also have low divorce rates. Fixed-effects for urban communities are mostly positive, indicating higher risks of divorce, so there seems to be some time-constant factor, unrelated to population density, which produces the urban/rural difference

demonstrated quite often in the literature. One possible explanation is that urban areas are "liberalized environments" where acceptance of divorce is high and that this phenomenon is not captured by the included community-level variables in the fixed-effect models.

*Results for control variables*

All the couple-level variables included in the model conform to recently published results on divorce determinants in the Nordic countries: We find negative effects of both spouses' ages at marriage, educational attainments, and the number and age of any children the couple has. Any parental divorce, educational activity, and wife's income are positively related to the divorce risk. The duration pattern reaches its peak around the 6$^{th}$ year of marriage and shows some subsequent decline, while there is a monotonic increase in divorce risk over the period as a whole.

## CONCLUSIONS AND POINTERS TO FURTHER RESEARCH

This study has shown that there is substantial variation in divorce risk between different community contexts. The level of support for Christian political parties, which is our available measure or religious activity and beliefs in the community, has a strong, negative effect on the divorce rate as stated by our theoretical predictions. Although this variable cannot be included in the model with municipality-level fixed-effects, it does show up in both the ordinary model and the model with county fixed-effects, which suggests it plays an important role.

Population density is negatively related to divorce risk. The earlier studies that have shown urban areas to have the highest divorce rates have never included many other community-level variables, so a more critical view on this assertion is now warranted.

A low level of aggregate education in the municipality is in the best model shown to be a strong predictor of divorce. The interpretation of this effect is not unambiguous, as the mechanisms at work may be either attitudinal, economic, or both. The finding corresponds with the strong negative effects found for the spouses' individual educations, suggesting that it might be the same forces that are behind both effects. Although there are controls included for the economic conditions in the community, these controls may not pick up all the contributions from variation in such conditions.

The unemployment rate for men and the average income in the municipality fail to consistently show up in the models as important covariates of divorce risk. These results accord with earlier findings where living in an economically disadvantaged neighborhood did not affect U.S. divorce rates, net of individual-level socioeconomic variables (South 2001).

Moreover, the impact of community characteristics is demonstrated to be substantial and of magnitude comparable to that of well-known predictors of divorce. Thus, studies should be designed so that one can separate the contributions of couple-level characteristics and their corresponding community-level characteristics. For this study, a particular problem remains in that we do not have couple-level controls for religiosity and unemployment (although a very low labor income would capture parts of this bias). It is also clear from the results presented in this study that estimates of community effects in divorce rate models are very sensitive to inclusion of fixed-effects controls for unobserved characteristics of the communities. Models with fixed-effects display markedly different results, and this leads us to the conclusion that such community fixed-effects should be included in future studies whenever possible.

**NOTES**

[1]

In other words, the current computer architecture and associated software cannot calculate with numbers that are as small as the likelihood function becomes in this estimation. Similar and additional problems appear also with other software packages such as MLwiN and SAS when estimating random effect models on data sets as large as this. An iterative approach was tested with aML where for every iteration, small parts of the data were added to a sample, but this attempt also ended in numerical underflow.

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**Table 1. Distributions of couple-level variables**

| Variable | Category | Proportion | Variable | Category | Proportion |
|---|---|---|---|---|---|
| Duration | 1 | 9 % | Wife's annual | Less than 25K | 28 % |
| | 2 | 9 % | income | 25-50K | 20 % |
| | 3 | 9 % | | 50-100K | 43 % |
| | 4 | 8 % | | 100-150K | 7 % |
| | 5-7 | 21 % | | 150K+ | 1 % |
| | 8-10 | 16 % | Husband's family | Intact family | 78 % |
| | 11-14 | 16 % | structure | Parental death | 4 % |
| | 15+ | 13 % | | Parental divorce | 5 % |
| Husband's age | Up to 24 | 28 % | | Indeterminate | 13 % |
| at marriage | 25-29 | 44 % | Wife's family | Intact family | 75 % |
| | 30-34 | 18 % | structure | Parental death | 4 % |
| | 35+ | 9 % | | Parental divorce | 6 % |
| Wife's age at | Up to 24 | 52 % | | Indeterminate | 15 % |
| marriage | 25-29 | 33 % | Husband's school | No | 95 % |
| | 30-34 | 9 % | enrolment | Yes | 5 % |
| | 35+ | 5 % | Wife's school | No | 94 % |
| Husband's | Up to primary | 12 % | enrolment | Yes | 6 % |
| education | Secondary | 59 % | Parity and age of | Childless | 27 % |
| | College level | 21 % | youngest child | 1, 0 years | 6 % |
| | Postgraduate | 8 % | | 1, 1-6 years | 15 % |
| | Missing | 1 % | | 1, 7+ years | 3 % |
| Wife's | Up to primary | 10 % | | 2, 0 years | 5 % |
| education | Secondary | 60 % | | 2, 1-6 years | 21 % |
| | College level | 26 % | | 2, 7+ years | 8 % |
| | Postgraduate | 3 % | | 3+, 0 years | 3 % |
| | Missing | 1 % | | 3+, 1-6 years | 10 % |
| Husband's | Less than 50K | 12 % | | 3+, 7+ years | 3 % |
| annual income | 50K-100K | 40 % | | | |
| | 100K-150K | 34 % | | | |
| | 150-200K | 9 % | | Marriage-years | 3242904 |
| | 200K+ | 5 % | | | |

**Table 2. Results for discrete-time hazard regression models**

| | | Model 1 | | | Model 2 | | | Model 3 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Variable | Category | Beta | | s.e. | Beta | | s.e. | Beta | | s.e. |
| Intercept | | -8,46 | *** | 0,44 | -8,83 | *** | 0,45 | -8,31 | *** | 0,49 |
| Duration | 1 | -4,98 | *** | 0,13 | -4,98 | *** | 0,13 | -4,99 | *** | 0,13 |
| | 2 | -1,53 | *** | 0,03 | -1,53 | *** | 0,03 | -1,53 | *** | 0,03 |
| | 3 | -0,44 | *** | 0,02 | -0,44 | *** | 0,02 | -0,44 | *** | 0,02 |
| | 4 | -0,13 | *** | 0,02 | -0,13 | *** | 0,02 | -0,13 | *** | 0,02 |
| | 5-7 | | | | | | | | | |
| | 8-10 | -0,06 | *** | 0,01 | -0,06 | *** | 0,01 | -0,06 | *** | 0,01 |
| | 11-14 | -0,26 | *** | 0,02 | -0,26 | *** | 0,02 | -0,25 | *** | 0,02 |
| | 15+ | -0,58 | *** | 0,02 | -0,58 | *** | 0,02 | -0,57 | *** | 0,02 |
| Husband's age at marriage | Up to 24 | 0,14 | *** | 0,01 | 0,14 | *** | 0,01 | 0,13 | *** | 0,01 |
| | 25-29 | | | | | | | | | |
| | 30-34 | -0,03 | * | 0,01 | -0,03 | * | 0,01 | -0,02 | | 0,01 |
| | 35+ | -0,10 | *** | 0,03 | -0,09 | ** | 0,03 | -0,07 | ** | 0,03 |
| Wife's at age marriage | Up to 24 | 0,35 | *** | 0,01 | 0,35 | *** | 0,01 | 0,35 | *** | 0,01 |
| | 25-29 | | | | | | | | | |
| | 30-34 | -0,29 | *** | 0,02 | -0,29 | *** | 0,02 | -0,29 | *** | 0,02 |
| | 35+ | -0,92 | *** | 0,04 | -0,91 | *** | 0,04 | -0,91 | *** | 0,04 |
| Husband's education | Primary | 0,20 | *** | 0,01 | 0,20 | *** | 0,01 | 0,21 | *** | 0,01 |
| | Secondary | | | | | | | | | |
| | College | -0,28 | *** | 0,01 | -0,29 | *** | 0,01 | -0,29 | *** | 0,01 |
| | Graduate | -0,42 | *** | 0,02 | -0,42 | *** | 0,02 | -0,42 | *** | 0,02 |
| | Missing | 0,31 | *** | 0,05 | 0,31 | *** | 0,05 | 0,31 | *** | 0,05 |
| Wife's Education | Primary | 0,28 | *** | 0,01 | 0,27 | *** | 0,01 | 0,27 | *** | 0,01 |
| | Secondary | | | | | | | | | |
| | College | -0,31 | *** | 0,01 | -0,31 | *** | 0,01 | -0,31 | *** | 0,01 |
| | Graduate | -0,38 | *** | 0,04 | -0,38 | *** | 0,04 | -0,37 | *** | 0,04 |
| | Missing | 0,39 | *** | 0,06 | 0,38 | *** | 0,06 | 0,38 | *** | 0,06 |

*continued on next page*

| *continued from last page* | | Beta | | s.e. | Beta | | s.e. | Beta | | s.e. |
|---|---|---|---|---|---|---|---|---|---|---|
| Husband's | Up to 50K | 0,41 | *** | 0,01 | 0,42 | *** | 0,01 | 0,43 | *** | 0,02 |
| income | 50K-100K | 0,08 | *** | 0,01 | 0,08 | *** | 0,01 | 0,09 | *** | 0,01 |
| | 100K-150K | | | | | | | | | |
| | 150-200K | 0,00 | | 0,02 | 0,00 | | 0,02 | 0,01 | | 0,02 |
| | 200K+ | 0,06 | * | 0,02 | 0,06 | * | 0,02 | 0,08 | ** | 0,02 |
| Wife's | Up to 25K | -0,45 | *** | 0,02 | -0,45 | *** | 0,02 | -0,45 | *** | 0,02 |
| income | 25-50K | -0,56 | *** | 0,02 | -0,56 | *** | 0,02 | -0,56 | *** | 0,02 |
| | 50-100K | -0,40 | *** | 0,02 | -0,40 | *** | 0,02 | -0,41 | *** | 0,02 |
| | 100-150K | | | | | | | | | |
| | 150K+ | 0,09 | * | 0,04 | 0,09 | * | 0,04 | 0,11 | ** | 0,04 |
| Husband's | Intact family | | | | | | | | | |
| family | Parental death | 0,03 | | 0,02 | 0,03 | | 0,02 | 0,03 | | 0,02 |
| structure | Parental divorce | 0,41 | *** | 0,02 | 0,40 | *** | 0,02 | 0,39 | *** | 0,02 |
| | Indeterminate | 0,18 | *** | 0,01 | 0,18 | *** | 0,01 | 0,17 | *** | 0,01 |
| Wife’s | Intact family | | | | | | | | | |
| family | Parental death | 0,04 | | 0,02 | 0,04 | | 0,02 | 0,04 | | 0,02 |
| structure | Parental divorce | 0,57 | *** | 0,01 | 0,56 | *** | 0,01 | 0,55 | *** | 0,01 |
| | Indeterminate | 0,28 | *** | 0,01 | 0,28 | *** | 0,01 | 0,28 | *** | 0,01 |
| Husband's | No | | | | | | | | | |
| enrolment | Yes | -0,01 | | 0,02 | -0,01 | | 0,02 | -0,02 | | 0,02 |
| Wife's | No | | | | | | | | | |
| enrolment | Yes | 0,46 | *** | 0,02 | 0,46 | *** | 0,02 | 0,45 | *** | 0,02 |
| Parity and | Childless | | | | | | | | | |
| age of | 1, 0 years | -1,58 | *** | 0,04 | -1,57 | *** | 0,04 | -1,57 | *** | 0,04 |
| youngest | 1, 1-6 years | -0,34 | *** | 0,01 | -0,34 | *** | 0,01 | -0,34 | *** | 0,01 |
| child | 1, 7+ years | 0,02 | | 0,02 | 0,02 | | 0,02 | 0,03 | | 0,02 |
| | 2, 0 years | -1,65 | *** | 0,03 | -1,64 | *** | 0,03 | -1,64 | *** | 0,03 |
| | 2, 1-6 years | -0,59 | *** | 0,01 | -0,58 | *** | 0,01 | -0,58 | *** | 0,01 |
| | 2, 7+ years | -0,34 | *** | 0,02 | -0,33 | *** | 0,02 | -0,32 | *** | 0,02 |
| | 3+, 0 years | -2,03 | *** | 0,06 | -2,02 | *** | 0,06 | -2,01 | *** | 0,06 |
| | 3+, 1-6 years | -0,82 | *** | 0,02 | -0,81 | *** | 0,02 | -0,80 | *** | 0,02 |
| | 3+, 7+ years | -0,40 | *** | 0,03 | -0,38 | *** | 0,03 | -0,38 | *** | 0,03 |

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| | Beta | s.e. | Beta | s.e. | Beta | s.e. |
|---|---|---|---|---|---|---|
| Support for christian parties | -0,0208*** | 0,0009 | -0,016*** | 0,0016 | | N/A |
| Population density | 0,0000 | 0,0000 | 0,0001** | 0,0000 | -0,0008* | 0,0004 |
| Alternative sex ratio | 0,0990*** | 0,0082 | 0,1023*** | 0,0084 | 0,0973*** | 0,0088 |
| Alt. sex ratio squared | -0,0005*** | 0,0000 | -0,0005*** | 0,0000 | -0,0005*** | 0,0000 |
| Prop. with higher education | 0,0054*** | 0,0013 | -0,0003 | 0,0015 | -0,0335*** | 0,0063 |
| Mean income | 0,0010 | 0,0010 | 0,0063*** | 0,0015 | 0,0044 | 0,0029 |
| Unemploymentrate | 0,0165** | 0,0050 | 0,0095 | 0,0056 | -0,0088 | 0,0072 |